

Texinfo

The GNU Documentation Format
for Texinfo version 6.5, 25 August 2017

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This manual is for GNU Texinfo (version 6.5, 25 August 2017), a documentation system that can produce both online information and a printed manual from a single source using semantic markup.

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Published by the Free Software Foundation
51 Franklin St, Fifth Floor
Boston, MA 02110-1301
USA
ISBN 1-882114-67-1

Cover art by Etienne Suvasa.

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Documentation is like sex: when it is good, it is very, very good; and when it is bad, it is better than nothing. —Dick Brandon

Texinfo Copying Conditions

GNU Texinfo is *free software*; this means that everyone is free to use it and free to re-distribute it on certain conditions. Texinfo is not in the public domain; it is copyrighted and there are restrictions on its distribution, but these restrictions are designed to permit everything that a good cooperating citizen would want to do. What is not allowed is to try to prevent others from further sharing any version of Texinfo that they might get from you.

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The precise conditions of the licenses for the programs currently being distributed that relate to Texinfo are found in the General Public Licenses that accompany them. This manual is covered by the GNU Free Documentation License (see Appendix H [GNU Free Documentation License], page 289).

1 Overview of Texinfo

Texinfo is a documentation system that uses a single source file to produce both online information and printed output. This means that instead of writing several different documents, one for each output format, you need only write one document.

Using Texinfo, you can create a printed document (via the \TeX typesetting system) in PDF or PostScript format, including chapters, sections, cross-references, and indices. From the same Texinfo source file, you can create an HTML output file suitable for use with a web browser, you can create an Info file with special features to make browsing documentation easy, and also create a Docbook file or a transliteration to XML format.

A Texinfo source file is a plain text file containing text interspersed with *@-commands* (words preceded by an '@') that tell the Texinfo processors what to do. Texinfo's markup commands are almost entirely *semantic*; that is, they specify the intended meaning of text in the document, rather than physical formatting instructions. You can edit a Texinfo file with any text editor, but it is especially convenient to use GNU Emacs since that editor has a special mode, called Texinfo mode, that provides various Texinfo-related features. (See Appendix D [Texinfo Mode], page 258.)

Texinfo was devised specifically for the purpose of writing software documentation and manuals. If you want to write a good manual for your program, Texinfo has many features which we hope will make your job easier. However, it provides almost no commands for controlling the final formatting. Texinfo is not intended to be a general-purpose formatting program, so if you need to lay out a newspaper, devise a glossy magazine ad, or follow the exact formatting requirements of a publishing house, Texinfo may not be the simplest tool.

Spell "Texinfo" with a capital "T" and the other letters in lowercase. The first syllable of "Texinfo" is pronounced like "speck", not "hex". This odd pronunciation is derived from the pronunciation of \TeX . Pronounce \TeX as if the 'X' were the last sound in the name 'Bach'. In the word \TeX , the 'X' is, rather than the English letter "ex", actually the Greek letter "chi".

Texinfo is the official documentation format of the GNU project. More information, including manuals for GNU packages, is available at the GNU documentation web page (<http://www.gnu.org/doc/>).

1.1 Reporting Bugs

We welcome bug reports and suggestions for any aspect of the Texinfo system: programs, documentation, installation, etc. Please email them to bug-texinfo@gnu.org. You can get the latest version of Texinfo via its home page, <http://www.gnu.org/software/texinfo>.

For bug reports, please include enough information for the maintainers to reproduce the problem. Generally speaking, that means:

- The version number of Texinfo and the program(s) or manual(s) involved.
- The contents of any input files necessary to reproduce the bug.
- Precisely how you ran any program(s) involved.
- A description of the problem and samples of any erroneous output.
- Hardware and operating system names and versions.

- Anything else that you think would be helpful.

When in doubt whether something is needed or not, include it. It's better to include too much than to leave out something important.

It is critical to send an actual input file that reproduces the problem. What's not critical is to “narrow down” the example to the smallest possible input—the actual input with which you discovered the bug will suffice. (Of course, if you do do experiments, the smaller the input file, the better.)

Patches are most welcome; if possible, please make them with ‘`diff -c`’ (see *Comparing and Merging Files*) and include `ChangeLog` entries (see Section “Change Log” in *The GNU Emacs Manual*), and follow the existing coding style.

1.2 Output Formats

Here is a brief overview of the output formats currently supported by Texinfo.

- | | |
|------------|---|
| Info | (Generated via <code>makeinfo</code> .) Info format is mostly a plain text transliteration of the Texinfo source. It adds a few control characters to provide navigational information for cross-references, indices, and so on. The Emacs Info subsystem (see <i>Info</i>), and the standalone <code>info</code> program (see <i>GNU Info</i>), among others, can read these files. See Section 1.3 [Info Files], page 5, and Chapter 21 [Creating and Installing Info Files], page 201. |
| Plain text | (Generated via <code>makeinfo --plaintext</code> .) This is almost the same as Info output with the navigational control characters are omitted. |
| HTML | (Generated via <code>makeinfo --html</code> .) HTML, standing for Hyper Text Markup Language, has become the most commonly used language for writing documents on the World Wide Web. Web browsers, such as Mozilla, Lynx, and Emacs-W3, can render this language online. There are many versions of HTML, both different standards and browser-specific variations. <code>makeinfo</code> tries to use a subset of the language that can be interpreted by any common browser, intentionally not using many newer or less widely-supported tags. Although the native output is thus rather plain, it can be customized at various levels, if desired. For details of the HTML language and much related information, see http://www.w3.org/MarkUp/ . See Chapter 22 [Generating HTML], page 211. |
| DVI | (Generated via <code>texi2dvi</code> .) The DeVIce Independent binary format is output by the T _E X typesetting program (http://tug.org). This is then read by a DVI ‘driver’, which knows the actual device-specific commands that can be viewed or printed, notably <code>Dvips</code> for translation to PostScript (see <i>Dvips</i>) and <code>Xdvi</code> for viewing on an X display (http://sourceforge.net/projects/xdvi/). See Chapter 19 [Hardcopy], page 163. (Be aware that the Texinfo language is very different from and much stricter than T _E X’s usual languages: plain T _E X, L ^A T _E X, ConT _E Xt, etc.) |
| PostScript | (Generated via <code>texi2dvi --ps</code> .) PostScript is a page description language that became widely used around 1985 and is still used today. http://en.wikipedia.org/wiki/PostScript gives a basic description and more preferences. By default, Texinfo uses the <code>dvips</code> program to convert T _E X’s DVI output to PostScript. See <i>Dvips</i> . |

- PDF** (Generated via `texi2dvi --pdf` or `texi2pdf`.) This format was developed by Adobe Systems for portable document interchange, based on their previous PostScript language. It can represent the exact appearance of a document, including fonts and graphics, and supporting arbitrary scaling. It is intended to be platform-independent and easily viewable, among other design goals; http://en.wikipedia.org/wiki/Portable_Document_Format and <http://tug.org/TUGboat/tb22-3/tb72beebe-pdf.pdf> have some background. By default, Texinfo uses the `pdftex` program, an extension of \TeX , to output PDF; see <http://tug.org/applications/pdftex>. See Section 19.15 [PDF Output], page 174.
- Docbook** (Generated via `makeinfo --docbook`.) This is an XML-based format developed some years ago, primarily for technical documentation. It therefore bears some resemblance, in broad outline, to Texinfo. See <http://www.docbook.org>. Various converters from Docbook to Texinfo have also been developed; see the Texinfo web pages.
- XML** (Generated via `makeinfo --xml`.) XML is a generic syntax specification usable for any sort of content (a reference is at <http://www.w3.org/XML>). The `makeinfo` XML output, unlike all the other output formats, is a transliteration of the Texinfo source rather than processed output. That is, it translates the Texinfo markup commands into XML syntax, for further processing by XML tools. The XML contains enough information to recreate the original content, except for syntactic constructs such as Texinfo macros and conditionals. The Texinfo source distribution includes a utility script `txixml2texi` to do that backward transformation.
- The details of the output syntax are defined in an XML DTD as usual, which is contained in a file `texinfo.dtd` included in the Texinfo source distribution and available via the Texinfo web pages. Texinfo XML files, and XML files in general, cannot be viewed in typical web browsers; they won't follow the DTD reference and as a result will simply report a (misleading) syntax error.

1.3 Info Files

As mentioned above, Info format is mostly a plain text transliteration of the Texinfo source, with the addition of a few control characters to separate nodes and provide navigational information, so that Info-reading programs can operate on it.

Info files are nearly always created by processing a Texinfo source document. `makeinfo`, also known as `texi2any`, is the principal command that converts a Texinfo file into an Info file; see Chapter 20 [Generic Translator `texi2any`], page 176.

Generally, you enter an Info file through a node that by convention is named ‘Top’. This node normally contains just a brief summary of the file’s purpose, and a large menu through which the rest of the file is reached. From this node, you can either traverse the file systematically by going from node to node, or you can go to a specific node listed in the main menu, or you can search the index menus and then go directly to the node that has the information you want. Alternatively, with the standalone Info program, you can specify specific menu items on the command line (see *Info*).

If you want to read through an Info file in sequence, as if it were a printed manual, you can hit `SPC` repeatedly, or you get the whole file with the advanced Info command `g *`. (See Section “Advanced Info commands” in *Info*.)

The `dir` file in the `info` directory serves as the departure point for the whole Info system. From it, you can reach the ‘Top’ nodes of each of the documents in a complete Info system.

If you wish to refer to an Info file via a URI, you can use the (unofficial) syntax exemplified by the following. This works with Emacs/W3, for example:

```
info:emacs#Dissociated%20Press
info:///usr/info/emacs#Dissociated%20Press
info://localhost/usr/info/emacs#Dissociated%20Press
```

The `info` program itself does not follow URIs of any kind.

1.4 Printed Books

A Texinfo file can be formatted and typeset as a printed book or manual. To do this, you need \TeX , a sophisticated typesetting program written by Donald Knuth of Stanford University.

A Texinfo-based book is similar to any other typeset, printed work: it can have a title page, copyright page, table of contents, and preface, as well as chapters, numbered or unnumbered sections and subsections, page headers, cross-references, footnotes, and indices.

\TeX is a general purpose typesetting program. Texinfo provides a file `texinfo.tex` that contains information (definitions or *macros*) that \TeX uses when it typesets a Texinfo file. (`texinfo.tex` tells \TeX how to convert the Texinfo `@`-commands to \TeX commands, which \TeX can then process to create the typeset document.) `texinfo.tex` contains the specifications for printing a document. You can get the latest version of `texinfo.tex` from the Texinfo home page, <http://www.gnu.org/software/texinfo/>.

In the United States, documents are most often printed on 8.5 inch by 11 inch pages (216 mm by 280 mm); this is the default size. But you can also print for 7 inch by 9.25 inch pages (178 mm by 235 mm, the `@smallbook` size; or on A4 or A5 size paper (`@afourpaper`, `@afivepaper`). See Section 19.11 [`@smallbook`], page 172, and Section 19.12 [A4 Paper], page 173.

\TeX is freely distributable. It is written in a superset of Pascal for literate programming called WEB and can be compiled either in Pascal or (by using a conversion program that comes with the \TeX distribution) in C.

\TeX is very powerful and has a great many features. Because a Texinfo file must be able to present information both on a character-only terminal in Info form and in a typeset book, the formatting commands that Texinfo supports are necessarily limited.

See Section 19.16 [Obtaining \TeX], page 175, for information on acquiring \TeX . It is not part of the Texinfo distribution.

1.5 Adding Output Formats

The output formats in the previous sections handle a wide variety of usage, but of course there is always room for more.

If you are a programmer and would like to contribute to the GNU project by implementing additional output formats for Texinfo, that would be excellent. The way to do this that

would be most useful is to write a new back-end for `texi2any`, our reference implementation of a Texinfo parser; it creates a tree representation of the Texinfo input that you can use for the conversion. The documentation in the source file `tp/Texinfo/Convert/Converter.pm` is a good place to start. See Chapter 20 [Generic Translator `texi2any`], page 176.

Another viable approach is use the Texinfo XML output from `texi2any` as your input. This XML is an essentially complete representation of the input, but without the Texinfo syntax and option peculiarities, as described above.

If you still cannot resist the temptation of writing a new program that reads Texinfo source directly, let us give some more caveats: please do not underestimate the amount of work required. Texinfo is by no means a simple language to parse correctly, and remains under development, so you would be committing to an ongoing task. You are advised to check that the tests of the language that come with `texi2any` give correct results with your new program.

From time to time, proposals are made to generate traditional Unix man pages from Texinfo source. However, because man pages have a strict conventional format, creating a good man page requires a completely different source from that needed for the typical Texinfo applications of writing a good user tutorial and/or a good reference manual. This makes generating man pages incompatible with the Texinfo design goal of not having to document the same information in different ways for different output formats. You might as well write the man page directly.

As an alternative way to support man pages, you may find the program `help2man` to be useful. It generates a traditional man page from the ‘`--help`’ output of a program. In fact, the man pages for the programs in the Texinfo distribution are generated with this. It is GNU software written by Brendan O’Dea, available from <http://www.gnu.org/software/help2man>.

1.6 History

Richard M. Stallman invented the Texinfo format, wrote the initial processors, and created Edition 1.0 of this manual. Robert J. Chassell greatly revised and extended the manual, starting with Edition 1.1. Brian Fox was responsible for the standalone Texinfo distribution until version 3.8, and originally wrote the standalone `makeinfo` and `info` programs. Karl Berry has continued maintenance since Texinfo 3.8 (manual edition 2.22).

Our thanks go out to all who helped improve this work, particularly the indefatigable Eli Zaretskii and Andreas Schwab, who have provided patches beyond counting. François Pinard and David D. Zuhn, tirelessly recorded and reported mistakes and obscurities. Zack Weinberg did the impossible by implementing the macro syntax in `texinfo.tex`. Thanks to Melissa Weisshaus for her frequent reviews of nearly similar editions. Dozens of others have contributed patches and suggestions, they are gratefully acknowledged in the `ChangeLog` file. Our mistakes are our own.

Beginnings

In the 1970’s at CMU, Brian Reid developed a program and format named Scribe to mark up documents for printing. It used the `@` character to introduce commands, as Texinfo does. Much more consequentially, it strove to describe document contents rather than formatting, an idea wholeheartedly adopted by Texinfo.

Meanwhile, people at MIT developed another, not too dissimilar format called Bolio. This then was converted to using \TeX as its typesetting language: $\text{Bo}\TeX$. The earliest $\text{Bo}\TeX$ version seems to have been 0.02 on October 31, 1984.

$\text{Bo}\TeX$ could only be used as a markup language for documents to be printed, not for online documents. Richard Stallman (RMS) worked on both Bolio and $\text{Bo}\TeX$. He also developed a nifty on-line help format called Info, and then combined $\text{Bo}\TeX$ and Info to create Texinfo, a mark up language for text that is intended to be read both online and as printed hard copy.

Moving forward, the original translator to create Info was written (primarily by RMS and Bob Chassell) in Emacs Lisp, namely the `texinfo-format-buffer` and other functions. In the early 1990s, Brian Fox reimplemented the conversion program in C, now called `makeinfo`.

Reimplementing in Perl

In 2012, the C `makeinfo` was itself replaced by a Perl implementation generically called `texi2any`. This version supports the same level of output customization as `texi2html`, an independent program originally written by Lionel Cons, later with substantial work by many others. The many additional features needed to make `texi2html` a replacement for `makeinfo` were implemented by Patrice Dumas. The first never-released version of `texi2any` was based on the `texi2html` code. That implementation, however, was abandoned in favor of the current program, which parses the Texinfo input into a tree for processing. It still supports nearly all the features of `texi2html`.

The new Perl program is much slower than the old C program. We hope the speed gap will close in the future, but it may not ever be entirely comparable. So why did we switch? In short, we intend and hope that the present program will be much easier than the previous C implementation of `makeinfo` to extend to different output styles, back-end output formats, and all other customizations. In more detail:

- HTML customization. Many GNU and other free software packages had been happily using the HTML customization features in `texi2html` for years. Thus, in effect two independent implementations of the Texinfo language had developed, and keeping them in sync was not simple. Adding the HTML customization possible in `texi2html` to a C program would have been an enormous effort.
- Unicode, and multilingual support generally, especially of east Asian languages. Although of course it's perfectly plausible to write such support in C, in the particular case of `makeinfo`, it would have been tantamount to rewriting the entire program. In Perl, much of that comes essentially for free.
- Additional back-ends. The `makeinfo` code had become convoluted to the point where adding a new back-end was quite complex, requiring complex interactions with existing back-ends. In contrast, our Perl implementation provides a clean tree-based representation for all back-ends to work from. People have requested numerous different back-ends ($\text{L}\text{A}\text{T}\text{E}\text{X}$, the latest (X)HTML, . . .), and they will now be much more feasible to implement. Which leads to the last item:
- Making contributions easier. In general, due to the cleaner structure, the Perl program should be considerably easier than the C for anyone to read and contribute to, with the resulting obvious benefits.

See Section 20.1 [Reference Implementation], page 176, for more on the rationale for and role of `texi2any`.

2 Writing a Texinfo File

This chapter describes Texinfo syntax and what is required in a Texinfo file, and gives a short sample file.

2.1 General Syntactic Conventions

This section describes the general conventions used in all Texinfo documents.

- All printable ASCII characters except ‘@’, ‘{’ and ‘}’ can appear in a Texinfo file and stand for themselves. ‘@’ is the escape character which introduces commands, while ‘{’ and ‘}’ are used to surround arguments to certain commands. To put one of these special characters into the document, put an ‘@’ character in front of it, like this: ‘@@’, ‘@{’, and ‘@}’.
- In a Texinfo file, the commands you write to describe the contents of the manual are preceded by an ‘@’ character; they are called *@-commands*. (The ‘@’ in Texinfo has the same meaning that ‘\’ has in plain TeX.)

Depending on what they do or what arguments¹ they take, you need to write @-commands on lines of their own, or as part of sentences. As a general rule, a command requires braces if it mingles among other text; but it does not need braces if it is on a line of its own. For more details of Texinfo command syntax, see Section A.1 [Command Syntax], page 222.

- Whitespace following an @-command name is optional and (usually) ignored if present. The exceptions are contexts when whitespace is significant, e.g., an `@example` environment.
- Texinfo supports the usual quotation marks used in English and in other languages; see Section 12.5 [Inserting Quotation Marks], page 109.
- Use three hyphens in a row, ‘---’, to produce a long dash—like this (called an *em dash*), used for punctuation in sentences. Use two hyphens, ‘--’, to produce a medium dash (called an *en dash*), used primarily for numeric ranges, as in “June 25–26”. Use a single hyphen, ‘-’, to produce a standard hyphen used in compound words. For display on the screen, Info reduces three hyphens to two and two hyphens to one (not transitively!). Of course, any number of hyphens in the source remain as they are in literal contexts, such as `@code` and `@example`.
- Form feed (`CTRL-L`) characters in the input are handled as follows:

PDF/DVI In normal text, treated as ending any open paragraph; essentially ignored between paragraphs.

Info Output as-is between paragraphs (their most common use); in other contexts, they may be treated as regular spaces (and thus consolidated with surrounding whitespace).

¹ The word *argument* comes from the way it is used in mathematics and does not refer to a dispute between two people; it refers to the information presented to the command. According to the *Oxford English Dictionary*, the word derives from the Latin for *to make clear, prove*; thus it came to mean ‘the evidence offered as proof’, which is to say, ‘the information offered’, which led to its mathematical meaning. In its other thread of derivation, the word came to mean ‘to assert in a manner against which others may make counter assertions’, which led to the meaning of ‘argument’ as a dispute.

HTML	Written as a numeric entity except contexts where spaces are ignored; for example, in ‘@footnote{ ^L foo}’, the form feed is ignored.
XML	Keep them everywhere; in attributes, escaped as ‘\f’; also, ‘\’ is escaped as ‘\\’ and newline as ‘\n’.
Docbook	Completely removed, as they are not allowed.

As you can see, because of these differing requirements of the output formats, it’s not possible to use form feeds completely portably.

- **Caution:** Last, do not use tab characters in a Texinfo file! (Except perhaps in verbatim modes.) \TeX uses variable-width fonts, which means that it is impractical at best to define a tab to work in all circumstances. Consequently, \TeX treats tabs like single spaces, and that is not what they look like in the source. Furthermore, `makeinfo` does nothing special with tabs, and thus a tab character in your input file will usually have a different appearance in the output.

To avoid this problem, Texinfo mode in GNU Emacs inserts multiple spaces when you press the `TAB` key. Also, you can run `untabify` in Emacs to convert tabs in a region to multiple spaces, or use the `unexpand` command from the shell.

2.2 Comments

You can write comments in a Texinfo file by using the `@comment` command, which may be abbreviated to `@c`. Such comments are for a person looking at the Texinfo source file. All the text on a line that follows either `@comment` or `@c` is a comment; the rest of the line does not appear in the visible output. (To be precise, the character after the `@c` or `@comment` must be something other than a dash or alphanumeric, or it will be taken as part of the command.)

Often, you can write the `@comment` or `@c` in the middle of a line, and only the text that follows after the `@comment` or `@c` command does not appear; but some commands, such as `@settitle`, work on a whole line. You cannot use `@comment` or `@c` within a line beginning with such a command.

In cases of nested command invocations, complicated macro definitions, etc., `@c` and `@comment` may provoke an error when processing with \TeX . Therefore, you can also use the `DEL` character (ASCII 127 decimal, 0x7f hex, 0177 octal) as a true \TeX comment character (catcode 14, in \TeX internals). Everything on the line after the `DEL` will be ignored.

You can also have long stretches of text ignored by the Texinfo processors with the `@ignore` and `@end ignore` commands. Write each of these commands on a line of its own, starting each command at the beginning of the line. Text between these two commands does not appear in the processed output. You can use `@ignore` and `@end ignore` for writing comments. (For some caveats regarding nesting of such commands, see Section 16.7 [Conditional Nesting], page 148.)

2.3 What a Texinfo File Must Have

By convention, the name of a Texinfo file ends with one of the extensions `.texinfo`, `.texi`, `.txi`, or `.tex`.²

In order to be made into a printed manual and other output formats, a Texinfo file must begin with lines like this:

```
\input texinfo
@settitle name-of-manual
```

The contents of the file follow this beginning, and then you must end the Texinfo source with a line like this:

```
@bye
```

Here's an explanation:

- The `\input texinfo` line tells T_EX to use the `texinfo.tex` file, which tells T_EX how to translate the Texinfo @-commands into T_EX typesetting commands. (Note the use of the backslash, `\`; this is correct for T_EX.)
- The `@settitle` line specifies a title for the page headers (or footers) of the printed manual, and the default title and document description for the `<head>` in HTML. Strictly speaking, `@settitle` is optional—if you don't mind your document being titled 'Untitled'.
- The `@bye` line at the end of the file on a line of its own tells the formatters that the file is ended and to stop formatting. If you leave this out, you'll be dumped at T_EX's prompt at the end of the run.

Furthermore, you will usually provide a Texinfo file with a title page, indices, and the like, all of which are explained in this manual. But the minimum, which can be useful for short documents, is just the two lines at the beginning and the one line at the end.

2.4 A Short Sample Texinfo File

Here is a short but complete Texinfo file, so you can see how Texinfo source appears in practice. The first three parts of the file are mostly boilerplate: when writing a manual, you simply change the names as appropriate.

The complete file, without interspersed comments, is shown in Section C.1 [Short Sample Texinfo File], page 252.

See Chapter 3 [Beginning and Ending a File], page 15, for more documentation on the commands listed here.

Header

The header tells T_EX which definitions file to use, names the manual, and carries out other such housekeeping tasks.

```
\input texinfo
@settitle Sample Manual 1.0
```

² The longer extensions are preferred, since they describe more clearly to a human reader the nature of the file. The shorter extensions are for operating systems that cannot handle long file names.

Summary Description and Copyright

This segment describes the document and contains the copyright notice and copying permissions. This is done with the `@copying` command.

A real manual includes more text here, according to the license under which it is distributed. See Section C.2 [GNU Sample Texts], page 253.

```
@copying
This is a short example of a complete Texinfo file, version 1.0.

Copyright @copyright{} 2016 Free Software Foundation, Inc.
@end copying
```

Titlepage, Copyright, Contents

The title and copyright segment contains the title and copyright pages for the printed manual. The segment must be enclosed between `@titlepage` and `@end titlepage` commands. The title and copyright page does not appear in the online output.

We use the `@insertcopying` command to include the permission text from the previous section, instead of writing it out again; it is output on the back of the title page. The `@contents` command generates a table of contents.

```
@titlepage
@title Sample Title

@c The following two commands start the copyright page.
@page
@vskip 0pt plus 1filll
@insertcopying
@end titlepage

@c Output the table of contents at the beginning.
@contents
```

‘Top’ Node and Master Menu

The ‘Top’ node starts off the online output; it does not appear in the printed manual. We repeat the short description from the beginning of the ‘`@copying`’ text, but there’s no need to repeat the copyright information, so we don’t use ‘`@insertcopying`’ here.

The ‘`@top`’ command itself helps `makeinfo` determine the relationships between nodes. The ‘Top’ node contains at least a top-level *menu* listing the chapters, and possibly a *Master Menu* listing all the nodes in the entire document.

```
@ifnottex
@node Top
@top Short Sample

This is a short sample Texinfo file.
@end ifnottex
```

```

@menu
* First Chapter::   The first chapter is the
                    only chapter in this sample.
* Index::          Complete index.
@end menu

```

The Body of the Document

The body segment contains all the text of the document, but not the indices or table of contents. This example illustrates a node and a chapter containing an enumerated list.

```

@node First Chapter
@chapter First Chapter

@cindex chapter, first

This is the first chapter.
@cindex index entry, another

Here is a numbered list.

@enumerate
@item
This is the first item.

@item
This is the second item.
@end enumerate

```

The End of the Document

This may contain commands for printing indices, and closes with the `@bye` command, which marks the end of the document.

```

@node Index
@unnumbered Index

@printindex cp

@bye

```

Some Results

Here is what the contents of the first chapter of the sample look like:

```

This is the first chapter.
Here is a numbered list.
  1. This is the first item.
  2. This is the second item.

```

3 Beginning and Ending a Texinfo File

This chapter expands on the minimal complete Texinfo source file previously given (see Section 2.4 [Short Sample], page 12).

Certain pieces of information must be provided at the beginning of a Texinfo file, such the title of the document and the Top node. A table of contents is also generally produced here.

Straight text outside of any command before the Top node should be avoided. Such text is treated differently in the different output formats: at the time of writing, it is visible in T_EX and HTML, by default not shown in Info readers, and so on.

3.1 Sample Texinfo File Beginning

The following sample shows what is needed. The elements given here are explained in more detail in the following sections. Other commands are often included at the beginning of Texinfo files, but the ones here are the most critical.

See Section C.2 [GNU Sample Texts], page 253, for the full texts to be used in GNU manuals.

```

\input texinfo
@settitle name-of-manual version

@copying
This manual is for program, version version.

Copyright @copyright{} years copyright-owner.

@quotation
Permission is granted to ...
@end quotation
@end copying

@titlepage
@title name-of-manual-when-printed
@subtitle subtitle-if-any
@subtitle second-subtitle
@author author

@c The following two commands
@c start the copyright page.
@page
@vskip 0pt plus 1filll
@insertcopying

Published by ...
@end titlepage

```

```

@c So the toc is printed at the start.
@contents

@ifnottex
@node Top
@top title

This manual is for program, version version.
@end ifnottex

@menu
* First Chapter::    Getting started ...
* Second Chapter::  ...
...
* Copying::         Your rights and freedoms.
@end menu

@node First Chapter
@chapter First Chapter

@cindex first chapter
@cindex chapter, first
...

```

3.2 Texinfo File Header

Texinfo files start with at least two lines. These are the `\input texinfo` line and the `@settitle` line.

Also, if you want to format just part of the Texinfo file in Emacs, you must write the `@settitle` line between start-of-header and end-of-header lines. These start- and end-of-header lines are optional, but they do no harm, so you might as well always include them.

Any command that affects document formatting as a whole makes sense to include in the header. `@synindex` (see Section 11.5.2 [`@synindex`], page 101), for instance, is another command often included in the header.

Thus, the beginning of a Texinfo file looks approximately like this:

```

\input texinfo
@settitle Sample Manual 1.0

```

(See Section C.2 [GNU Sample Texts], page 253, for complete sample texts.)

3.2.1 The First Line of a Texinfo File

Every Texinfo file that is to be the top-level input to \TeX must begin with a line that looks like this:

```

\input texinfo

```

When the file is processed by \TeX , the `'\input texinfo'` command tells \TeX to load the macros needed for processing a Texinfo file. These are in a file called `texinfo.tex`, which

should have been installed on your system along with either the T_EX or Texinfo software. T_EX uses the backslash, ‘\’, to mark the beginning of a command, exactly as Texinfo uses ‘@’. The `texinfo.tex` file causes the switch from ‘\’ to ‘@’; before the switch occurs, T_EX requires ‘\’, which is why it appears at the beginning of the file.

You may optionally follow this line with a comment to tell GNU Emacs to use Texinfo mode when the file is edited:

```
\input texinfo @c --texinfo--
```

This may be useful when Emacs doesn’t detect the file type from the file extension automatically.

3.2.2 Start of Header

A start-of-header line is a Texinfo comment that looks like this:

```
@c %**start of header
```

Write the start-of-header line on the second line of a Texinfo file. Follow the start-of-header line with an `@settitle` line and, optionally, with other commands that globally affect the document formatting, such as `@synindex` or `@footnotestyle`; and then by an end-of-header line (see Section 3.2.5 [End of Header], page 18).

The start- and end-of-header lines allow you to format only part of a Texinfo file for Info or printing. See Section 21.1.3 [`texinfo-format` commands], page 202.

The odd string of characters, ‘%**’, is to ensure that no other comment is accidentally taken for a start-of-header line. You can change it if you wish by setting the `tex-start-of-header` and/or `tex-end-of-header` Emacs variables. See Section 19.6 [Texinfo Mode Printing], page 168.

3.2.3 `@setfilename`: Set the Output File Name

The `@setfilename` line specifies the name of the output file to be generated. When present, it should be the first Texinfo command (that is, after ‘`\input texinfo`’). Write the `@setfilename` command at the beginning of a line and follow it on the same line by the Info file name.

```
@setfilename info-file-name
```

The name must be different from the name of the Texinfo file. There are two conventions for choosing the name: you can either remove the extension (such as ‘`.texi`’) entirely from the input file name, or (recommended) replace it with the ‘`.info`’ extension.

When a `@setfilename` line is present, the Texinfo processors ignore everything written before the `@setfilename` line. This is why the very first line of the file (the `\input` line) does not show up in the output.

If there is no `@setfilename` line, `makeinfo` uses the input file name to determine the output name: first, any of the extensions `.texi`, `.tex`, `.txi` or `.texinfo` is removed from the input file name; then, the output format specific extension is added—`.html` when generating HTML, `.info` when generating Info, etc. The `\input` line is still ignored in this processing, as well as leading blank lines.

When producing another output format, `makeinfo` will replace any final extension with the output format-specific extension (‘`.html`’ when generating HTML, for example), or add a dot followed by the extension (‘`.html`’ for HTML) if the given name has no extension.

`@setfilename` used to be required by the Texinfo processors, and some other programs may still expect it to be present; for example, Automake (see Section “Texinfo” in *GNU Automake*).

Although an explicit `.info` extension is preferable, some operating systems cannot handle long file names. You can run into a problem even when the file name you specify is itself short enough. This occurs because the Info formatters split a long Info file into short indirect subfiles, and name them by appending `‘-1’`, `‘-2’`, . . . , `‘-10’`, `‘-11’`, and so on, to the original file name. (See Section 21.1.5 [Tag and Split Files], page 203.) The subfile name `texinfo.info-10`, for example, is too long for old systems with a 14-character limit on filenames; so the Info file name for this document is `texinfo` rather than `texinfo.info`. When `makeinfo` is running on operating systems such as MS-DOS which impose severe limits on file names, it may remove some characters from the original file name to leave enough space for the subfile suffix, thus producing files named `texin-10`, `gcc.i12`, etc.

See also the `--output` option in Section 20.2 [Invoking `texi2any`], page 177.

3.2.4 @settitle: Set the Document Title

A Texinfo file should contain a line that looks like this:

```
@settitle title
```

Write the `@settitle` command at the beginning of a line and follow it on the same line by the title. Do not write anything else on the line. The `@settitle` command should precede everything that generates actual output. The best place for it is right after the `@setfilename` command (described in the previous section).

This command tells \TeX the title to use in a header or footer for double-sided output, in case such headings are output. For more on headings for \TeX , see Section 3.4.5 [Heading Generation], page 24.

In the HTML file produced by `makeinfo`, `title` serves as the document `‘<title>’`. It also becomes the default document description in the `‘<head>’` part (see Section 3.7.1 [`@documentdescription`], page 27).

When the title page is used in the output, the title in the `@settitle` command does not affect the title as it appears on the title page. Thus, the two do not need to match exactly. A practice we recommend is to include the version or edition number of the manual in the `@settitle` title; on the title page, the version number generally appears as a `@subtitle` so it would be omitted from the `@title`. See Section 3.4.1 [`@titlepage`], page 20.

3.2.5 End of Header

Follow the header lines with an end-of-header line, which is a Texinfo comment that looks like this:

```
@c %**end of header
```

See Section 3.2.2 [Start of Header], page 17.

3.3 Document Permissions

The copyright notice and copying permissions for a document need to appear in several places in the various Texinfo output formats. Therefore, Texinfo provides a command

(`@copying`) to declare this text once, and another command (`@insertcopying`) to insert the text at appropriate points.

This section is about the license of the Texinfo document. If the document is a software manual, the software is typically under a different license—for GNU and many other free software packages, software is usually released under the GNU GPL, and manuals are released under the GNU FDL. It is helpful to state the license of the software of the manual, but giving the complete text of the software license is not necessarily required.

3.3.1 `@copying`: Declare Copying Permissions

The `@copying` command should be given very early in the document; the recommended location is right after the header material (see Section 3.2 [Texinfo File Header], page 16). It conventionally consists of a sentence or two about what the program is, identification of the documentation itself, the legal copyright line, and the copying permissions. Here is a skeletal example:

```
@copying
This manual is for program (version version, updated
date), which ...

Copyright @copyright{} years copyright-owner.

@quotation
Permission is granted to ...
@end quotation
@end copying
```

The `@quotation` has no legal significance; it's there to improve readability in some contexts.

The text of `@copying` is output as a comment at the beginning of Info, HTML, XML, and Docbook output files. It is *not* output implicitly in plain text or T_EX; it's up to you to use `@insertcopying` to emit the copying information. See the next section for details.

The `@copyright{}` command generates a ‘c’ inside a circle when the output format supports this glyph (print and HTML always do, for instance). When the glyph is not supported in the output, it generates the three-character sequence ‘(C)’.

The copyright notice itself has the following legally-prescribed form:

```
Copyright © years copyright-owner.
```

The word ‘Copyright’ must always be written in English, even if the document is otherwise written in another language. This is due to international law.

The list of years should include all years in which a version was completed (even if it was released in a subsequent year). It is simplest for each year to be written out individually and in full, separated by commas.

The copyright owner (or owners) is whoever holds legal copyright on the work. In the case of works assigned to the FSF, the owner is ‘Free Software Foundation, Inc.’.

The copyright ‘line’ may actually be split across multiple lines, both in the source document and in the output. This often happens for documents with a long history, having many different years of publication. If you do use several lines, do not indent any of them (or anything else in the `@copying` block) in the source file.

See Section “Copyright Notices” in *GNU Maintainer Information*, for additional information. See Section C.2 [GNU Sample Texts], page 253, for the full text to be used in GNU manuals. See Appendix H [GNU Free Documentation License], page 289, for the license itself under which GNU and other free manuals are distributed.

3.3.2 @insertcopying: Include Permissions Text

The `@insertcopying` command is simply written on a line by itself, like this:

```
@insertcopying
```

This inserts the text previously defined by `@copying`. To meet legal requirements, it must be used on the copyright page in the printed manual (see Section 3.4.4 [Copyright], page 23).

The `@copying` command itself causes the permissions text to appear in an Info file *before* the first node. The text is also copied into the beginning of each split Info output file, as is legally necessary. This location implies a human reading the manual using Info does *not* see this text (except when using the advanced Info command `g *`), but this does not matter for legal purposes, because the text is present.

Similarly, the `@copying` text is automatically included at the beginning of each HTML output file, as an HTML comment. Again, this text is not visible (unless the reader views the HTML source).

The permissions text defined by `@copying` also appears automatically at the beginning of the XML and Docbook output files.

3.4 Title and Copyright Pages

In hard copy output, the manual’s name and author are usually printed on a title page. Copyright information is usually printed on the back of the title page.

The title and copyright pages appear in printed manuals, but not in most other output formats. Because of this, it is possible to use several slightly obscure typesetting commands that are not to be used in the main text. In addition, this part of the beginning of a Texinfo file contains the text of the copying permissions that appears in the printed manual.

3.4.1 @titlepage

Start the material for the title page and following copyright page with `@titlepage` on a line by itself and end it with `@end titlepage` on a line by itself.

The `@end titlepage` command starts a new page and turns on page numbering (see Section 3.4.5 [Heading Generation], page 24). All the material that you want to appear on unnumbered pages should be put between the `@titlepage` and `@end titlepage` commands. You can force the table of contents to appear there with the `@setcontentsaftertitlepage` command (see Section 3.5 [Contents], page 24).

By using the `@page` command you can force a page break within the region delineated by the `@titlepage` and `@end titlepage` commands and thereby create more than one unnumbered page. This is how the copyright page is produced. (The `@titlepage` command might perhaps have been better named the `@titleandadditionalpages` command, but that would have been rather long!)

When you write a manual about a computer program, you should write the version of the program to which the manual applies on the title page. If the manual changes more frequently than the program or is independent of it, you should also include an edition number¹ for the manual. This helps readers keep track of which manual is for which version of the program. (The ‘Top’ node should also contain this information; see Section 3.6 [The Top Node], page 25.)

Texinfo provides two main methods for creating a title page. One method uses the `@titlefont`, `@sp`, and `@center` commands to generate a title page in which the words on the page are centered.

The second method uses the `@title`, `@subtitle`, and `@author` commands to create a title page with black rules under the title and author lines and the subtitle text set flush to the right hand side of the page. With this method, you do not specify any of the actual formatting of the title page. You specify the text you want, and Texinfo does the formatting.

You may use either method, or you may combine them; see the examples in the sections below.

For sufficiently simple documents, and for the bastard title page in traditional book frontmatter, Texinfo also provides a command `@shorttitlepage` which takes the rest of the line as the title. The argument is typeset on a page by itself and followed by a blank page.

3.4.2 `@titlefont`, `@center`, and `@sp`

You can use the `@titlefont`, `@sp`, and `@center` commands to create a title page for a printed document. (This is the first of the two methods for creating a title page in Texinfo.)

Use the `@titlefont` command to select a large font suitable for the title itself. You can use `@titlefont` more than once if you have an especially long title.

For HTML output, each `@titlefont` command produces an `<h1>` heading, but the HTML document `<title>` is not affected. For that, you must put a `@settitle` command before the `@titlefont` command (see Section 3.2.4 [`@settitle`], page 18).

For example:

```
@titlefont{Texinfo}
```

Use the `@center` command at the beginning of a line to center the remaining text on that line. Thus,

```
@center @titlefont{Texinfo}
```

centers the title, which in this example is “Texinfo” printed in the title font.

Use the `@sp` command to insert vertical space. For example:

```
@sp 2
```

This inserts two blank lines on the printed page. (See Section 13.7 [`@sp`], page 121, for more information about the `@sp` command.)

¹ We have found that it is helpful to refer to versions of independent manuals as ‘editions’ and versions of programs as ‘versions’; otherwise, we find we are liable to confuse each other in conversation by referring to both the documentation and the software with the same words.

A template for this method looks like this:

```
@titlepage
@sp 10
@center @titlefont{name-of-manual-when-printed}
@sp 2
@center subtitle-if-any
@sp 2
@center author
...
@end titlepage
```

The spacing of the example fits an 8.5 by 11 inch manual.

You can in fact use these commands anywhere, not just on a title page, but since they are not logical markup commands, we don't recommend them.

3.4.3 @title, @subtitle, and @author

You can use the @title, @subtitle, and @author commands to create a title page in which the vertical and horizontal spacing is done for you automatically. This contrasts with the method described in the previous section, in which the @sp command is needed to adjust vertical spacing.

Write the @title, @subtitle, or @author commands at the beginning of a line followed by the title, subtitle, or author. The @author command may be used for a quotation in an @quotation block (see Section 8.2 [quotation], page 73); except for that, it is an error to use any of these commands outside of @titlepage.

The @title command produces a line in which the title is set flush to the left-hand side of the page in a larger than normal font. The title is underlined with a black rule. The title must be given on a single line in the source file; it will be broken into multiple lines of output is needed.

For long titles, the @* command may be used to specify the line breaks in long titles if the automatic breaks do not suit. Such explicit line breaks are generally reflected in all output formats; if you only want to specify them for the printed output, use a conditional (see Chapter 16 [Conditionals], page 139). For example:

```
@title This Long Title@inlinefmt{tex,*} Is Broken in @TeX{}
```

The @subtitle command sets subtitles in a normal-sized font flush to the right-hand side of the page.

The @author command sets the names of the author or authors in a middle-sized font flush to the left-hand side of the page on a line near the bottom of the title page. The names are followed by a black rule that is thinner than the rule that underlines the title.

There are two ways to use the @author command: you can write the name or names on the remaining part of the line that starts with an @author command:

```
@author by Jane Smith and John Doe
```

or you can write the names one above each other by using multiple @author commands:

```
@author Jane Smith
@author John Doe
```

A template for this method looks like this:

```
@titlepage
@title name-of-manual-when-printed
@subtitle subtitle-if-any
@subtitle second-subtitle
@author author
@page
...
@end titlepage
```

3.4.4 Copyright Page

By international treaty, the copyright notice for a book must be either on the title page or on the back of the title page. When the copyright notice is on the back of the title page, that page is customarily not numbered. Therefore, in Texinfo, the information on the copyright page should be within `@titlepage` and `@end titlepage` commands.

Use the `@page` command to cause a page break. To push the copyright notice and the other text on the copyright page towards the bottom of the page, use the following incantation after `@page`:

```
@vskip 0pt plus 1filll
```

The `@vskip` command inserts whitespace in the T_EX output; it is ignored in all other output formats. The ‘`0pt plus 1filll`’ means to put in zero points of mandatory whitespace, and as much optional whitespace as needed to push the following text to the bottom of the page. Note the use of three ‘l’s in the word ‘filll’; this is correct.

To insert the copyright text itself, write `@insertcopying` next (see Section 3.3 [Document Permissions], page 18):

```
@insertcopying
```

Follow the copying text by the publisher, ISBN numbers, cover art credits, and other such information.

Here is an example putting all this together:

```
@titlepage
...
@page
@vskip 0pt plus 1filll
@insertcopying

Published by ...

Cover art by ...
@end titlepage
```

We have one more special case to consider: for plain text output, you must insert the copyright information explicitly if you want it to appear. For instance, you could have the following after the copyright page:

```
@ifplaintext
@insertcopying
```

`@end ifplaintext`

You could include other title-like information for the plain text output in the same place.

3.4.5 Heading Generation

Like all `@end` commands (see Chapter 8 [Quotations and Examples], page 72), the `@end titlepage` command must be written at the beginning of a line by itself, with only one space between the `@end` and the `titlepage`. It not only marks the end of the title and copyright pages, but also causes T_EX to start generating page headings and page numbers.

Texinfo has two standard page heading formats, one for documents printed on one side of each sheet of paper (single-sided printing), and the other for documents printed on both sides of each sheet (double-sided printing).

In full generality, you can control the headings in different ways:

- The conventional way is to write a `@setchapternewpage` command before the title page commands, if required, and then have the `@end titlepage` command start generating page headings in the manner desired.

Most documents are formatted with the standard single-sided or double-sided headings, (sometimes) using `@setchapternewpage odd` for double-sided printing and (almost always) no `@setchapternewpage` command for single-sided printing (see Section 3.7.2 [`@setchapternewpage`], page 27).

- Alternatively, you can use the `@headings` command to prevent page headings from being generated or to start them for either single or double-sided printing. Write a `@headings` command immediately after the `@end titlepage` command. To turn off headings, write `@headings off`. See Section 3.7.3 [`@headings`], page 28.
- Or, you may specify your own page heading and footing format. See Appendix E [Headings], page 270.

3.5 Generating a Table of Contents

The `@chapter`, `@section`, and other structuring commands (see Chapter 5 [Chapter Structuring], page 42) supply the information to make up a table of contents, but they do not cause an actual table to appear in the manual. To do this, you must use the `@contents` and/or `@summarycontents` command(s).

`@contents`

Generates a table of contents in a printed manual, including all chapters, sections, subsections, etc., as well as appendices and unnumbered chapters. Headings generated by `@majorheading`, `@chapheading`, and the other `@...heading` commands do not appear in the table of contents (see Section 5.2 [Structuring Command Types], page 42).

`@shortcontents`

`@summarycontents`

(`@summarycontents` is a synonym for `@shortcontents`.)

Generates a short or summary table of contents that lists only the chapters, appendices, and unnumbered chapters. Sections, subsections and subsubsections are omitted. Only a long manual needs a short table of contents in addition to the full table of contents.

Both contents commands should be written on a line by themselves, and placed near the beginning of the file, after the `@end titlepage` (see Section 3.4.1 [`@titlepage`], page 20), before any sectioning command. The contents commands automatically generate a chapter-like heading at the top of the first table of contents page, so don't include any sectioning command such as `@unnumbered` before them.

Since an Info file uses menus instead of tables of contents, the Info formatting commands ignore the contents commands. But the contents are included in plain text output (generated by `makeinfo --plaintext`) and in other output formats, such as HTML.

When `makeinfo` writes a short table of contents while producing HTML output, the links in the short table of contents point to corresponding entries in the full table of contents rather than the text of the document. The links in the full table of contents point to the main text of the document.

3.6 The ‘Top’ Node and Master Menu

The ‘Top’ node is the node in which a reader enters an Info manual. As such, it should begin with a brief description of the manual (including the version number), and end with a master menu for the whole manual. Of course you should include any other general information you feel a reader would find helpful.

It is conventional and desirable to write a `@top` sectioning command line containing the title of the document immediately after the `@node Top` line (see Section 4.6 [`@top` Command], page 35).

The contents of the ‘Top’ node should appear only in the online output; none of it should appear in printed output, so enclose it between `@ifnottex` and `@end ifnottex` commands. (T_EX does not print either an `@node` line or a menu; they appear only in Info; strictly speaking, you are not required to enclose these parts between `@ifnottex` and `@end ifnottex`, but it is simplest to do so. See Chapter 16 [Conditionally Visible Text], page 139.)

3.6.1 Top Node Example

Here is an example of a Top node.

```
@ifnottex
@node Top
@top Sample Title

This is the text of the top node.
@end ifnottex

Additional general information.

@menu
* First Chapter::
* Second Chapter::
...
* Index::
@end menu
```

3.6.2 Parts of a Master Menu

A *master menu* is the main menu. It is customary to include a detailed menu listing all the nodes in the document in this menu.

Like any other menu, a master menu is enclosed in `@menu` and `@end menu` and does not appear in the printed output.

Generally, a master menu is divided into parts.

- The first part contains the major nodes in the Texinfo file: the nodes for the chapters, chapter-like sections, and the appendices.
- The second part contains nodes for the indices.
- The third and subsequent parts contain a listing of the other, lower-level nodes, often ordered by chapter. This way, rather than go through an intermediary menu, an inquirer can go directly to a particular node when searching for specific information. These menu items are not required; add them if you think they are a convenience. If you do use them, put `@detailmenu` before the first one, and `@end detailmenu` after the last; otherwise, `makeinfo` will get confused.

Each section in the menu can be introduced by a descriptive line. So long as the line does not begin with an asterisk, it will not be treated as a menu entry. (See Section 4.9.1 [Writing a Menu], page 38, for more information.)

For example, the master menu for this manual looks like the following (but has many more entries):

```
@menu
* Copying Conditions:: Your rights.
* Overview::          Texinfo in brief.
...
* Command and Variable Index::
* General Index::

@detailmenu
--- The Detailed Node Listing ---

Overview of Texinfo

* Reporting Bugs:: ...
...

Beginning a Texinfo File

* Sample Beginning:: ...
...
@end detailmenu
@end menu
```

3.7 Global Document Commands

Besides the basic commands mentioned in the previous sections, here are additional commands which affect the document as a whole. They are generally all given before the Top node, if they are given at all.

3.7.1 @documentdescription: Summary Text

When producing HTML output for a document, `makeinfo` writes a ‘<meta>’ element in the ‘<head>’ to give some idea of the content of the document. By default, this *description* is the title of the document, taken from the `@settitle` command (see Section 3.2.4 [`@settitle`], page 18). To change this, use the `@documentdescription` environment, as in:

```
@documentdescription
descriptive text.
@end documentdescription
```

This will produce the following output in the ‘<head>’ of the HTML:

```
<meta name=description content="descriptive text.">
```

`@documentdescription` must be specified before the first node of the document.

3.7.2 @setchapternewpage: Blank Pages Before Chapters

In an officially bound book, text is usually printed on both sides of the paper, chapters start on right-hand pages, and right-hand pages have odd numbers. But in short reports, text often is printed only on one side of the paper. Also in short reports, chapters sometimes do not start on new pages, but are printed on the same page as the end of the preceding chapter, after a small amount of vertical whitespace.

You can use the `@setchapternewpage` command with various arguments to specify how `TEX` should start chapters and whether it should format headers for printing on one or both sides of the paper (single-sided or double-sided printing).

Write the `@setchapternewpage` command at the beginning of a line followed by its argument.

For example, you would write the following to cause each chapter to start on a fresh odd-numbered page:

```
@setchapternewpage odd
```

You can specify one of three alternatives with the `@setchapternewpage` command:

`@setchapternewpage off`

Cause `TEX` to typeset a new chapter on the same page as the last chapter, after skipping some vertical whitespace. Also, cause `TEX` to format page headers for single-sided printing.

`@setchapternewpage on`

Cause `TEX` to start new chapters on new pages and to format page headers for single-sided printing. This is the form most often used for short reports or personal printing. This is the default.

`@setchapternewpage odd`

Cause `TEX` to start new chapters on new, odd-numbered pages (right-handed pages) and to typeset for double-sided printing. This is the form most often used for books and manuals.

Texinfo does not have a `@setchapternewpage even` command, because there is no printing tradition of starting chapters or books on an even-numbered page.

If you don't like the default headers that `@setchapternewpage` sets, you can explicitly control them with the `@headings` command. See Section 3.7.3 [`@headings`], page 28.

At the beginning of a manual or book, pages are not numbered—for example, the title and copyright pages of a book are not numbered. By convention, table of contents and frontmatter pages are numbered with roman numerals and not in sequence with the rest of the document.

The `@setchapternewpage` has no effect in output formats that do not have pages, such as Info and HTML.

We recommend not including any `@setchapternewpage` command in your document source at all, since such desired pagination is not intrinsic to the document. For a particular hard copy run, if you don't want the default output (no blank pages, same headers on all pages) use the `--texinfo` option to `texi2dvi` to specify the output you want.

3.7.3 The `@headings` Command

The `@headings` command is rarely used. It specifies what kind of page headings and footings to print on each page. Usually, this is controlled by the `@setchapternewpage` command. You need the `@headings` command only if the `@setchapternewpage` command does not do what you want, or if you want to turn off predefined page headings prior to defining your own. Write a `@headings` command immediately after the `@end titlepage` command.

You can use `@headings` as follows:

`@headings off`

Turn off printing of page headings.

`@headings single`

Turn on page headings appropriate for single-sided printing.

`@headings double`

Turn on page headings appropriate for double-sided printing.

`@headings singleafter`

`@headings doubleafter`

Turn on `single` or `double` headings, respectively, after the current page is output.

`@headings on`

Turn on page headings: `single` if '`@setchapternewpage on`', `double` otherwise.

For example, suppose you write `@setchapternewpage off` before the `@titlepage` command to tell `TEX` to start a new chapter on the same page as the end of the last chapter. This command also causes `TEX` to typeset page headers for single-sided printing. To cause `TEX` to typeset for double sided printing, write `@headings double` after the `@end titlepage` command.

You can stop `TEX` from generating any page headings at all by writing `@headings off` on a line of its own immediately after the line containing the `@end titlepage` command, like this:

```
@end titlepage
@headings off
```


@headings off

The `@headings off` command overrides the `@end titlepage` command, which would otherwise cause TeX to print page headings.

You can also specify your own style of page heading and footing. See Appendix E [Page Headings], page 270, for more information.

3.7.4 @paragraphindent: Controlling Paragraph Indentation

The Texinfo processors may insert whitespace at the beginning of the first line of each paragraph, thereby indenting that paragraph. You can use the `@paragraphindent` command to specify this indentation. Write a `@paragraphindent` command at the beginning of a line followed by either ‘asis’ or a number:

@paragraphindent *indent*

The indentation is according to the value of *indent*:

asis Do not change the existing indentation (not implemented in TeX).

none

0 Omit all indentation.

n Indent by *n* space characters in Info output, by *n* ems in TeX.

The default value of *indent* is 3. `@paragraphindent` is ignored for HTML output.

It is best to write the `@paragraphindent` command before the end-of-header line at the beginning of a Texinfo file, so the region formatting commands indent paragraphs as specified. See Section 3.2.2 [Start of Header], page 17.

3.7.5 @firstparagraphindent: Indenting After Headings

As you can see in the present manual, the first paragraph in any section is not indented by default. Typographically, indentation is a paragraph separator, which means that it is unnecessary when a new section begins. This indentation is controlled with the `@firstparagraphindent` command:

@firstparagraphindent *word*

The first paragraph after a heading is indented according to the value of *word*:

none Prevents the first paragraph from being indented (default). This option is ignored by `makeinfo` if `@paragraphindent asis` is in effect.

insert Include normal paragraph indentation. This respects the paragraph indentation set by a `@paragraphindent` command (see Section 3.7.4 [`@paragraphindent`], page 29).

`@firstparagraphindent` is ignored for HTML and Docbook output.

It is best to write the `@firstparagraphindent` command before the end-of-header line at the beginning of a Texinfo file, so the region formatting commands indent paragraphs as specified. See Section 3.2.2 [Start of Header], page 17.

3.7.6 @exampleindent: Environment Indenting

The Texinfo processors indent each line of `@example` and similar environments. You can use the `@exampleindent` command to specify this indentation. Write an `@exampleindent` command at the beginning of a line followed by either ‘asis’ or a number:

```
@exampleindent indent
```

The indentation is according to the value of *indent*:

- `asis` Do not change the existing indentation (not implemented in T_EX).
- `0` Omit all indentation.
- `n` Indent environments by *n* space characters in Info output, by *n* ems in T_EX.

The default value of *indent* is 5 spaces in Info, and 0.4in in T_EX, which is somewhat less. (The reduction is to help T_EX fit more characters onto physical lines.)

It is best to write the `@exampleindent` command before the end-of-header line at the beginning of a Texinfo file, so the region formatting commands indent paragraphs as specified. See Section 3.2.2 [Start of Header], page 17.

3.8 Ending a Texinfo File

The end of a Texinfo file should include commands to create indices (see Section 11.4 [Printing Indices & Menus], page 99), and the `@bye` command to mark the last line to be processed. For example:

```
@node Index
@unnumbered Index

@printindex cp

@bye
```

An `@bye` command terminates Texinfo processing. None of the formatters process anything following `@bye`; any such text is completely ignored. The `@bye` command should be on a line by itself.

Thus, if you wish, you may follow the `@bye` line with arbitrary notes. Also, you may follow the `@bye` line with a local variables list for Emacs, most typically a ‘`compile-command`’ (see Section 19.7 [Using the Local Variables List], page 170).

4 Nodes

A *node* is a region of text that begins at a `@node` command, and continues until the next `@node` command. To specify a node, write a `@node` command at the beginning of a line, and follow it with the name of the node. Each node contains the discussion of one topic. Info readers display one node at a time, and provide commands for the user to move to related nodes. The HTML output can be similarly navigated.

Nodes are used as the targets of cross-references. Cross-references, such as the one at the end of this sentence, are made with `@xref` and related commands; see Chapter 6 [Cross References], page 49. Cross-references can be sprinkled throughout the text, and provide a way to represent links that do not fit a hierarchical structure.

Normally, you put a node command immediately before each chapter structuring command—for example, an `@section` or `@subsection` line. (See Chapter 5 [Chapter Structuring], page 42.). You must do this even if you do not intend to format the file for Info. This is because \TeX uses both `@node` names and chapter-structuring names in the output for cross-references. The only time you are likely to use the chapter structuring commands without also using nodes is if you are writing a document that contains no cross references and will only be printed, not transformed into Info, HTML, or other formats.

4.1 Texinfo Document Structure

Nodes can contain *menus*, which contain the names of *child nodes* within the parent node; for example, a node corresponding to a chapter would have a menu of the sections in that chapter. The menus allow the user to move to the child nodes in a natural way in the online output.

In addition, nodes contain *node pointers* that name other nodes. The ‘Next’ and ‘Previous’ pointers form nodes at the same sectioning level into a chain. As you might imagine, the ‘Next’ pointer links to the next node, and the ‘Previous’ pointer links to the previous node. Thus, for example, all the nodes that are at the level of sections within a chapter are linked together, and the order in this chain is the same as the order of the children in the menu of the parent chapter. Each child node records the parent node name as its ‘Up’ pointer.

The Info and HTML output from `makeinfo` for each node includes links to the ‘Next’, ‘Previous’, and ‘Up’ nodes. The HTML also uses the `accesskey` attribute with the values ‘n’, ‘p’, and ‘u’ respectively. This allows people using web browsers to follow the navigation using (typically) *M-letter*, e.g., *M-n* for the ‘Next’ node, from anywhere within the node. Node pointers and menus provide structure for Info files just as chapters, sections, subsections, and the like provide structure for printed books. The two structures are theoretically distinct; in practice, however, the tree structure of printed books is essentially always used for the node and menu structure also, as this leads to a document which is easiest to follow. See Section 4.1 [Texinfo Document Structure], page 31.

Typically, the sectioning structure and the node structure are completely parallel, with one node for each chapter, section, etc., and with the nodes following the same hierarchical arrangement as the sectioning. Thus, if a node is at the logical level of a chapter, its child nodes are at the level of sections; similarly, the child nodes of sections are at the level of subsections.

Although it is technically possible to create Texinfo documents with only one structure or the other, or for the two structures not to be parallel, or for either the sectioning or node structure to be abnormally formed, etc., this is *not at all recommended*. To the best of our knowledge, all the Texinfo manuals currently in general use do follow the conventional parallel structure.

4.2 Choosing Node Names

The name of a node identifies the node. For all the details of node names, see Section 4.4 [Node Line Requirements], page 33).

Here are some suggestions for node names:

- Try to pick node names that are informative but short.
In the Info file, the file name, node name, and pointer names are all inserted on one line, which may run into the right edge of the window. (This does not cause a problem with Info, but is ugly.)
- Try to pick node names that differ from each other near the beginnings of their names. This way, it is easy to use automatic name completion in Info.
- Conventionally, node names are capitalized in the same way as section and chapter titles. In this manual, initial and significant words are capitalized; others are not. In other manuals, just initial words and proper nouns are capitalized. Either way is fine; we recommend just being consistent.

Because node names are used in cross-references, it is not desirable to casually change them once published. Such name changes invalidate references from other manuals, from mail archives, and so on. See Section 22.4.7 [HTML Xref Link Preservation], page 220.

The pointers from a given node enable you to reach other nodes and consist simply of the names of those nodes. The pointers are usually not specified explicitly, as `makeinfo` can determine them (see Section 4.8 [makeinfo Pointer Creation], page 37).

Normally, a node's 'Up' pointer contains the name of the node whose menu mentions that node. The node's 'Next' pointer contains the name of the node that follows the present node in that menu and its 'Previous' pointer contains the name of the node that precedes it in that menu. When a node's 'Previous' node is the same as its 'Up' node, both pointers name the same node.

Usually, the first node of a Texinfo file is the 'Top' node, and its 'Up' pointer points to the `dir` file, which contains the main menu for all of Info.

4.3 Writing an @node Line

The easiest way to write an `@node` line is to write `@node` at the beginning of a line and then the name of the node, like this:

```
@node node-name
```

After you have inserted an `@node` line, you should immediately write an `@-`command for the chapter or section and insert its name. Next (and this is important!), put in several index entries. Usually, you will find at least two and often as many as four or five ways of referring to the node in the index. Use them all. This will make it much easier for people to find the node.

If you wish, you can ignore `@node` lines altogether in your first draft and then use the `texinfo-insert-node-lines` command to create `@node` lines for you. However, we do not recommend this practice. It is better to name the node itself at the same time that you write a segment so you can easily make cross-references. Useful cross-references are an especially important feature of a good Texinfo manual.

Even when you explicitly specify all pointers, you cannot write the nodes in the Texinfo source file in an arbitrary order! Because formatters must process the file sequentially, irrespective of node pointers, you must write the nodes in the order you wish them to appear in the output. For Info format one can imagine that the order may not matter, but it matters for the other formats.

You may optionally follow the node name argument to `@node` with up to three optional arguments on the rest of the same line, separating the arguments with commas. These are the names of the ‘Next’, ‘Previous’, and ‘Up’ pointers, in that order. We recommend omitting them if your Texinfo document is hierarchically organized, as virtually all are (see Section 4.8 [makeinfo Pointer Creation], page 37).

Any spaces before or after each name on the `@node` line are ignored.

The template for a fully-written-out node line with ‘Next’, ‘Previous’, and ‘Up’ pointers looks like this:

```
@node node-name, next, previous, up
```

The *node-name* argument must be present, but the others are optional. If you wish to specify some but not others, just insert commas as needed, as in: ‘`@node mynode,,uppernode`’. However, we recommend leaving off all the pointers and letting `makeinfo` determine them.

If you are using GNU Emacs, you can use the update node commands provided by Texinfo mode to insert the names of the pointers; or (recommended), you can leave the pointers out of the Texinfo file and let `makeinfo` insert node pointers into the Info file it creates. (See Appendix D [Texinfo Mode], page 258, and Section 4.8 [makeinfo Pointer Creation], page 37.)

Alternatively, you can insert the ‘Next’, ‘Previous’, and ‘Up’ pointers yourself. If you do this, you may find it helpful to use the Texinfo mode keyboard command `C-c C-c n`. This command inserts ‘`@node`’ and a comment line listing the names of the pointers in their proper order. The comment line helps you keep track of which arguments are for which pointers. This comment line is especially useful if you are not familiar with Texinfo.

4.4 @node Line Requirements

Names used with `@node` have several requirements:

- All the node names in a single Texinfo file must be unique. This means, for example, that if you end every chapter with a summary, you must name each summary node differently. You cannot just call them all “Summary”. You may, however, duplicate the titles of chapters, sections, and the like. Thus you can end each chapter with a section called “Summary”, so long as the node names for those sections are all different.
- Node names can contain @-commands. The output is generally the natural result of the command; for example, using `@TeX{}` in a node name results in the T_EX logo being

output, as it would be in normal text. Cross-references should use `@TeX{}` just as the node name does.

For Info and HTML output, especially, it is necessary to expand commands to some sequence of plain characters; for instance, `@TeX{}` expands to the three letters ‘TeX’ in the Info node name. However, cross-references to the node should not take the “shortcut” of using ‘TeX’; stick to the actual node name, commands and all.

Some commands do not make sense in node names; for instance, environments (e.g., `@quotation`), commands that read a whole line as their argument (e.g., `@sp`), and plenty of others.

For the complete list of commands that are allowed, and their expansion for HTML identifiers and file names, see Section 22.4.3 [HTML Xref Command Expansion], page 216. The expansions for Info are generally given with main the description of the command.

Prior to the Texinfo 5 release in 2013, this feature was supported in an ad hoc way (the `--commands-in-node-names` option to `makeinfo`). Now it is part of the language.

- Unfortunately, you cannot reliably use periods, commas, or colons within a node name; these can confuse the Info reader. Also, a node name may not start with a left parenthesis preceding a right parenthesis, as in `(not)allowed`, since this syntax is used to specify an external manual. (Perhaps these limitations will be removed some day.)

`makeinfo` warns about such problematic usage in node names, menu items, and cross-references. If you don’t want to see the warnings, you can set the customization variable `INFO_SPECIAL_CHARS_WARNING` to ‘0’ (see Section 20.6.4 [Other Customization Variables], page 192).

Also, if you insist on using these characters in node names (accepting the resulting substandard Info output), in order not to confuse the Texinfo processors you must still escape those characters, by using either special insertions (see Section 12.1.3 [Inserting a Comma], page 104) or `@asis` (see [`@asis`], page 86). For example:

```
@node foo@asis{::}bar
```

As an example of avoiding the special characters, the following is a section title in this manual:

```
@section @code{@@unnumbered}, @code{@@appendix}: ...
```

But the corresponding node name lacks the commas and the subtitle:

```
@node @unnumbered @appendix
```

- Case is significant in node names.
- Spaces before and after names on the ‘`@node`’ line are ignored. Multiple whitespace characters “inside” a name are collapsed to a single space. For example:

```
@node foo bar
@node foo bar,
@node foo bar ,
@node foo bar,
@node foo bar ,
```

all define the same node, namely ‘foo bar’. In menu entries, this is the name that should be used: no leading or trailing spaces, and a single internal space. (For cross-

references, the node name used in the Texinfo sources is automatically normalized in this way.)

- The next/previous/up pointers on `@node` lines must be the names of nodes. (It's recommended to leave out these explicit node pointer names, which automatically avoids any problem here; see Section 4.8 [makeinfo Pointer Creation], page 37.)

4.5 The First Node

The first node of a Texinfo file is the *Top* node, except in an included file (see Chapter 18 [Include Files], page 159). The Top node should contain a short summary, copying permissions, and a master menu. See Section 3.6 [The Top Node], page 25, for more information on the Top node contents and examples.

Here is a description of the node pointers to be used in the Top node:

- The Top node (which must be named ‘`top`’ or ‘`Top`’) should have as its ‘Up’ node the name of a node in another file, where there is a menu that leads to this file. Specify the file name in parentheses.

Usually, all Info files are available through a single virtual Info tree, constructed from multiple directories. In this case, use ‘`(dir)`’ as the parent of the Top node; this specifies the top-level node in the `dir` file, which contains the main menu for the Info system as a whole. (Each directory with Info files is intended to contain a file named `dir`.)

That's fine for Info, but for HTML output, one might well want the Up link from the Top node to go somewhere other than ‘`dir.html`’. For example, for GNU the natural place would be `http://www.gnu.org/manual/` (a web page collecting links to most GNU manuals), better specified as just `/manual/` if the manual will be installed on `www.gnu.org`. This can be specified with the `TOP_NODE_UP_URL` customization variable (see Section 20.6.3 [HTML Customization Variables], page 187), as in

```
$ makeinfo --html -c TOP_NODE_UP_URL=/manual/ ...
```

All links to `(dir)` will be replaced by the given url.

- The ‘Prev’ node of the Top node is usually either omitted or also set to `(dir)`. Either is fine.
- The ‘Next’ node of the Top node should be the first chapter in your document.

See Section 21.2 [Installing an Info File], page 204, for more information about installing an Info file in the `info` directory.

It is usually best to leave the pointers off entirely and let the tools implicitly define them, with this simple result:

```
@node Top
```

4.6 The @top Sectioning Command

The `@top` command is a special sectioning command that you should only use after a ‘`@node Top`’ line at the beginning of a Texinfo file. The `@top` command tells the `makeinfo` formatter which node is to be used as the root of the node tree.

It produces the same sort of output as `@unnumbered` (see Section 5.4 [unnumbered @appendix], page 44).

The `@top` node is conventionally wrapped in an `@ifnottex` conditional so that it will not appear in \TeX output (see Chapter 16 [Conditionals], page 139). Thus, in practice, a Top node usually looks like this:

```
@ifnottex
@node Top
@top your-manual-title

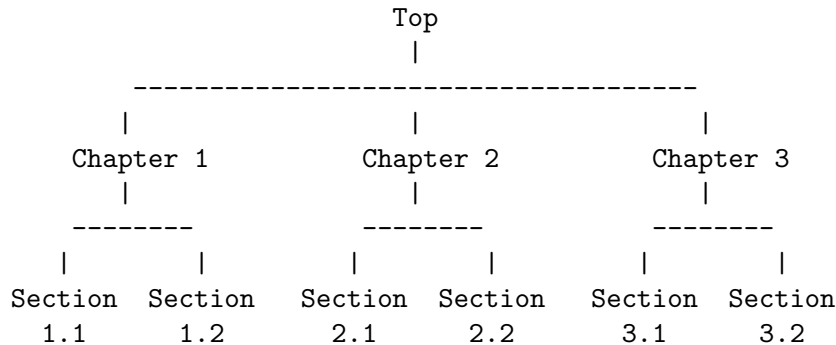
very-high-level-summary
@end ifnottex
```

`@top` is ignored when raising or lowering sections. That is, it is never lowered and nothing can be raised to it (see Section 5.12 [Raise/lower sections], page 47).

4.7 Node and Menu Illustration

Here is a diagram that illustrates a Texinfo file with three chapters, each of which contains two sections.

The “root” is at the top of the diagram and the “leaves” are at the bottom. This is how such a diagram is drawn conventionally; it illustrates an upside-down tree. For this reason, the root node is called the ‘Top’ node, and ‘Up’ node pointers carry you closer to the root.



Using explicit pointers (not recommended, but for shown for purposes of the example), the fully-written command to start Chapter 2 would be this:

```
@node Chapter 2, Chapter 3, Chapter 1, Top
@comment node-name, next, previous, up
```

This `@node` line says that the name of this node is “Chapter 2”, the name of the ‘Next’ node is “Chapter 3”, the name of the ‘Previous’ node is “Chapter 1”, and the name of the ‘Up’ node is “Top”. You can (and should) omit writing out these node names if your document is hierarchically organized (see Section 4.8 [makeinfo Pointer Creation], page 37), but the pointer relationships still obtain.

Note: ‘Next’ and ‘Previous’ refer to nodes at the *same hierarchical level* in the manual, not necessarily to the next node within the Texinfo file. In the Texinfo file, the subsequent node may be at a lower level—a section-level node most often follows a chapter-level node, for example. (The ‘Top’ node contains the exception to this rule. Since the ‘Top’ node is the only node at that level, ‘Next’ refers to the first following node, which is almost always a chapter or chapter-level node.)

To go to Sections 2.1 and 2.2 using Info, you need a menu inside Chapter 2. (See Section 4.9 [Menus], page 38.) You would write the menu just before the beginning of Section 2.1, like this:

```
@menu
* Sect. 2.1::    Description of this section.
* Sect. 2.2::    Description.
@end menu
```

Using explicit pointers, the node for Sect. 2.1 is written like this:

```
@node      Sect. 2.1, Sect. 2.2, Chapter 2, Chapter 2
@comment  node-name, next,          previous, up
```

In Info format, the ‘Next’ and ‘Previous’ pointers of a node usually lead to other nodes at the same level—from chapter to chapter or from section to section (sometimes, as shown, the ‘Previous’ pointer points up); an ‘Up’ pointer usually leads to a node at the level above (closer to the ‘Top’ node); and a ‘Menu’ leads to nodes at a level below (closer to ‘leaves’). (A cross-reference can point to a node at any level; see Chapter 6 [Cross References], page 49.)

A `@node` command and a chapter structuring command are conventionally used together, in that order, often followed by indexing commands. (As shown in the example above, you may follow the `@node` line with a comment line, e.g., to show which pointer is which if explicit pointers are used.) The Texinfo processors use this construct to determine the relationships between nodes and sectioning commands.

Here is the beginning of the chapter in this manual called “Ending a Texinfo File”. This shows an `@node` line followed by an `@chapter` line, and then by indexing lines.

```
@node Ending a File
@chapter Ending a Texinfo File
@cindex Ending a Texinfo file
@cindex Texinfo file ending
@cindex File ending
```

An earlier version of the manual used explicit node pointers. Here is the beginning of the same chapter for that case. This shows an `@node` line followed by a comment line, a `@chapter` line, and then by indexing lines.

```
@node      Ending a File, Structuring, Beginning a File, Top
@comment  node-name, next,          previous, up
@chapter  Ending a Texinfo File
@cindex  Ending a Texinfo file
...
```

4.8 makeinfo Pointer Creation

The `makeinfo` program can automatically determine node pointers for a hierarchically organized document. This implicit node pointer creation feature in `makeinfo` relieves you from the need to update menus and pointers manually or with Texinfo mode commands. (See Section D.5 [Updating Nodes and Menus], page 261.) We highly recommend taking advantage of this.

To do so, write your `@node` lines with just the name of the node:

```
@node My Node
```

You do not need to write out the ‘Next’, ‘Previous’, and ‘Up’ pointers.

Then, you must write a sectioning command, such as `@chapter` or `@section`, on the line immediately following each truncated `@node` line (except that comment lines may intervene). This is where it normally goes.

Also, you must write the name of each node (except for the ‘Top’ node) in a menu that is one or more hierarchical levels above the node’s level.

Finally, you must follow the ‘Top’ `@node` line with a line beginning with `@top` to mark the top-level node in the file. See Section 4.6 [`@top` Command], page 35.

If you use a detailed menu in your master menu (see Section 3.6.2 [Master Menu Parts], page 26), mark it with the `@detailmenu ... @end detailmenu` environment, or `makeinfo` will get confused, typically about the last and/or first node in the document.

In most cases, you will want to take advantage of this feature and not redundantly specify node pointers that the programs can determine. However, Texinfo documents are not required to be organized hierarchically or in fact to contain sectioning commands at all (for example, if you never intend the document to be printed), so node pointers may still be specified explicitly, in full generality.

4.9 Menus

Menus contain pointers to subordinate nodes. In online output, you use menus to go to such nodes. Menus have no effect in printed manuals and do not appear in them.

4.9.1 Writing a Menu

A menu consists of a `@menu` command on a line by itself, followed by menu entry lines or menu comment lines, and then followed by an `@end menu` command on a line by itself.

A menu looks like this:

```
@menu
Larger Units of Text

* Files::                All about handling files.
* Multiples: Buffers.    Multiple buffers; editing
                        several files at once.

@end menu
```

In a menu, every line that begins with an ‘*’ is a *menu entry*. (Note the space after the asterisk.)

A line that does not start with an ‘*’ may also appear in a menu. Such a line is not a menu entry but rather a *menu comment* line that appears in the Info file. In the example above, the line ‘Larger Units of Text’ is such a menu comment line; the two lines starting with ‘*’ are menu entries.

Technically, menus can carry you to any node, regardless of the structure of the document; even to nodes in a different Info file. However, we do not recommend making use of this, because it is hard for readers to follow. Also, the `makeinfo` implicit pointer creation feature (see Section 4.8 [`makeinfo` Pointer Creation], page 37) and GNU Emacs Texinfo

mode updating commands work only to create menus of subordinate nodes in a hierarchically structured document. It is much better to use cross-references to refer to arbitrary nodes.

`makeinfo` can automatically generate menus in nodes for Info and HTML output, based on the chapter structure of the document. To specify that you want it to do this, place the line `@validatemenus off` near the beginning of the document.

In Info, a user selects a node with the `m` (Info-menu) command. The menu entry name is what the user types after the `m` command. In the HTML output from `makeinfo`, the `accesskey` attribute is used with the values ‘1’..‘9’ for the first nine entries. This allows people using web browsers to follow the first menu entries using (typically) *M-digit*, e.g., *M-1* for the first entry.

4.9.2 A Menu Example

A menu looks like this in Texinfo:

```
@menu
* menu entry name: Node name.    A short description.
* Node name::                    This form is preferred.
@end menu
```

This produces:

```
* menu:

* menu entry name: Node name.    A short description.
* Node name::                    This form is preferred.
```

Here is an example as you might see it in a Texinfo file:

```
@menu
Larger Units of Text

* Files::                        All about handling files.
* Multiples: Buffers.           Multiple buffers; editing
                                several files at once.
@end menu
```

This produces:

```
* menu:
Larger Units of Text

* Files::                        All about handling files.
* Multiples: Buffers.           Multiple buffers; editing
                                several files at once.
```

In this example, the menu has two entries. ‘Files’ is both a menu entry name and the name of the node referred to by that name. ‘Multiples’ is the menu entry name; it refers to the node named ‘Buffers’. The line ‘Larger Units of Text’ is a comment; it appears in the menu, but is not an entry.

Since no file name is specified with either ‘Files’ or ‘Buffers’, they must be the names of nodes in the same Info file (see Section 4.9.6 [Referring to Other Info Files], page 41).

4.9.3 Menu Location

There may be at most one menu in a node. A menu is conventionally located at the end of a node, without any regular text or additional commands between the `@end menu` and the beginning of the next node.

This convention is useful, since a reader who uses the menu could easily miss any such text. Also, any such post-menu text will be considered part of the menu in Info output (which has no marker for the end of a menu). Thus, a line beginning with ‘* ’ will likely be incorrectly handled.

It’s usually best if a node with a menu does not contain much text. If you find yourself with a lot of text before a menu, we generally recommend moving all but a couple of paragraphs into a new subnode. Otherwise, it is easy for readers to miss the menu.

4.9.4 The Parts of a Menu

A menu entry has three parts, only the second of which is required:

1. The menu entry name (optional).
2. The name of the node (required).
3. A description of the item (optional).

The template for a generic menu entry looks like this (but see the next section for one more possibility):

```
* menu-entry-name: node-name.   description
```

Follow the menu entry name with a single colon, and follow the node name with tab, comma, newline, or the two characters period and space (‘. ’).

The third part of a menu entry is a descriptive phrase or sentence. Menu entry names and node names are often short; the description explains to the reader what the node is about. A useful description complements the node name rather than repeats it. The description, which is optional, can spread over multiple lines; if it does, some authors prefer to indent the second line while others prefer to align it with the first (and all others). It’s up to you. An empty line, or the next menu entry, ends a description.

Space characters in a menu are preserved as-is in the Info output; this allows you to format the menu as you wish. Unfortunately you must type node names without any extra spaces or some versions of some Info readers will not find the node (see Section 4.4 [Node Line Requirements], page 33).

`makeinfo` warns when the text of a menu item (and node names and cross-references) contains a problematic construct that will interfere with its parsing in Info. If you don’t want to see the warnings, you can set the customization variable `INFO_SPECIAL_CHARS_WARNING` to ‘0’ (see Section 20.6.4 [Other Customization Variables], page 192).

4.9.5 Less Cluttered Menu Entry

When the menu entry name and node name are the same, you can write the name immediately after the asterisk and space at the beginning of the line and follow the name with two colons.

For example, write

```
* Name::                description
```

instead of

```
* Name: Name.          description
```

We recommend using the node name for the menu entry name whenever possible, since it reduces visual clutter in the menu.

4.9.6 Referring to Other Info Files

You can create a menu entry that enables a reader in Info to go to a node in another Info file by writing the file name in parentheses just before the node name. Some examples:

```
@menu
* first-entry-name:(filename)nodename.    description
* (filename)second-node::                description
@end menu
```

For example, to refer directly to the ‘Outlining’ and ‘Rebinding’ nodes in the *Emacs Manual*, you could write a menu like this:

```
@menu
* Outlining: (emacs)Outline Mode. The major mode for
              editing outlines.
* (emacs)Rebinding::                How to redefine the
              meaning of a key.
@end menu
```

If you do not list the node name, but only name the file, then Info presumes that you are referring to the ‘Top’ node. Examples:

```
* Info: (info).           Documentation browsing system.
* (emacs)::              The extensible, self-documenting
                        text editor.
```

The GNU Emacs Texinfo mode menu updating commands only work with nodes within the current buffer, so you cannot use them to create menus that refer to other files. You must write such menus by hand.

5 Chapter Structuring

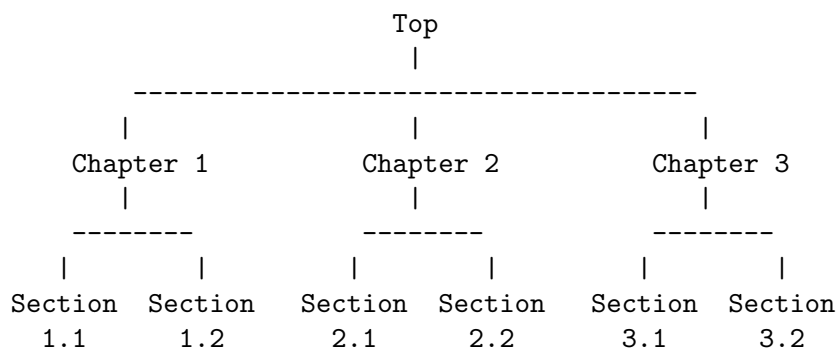
TeXinfo's *chapter structuring* commands divide a document into a hierarchy of chapters, sections, subsections, and subsubsections. These commands generate large headings in the text, like the one above. They also provide information for generating the table of contents (see Section 3.5 [Generating a Table of Contents], page 24).

Normally you put a `@node` command immediately before each chapter structuring command. See Chapter 4 [Nodes], page 31.

5.1 Tree Structure of Sections

A TeXinfo file is usually structured like a book with chapters, sections, subsections, and the like. This structure can be visualized as a tree (or rather as an upside-down tree) with the root at the top and the levels corresponding to chapters, sections, subsection, and subsubsections.

Here is a diagram that shows a TeXinfo file with three chapters, each with two sections.



In a TeXinfo file that has this structure, the beginning of Chapter 2 would be written like this:

```
@node    Chapter 2
@chapter Chapter 2
```

For purposes of example, here is how it would be written with explicit node pointers:

```
@node    Chapter 2, Chapter 3, Chapter 1, Top
@chapter Chapter 2
```

The chapter structuring commands are described in the sections that follow; the `@node` command is described in the previous chapter (see Chapter 4 [Nodes], page 31).

5.2 Structuring Command Types

The chapter structuring commands fall into four groups or series, each of which contains structuring commands corresponding to the hierarchical levels of chapters, sections, subsections, and subsubsections.

The four groups of commands are the `@chapter` series, the `@unnumbered` series, the `@appendix` series, and the `@heading` series. Each command produces a title with a different

appearance in the body of the document. Some of the commands list their titles in the tables of contents, while others do not. Here are the details:

- The `@chapter` and `@appendix` series of commands produce numbered or lettered entries both in the body of a document and in its table of contents.
- The `@unnumbered` series of commands produce unnumbered entries both in the body of a document and in its table of contents. The `@top` command, which has a special use, is a member of this series (see Section 4.6 [`@top` Command], page 35). An `@unnumbered` section is a normal part of the document structure.
- The `@heading` series of commands produce simple unnumbered headings that do not appear in a table of contents, are not associated with nodes, and cannot be cross-referenced. These heading commands never start a new page.

When a `@setchapternewpage` command says to do so, the `@chapter`, `@unnumbered`, and `@appendix` commands start new pages in the printed manual; the `@heading` commands do not. See Section 3.7.2 [`@setchapternewpage`], page 27.

Here is a summary:

<i>Numbered</i>	<i>Unnumbered</i>	<i>Lettered/numbered</i>	<i>No new page</i>
In contents	In contents	In contents	<i>Unnumbered</i>
	<code>@top</code>		Not in contents
<code>@chapter</code>	<code>@unnumbered</code>	<code>@appendix</code>	<code>@majorheading</code>
<code>@section</code>	<code>@unnumberedsec</code>	<code>@appendixsec</code>	<code>@chapheading</code>
<code>@subsection</code>	<code>@unnumberedsubsec</code>	<code>@appendixsubsec</code>	<code>@heading</code>
<code>@subsubsection</code>	<code>@unnumberedsubsubsec</code>	<code>@appendixsubsubsec</code>	<code>@subheading</code>
			<code>@subsubheading</code>

5.3 `@chapter`: Chapter Structuring

`@chapter` identifies a chapter in the document—the highest level of the normal document structuring hierarchy. Write the command at the beginning of a line and follow it on the same line by the title of the chapter. The chapter is numbered automatically, starting from 1.

For example, the present chapter in this manual is entitled “`@chapter`: Chapter Structuring”; the `@chapter` line looks like this:

```
@chapter @code{@@chapter}: Chapter Structuring
```

In $\text{T}_{\text{E}}\text{X}$, the `@chapter` command produces a chapter heading in the document.

In Info and plain text output, the `@chapter` command causes the title to appear on a line by itself, with a line of asterisks inserted underneath. So, the above example produces the following output:

```
5 Chapter Structuring
*****
```

In HTML, the `@chapter` command produces an `<h2>`-level header by default (controlled by the `CHAPTER_HEADER_LEVEL` customization variable, see Section 20.6.4 [Other Customization Variables], page 192).

In the XML and Docbook output, a `<chapter>` element is produced that includes all the following sections, up to the next chapter.

5.4 @unnumbered, @appendix: Chapters with Other Labeling

Use the `@unnumbered` command to start a chapter-level element that appears without chapter numbers of any kind. Use the `@appendix` command to start an appendix that is labeled by letter ('A', 'B', ...) instead of by number; appendices are also at the chapter level of structuring.

Write an `@appendix` or `@unnumbered` command at the beginning of a line and follow it on the same line by the title, just as with `@chapter`.

Texinfo also provides a command `@centerchap`, which is analogous to `@unnumbered`, but centers its argument in the printed and HTML outputs. This kind of stylistic choice is not usually offered by Texinfo. It may be suitable for short documents.

With `@unnumbered`, if the name of the associated node is one of these English words (case-insensitive):

```
Acknowledgements Colophon Dedication Preface
```

then the Docbook output uses corresponding special tags (`<preface>`, etc.) instead of the default `<chapter>`. The argument to `@unnumbered` itself can be anything, and is output as the following `<title>` text as usual.

5.5 @majorheading, @chapheading: Chapter-level Headings

The `@majorheading` and `@chapheading` commands produce chapter-like headings in the body of a document.

However, neither command produces an entry in the table of contents, and neither command causes TeX to start a new page in a printed manual.

In TeX, a `@majorheading` command generates a larger vertical whitespace before the heading than a `@chapheading` command but is otherwise the same.

In Info and plain text, the `@majorheading` and `@chapheading` commands produce the same output as `@chapter`: the title is printed on a line by itself with a line of asterisks underneath. Similarly for HTML. The only difference is the lack of numbering and the lack of any association with nodes. See Section 5.3 [`@chapter`], page 43.

5.6 @section: Sections Below Chapters

An `@section` command identifies a section within a chapter unit, whether created with `@chapter`, `@unnumbered`, or `@appendix`, following the numbering scheme of the chapter-level command. Thus, within a `@chapter` chapter numbered '1', the sections are numbered '1.1', '1.2', etc.; within an `@appendix` "chapter" labeled 'A', the sections are numbered 'A.1', 'A.2', etc.; within an `@unnumbered` chapter, the section gets no number. The output is underlined with '=' in Info and plain text.

To make a section, write the `@section` command at the beginning of a line and follow it on the same line by the section title. For example,

```
@section This is a section
```

might produce the following in Info:

```
5.7 This is a section
=====
```


Section titles are listed in the table of contents.

The `TEX`, HTML, Docbook, and XML output is all analogous to the chapter-level output, just “one level down”; see Section 5.3 [`@chapter`], page 43.

5.7 `@unnumberedsec`, `@appendixsec`, `@heading`

The `@unnumberedsec`, `@appendixsec`, and `@heading` commands are, respectively, the unnumbered, appendix-like, and heading-like equivalents of the `@section` command (see the previous section).

`@unnumberedsec` and `@appendixsec` do not need to be used in ordinary circumstances, because `@section` may also be used within `@unnumbered` and `@appendix` chapters; again, see the previous section.

`@unnumberedsec`

The `@unnumberedsec` command may be used within an unnumbered chapter or within a regular chapter or appendix to produce an unnumbered section.

`@appendixsec`

`@appendixsection`

`@appendixsection` is a longer spelling of the `@appendixsec` command; the two are synonymous.

Conventionally, the `@appendixsec` or `@appendixsection` command is used only within appendices.

`@heading` You may use the `@heading` command (almost) anywhere for a section-style heading that will not appear in the table of contents. The `@heading-series` commands can appear inside most environments, for example, though pathological and useless locations such as inside `@titlepage`, as an argument to another command, etc., are not allowed.

5.8 `@subsection`: Subsections Below Sections

Subsections are to sections as sections are to chapters; see Section 5.6 [`@section`], page 44. In Info and plain text, subsection titles are underlined with ‘-’. For example,

```
@subsection This is a subsection
might produce
  1.2.3 This is a subsection
  -----
```

Subsection titles are listed in the table of contents.

The `TEX`, HTML, Docbook, and XML output is all analogous to the chapter-level output, just “two levels down”; see Section 5.3 [`@chapter`], page 43.

5.9 The `@subsection-like` Commands

The `@unnumberedsubsec`, `@appendixsubsec`, and `@subheading` commands are, respectively, the unnumbered, appendix-like, and heading-like equivalents of the `@subsection` command. (See Section 5.8 [`@subsection`], page 45.)

`@unnumberedsubsec` and `@appendixsubsec` do not need to be used in ordinary circumstances, because `@subsection` may also be used within sections of `@unnumbered` and `@appendix` chapters (see Section 5.6 [section], page 44).

An `@subheading` command produces a heading like that of a subsection except that it is not numbered and does not appear in the table of contents. Similarly, an `@unnumberedsubsec` command produces an unnumbered heading like that of a subsection and an `@appendixsubsec` command produces a subsection-like heading labeled with a letter and numbers; both of these commands produce headings that appear in the table of contents. In Info and plain text, the `@subsection`-like commands generate a title underlined with hyphens.

5.10 @subsection and Other Subsub Commands

The fourth and lowest level sectioning commands in Texinfo are the ‘subsub’ commands. They are:

`@subsubsection`

Subsubsections are to subsections as subsections are to sections. (See Section 5.8 [section], page 45.) Subsubsection titles appear in the table of contents.

`@unnumberedsubsubsec`

Unnumbered subsubsection titles appear in the table of contents, but lack numbers. Otherwise, unnumbered subsubsections are the same as subsubsections.

`@appendixsubsubsec`

Conventionally, appendix commands are used only for appendices and are lettered and numbered appropriately. They also appear in the table of contents.

`@subsubheading`

The `@subsubheading` command may be used anywhere that you want a small heading that will not appear in the table of contents.

As with subsections, `@unnumberedsubsubsec` and `@appendixsubsubsec` do not need to be used in ordinary circumstances, because `@subsubsection` may also be used within subsections of `@unnumbered` and `@appendix` chapters (see Section 5.6 [section], page 44).

In Info, ‘subsub’ titles are underlined with periods. For example,

```
@subsubsection This is a subsubsection
might produce
```

```
1.2.3.4 This is a subsubsection
.....
```

The TeX, HTML, Docbook, and XML output is all analogous to the chapter-level output, just “three levels down”; see Section 5.3 [chapter], page 43.

5.11 @part: Groups of Chapters

The final sectioning command is `@part`, to mark a *part* of a manual, that is, a group of chapters or (rarely) appendices. This behaves quite differently from the other sectioning commands, to fit with the way such “parts” are conventionally used in books.

No `@node` command is associated with `@part`. Just write the command on a line by itself, including the part title, at the place in the document you want to mark off as starting that part. For example:

```
@part Part I:@* The beginning
```

As can be inferred from this example, no automatic numbering or labeling of the `@part` text is done. The text is taken as-is.

Because parts are not associated with nodes, no general text can follow the `@part` line. To produce the intended output, it must be followed by a chapter-level command (including its node). Thus, to continue the example:

```
@part Part I:@* The beginning
```

```
@node Introduction
@chapter Introduction
...
```

In the $\text{T}_{\text{E}}\text{X}$ output, the `@part` text is included in both the normal and short tables of contents (see Section 3.5 [Contents], page 24), without a page number (since that is the normal convention). In addition, a “part page” is output in the body of the document, with just the `@part` text. In the example above, the `@*` causes a line break on the part page (but is replaced with a space in the tables of contents). This part page is always forced to be on an odd (right-hand) page, regardless of the chapter pagination (see Section 3.7.2 [`@setchapternewpage`], page 27).

In the HTML output, the `@part` text is similarly included in the tables of contents, and a heading is included in the main document text, as part of the following chapter or appendix node.

In the XML and Docbook output, the `<part>` element includes all the following chapters, up to the next `<part>`. A `<part>` containing chapters is also closed at an appendix.

In the Info and plain text output, `@part` has no effect.

`@part` is ignored when raising or lowering sections (see next section). That is, it is never lowered and nothing can be raised to it.

5.12 Raise/lower Sections: `@raisesections` and `@lowersections`

The `@raisesections` and `@lowersections` commands implicitly raise and lower the hierarchical level of following chapters, sections and the other sectioning commands (excluding parts).

That is, the `@raisesections` command changes sections to chapters, subsections to sections, and so on. Conversely, the `@lowersections` command changes chapters to sections, sections to subsections, and so on. Thus, a `@lowersections` command cancels a `@raisesections` command, and vice versa.

You can use `@lowersections` to include text written as an outer or standalone Texinfo file in another Texinfo file as an inner, included file (see Chapter 18 [Include Files], page 159). Typical usage looks like this:

```
@lowersections
```

```
@include somefile.texi
@raisesections
```

(Without the `@raisesections`, all the subsequent sections in the main file would also be lowered.)

If the included file being lowered has a `@top` node, you'll need to conditionalize its inclusion with a flag (see Section 16.5.1 [`@set @value`], page 143).

As a practical matter, you generally only want to raise or lower large chunks, usually in external files as shown above. The final result has to have menus that take the raising and lowering into account, so you cannot just arbitrarily sprinkle `@raisesections` and `@lowersections` commands throughout the document.

Repeated use of the commands continues to raise or lower the hierarchical level a step at a time. An attempt to raise above 'chapter' reproduces chapter commands; an attempt to lower below 'subsubsection' reproduces subsubsection commands. Also, lowered subsubsections and raised chapters will not work with `makeinfo`'s feature of implicitly determining node pointers, since the menu structure cannot be represented correctly.

Write each `@raisesections` and `@lowersections` command on a line of its own.

6 Cross-references

Cross-references are used to refer the reader to other parts of the same or different Texinfo files.

6.1 What References Are For

Often, but not always, a printed document should be designed so that it can be read sequentially. People tire of flipping back and forth to find information that should be presented to them as they need it.

However, in any document, some information will be too detailed for the current context, or incidental to it; use cross-references to provide access to such information. Also, an online help system or a reference manual is not like a novel; few read such documents in sequence from beginning to end. Instead, people look up what they need. For this reason, such creations should contain many cross references to help readers find other information that they may not have read.

In a printed manual, a cross-reference results in a page reference, unless it is to another manual altogether, in which case the cross-reference names that manual. In Info, a cross-reference results in an entry that you can follow using the Info ‘f’ command. (See Section “Following cross-references” in *Info*.) In HTML, a cross-reference results in an hyperlink.

The various cross-reference commands use nodes (or anchors, see Section 6.8 [`@anchor`], page 56) to define cross-reference locations. `TEX` needs nodes to define cross-reference locations. When `TEX` generates a DVI file, it records each node’s page number and uses the page numbers in making references. Thus, even if you are writing a manual that will only be printed, and not used online, you must nonetheless write `@node` lines in order to name the places to which you make cross-references.

6.2 Different Cross-reference Commands

There are three different cross-reference commands:

- `@xref` Used to start a sentence in the printed manual and in HTML with ‘See . . .’ or an Info cross-reference saying ‘*Note *name*: *node*.’.
- `@ref` Used within or, more often, at the end of a sentence; produces just the reference in the printed manual and in HTML without the preceding ‘See’ (same as `@xref` for Info).
- `@pxref` Used within parentheses, at the end of a sentence, or otherwise before punctuation, to make a reference. Its output starts with a lowercase ‘see’ in the printed manual and in HTML, and a lowercase ‘*note’ in Info. (‘p’ is for ‘parenthesis’.)

Additionally, there are commands to produce references to documents outside the Texinfo system. The `@cite` command is used to make references to books and manuals. `@url` produces a URL, for example a reference to a page on the World Wide Web. `@inforef` is used to make a reference to an Info file for which there is no printed manual.

6.3 Parts of a Cross-reference

A cross-reference command requires only one argument, which is the name of the node to which it refers. Here is a simple example:

```
@xref{Node name}.
```

In Info output, this produces

```
*Note Node name::.
```

In a printed manual, the output is

```
See Section nnn [Node name], page ppp.
```

A cross-reference command may contain up to four additional arguments. By using these arguments, you can provide a cross-reference name, a topic description or section title for the printed output, the name of a different manual file, and the name of a different printed manual. To refer to another manual as a whole, the manual file and/or the name of the printed manual are the only required arguments (see Section 6.5 [Referring to a Manual as a Whole], page 54).

Here is an example of a full five-part cross-reference:

```
@xref{Node name, Online Label, Printed Label,  
info-file-name, A Printed Manual}, for details.
```

which produces

```
*Note Online Label: (info-file-name)Node name,  
for details.
```

in Info and

```
See section "Printed Label" in A Printed Manual, for details.
```

in a printed book.

The five possible arguments for a cross-reference are:

1. The node or anchor name (required, except for reference to whole manuals). This is the location to which the cross-reference takes you. In a printed document, the location of the node provides the page reference only for references within the same document. Use `@node` to define the node (see Section 4.3 [Writing a Node], page 32), or `@anchor` (see Section 6.8 [@anchor], page 56).

Write a node name in a cross-reference in exactly the same way as in the `@node` line, including the same capitalization; otherwise, the formatters may not find the reference.

2. A label for online output. It is usually omitted; then the topic description (third argument) is used if it was specified; if that was omitted as well, the node name is used.
3. A label for printed output. Often, this is the title or topic of the section. This is used as the name of the reference in the printed manual. If omitted, the node name is used.
4. The name of the manual file in which the reference is located, if it is different from the current file. This name is used both for Info and HTML.
5. The name of a printed manual from a different Texinfo file.

The template for a full five argument cross-reference looks like this:

```
@xref{node-name, online-label, printed-label,  
info-file-name, printed-manual-title}
```

Whitespace before and after the commas separating these arguments is ignored. To include a comma in one of the arguments, use `@comma{}` (see Section 12.1.3 [Inserting a Comma], page 104).

When processing with TeX, a comma is automatically inserted after the page number for cross-references to within the same manual, unless the closing brace of the argument is followed by non-whitespace (such as a comma or period). This gives you the choice of whether to have a comma there in Info or HTML output. For example,

```
@xref{Another Section} for more information
```

produces ‘See Another Section, page *ppp*, for more information’ in the printed output, and ‘**Note Another Section:: for more information*’ in the Info output.

If an unwanted comma is added, follow the argument with a command such as ‘@.’. For example, ‘`@xref{Hurricanes}@: --- for the details`’ produces

```
See Hurricanes, page ppp — for the details
```

instead of ‘See Hurricanes, page *ppp*, — for the details’.

Cross-references with one, two, three, four, and five arguments are described separately following the description of `@xref`.

`makeinfo` warns when the text of a cross-reference (and node names and menu items) contains a problematic construct that will interfere with its parsing in Info. If you don’t want to see the warnings, you can set the customization variable `INFO_SPECIAL_CHARS_WARNING` to ‘0’ (see Section 20.6.4 [Other Customization Variables], page 192).

6.4 `@xref`

The `@xref` command generates a cross-reference for the beginning of a sentence.

6.4.1 `@xref` with One Argument

The simplest form of `@xref` takes one argument, the name of another node in the same Texinfo file.

For example,

```
@xref{Tropical Storms}.
```

produces

```
*Note Tropical Storms::.
```

in Info and

```
See Section 3.1 [Tropical Storms], page 24.
```

in a printed manual.

6.4.2 `@xref` with Two Arguments

With two arguments, the second is used as a label for the online output.

The template is like this:

```
@xref{node-name, online-label}.
```

For example,

```
@xref{Electrical Effects, Lightning}.
```

produces:

```
*Note Lightning: Electrical Effects.
```

in Info and

See Section 5.2 [Electrical Effects], page 57.

in a printed manual, where the node name is printed.

The second argument to cross-references must observe some of the restrictions for node names (see Section 4.4 [Node Line Requirements], page 33). The most common issue is that colons cannot be used, since that interferes with the parsing of the Info file.

6.4.3 @xref with Three Arguments

A third argument replaces the node name in the T_EX output. The third argument should be the name of the section in the printed output, or else state the topic discussed by that section.

The template is like this:

```
@xref{node-name, online-label, printed-label}.
```

For example,

```
@xref{Electrical Effects, Lightning, Thunder and Lightning},
for details.
```

produces

```
*Note Lightning: Electrical Effects, for details.
```

in Info and

See Section 5.2 [Thunder and Lightning], page 57, for details.

in a printed manual.

If a third argument is given and the second one is empty, then the third argument serves for both. (Note how two commas, side by side, mark the empty second argument.)

```
@xref{Electrical Effects, , Thunder and Lightning},
for details.
```

produces

```
*Note Thunder and Lightning: Electrical Effects, for details.
```

in Info and

See Section 5.2 [Thunder and Lightning], page 57, for details.

in a printed manual.

The third argument to cross-references must observe some of the restrictions for node names (see Section 4.4 [Node Line Requirements], page 33). The most common issue is that colons cannot be used, since that interferes with the parsing of the Info file.

As a practical matter, it is often best to write cross-references with just the first argument if the node name and the section title are the same (or nearly so), and with the first and third arguments only if the node name and title are different.

Texinfo offers a setting to use the section title instead of node names by default in cross-references (an explicitly specified third argument still takes precedence):

```
@xrefautomaticsectiontitle on
```


Typically this line would be given near the beginning of the document and used for the whole manual. But you can turn it off if you want (`@xrefautomaticsectiontitle off`), for example, if you're including some other sub-document that doesn't have suitable section names.

6.4.4 @xref with Four and Five Arguments

In a cross-reference, a fourth argument specifies the name of another Info file, different from the file in which the reference appears, and a fifth argument specifies its title as a printed manual.

The full template is:

```
@xref{node-name, online-label, printed-label,
info-file-name, printed-manual-title}.
```

For example,

```
@xref{Electrical Effects, Lightning, Thunder and Lightning,
weather, An Introduction to Meteorology}.
```

produces this output in Info:

```
*Note Lightning: (weather)Electrical Effects.
```

As you can see, the name of the Info file is enclosed in parentheses and precedes the name of the node.

In a printed manual, the reference looks like this:

See section “Thunder and Lightning” in *An Introduction to Meteorology*.

The title of the printed manual is typeset like `@cite`; and the reference lacks a page number since `TEX` cannot know to which page a reference refers when that reference is to another manual.

Next case: often, you will leave out the second argument when you use the long version of `@xref`. In this case, the third argument, the topic description, will be used as the cross-reference name in Info. For example,

```
@xref{Electrical Effects, , Thunder and Lightning,
weather, An Introduction to Meteorology}.
```

produces

```
*Note Thunder and Lightning: (weather)Electrical Effects.
```

in Info and

See section “Thunder and Lightning” in *An Introduction to Meteorology*.

in a printed manual.

Next case: If the node name and the section title are the same in the other manual, you may also leave out the section title. In this case, the node name is used in both instances. For example,

```
@xref{Electrical Effects,,,
weather, An Introduction to Meteorology}.
```

produces

```
*Note (weather)Electrical Effects:..
```

in Info and

See section “Electrical Effects” in *An Introduction to Meteorology*.
in a printed manual.

A very unusual case: you may want to refer to another manual file that is within a single printed manual—when multiple Texinfo files are incorporated into the same T_EX run but can create separate Info or HTML output files. In this case, you need to specify only the fourth argument, and not the fifth.

Finally, it’s also allowed to leave out all the arguments *except* the fourth and fifth, to refer to another manual as a whole. See the next section.

6.5 Referring to a Manual as a Whole

Ordinarily, you must always name a node in a cross-reference. However, it’s not unusual to want to refer to another manual as a whole, rather than a particular section within it. In this case, giving any section name is an unnecessary distraction.

So, with cross-references to other manuals (see Section 6.4.4 [Four and Five Arguments], page 53), if the first argument is either ‘Top’ (capitalized just that way) or omitted entirely, and the third argument is omitted, the printed output includes no node or section name. (The Info output includes ‘Top’ if it was given.) For example,

```
@xref{Top,,, make, The GNU Make Manual}.
```

produces

```
*Note (make)Top:..
```

and

```
See The GNU Make Manual.
```

Info readers will go to the Top node of the manual whether or not the ‘Top’ node is explicitly specified.

It’s also possible (and is historical practice) to refer to a whole manual by specifying the ‘Top’ node and an appropriate entry for the third argument to the @xref command. Using this idiom, to make a cross-reference to *The GNU Make Manual*, you would write:

```
@xref{Top,, Overview, make, The GNU Make Manual}.
```

which produces

```
*Note Overview: (make)Top.
```

in Info and

```
See section “Overview” in The GNU Make Manual.
```

in a printed manual.

In this example, ‘Top’ is the name of the first node, and ‘Overview’ is the name of the first section of the manual. There is no widely-used convention for naming the first section in a printed manual, this is just what the Make manual happens to use. This arbitrariness of the first name is a principal reason why omitting the third argument in whole-manual cross-references is preferable.

6.6 @ref

`@ref` is nearly the same as `@xref` except that it does not generate a ‘See’ in the printed output, just the reference itself. This makes it useful as the last part of a sentence.

For example,

```
For more information, @pxref{This}, and @ref{That}.
```

produces in Info:

```
For more information, *note This::, and *note That::.
```

and in printed output:

```
For more information, see Section 1.1 [This], page 1, and Section 1.2 [That],
page 2.
```

The `@ref` command can tempt writers to express themselves in a manner that is suitable for a printed manual but looks awkward in the Info format. Bear in mind that your audience could be using both the printed and the Info format. For example:

```
Sea surges are described in @ref{Hurricanes}.
```

looks ok in the printed output:

```
Sea surges are described in Section 6.7 [Hurricanes], page 72.
```

but is awkward to read in Info, “note” being a verb:

```
Sea surges are described in *note Hurricanes::.
```

6.7 @pxref

The parenthetical reference command, `@pxref`, is nearly the same as `@xref`, but it is best used at the end of a sentence or before a closing parenthesis. The command differs from `@xref` in that \TeX typesets the reference for the printed manual with a lowercase ‘see’ rather than an uppercase ‘See’.

With one argument, a parenthetical cross-reference looks like this:

```
... storms cause flooding (@pxref{Hurricanes}) ...
```

which produces

```
... storms cause flooding (*note Hurricanes::) ...
```

in Info and

```
... storms cause flooding (see Section 6.7 [Hurricanes], page 72) ...
```

in a printed manual.

With two arguments, a parenthetical cross-reference has this template:

```
... (@pxref{node-name, cross-reference-name}) ...
```

which produces

```
... (*note cross-reference-name: node-name.) ...
```

in Info and

```
... (see Section nnn [node-name], page ppp) ...
```

in a printed manual.

`@pxref` can be used with up to five arguments, just like `@xref` (see Section 6.4 [`@xref`], page 51).

In past versions of Texinfo, it was not allowed to write punctuation after a `@pxref`, so it could be used *only* before a right parenthesis. This is no longer the case, so now it can be used (for example) at the end of a sentence, where a lowercase “see” works best. For instance:

```
... For more information, @pxref{More}.
```

which outputs (in Info):

```
... For more information, *note More::.
```

As a matter of style, `@pxref` is best used at the ends of sentences. Although it technically works in the middle of a sentence, that location breaks up the flow of reading.

6.8 @anchor: Defining Arbitrary Cross-reference Targets

An *anchor* is a position in your document, labelled so that cross-references can refer to it, just as they can to nodes. You create an anchor with the `@anchor` command, and give the label as a normal brace-delimited argument. For example:

```
This marks the @anchor{x-spot}spot.
...
@xref{x-spot,,the spot}.
```

produces:

```
This marks the spot.
...
See [the spot], page 1.
```

As you can see, the `@anchor` command itself produces no output. This example defines an anchor ‘x-spot’ just before the word ‘spot’. You can refer to it later with an `@xref` or other cross reference command, as shown (see Chapter 6 [Cross References], page 49).

It is best to put `@anchor` commands just before the position you wish to refer to; that way, the reader’s eye is led on to the correct text when they jump to the anchor. You can put the `@anchor` command on a line by itself if that helps readability of the source. Whitespace (including newlines) is ignored after `@anchor`.

Anchor names and node names may not conflict. Anchors and nodes are given similar treatment in some ways; for example, the `goto-node` command takes either an anchor name or a node name as an argument. (See Section “Go to node” in *Info*.)

Also like node names, anchor names cannot include some characters (see Section 4.4 [Node Line Requirements], page 33).

Because of this duality, when you delete or rename a node, it is usually a good idea to define an `@anchor` with the old name. That way, any links to the old node, whether from other Texinfo manuals or general web pages, keep working. You can also do this with the `RENAMED_NODES_FILE` feature of `makeinfo` (see Section 22.4.7 [HTML Xref Link Preservation], page 220). Both methods keep links on the web working; the only substantive difference is that defining anchors also makes the old node names available when reading the document in Info.

6.9 @inforef: Cross-references to Info-only Material

`@inforef` is used for making cross-references to Info documents—even from a printed manual. This might be because you want to refer to conditional `@ifinfo` text (see Chapter 16 [Conditionals], page 139), or because printed output is not available (perhaps because there is no Texinfo source), among other possibilities.

The command takes either two or three arguments, in the following order:

1. The node name.
2. The cross-reference name (optional).
3. The Info file name.

The template is:

```
@inforef{node-name, cross-reference-name, info-file-name}
```

For example,

```
@inforef{Advanced, Advanced Info commands, info},
for more information.
```

produces (in Info):

```
*Note Advanced Info commands: (info)Advanced,
for more information.
```

and (in the printed output):

```
See Info file info, node ‘Advanced’, for more information.
```

(This particular example is not realistic, since the Info manual is written in Texinfo, so all formats are available. In fact, we don’t know of any extant Info-only manuals.)

The converse of `@inforef` is `@cite`, which is used to refer to printed works for which no Info form exists. See Section 6.11 [`@cite`], page 60.

6.10 @url, @uref{url[, text][, replacement]}

`@uref` produces a reference to a uniform resource locator (url). It takes one mandatory argument, the url, and two optional arguments which control the text that is displayed. In HTML and PDF output, `@uref` produces a link you can follow. (To merely indicate a url without creating a link people can follow, use `@indicateurl`, see Section 7.1.15 [`@indicateurl`], page 69.)

`@url` is a synonym for `@uref`. (Originally, `@url` had the meaning of `@indicateurl`, but in practice it was almost always misused. So we’ve changed the meaning.)

The second argument, if specified, is the text to display (the default is the url itself); in Info, DVI, and PDF output, but not in HTML output, the url is output in addition to this text.

The third argument, if specified, is the text to display, but in this case the url is not output in any format. This is useful when the text is already sufficiently referential, as in a man page. Also, if the third argument is given, the second argument is ignored.

6.10.1 @url Examples

First, here is an example of the simplest form of `@url`, with just one argument. The given url is both the target and the visible text of the link:

The official GNU ftp site is `@uref{http://ftp.gnu.org/gnu}`.
produces:

The official GNU ftp site is <http://ftp.gnu.org/gnu>.

Two-argument form of @url

Here is an example of the two-argument form:

The official `@uref{http://ftp.gnu.org/gnu, GNU ftp site}`
holds programs and texts.

which produces:

The official GNU ftp site (<http://ftp.gnu.org/gnu>)
holds programs and texts.

that is, the Info (and \TeX , etc.) output is this:

The official GNU ftp site (<http://ftp.gnu.org/gnu>)
holds programs and texts.

while the HTML output is this:

The official `GNU ftp site`
holds programs and texts.

Three-argument form of @url

Finally, an example of the three-argument form:

The `@uref{/man.cgi/1/ls,,ls}` program ...

which, except for HTML, produces:

The ls program ...

but with HTML:

The `ls` program ...

By the way, some people prefer to display urls in the unambiguous format:

`<URL:http://host/path>`

You can use this form in the input file if you wish. We feel it's not necessary to include the '`<URL:.`' and '`>`' in the output, since to be useful any software that tries to detect urls in text already has to detect them without the '`<URL:.`'.

6.10.2 URL Line Breaking

\TeX allows line breaking within urls at only a few characters (which are special in urls): '&', '.', '#', '?', and '/' (but not between two '/' characters). A tiny amount of stretchable space is also inserted around these characters to help with line breaking.

For HTML output, modern browsers will also do line breaking within displayed urls. If you need to allow breaks at other characters you can insert `@/` as needed (see Section 13.2 [Line Breaks], page 119).

By default, in \TeX any such breaks at special characters will occur after the character. Some people prefer such breaks to happen before the special character. This can be controlled with the `@urefbreakstyle` command (this command has effect only in \TeX):

```
@urefbreakstyle how
```

where the argument *how* is one of these words:

- ‘after’ (the default) Potentially break after the special characters.
- ‘before’ Potentially break before the special characters.
- ‘none’ Do not consider breaking at the special characters at all; any potential breaks must be manually inserted.

6.10.3 @url PDF Output Format

If the ultimate purpose of a PDF is only to be viewed online, perhaps similar to HTML in some inchoate way, you may not want the urls to be included in the visible text (just as urls are not visible to readers of web pages). Texinfo provides a PDF-specific option for this, which must be used inside `@tex`:

```
@tex
\global\urefurlonlylinktrue
@end tex
```

The result is that `@url{http://www.gnu.org, GNU}` has the visible output of just ‘GNU’, with a link target of `http://www.gnu.org`. Ordinarily, the visible output would include both the label and the url: ‘GNU (`http://www.gnu.org`)’.

This option only has effect when the PDF output is produced with the pdf \TeX program, not with other ways of getting from Texinfo to PDF (e.g., \TeX to DVI to PDF). Consequently, it is ok to specify this option unconditionally within `@tex`, as shown above. It is ignored when DVI is being produced.

6.10.4 PDF Colors

By default, urls and cross-reference links are printed in black in PDF output. Very occasionally, however, you may want to highlight such “live” links with a different color, as is commonly done on web pages. Texinfo provides a PDF-specific option for specifying these colors, which must be used inside `@tex`:

```
@tex
\global\def\linkcolor{1 0 0} % red
\global\def\urlcolor{0 1 0} % green
@end tex
```

`\urlcolor` changes the color of `@url` output (both the actual url and any textual label), while `\linkcolor` changes the color for cross-references to nodes, etc. They are independent.

The three given values must be numbers between 0 and 1, specifying the amount of red, green, and blue respectively.

These definitions only have an effect when the PDF output is produced with the pdf \TeX program, not with other ways of getting from Texinfo to PDF (e.g., \TeX to DVI to PDF). Consequently, it is ok to specify this option unconditionally within `@tex`, as shown above. It is ignored when DVI is being produced.

We do not recommend colorizing just for fun; unless you have a specific reason to use colors, best to skip it.

6.11 `@cite`{*reference*}

Use the `@cite` command for the name of a book that lacks a companion Info file. The command produces italics in the printed manual, and quotation marks in the Info file.

If a book is written in Texinfo, it is better to use a cross-reference command since a reader can easily follow such a reference in Info. See Section 6.4 [`@xref`], page 51.

7 Marking Text, Words and Phrases

In Texinfo, you can mark words and phrases in a variety of ways. The Texinfo formatters use this information to determine how to highlight the text. You can specify, for example, whether a word or phrase is a defining occurrence, a metasyntactic variable, or a symbol used in a program. Also, you can emphasize text, in several different ways.

7.1 Indicating Definitions, Commands, etc.

Texinfo has commands for indicating just what kind of object a piece of text refers to. For example, email addresses are marked by `@email`; that way, the result can be a live link to send email when the output format supports it. If the email address was simply marked as “print in a typewriter font”, that would not be possible.

7.1.1 Highlighting Commands are Useful

The commands serve a variety of purposes:

`@code{sample-code}`

Indicate text that is a literal example of a piece of a program. See Section 7.1.2 [`@code`], page 62.

`@kbd{keyboard-characters}`

Indicate keyboard input. See Section 7.1.3 [`@kbd`], page 63.

`@key{key-name}`

Indicate the conventional name for a key on a keyboard. See Section 7.1.4 [`@key`], page 64.

`@samp{text}`

Indicate text that is a literal example of a sequence of characters. See Section 7.1.5 [`@samp`], page 65.

`@verb{text}`

Write a verbatim sequence of characters. See Section 7.1.6 [`@verb`], page 65.

`@var{metasyntactic-variable}`

Indicate a metasyntactic variable. See Section 7.1.7 [`@var`], page 66.

`@env{environment-variable}`

Indicate an environment variable. See Section 7.1.8 [`@env`], page 66.

`@file{file-name}`

Indicate the name of a file. See Section 7.1.9 [`@file`], page 67.

`@command{command-name}`

Indicate the name of a command. See Section 7.1.10 [`@command`], page 67.

`@option{option}`

Indicate a command-line option. See Section 7.1.11 [`@option`], page 67.

`@dfn{term}`

Indicate the introductory or defining use of a term. See Section 7.1.12 [`@dfn`], page 67.

`@cite{reference}`

Indicate the name of a book. See Section 6.11 [`@cite`], page 60.

`@abbr{abbreviation}`

Indicate an abbreviation, such as ‘Comput.’.

`@acronym{acronym}`

Indicate an acronym. See Section 7.1.14 [`@acronym`], page 68.

`@indicaturl{uniform-resource-locator}`

Indicate an example (that is, nonfunctional) uniform resource locator. See Section 7.1.15 [`@indicaturl`], page 69. (Use `@url` (see Section 6.10 [`@url`], page 57) for live urls.)

`@email{email-address[, displayed-text]}`

Indicate an electronic mail address. See Section 7.1.16 [`@email`], page 69.

7.1.2 `@code{sample-code}`

Use the `@code` command to indicate text that is a piece of a program and which consists of entire syntactic tokens. Enclose the text in braces.

Thus, you should use `@code` for an expression in a program, for the name of a variable or function used in a program, or for a keyword in a programming language.

Use `@code` for command names in languages that resemble programming languages, such as Texinfo. For example, `@code` and `@samp` are produced by writing ‘`@code{@code}`’ and ‘`@code{@samp}`’ in the Texinfo source, respectively.

It is incorrect to alter the case of a word inside a `@code` command when it appears at the beginning of a sentence. Most computer languages are case sensitive. In C, for example, `Printf` is different from the identifier `printf`, and most likely is a misspelling of it. Even in languages which are not case sensitive, it is confusing to a human reader to see identifiers spelled in different ways. Pick one spelling and always use that. If you do not want to start a sentence with a command name written all in lowercase, you should rearrange the sentence.

In the Info output, `@code` results in single quotation marks around the text. In other formats, `@code` argument is typeset in a typewriter (monospace) font. For example,

```
The function returns @code{nil}.
```

produces this:

```
The function returns nil.
```

Here are some cases for which it is preferable *not* to use `@code`:

- For shell command names, such as `ls` (use `@command`).
- For environment variables, such as `TEXINPUTS` (use `@env`).
- For shell options, such as ‘`-c`’, when such options stand alone (use `@option`).
- An entire shell command often looks better if written using `@samp` rather than `@code`. In this case, the rule is to choose the more pleasing format.
- For a string of characters shorter than a syntactic token. For example, if you are writing about ‘`goto-ch`’, which is just a part of the name for the `goto-char` Emacs Lisp function, you should use `@samp`.

- In general, when writing about the characters used in a token; for example, do not use `@code` when you are explaining what letters or printable symbols can be used in the names of functions. (Use `@samp`.) Also, you should not use `@code` to mark text that is considered input to programs unless the input is written in a language that is like a programming language. For example, you should not use `@code` for the keystroke commands of GNU Emacs (use `@kbd` instead) although you may use `@code` for the names of the Emacs Lisp functions that the keystroke commands invoke.

By default, $\text{T}_{\text{E}}\text{X}$ will consider breaking lines at ‘-’ and ‘_’ characters within `@code` and related commands. This can be controlled with `@allowcodebreaks` (see Section 13.4 [`@allowcodebreaks`], page 120). The HTML output attempts to respect this for ‘-’, but ultimately it is up to the browser’s behavior. For Info, it seems better never to make such breaks.

For Info, the quotes are omitted in the output of the `@code` command and related commands (e.g., `@kbd`, `@command`), in typewriter-like contexts such as the `@example` environment (see Section 8.4 [`@example`], page 74) and `@code` itself, etc.

To control which quoting characters are implicitly inserted by Texinfo processors in the output of ‘`@code`’, etc., see the `OPEN_QUOTE_SYMBOL` and `CLOSE_QUOTE_SYMBOL` customization variables (see Section 20.6.4 [Other Customization Variables], page 192). This is separate from how actual quotation characters in the input document are handled (see Section 12.2 [Inserting Quote Characters], page 105).

7.1.3 `@kbd`{*keyboard-characters*}

Use the `@kbd` command for characters of input to be typed by users. For example, to refer to the characters *M-a*, write:

```
@kbd{M-a}
```

and to refer to the characters *M-x shell*, write:

```
@kbd{M-x shell}
```

By default, the `@kbd` command produces a different font (slanted typewriter instead of normal typewriter), so users can distinguish the characters that they are supposed to type from those that the computer outputs.

Since the usage of `@kbd` varies from manual to manual, you can control the font switching with the `@kbdinputstyle` command. This command has no effect on Info output. Write this command at the beginning of a line with a single word as an argument, one of the following:

‘code’ Always use the same font for `@kbd` as `@code`.

‘example’ Use the distinguishing font for `@kbd` only in `@example` and similar environments.

‘distinct’

(the default) Always use the distinguishing font for `@kbd`.

You can embed another `@-`command inside the braces of a `@kbd` command. Here, for example, is the way to describe a command that would be described more verbosely as “press the ‘r’ key and then press the RETURN key”:

```
@kbd{r @key{RET}}
```

This produces: *r RET*. (The present manual uses the default for `@kbdinputstyle`.)

You also use the `@kbd` command if you are spelling out the letters you type; for example:

To give the `@code{logout}` command,
type the characters `@kbd{l o g o u t @key{RET}}`.

This produces:

To give the `logout` command, type the characters `l o g o u t RET`.

(Also, this example shows that you can add spaces for clarity. If you explicitly want to mention a space character as one of the characters of input, write `@key{SPC}` for it.)

7.1.4 `@key{key-name}`

Use the `@key` command for the conventional name for a key on a keyboard, as in:

`@key{RET}`

You can use the `@key` command within the argument of an `@kbd` command when the sequence of characters to be typed includes one or more keys that are described by name.

For example, to produce `C-x ESC` and `M-TAB` you would type:

`@kbd{C-x @key{ESC}}`
`@kbd{M-@key{TAB}}`

Here is a list of the recommended names for keys:

SPC	Space
RET	Return
LFD	Linefeed (however, since most keyboards nowadays do not have a Linefeed key, it might be better to call this character <code>C-j</code>)
TAB	Tab
BS	Backspace
ESC	Escape
DELETE	Delete
SHIFT	Shift
CTRL	Control
META	Meta

There are subtleties to handling words like ‘meta’ or ‘ctrl’ that are names of modifier keys. When mentioning a character in which the modifier key is used, such as `Meta-a`, use the `@kbd` command alone; do not use the `@key` command; but when you are referring to the modifier key in isolation, use the `@key` command. For example, write `@kbd{Meta-a}` to produce `Meta-a` and `@key{META}` to produce `META`.

As a convention in GNU manuals, `@key` should not be used in index entries.

7.1.5 `@samp{text}`

Use the `@samp` command to indicate text that is a literal example or ‘sample’ of a sequence of characters in a file, string, pattern, etc. Enclose the text in braces. The argument appears within single quotation marks in both the Info file and the printed manual; in addition, it is printed in a fixed-width font.

To match `@samp{foo}` at the end of the line,
use the regexp `@samp{foo$}`.

produces

To match ‘foo’ at the end of the line, use the regexp ‘foo\$’.

Any time you are referring to single characters, you should use `@samp` unless `@kbd` or `@key` is more appropriate. Also, you may use `@samp` for entire statements in C and for entire shell commands—in this case, `@samp` often looks better than `@code`. Basically, `@samp` is a catchall for whatever is not covered by `@code`, `@kbd`, `@key`, `@command`, etc.

Only include punctuation marks within braces if they are part of the string you are specifying. Write punctuation marks outside the braces if those punctuation marks are part of the English text that surrounds the string. In the following sentence, for example, the commas and period are outside of the braces:

In English, the vowels are `@samp{a}`, `@samp{e}`,
`@samp{i}`, `@samp{o}`, `@samp{u}`, and sometimes
`@samp{y}`.

This produces:

In English, the vowels are ‘a’, ‘e’, ‘i’, ‘o’, ‘u’, and sometimes ‘y’.

7.1.6 `@verb{chartextchar}`

Use the `@verb` command to print a verbatim sequence of characters.

Like L^AT_EX’s `\verb` command, the verbatim text can be quoted using any unique delimiter character. Enclose the verbatim text, including the delimiters, in braces. Text is printed in a fixed-width font:

How many `@verb{|@|}`-escapes does one need to print this
`@verb{.@a @b.@c.}` string or `@verb{+@'e?{'!'\+}` this?

produces

How many @-escapes does one need to print this
@a @b.@c string or @'e?{'!\ this?

This is in contrast to `@samp` (see the previous section), `@code`, and similar commands; in those cases, the argument is normal Texinfo text, where the three characters `@{}` are special, as usual. With `@verb`, nothing is special except the delimiter character you choose.

The delimiter character itself may appear inside the verbatim text, as shown above. As another example, `@verb{...}` prints a single (fixed-width) period.

It is not reliable to use `@verb` inside other Texinfo constructs. In particular, it does not work to use `@verb` in anything related to cross-referencing, such as section titles or figure captions.

7.1.7 @var{*metasyntactic-variable*}

Use the `@var` command to indicate metasyntactic variables. A *metasyntactic variable* is something that stands for another piece of text. For example, you should use a metasyntactic variable in the documentation of a function to describe the arguments that are passed to that function.

Do not use `@var` for the names of normal variables in computer programs. These are specific names, so `@code` is correct for them (`@code`). For example, the Emacs Lisp variable `texinfo-tex-command` is not a metasyntactic variable; it is properly formatted using `@code`.

Do not use `@var` for environment variables either; `@env` is correct for them (see the next section).

The effect of `@var` in the Info file is to change the case of the argument to all uppercase. In the printed manual and HTML output, the argument is output in slanted type.

For example,

```
To delete file @var{filename},
type @samp{rm @var{filename}}.
```

produces

```
To delete file filename, type ‘rm filename’.
```

(Note that `@var` may appear inside `@code`, `@samp`, `@file`, etc.)

Write a metasyntactic variable all in lowercase without spaces, and use hyphens to make it more readable. Thus, the Texinfo source for the illustration of how to begin a Texinfo manual looks like this:

```
\input texinfo
@@settitle @var{name-of-manual}
```

This produces:

```
\input texinfo
@settitle name-of-manual
```

In some documentation styles, metasyntactic variables are shown with angle brackets, for example:

```
..., type rm <filename>
```

However, that is not the style that Texinfo uses.

7.1.8 @env{*environment-variable*}

Use the `@env` command to indicate environment variables, as used by many operating systems, including GNU. Do not use it for *metasyntactic* variables; use `@var` for those (see the previous section).

`@env` is equivalent to `@code` in its effects. For example:

```
The @env{PATH} environment variable ...
```

produces

```
The PATH environment variable ...
```

7.1.9 @file{*file-name*}

Use the @file command to indicate text that is the name of a file, buffer, or directory, or is the name of a node in Info. You can also use the command for file name suffixes. Do not use @file for symbols in a programming language; use @code.

@file is equivalent to @code in its effects. For example,

The @file{.el} files are in
the @file{/usr/local/emacs/lisp} directory.

produces

The .el files are in the /usr/local/emacs/lisp directory.

7.1.10 @command{*command-name*}

Use the @command command to indicate command names, such as `ls` or `cc`.

@command is equivalent to @code in its effects. For example:

The command @command{ls} lists directory contents.

produces

The command `ls` lists directory contents.

You should write the name of a program in the ordinary text font, rather than using @command, if you regard it as a new English word, such as ‘Emacs’ or ‘Bison’.

When writing an entire shell command invocation, as in ‘`ls -l`’, you should use either @samp or @code at your discretion.

7.1.11 @option{*option-name*}

Use the @option command to indicate a command-line option; for example, `-l` or `--version` or `--output=filename`.

@option is equivalent to @code in its effects. For example:

The option @option{-l} produces a long listing.

produces

The option `-l` produces a long listing.

7.1.12 @dfn{*term*}

Use the @dfn command to identify the introductory or defining use of a technical term. Use the command only in passages whose purpose is to introduce a term which will be used again or which the reader ought to know. Mere passing mention of a term for the first time does not deserve @dfn. The command generates italics in the printed manual, and double quotation marks in the Info file. For example:

Getting rid of a file is called @dfn{deleting} it.

produces

Getting rid of a file is called *deleting* it.

As a general rule, a sentence containing the defining occurrence of a term should be a definition of the term. The sentence does not need to say explicitly that it is a definition, but it should contain the information of a definition—it should make the meaning clear.

7.1.13 `@abbr{abbreviation[, meaning]}`

You can use the `@abbr` command for general abbreviations. The abbreviation is given as the single argument in braces, as in `@abbr{Comput.}`. As a matter of style, or for particular abbreviations, you may prefer to omit periods, as in `@abbr{Mr} Stallman`.

`@abbr` accepts an optional second argument, intended to be used for the meaning of the abbreviation.

If the abbreviation ends with a lowercase letter and a period, and is not at the end of a sentence, and has no second argument, remember to use the `@.` command (see Section 12.3.3 [Ending a Sentence], page 107) to get the correct spacing. However, you do not have to use `@.` within the abbreviation itself; Texinfo automatically assumes periods within the abbreviation do not end a sentence.

In \TeX and in the Info output, the first argument is printed as-is; if the second argument is present, it is printed in parentheses after the abbreviation. In HTML the `<abbr>` tag is used; in Docbook, the `<abbrev>` tag is used. For instance:

```
@abbr{Comput. J., Computer Journal}
```

produces:

```
Comput. J. (Computer Journal)
```

For abbreviations consisting of all capital letters, you may prefer to use the `@acronym` command instead. See the next section for more on the usage of these two commands.

7.1.14 `@acronym{acronym[, meaning]}`

You can use the `@acronym` command for abbreviations written in all capital letters, such as 'NASA'. The abbreviation is given as the single argument in braces, as in `@acronym{NASA}`. As a matter of style, or for particular acronyms, you may prefer to use periods, as in `@acronym{N.A.S.A.}`.

`@acronym` accepts an optional second argument, intended to be used for the meaning of the acronym.

If the acronym is at the end of a sentence, and if there is no second argument, remember to use the `@.` or similar command (see Section 12.3.3 [Ending a Sentence], page 107) to get the correct spacing.

In \TeX , the acronym is printed in slightly smaller font. In the Info output, the argument is printed as-is. In either format, if the second argument is present, it is printed in parentheses after the acronym. In HTML and Docbook the `<acronym>` tag is used.

For instance (since GNU is a recursive acronym, we use `@acronym` recursively):

```
@acronym{GNU, @acronym{GNU}'s Not Unix}
```

produces:

```
GNU (GNU's Not Unix)
```

In some circumstances, it is conventional to print family names in all capitals. Don't use `@acronym` for this, since a name is not an acronym. Use `@sc` instead (see Section 7.2.2 [Smallcaps], page 70).

`@abbr` and `@acronym` are closely related commands: they both signal to the reader that a shortened form is being used, and possibly give a meaning. When choosing whether to use these two commands, please bear the following in mind.

- In common English usage, acronyms are a subset of abbreviations: they include pronounceable words like ‘NATO’, ‘radar’, and ‘snafu’; some sources also include syllable acronyms like ‘Usenet’, hybrids like ‘SIGGRAPH’, and unpronounceable initialisms like ‘FBI’.
- In Texinfo, an acronym (but not an abbreviation) should consist only of capital letters and periods, no lowercase.
- In T_EX, an acronym (but not an abbreviation) is printed in a slightly smaller font.
- Some browsers place a dotted bottom border under abbreviations but not acronyms.
- It usually turns out to be quite difficult and/or time-consuming to consistently use `@acronym` for all sequences of uppercase letters. Furthermore, it looks strange for some acronyms to be in the normal font size and others to be smaller. Thus, a simpler approach you may wish to consider is to avoid `@acronym` and just typeset everything as normal text in all capitals: ‘GNU’, producing the output ‘GNU’.
- In general, it’s not essential to use either of these commands for all abbreviations; use your judgment. Text is perfectly readable without them.

7.1.15 `@indicateurl`{*uniform-resource-locator*}

Use the `@indicateurl` command to indicate a uniform resource locator on the World Wide Web. This is purely for markup purposes and does not produce a link you can follow (use the `@url` or `@uref` command for that, see Section 6.10 [`@url`], page 57). `@indicateurl` is useful for urls which do not actually exist. For example:

For example, the url might be `@indicateurl{http://example.org/path}`.

which produces:

For example, the url might be ‘`http://example.org/path`’.

The output from `@indicateurl` is more or less like that of `@samp` (see Section 7.1.5 [`@samp`], page 65).

7.1.16 `@email`{*email-address*[, *displayed-text*]}

Use the `@email` command to indicate an electronic mail address. It takes one mandatory argument, the address, and one optional argument, the text to display (the default is the address itself).

In Info, the address is shown in angle brackets, preceded by the text to display if any. In T_EX, the angle brackets are omitted. In HTML output, `@email` produces a ‘mailto’ link that usually brings up a mail composition window. For example:

Send bug reports to `@email{bug-texinfo@gnu.org}`,
 suggestions to the `@email{bug-texinfo@gnu.org, same place}`.

produces

Send bug reports to `bug-texinfo@gnu.org`,
 suggestions to the same place.

7.2 Emphasizing Text

Usually, Texinfo changes the font to mark words in the text according to the category the words belong to; an example is the `@code` command. Most often, this is the best way to

mark words. However, sometimes you will want to emphasize text without indicating a category. Texinfo has two commands to do this. Also, Texinfo has several commands that specify the font in which text will be output. These commands have no effect in Info and only one of them, the `@r` command, has any regular use.

7.2.1 `@emph{text}` and `@strong{text}`

The `@emph` and `@strong` commands are for emphasis; `@strong` is stronger. In printed output, `@emph` produces *italics* and `@strong` produces **bold**. In the Info output, `@emph` surrounds the text with underscores (`'_'`), and `@strong` puts asterisks around the text.

For example,

```
@strong{Caution:} @samp{rm * .[^.]*}
removes @emph{all} files in the directory.
```

produces the following:

Caution: ‘`rm * .[^.]*`’ removes *all* files in the directory.

The `@strong` command is seldom used except to mark what is, in effect, a typographical element, such as the word ‘Caution’ in the preceding example.

Caution: Do not use `@strong` with the word ‘Note’ followed by a space; Info will mistake the combination for a cross-reference. Use a phrase such as **Please notice** or **Caution** instead, or the optional argument to `@quotation`—‘Note’ is allowable there.

7.2.2 `@sc{text}`: The Small Caps Font

Use the ‘`@sc`’ command to set text in A SMALL CAPS FONT (where possible). Write the text you want to be in small caps between braces in lowercase, like this:

```
Richard @sc{Stallman} commenc  GNU.
```

This produces:

Richard STALLMAN commenc  GNU.

As shown here, we recommend reserving `@sc` for special cases where you want typographic small caps; family names are one such, especially in languages other than English, though there are no hard-and-fast rules about such things.

\TeX typesets any uppercase letters between the braces of an `@sc` command in full-size capitals; only lowercase letters are printed in the small caps font. In the Info output, the argument to `@sc` is printed in all uppercase. In HTML, the argument is uppercased and the output marked with the `<small>` tag to reduce the font size, since HTML cannot easily represent true small caps.

Overall, we recommend using standard upper- and lowercase letters wherever possible.

7.2.3 Fonts for Printing

Texinfo provides one command to change the size of the main body font in the \TeX output for a document: `@fonttextsize`. It has no effect in other output. It takes a single argument on the remainder of the line, which must be either ‘10’ or ‘11’. For example:

```
@fonttextsize 10
```

The effect is to reduce the body font to a 10pt size (the default is 11pt). Fonts for other elements, such as sections and chapters, are reduced accordingly. This should only be

used in conjunction with `@smallbook` (see Section 19.11 [`@smallbook`], page 172) or similar, since 10 pt fonts on standard paper (8.5x11 or A4) are too small. One reason to use this command is to save pages, and hence printing cost, for physical books.

Texinfo does not at present have commands to switch the font family to use, or more general size-changing commands.

Texinfo also provides a number of font commands that specify font changes in the printed manual and (where possible) in the HTML output. They have no effect in Info. All the commands apply to a following argument surrounded by braces.

- `@b` selects **bold** face;
- `@i` selects an *italic* font;
- `@r` selects a roman font, which is the usual font in which text is printed. It may or may not be seriffed.
- `@sansserif` selects a sans serif font;
- `@slanted` selects a *slanted* font;
- `@t` selects the `fixed-width`, typewriter-style font used by `@code`;

(The commands with longer names were invented much later than the others, at which time it did not seem desirable to use very short names for such infrequently needed features.)

The `@r` command can be useful in example-like environments, to write comments in the standard roman font instead of the fixed-width font. This looks better in printed output, and produces a `<lineannotation>` tag in Docbook output.

For example,

```
@lisp
(+ 2 2)        ; @r{Add two plus two.}
@end lisp
```

produces

```
(+ 2 2)        ; Add two plus two.
```

The `@t` command can occasionally be useful to produce output in a typewriter font where that is supported (e.g., HTML and PDF), but no distinction is needed in Info or plain text: `@t{foo}` produces `foo`, cf. `@code{foo}` producing `foo`.

In general, the other font commands are unlikely to be useful; they exist primarily to make it possible to document the functionality of specific font effects, such as in \TeX and related packages.

8 Quotations and Examples

Quotations and examples are blocks of text consisting of one or more whole paragraphs that are set off from the bulk of the text and treated differently. They are usually indented in the output.

In Texinfo, you always begin a quotation or example by writing an @-command at the beginning of a line by itself, and end it by writing an @end command that is also at the beginning of a line by itself. For instance, you begin an example by writing @example by itself at the beginning of a line and end the example by writing @end example on a line by itself, at the beginning of that line, and with only one space between the @end and the example.

8.1 Block Enclosing Commands

Here is a summary of commands that enclose blocks of text, also known as *environments*. They're explained further in the following sections.

@quotation

Indicate text that is quoted. The text is filled, indented (from both margins), and printed in a roman font by default.

@indentedblock

Like @quotation, but the text is indented only on the left.

@example Illustrate code, commands, and the like. The text is printed in a fixed-width font, and indented but not filled.

@lisp Like @example, but specifically for illustrating Lisp code. The text is printed in a fixed-width font, and indented but not filled.

@verbatim

Mark a piece of text that is to be printed verbatim; no character substitutions are made and all commands are ignored, until the next @end verbatim. The text is printed in a fixed-width font, and not indented or filled. Extra spaces and blank lines are significant, and tabs are expanded.

@display Display illustrative text. The text is indented but not filled, and no font is selected (so, by default, the font is roman).

@format Like @display (the text is not filled and no font is selected), but the text is not indented.

@smallquotation

@smallindentedblock

@smallexample

@smalllisp

@smalldisplay

@smallformat

These @small... commands are just like their non-small counterparts, except that they output text in a smaller font size, where possible.

`@flushleft`

`@flushright`

Text is not filled, but is set flush with the left or right margin, respectively.

`@raggedright`

Text is filled, but only justified on the left, leaving the right margin ragged.

`@cartouche`

Highlight text, often an example or quotation, by drawing a box with rounded corners around it.

The `@exdent` command is used within the above constructs to undo the indentation of a line.

The `@noindent` command may be used after one of the above constructs (or at the beginning of any paragraph) to prevent the following text from being indented as a new paragraph.

8.2 `@quotation`: Block Quotations

The text of a quotation is processed like normal text (regular font, text is filled) except that:

- both the left and right margins are closer to the center of the page, so the whole of the quotation is indented;
- the first lines of paragraphs are indented no more than other lines; and
- an `@author` command may be given to specify the author of the quotation.

This is an example of text written between a `@quotation` command and an `@end quotation` command. A `@quotation` command is most often used to indicate text that is excerpted from another (real or hypothetical) printed work.

Write a `@quotation` command as text on a line by itself. This line will disappear from the output. Mark the end of the quotation with a line beginning with and containing only `@end quotation`. The `@end quotation` line will likewise disappear from the output.

`@quotation` takes one optional argument, given on the remainder of the line. This text, if present, is included at the beginning of the quotation in bold or otherwise emphasized, and followed with a ‘:’. For example:

```
@quotation Note
This is
a foo.
@end quotation
```

produces

Note: This is a foo.

If the `@quotation` argument is one of these English words (case-insensitive):

```
Caution Important Note Tip Warning
```

then the Docbook output uses corresponding special tags (`<note>`, etc.) instead of the default `<blockquote>`. HTML output always uses `<blockquote>`.

If the author of the quotation is specified in the `@quotation` block with the `@author` command, a line with the author name is displayed after the quotation:

```
@quotation
People sometimes ask me if it is a sin in the Church of Emacs to use
vi. Using a free version of vi is not a sin; it is a penance. So happy
hacking.

@author Richard Stallman
@end quotation
```

produces

```
People sometimes ask me if it is a sin in the Church of Emacs to use vi. Using
a free version of vi is not a sin; it is a penance. So happy hacking.
—Richard Stallman
```

Texinfo also provides a command `@smallquotation`, which is just like `@quotation` but uses a smaller font size where possible. See Section 8.15 [`@small...`], page 80.

8.3 `@indentedblock`: Indented text blocks

The `@indentedblock` environment is similar to `@quotation`, except that text is only indented on the left (and there is no optional argument for an author). Thus, the text font remains unchanged, and text is gathered and filled as usual, but the left margin is increased. For example:

```
This is an example of text written between an @indentedblock command and an
@end indentedblock command. The @indentedblock environment can contain any
text or other commands desired.
```

This is written in the Texinfo source as:

```
@indentedblock
This is an example ...
@end indentedblock
```

Texinfo also provides a command `@smallindentedblock`, which is just like `@indentedblock` but uses a smaller font size where possible. See Section 8.15 [`@small...`], page 80.

8.4 `@example`: Example Text

The `@example` environment is used to indicate an example that is not part of the running text, such as computer input or output. Write an `@example` command at the beginning of a line by itself. Mark the end of the example with an `@end example` command, also written at the beginning of a line by itself.

An `@example` environment has the following characteristics:

- Each line in the input file is a line in the output; that is, the source text is not filled as it normally is.
- Extra spaces and blank lines are significant.
- The output is indented.
- The output uses a fixed-width font.

- Texinfo commands *are* expanded; if you want the output to be the input verbatim, use the `@verbatim` environment instead (see Section 8.5 [`@verbatim`], page 75).

For example,

```
@example
cp foo @var{dest1}; \
cp foo @var{dest2}
@end example
```

produces

```
cp foo dest1; \
cp foo dest2
```

The lines containing `@example` and `@end example` will disappear from the output. To make the output look good, you should put a blank line before the `@example` and another blank line after the `@end example`. Blank lines inside the beginning `@example` and the ending `@end example`, on the other hand, do appear in the output.

Caution: Do not use tabs in the lines of an example! (Or anywhere else in Texinfo, except in verbatim environments.) \TeX treats tabs as single spaces, and that is not what they look like. In Emacs, you can use `M-x untabify` to convert tabs in a region to multiple spaces.

Examples are often, logically speaking, “in the middle” of a paragraph, and the text that continues afterwards should not be indented, as in the example above. The `@noindent` command prevents a piece of text from being indented as if it were a new paragraph (see Section 8.12 [`@noindent`], page 78).

If you want to embed code fragments within sentences, instead of displaying them, use the `@code` command or its relatives (see Section 7.1.2 [`@code`], page 62).

If you wish to write a “comment” on a line of an example in the normal roman font, you can use the `@r` command (see Section 7.2.3 [Fonts], page 70).

8.5 `@verbatim`: Literal Text

Use the `@verbatim` environment for printing of text that may contain special characters or commands that should not be interpreted, such as computer input or output (`@example` interprets its text as regular Texinfo commands). This is especially useful for including automatically generated files in a Texinfo manual.

In general, the output will be just the same as the input. No character substitutions are made, e.g., all spaces and blank lines are significant, including tabs. In the printed manual, the text is typeset in a fixed-width font, and not indented or filled.

Write a `@verbatim` command at the beginning of a line by itself. This line will disappear from the output. Mark the end of the verbatim block with an `@end verbatim` command, also written at the beginning of a line by itself. The `@end verbatim` will also disappear from the output.

For example:

```
@verbatim
{
TAB@command with strange characters: @'e
```

```
expandTABme
}
@end verbatim
```

This produces:

```
{
    @command with strange characters: @'e
expand me
}
```

Since the lines containing `@verbatim` and `@end verbatim` produce no output, typically you should put a blank line before the `@verbatim` and another blank line after the `@end verbatim`. Blank lines between the beginning `@verbatim` and the ending `@end verbatim` will appear in the output.

You can get a “small” verbatim by enclosing the `@verbatim` in an `@smallformat` environment, as shown here:

```
@smallformat
@verbatim
... still verbatim, but in a smaller font ...
@end verbatim
@end smallformat
```

Finally, a word of warning: it is not reliable to use `@verbatim` inside other Texinfo constructs.

See also Section 18.5 [`@verbatiminclude`], page 161.

8.6 `@lisp`: Marking a Lisp Example

The `@lisp` command is used for Lisp code. It is synonymous with the `@example` command.

```
This is an example of text written between an
@lisp command and an @end lisp command.
```

Use `@lisp` instead of `@example` to preserve information regarding the nature of the example. This is useful, for example, if you write a function that evaluates only and all the Lisp code in a Texinfo file. Then you can use the Texinfo file as a Lisp library. Mark the end of `@lisp` with `@end lisp` on a line by itself.

8.7 `@display`: Examples Using the Text Font

The `@display` command begins another kind of environment, where the font is left unchanged, not switched to typewriter as with `@example`. Each line of input still produces a line of output, and the output is still indented.

```
This is an example of text written between a @display command
and an @end display command. The @display command
indents the text, but does not fill it.
```

Texinfo also provides the environment `@smalldisplay`, which is like `@display` but uses a smaller font size. See Section 8.15 [`@small...`], page 80.

8.8 @format: Examples Using the Full Line Width

The `@format` command is similar to `@display`, except it leaves the text unindented. Like `@display`, it does not select the fixed-width font.

This is an example of text written between a `@format` command and an `@end format` command. As you can see from this example, the `@format` command does not fill the text.

Texinfo also provides the environment `@smallformat`, which is like `@format` but uses a smaller font size. See Section 8.15 [`@small...`], page 80.

8.9 @exdent: Undoing a Line's Indentation

The `@exdent` command removes any indentation a line might have. The command is written at the beginning of a line and applies only to the text that follows the command that is on the same line. Do not use braces around the text. In a printed manual, the text on an `@exdent` line is printed in the roman font.

```
@exdent is usually used within examples. Thus,
  @example
  This line follows an @@example command.
  @exdent This line is exdented.
  This line follows the exdented line.
  The @@end example comes on the next line.
  @end example
```

produces

```
This line follows an @example command.
This line is exdented.
  This line follows the exdented line.
  The @end example comes on the next line.
```

In practice, the `@exdent` command is rarely used. Usually, you un-indent text by ending the example and returning the page to its normal width.

`@exdent` has no effect in HTML output.

8.10 @flushleft and @flushright

The `@flushleft` and `@flushright` commands line up the ends of lines on the left and right margins of a page, but do not fill the text. The commands are written on lines of their own, without braces. The `@flushleft` and `@flushright` commands are ended by `@end flushleft` and `@end flushright` commands on lines of their own.

```
For example,
  @flushleft
  This text is
  written flushleft.
  @end flushleft
```

produces

```
This text is
```

written flushleft.

`@flushright` produces the type of indentation often used in the return address of letters. For example,

```
@flushright
Here is an example of text written
flushright. The @code{@flushright} command
right justifies every line but leaves the
left end ragged.
@end flushright
```

produces

```
Here is an example of text written
flushright. The @flushright command
right justifies every line but leaves the
left end ragged.
```

8.11 `@raggedright`: Ragged Right Text

The `@raggedright` fills text as usual, but the text is only justified on the left; the right margin is ragged. The command is written on a line of its own, without braces. The `@raggedright` command is ended by `@end raggedright` on a line of its own. This command has no effect in Info and HTML output, where text is always set ragged right.

The `@raggedright` command can be useful with paragraphs containing lists of commands with long names, when it is known in advance that justifying the text on both margins will make the paragraph look bad.

An example (from elsewhere in this manual):

```
@raggedright
Commands for double and single angle quotation marks:
@code{@@guillemetleft@{ }}, @code{@@guillemetright@{ }},
@code{@@guillemotleft@{ }}, @code{@@guillemotright@{ }},
@code{@@guilsinglleft@{ }}, @code{@@guilsinglright@{ }}.
@end raggedright
```

produces

```
Commands for double and single angle quotation marks: @guillemetleft{ },
@guillemetright{ }, @guillemotleft{ }, @guillemotright{ }, @guilsinglleft{ },
@guilsinglright{ }.
```

8.12 `@noindent`: Omitting Indentation

An example or other inclusion can break a paragraph into segments. Ordinarily, the formatters indent text that follows an example as a new paragraph. You can prevent this on a case-by-case basis by writing `@noindent` at the beginning of a line, preceding the continuation text. You can also disable indentation for all paragraphs globally with `@paragraphindent` (see Section 3.7.4 [`@paragraphindent`], page 29).

Here is an example showing how to eliminate the normal indentation of the text after an `@example`, a common situation:

```
@example
This is an example
@end example
```

```
@noindent
This line is not indented. As you can see, the
beginning of the line is fully flush left with the
line that follows after it.
```

produces:

```
    This is an example
```

```
    This line is not indented. As you can see, the
    beginning of the line is fully flush left with the
    line that follows after it.
```

The standard usage of `@noindent` is just as above: at the beginning of what would otherwise be a paragraph, to eliminate the indentation that normally happens there. It can either be followed by text or be on a line by itself. There is no reason to use it in other contexts, such as in the middle of a paragraph or inside an environment (see Chapter 8 [Quotations and Examples], page 72).

You can control the number of blank lines in the Info file output by adjusting the input as desired: a line containing just `@noindent` does not generate a blank line, and neither does an `@end` line for an environment.

Do not put braces after a `@noindent` command; they are not used, since `@noindent` is a command used outside of paragraphs (see Section A.1 [Command Syntax], page 222).

8.13 `@indent`: Forcing Indentation

To complement the `@noindent` command (see the previous section), Texinfo provides the `@indent` command to force a paragraph to be indented. For instance, this paragraph (the first in this section) is indented using an `@indent` command.

And indeed, the first paragraph of a section is the most likely place to use `@indent`, to override the normal behavior of no indentation there (see Section 3.7.4 [`@paragraphindent`], page 29). It can either be followed by text or be on a line by itself.

As a special case, when `@indent` is used in an environment where text is not filled, it produces a paragraph indentation space in the \TeX output. (These environments are where a line of input produces a line of output, such as `@example` and `@display`; for a summary of all environments, see Section 8.1 [Block Enclosing Commands], page 72.)

Do not put braces after an `@indent` command; they are not used, since `@indent` is a command used outside of paragraphs (see Section A.1 [Command Syntax], page 222).

8.14 `@cartouche`: Rounded Rectangles

In a printed manual, the `@cartouche` command draws a box with rounded corners around its contents. In HTML, a normal rectangle is drawn. `@cartouche` has no effect in Info output.

You can use this command to further highlight an example or quotation. For instance, you could write a manual in which one type of example is surrounded by a cartouche for emphasis.

For example,

```
@cartouche
@example
% pwd
/usr/local/share/emacs
@end example
@end cartouche
```

surrounds the two-line example with a box with rounded corners, in the printed manual.

The output from the example looks like this (if you’re reading this in Info, you’ll see the `@cartouche` had no effect):

```
% pwd
/usr/local/share/emacs
```

`@cartouche` also implies `@group` (see Section 13.9 [`@group`], page 121).

8.15 @small... Block Commands

In addition to the regular `@example` and similar commands, Texinfo has “small” example-style commands. These are `@smallquotation`, `@smallindentedblock`, `@smalldisplay`, `@smallexample`, `@smallformat`, and `@smalllisp`.

In Info output, the `@small...` commands are equivalent to their non-small companion commands.

In $\text{T}_{\text{E}}\text{X}$, however, the `@small...` commands typeset text in a smaller font than the non-small example commands. Thus, for instance, code examples can contain longer lines and still fit on a page without needing to be rewritten.

A smaller font size is also requested in HTML output, and (as usual) retained in the Texinfo XML transliteration.

Mark the end of a `@small...` block with a corresponding `@end small...`. For example, pair `@smallexample` with `@end smallexample`.

Here is an example of the font used by the `@smallexample` command (in Info, the output will be the same as usual):

```
... to make sure that you have the freedom to
distribute copies of free software (and charge for
this service if you wish), that you receive source
code or can get it if you want it, that you can
change the software or use pieces of it in new free
programs; and that you know you can do these things.
```

The `@small...` commands use the same font style as their normal counterparts: `@smallexample` and `@smalllisp` use a fixed-width font, and everything else uses the regular font. They also have the same behavior in other respects—whether filling is done and whether margins are narrowed.

As a general rule, a printed document looks better if you use only one of (for instance) `@example` or `@smallexample` consistently within a chapter.

9 Lists and Tables

Texinfo has several ways of making lists and tables. Lists can be bulleted or numbered; two-column tables can highlight the items in the first column; multi-column tables are also supported.

9.1 Introducing Lists

Texinfo automatically indents the text in lists or tables, and numbers an enumerated list. This last feature is useful if you modify the list, since you do not need to renumber it yourself.

Numbered lists and tables begin with the appropriate `@`-command at the beginning of a line, and end with the corresponding `@end` command on a line by itself. The table and itemized-list commands also require that you write formatting information on the same line as the beginning `@`-command.

Begin an enumerated list, for example, with an `@enumerate` command and end the list with an `@end enumerate` command. Begin an itemized list with an `@itemize` command, followed on the same line by a formatting command such as `@bullet`, and end the list with an `@end itemize` command.

Precede each element of a list with an `@item` or `@itemx` command.

Here is an itemized list of the different kinds of table and lists:

- Itemized lists with and without bullets.
- Enumerated lists, using numbers or letters.
- Two-column tables with highlighting.

Here is an enumerated list with the same items:

1. Itemized lists with and without bullets.
2. Enumerated lists, using numbers or letters.
3. Two-column tables with highlighting.

And here is a two-column table with the same items and their `@`-commands:

<code>@itemize</code>	Itemized lists with and without bullets.
<code>@enumerate</code>	Enumerated lists, using numbers or letters.
<code>@table</code>	
<code>@ftable</code>	
<code>@vtable</code>	Two-column tables, optionally with indexing.

9.2 @itemize: Making an Itemized List

The `@itemize` command produces a sequence of “items”, each starting with a bullet or other mark inside the left margin, and generally indented.

Begin an itemized list by writing `@itemize` at the beginning of a line. Follow the command, on the same line, with a character or a Texinfo command that generates a mark. Usually, you will use `@bullet` after `@itemize`, but you can use `@minus`, or any command or character that results in a single character in the Info file. (When you write the mark command such as `@bullet` after an `@itemize` command, you may omit the ‘{’.) If you don’t specify a mark command, the default is `@bullet`. If you don’t want any mark at all, but still want logical items, use `@w{}` (in this case the braces are required).

After the `@itemize`, write your items, each starting with `@item`. Text can follow on the same line as the `@item`. The text of an item can continue for more than one paragraph.

There should be at least one `@item` inside the `@itemize` environment. If none are present, `makeinfo` gives a warning. If you just want indented text and not a list of items, use `@indentedblock`; see Section 8.3 [`@indentedblock`], page 74.

Index entries and comments that are given before an `@item` including the first, are automatically moved (internally) to after the `@item`, so the output is as expected. Historically this has been a common practice.

Usually, you should put a blank line between items. This puts a blank line in the Info file. (`TEX` inserts the proper vertical space in any case.) Except when the entries are very brief, these blank lines make the list look better.

Here is an example of the use of `@itemize`, followed by the output it produces. `@bullet` produces an ‘*’ in Info and a round dot in other output formats.

```
@itemize @bullet
@item
Some text for foo.

@item
Some text
for bar.
@end itemize
```

This produces:

- Some text for foo.
- Some text for bar.

Itemized lists may be embedded within other itemized lists. Here is a list marked with dashes embedded in a list marked with bullets:

```

@itemize @bullet
@item
First item.

@itemize @minus
@item
Inner item.

@item
Second inner item.
@end itemize

@item
Second outer item.
@end itemize

```

This produces:

- First item.
 - Inner item.
 - Second inner item.
- Second outer item.

9.3 @enumerate: Making a Numbered or Lettered List

`@enumerate` is like `@itemize` (see Section 9.2 [`@itemize`], page 83), except that the labels on the items are successive integers or letters instead of bullets.

Write the `@enumerate` command at the beginning of a line. The command does not require an argument, but accepts either a number or a letter as an option. Without an argument, `@enumerate` starts the list with the number ‘1’. With a numeric argument, such as ‘3’, the command starts the list with that number. With an upper- or lowercase letter, such as ‘a’ or ‘A’, the command starts the list with that letter.

Write the text of the enumerated list in the same way as an itemized list: write a line starting with `@item` at the beginning of each item in the enumeration. It is ok to have text following the `@item`, and the text for an item can continue for several paragraphs.

You should put a blank line between entries in the list. This generally makes it easier to read the Info file.

Here is an example of `@enumerate` without an argument:

```

@enumerate
@item
Underlying causes.

@item
Proximate causes.
@end enumerate

```

This produces:

1. Underlying causes.

2. Proximate causes.

Here is an example with an argument of 3:

```
@enumerate 3
@item
Predisposing causes.

@item
Precipitating causes.

@item
Perpetuating causes.
@end enumerate
```

This produces:

3. Predisposing causes.
4. Precipitating causes.
5. Perpetuating causes.

Here is a brief summary of the alternatives. The summary is constructed using `@enumerate` with an argument of `a`.

a. `@enumerate`

Without an argument, produce a numbered list, with the first item numbered 1.

b. `@enumerate unsigned-integer`

With an (unsigned) numeric argument, start a numbered list with that number. You can use this to continue a list that you interrupted with other text.

c. `@enumerate upper-case-letter`

With an uppercase letter as argument, start a list in which each item is marked by a letter, beginning with that uppercase letter.

d. `@enumerate lower-case-letter`

With a lowercase letter as argument, start a list in which each item is marked by a letter, beginning with that lowercase letter.

You can also nest enumerated lists, as in an outline.

9.4 Making a Two-column Table

`@table` is similar to `@itemize` (see Section 9.2 [`@itemize`], page 83), but allows you to specify a name or heading line for each item. The `@table` command is used to produce two-column tables, and is especially useful for glossaries, explanatory exhibits, and command-line option summaries.

9.4.1 Using the `@table` Command

Use the `@table` command to produce a two-column table. This command is typically used when you have a list of items and a brief text with each one, such as a list of definitions.

Write the `@table` command at the beginning of a line, after a blank line, and follow it on the same line with an argument that is an ‘indicating’ command, such as `@code`, `@samp`, `@var`, `@option`, or `@kbd` (see Section 7.1 [Indicating], page 61). This command will be applied to the text in the first column. For example, `@table @code` will cause the text in the first column to be output as if it had been the argument to a `@code` command.

You may use the `@asis` command as an argument to `@table`. `@asis` is a command that does nothing: if you use this command after `@table`, the first column entries are output without added highlighting (“as is”).

The `@table` command works with other commands besides those explicitly mentioned here. However, you can only use predefined Texinfo commands that take an argument in braces. You cannot reliably use a new command defined with `@macro`, although an `@alias` (for a suitable predefined command) is acceptable. See Chapter 17 [Defining New Texinfo Commands], page 149.

Begin each table entry with an `@item` command at the beginning of a line. Write the text for the first column on the same line as the `@item` command. Write the text for the second column on the line following the `@item` line and on subsequent lines. You may write as many lines of supporting text as you wish, even several paragraphs. But only the text on the same line as the `@item` will be placed in the first column (including any footnotes). You do not need to type anything for an empty second column.

Normally, you should put a blank line before an `@item` line (except the first one). This puts a blank line in the Info file. Except when the entries are very brief, a blank line looks better. End the table with a line consisting of `@end table`, followed by a blank line. `TEX` will always start a new paragraph after the table, so the blank line is needed for the Info output to be analogous.

For example, the following table highlights the text in the first column with the `@samp` command:

```
@table @samp
@item foo
This is the text for
@samp{foo}.

@item bar
Text for @samp{bar}.
@end table
```

This produces:

```
‘foo’      This is the text for ‘foo’.
‘bar’      Text for ‘bar’.
```

If you want to list two or more named items with a single block of text, use the `@itemx` command. (See Section 9.4.3 [`@itemx`], page 87.)

The `@table` command (see Section 9.4.1 [`@table`], page 86) is not supported inside `@display`. Since `@display` is line-oriented, it doesn’t make sense to use them together.

If you want to indent a table, try `@quotation` (see Section 8.2 [`@quotation`], page 73) or `@indentedblock` (see Section 8.3 [`@indentedblock`], page 74).

9.4.2 `@ftable` and `@vtable`

The `@ftable` and `@vtable` commands are the same as the `@table` command except that `@ftable` automatically enters each of the items in the first column of the table into the index of functions and `@vtable` automatically enters each of the items in the first column of the table into the index of variables. This simplifies the task of creating indices. Only the items on the same line as the `@item` or `@itemx` commands are indexed, and they are indexed in exactly the form that they appear on that line. See Chapter 11 [Indices], page 97, for more information about indices.

Begin a two-column table using `@ftable` or `@vtable` by writing the `@`-command at the beginning of a line, followed on the same line by an argument that is a Texinfo command such as `@code`, exactly as you would for a `@table` command; and end the table with an `@end ftable` or `@end vtable` command on a line by itself.

See the example for `@table` in the previous section.

9.4.3 `@itemx`: Second and Subsequent Items

Use the `@itemx` command inside a table when you have two or more first column entries for the same item, each of which should appear on a line of its own.

Use `@item` for the first entry, and `@itemx` for all subsequent entries; `@itemx` must always follow an `@item` command, with no blank line intervening.

The `@itemx` command works exactly like `@item` except that it does not generate extra vertical space above the first column text. If you have multiple consecutive `@itemx` commands, do not insert any blank lines between them.

For example,

```
@table @code
@item upcase
@itemx downcase
These two functions accept a character or a string as
argument, and return the corresponding uppercase (lowercase)
character or string.
@end table
```

This produces:

```
upcase
downcase  These two functions accept a character or a string as argument, and return the
           corresponding uppercase (lowercase) character or string.
```

(Note also that this example illustrates multi-line supporting text in a two-column table.)

9.5 `@multitable`: Multi-column Tables

`@multitable` allows you to construct tables with any number of columns, with each column having any width you like.

You define the column widths on the `@multitable` line itself, and write each row of the actual table following an `@item` command, with columns separated by a `@tab` command. Finally, `@end multitable` completes the table. Details in the sections below.

9.5.1 Multitable Column Widths

You can define the column widths for a multitable in two ways: as fractions of the line length; or with a prototype row. Mixing the two methods is not supported. In either case, the widths are defined entirely on the same line as the `@multitable` command.

1. To specify column widths as fractions of the line length, write `@columnfractions` and the decimal numbers (presumably less than 1; a leading zero is allowed and ignored) after the `@multitable` command, as in:

```
@multitable @columnfractions .33 .33 .33
```

The fractions need not add up exactly to 1.0, as these do not. This allows you to produce tables that do not need the full line length.

2. To specify a prototype row, write the longest entry for each column enclosed in braces after the `@multitable` command. For example:

```
@multitable {some text for column one} {for column two}
```

The first column will then have the width of the typeset ‘some text for column one’, and the second column the width of ‘for column two’.

The prototype entries need not appear in the table itself.

Although we used simple text in this example, the prototype entries can contain Texinfo commands; markup commands such as `@code` are particularly likely to be useful.

9.5.2 Multitable Rows

After the `@multitable` command defining the column widths (see the previous section), you begin each row in the body of a multitable with `@item`, and separate the column entries with `@tab`. Line breaks are not special within the table body, and you may break input lines in your source file as necessary.

You can also use `@headitem` instead of `@item` to produce a *heading row*. The T_EX output for such a row is in bold, and the HTML and Docbook output uses the `<thead>` tag. In Info, the heading row is followed by a separator line made of dashes (‘-’ characters).

The command `@headitemfont` can be used in templates when the entries in a `@headitem` row need to be used in a template. It is a synonym for `@b`, but using `@headitemfont` avoids any dependency on that particular font style, in case we provide a way to change it in the future.

Here is a complete example of a multi-column table (the text is from *The GNU Emacs Manual*, see Section “Splitting Windows” in *The GNU Emacs Manual*):

```
@multitable @columnfractions .15 .45 .4
@headitem Key @tab Command @tab Description
@item C-x 2
@tab @code{split-window-vertically}
@tab Split the selected window into two windows,
with one above the other.
@item C-x 3
```

```

@tab @code{split-window-horizontally}
@tab Split the selected window into two windows
positioned side by side.
@item C-Mouse-2
@tab
@tab In the mode line or scroll bar of a window,
split that window.
@end multitable

```

produces:

Key	Command	Description
C-x 2	<code>split-window-vertically</code>	Split the selected window into two windows, with one above the other.
C-x 3	<code>split-window-horizontally</code>	Split the selected window into two windows positioned side by side.
C-Mouse-2		In the mode line or scroll bar of a window, split that window.

10 Special Displays

The commands in this chapter allow you to write text that is specially displayed (output format permitting), outside of the normal document flow.

One set of such commands is for creating “floats”, that is, figures, tables, and the like, set off from the main text, possibly numbered, captioned, and/or referred to from elsewhere in the document. Images are often included in these displays.

Another group of commands is for creating footnotes in Texinfo.

10.1 Floats

A *float* is a display which is set off from the main text. It is typically labeled as being a “Figure”, “Table”, “Example”, or some similar type.

A float is so-named because, in principle, it can be moved to the bottom or top of the current page, or to a following page, in the printed output. (Floating does not make sense in other output formats.) In the present version of Texinfo, however, this floating is unfortunately not yet implemented. Instead, the floating material is simply output at the current location, more or less as if it were an `@group` (see Section 13.9 [`@group`], page 121).

10.1.1 `@float [type][,label]`: Floating Material

To produce floating material, enclose the material you want to be displayed separate between `@float` and `@end float` commands, on lines by themselves.

Floating material often uses `@image` to display an already-existing graphic (see Section 10.2 [Images], page 92), or `@multitable` to display a table (see Section 9.5 [Multi-column Tables], page 87). However, the contents of the float can be anything. Here’s an example with simple text:

```
@float Figure,fig:ex1
  This is an example float.
@end float
```

And the output:

This is an example float.

Figure 10.1

As shown in the example, `@float` takes two arguments (separated by a comma), *type* and *label*. Both are optional.

type Specifies the sort of float this is; typically a word such as “Figure”, “Table”, etc. If this is not given, and *label* is, any cross-referencing will simply use a bare number.

label Specifies a cross-reference label for this float. If given, this float is automatically given a number, and will appear in any `@listoffloats` output (see Section 10.1.3 [`@listoffloats`], page 91). Cross references to *label* are allowed. On the other hand, if *label* is not given, then the float will not be numbered and consequently will not appear in the `@listoffloats` output or be cross-referenceable.

Ordinarily, you specify both *type* and *label*, to get a labeled and numbered float.

In Texinfo, all floats are numbered in the same way: with the chapter number (or appendix letter), a period, and the float number, which simply counts 1, 2, 3, . . . , and is reset at each chapter. Each float type is counted independently.

Floats within an `@unnumbered`, or outside of any chapter, are simply numbered consecutively from 1.

These numbering conventions are not, at present, changeable.

10.1.2 `@caption` & `@shortcaption`

You may write a `@caption` anywhere within a `@float` environment, to define a caption for the float. It is not allowed in any other context. `@caption` takes a single argument, enclosed in braces. Here's an example:

```
@float
  An example float, with caption.
  @caption{Caption for example float.}
@end float
```

The output is:

An example float, with caption.

Caption for example float.

`@caption` can appear anywhere within the float; it is not processed until the `@end float`. The caption text is usually a sentence or two, but may consist of several paragraphs if necessary.

In the output, the caption always appears below the float; this is not currently changeable. It is preceded by the float type and/or number, as specified to the `@float` command (see the previous section).

The `@shortcaption` command likewise may be used only within `@float`, and takes a single argument in braces. The short caption text is used instead of the caption text in a list of floats (see the next section). Thus, you can write a long caption for the main document, and a short title to appear in the list of floats. For example:

```
@float
  ... as above ...
  @shortcaption{Text for list of floats.}
@end float
```

The text for `@shortcaption` may not contain comments (`@c`), verbatim text (`@verb`), environments such as `@example`, footnotes (`@footnote`) or other complex constructs. The same constraints apply to `@caption` unless there is a `@shortcaption`.

10.1.3 `@listoffloats`: Tables of Contents for Floats

You can write a `@listoffloats` command to generate a list of floats for a given float type (see Section 10.1.1 [`@float`], page 90), analogous to the document's overall table of contents. Typically, it is written in its own `@unnumbered` node to provide a heading and structure, rather like `@printindex` (see Section 11.4 [Printing Indices & Menus], page 99).

`@listoffloats` takes one optional argument, the float type. Here's an example:

```
@node List of Figures
@unnumbered List of Figures
@listoffloats Figure
```

And here's what the output from `@listoffloats` looks like, given the example figure earlier in this chapter (the Info output is formatted as a menu):

```
Figure 10.1: ..... 90
```

Without any argument, `@listoffloats` generates a list of floats for which no float type was specified, i.e., no first argument to the `@float` command (see Section 10.1.1 [`@float`], page 90).

Each line in the list of floats contains the float type (if any), the float number, and the caption, if any—the `@shortcaption` argument, if it was specified, else the `@caption` argument. In Info, the result is a menu where each float can be selected. In HTML, each line is a link to the float. In printed output, the page number is included.

Unnumbered floats (those without cross-reference labels) are omitted from the list of floats.

10.2 Inserting Images

You can insert an image given in an external file with the `@image` command. Although images can be used anywhere, including the middle of a paragraph, we describe them in this chapter since they are most often part of a displayed figure or example.

10.2.1 Image Syntax

Here is the synopsis of the `@image` command:

```
@image{filename[, width[, height[, alttext[, extension]]]]}
```

The *filename* argument is mandatory, and must not have an extension, because the different processors support different formats:

- \TeX (DVI output) reads the file *filename.eps* (Encapsulated PostScript format).
- \pdfTeX reads *filename.pdf*, *filename.png*, *filename.jpg*, or *filename.jpeg* (in that order). It also tries uppercase versions of the extensions. The PDF format does not support EPS images, so such must be converted first.
- For Info, `makeinfo` includes *filename.txt* verbatim (more or less as if it were in `@verbatim`). The Info output may also include a reference to *filename.png* or *filename.jpg*. (See below.)
- For HTML, `makeinfo` outputs a reference to *filename.png*, *filename.jpg*, *filename.jpeg* or *filename.gif* (in that order). If none of those exist, it gives an error, and outputs a reference to *filename.jpg* anyway.
- For Docbook, `makeinfo` outputs references to *filename.eps*, *filename.gif*, *filename.jpeg*, *filename.jpg*, *filename.pdf*, *filename.png* and *filename.svg*, for every file found. Also, *filename.txt* is included verbatim, if present. (The subsequent Docbook processor is supposed to choose the appropriate one.)

- For Info and HTML output, `makeinfo` uses the optional fifth argument *extension* to `@image` for the filename extension, if it is specified and the file is found. Any leading period should be included in *extension*. For example:

```
@image{foo,,,,.xpm}
```

If you want to install image files for use by Info readers too, we recommend putting them in a subdirectory like ‘*foo-figures*’ for a package *foo*. Copying the files into `$(infodir)/foo-figures/` should be done in your `Makefile`.

The *width* and *height* arguments are described in the next section.

For $\text{T}_{\text{E}}\text{X}$ output, if an image is the only thing in a paragraph it will ordinarily be displayed on a line by itself, respecting the current environment indentation, but without the normal paragraph indentation. If you want it centered, use `@center` (see Section 3.4.2 [`@titlefont @center @sp`], page 21).

For HTML output, `makeinfo` sets the *alt attribute* for inline images to the optional *alttext* (fourth) argument to `@image`, if supplied. If not supplied, `makeinfo` uses the full file name of the image being displayed. The *alttext* is processed as Texinfo text, so special characters such as ‘”’ and ‘<’ and ‘&’ are escaped in the HTML output; also, you can get an empty *alt* string with `@-` (a command that produces no output; see Section 13.3 [`@-@hyphenation`], page 120).

For Info output, the *alt* string is also processed as Texinfo text and output. In this case, ‘\’ is escaped as ‘\\’ and ‘”’ as ‘\”’; no other escapes are done.

In Info output, `makeinfo` writes a reference to the binary image file (trying *filename* suffixed with *extension*, *.extension*, *.png*, or *.jpg*, in that order) if one exists. It also literally includes the *.txt* file if one exists. This way, Info readers which can display images (such as the Emacs Info browser, running under X) can do so, whereas Info readers which can only use text (such as the standalone Info reader) can display the textual version.

The implementation of this is to put the following construct into the Info output:

```
^@^H[image src="binaryfile" text="txtfile"
      alt="alttext ... ^@^H]
```

where ‘^@’ and ‘^H’ stand for the actual null and backspace control characters. If one of the files is not present, the corresponding argument is omitted.

The reason for mentioning this here is that older Info browsers (this feature was introduced in Texinfo version 4.6) will display the above literally, which, although not pretty, should not be harmful.

10.2.2 Image Scaling

The optional *width* and *height* arguments to the `@image` command (see the previous section) specify the size to which to scale the image. They are only taken into account in $\text{T}_{\text{E}}\text{X}$. If neither is specified, the image is presented in its natural size (given in the file); if only one is specified, the other is scaled proportionately; and if both are specified, both are respected, thus likely distorting the original image by changing its aspect ratio.

The *width* and *height* may be specified using any valid $\text{T}_{\text{E}}\text{X}$ dimension, namely:

pt	point (72.27pt = 1in)
pc	pica (1pc = 12pt)

bp	big point (72bp = 1in)
in	inch
cm	centimeter (2.54cm = 1in)
mm	millimeter (10mm = 1cm)
dd	didôt point (1157dd = 1238pt)
cc	cicero (1cc = 12dd)
sp	scaled point (65536sp = 1pt)

For example, the following will scale a file `ridt.eps` to one inch vertically, with the width scaled proportionately:

```
@image{ridt,,1in}
```

For `@image` to work with \TeX , the file `epsf.tex` must be installed somewhere that \TeX can find it. (The standard location is `texmf/tex/generic/dvips/epsf.tex`, where `texmf` is a root of your \TeX directory tree.) This file is included in the Texinfo distribution and is also available from `ftp://tug.org/tex/epsf.tex`, among other places.

`@image` can be used within a line as well as for displayed figures. Therefore, if you intend it to be displayed, be sure to leave a blank line before the command, or the output will run into the preceding text.

Image scaling is presently implemented only in \TeX , not in HTML or any other sort of output.

10.3 Footnotes

A *footnote* is for a reference that documents or elucidates the primary text.¹

Footnotes are distracting; use them sparingly at most, and it is best to avoid them completely. Standard bibliographical references are usually better placed in a bibliography at the end of a document instead of in footnotes throughout.

10.3.1 Footnote Commands

In Texinfo, footnotes are created with the `@footnote` command. This command is followed immediately by a left brace, then by the text of the footnote, and then by a terminating right brace. Footnotes may be of any length (they will be broken across pages if necessary), but are usually short. The template is:

```
ordinary text@footnote{text of footnote}
```

As shown here, the `@footnote` command should come right after the text being footnoted, with no intervening space; otherwise, the footnote marker might end up starting a line.

For example, this clause is followed by a sample footnote²; in the Texinfo source, it looks like this:

```
...a sample footnote@footnote{Here is the sample
```

¹ A footnote should complement or expand upon the primary text, but a reader should not need to read a footnote to understand the primary text. For a thorough discussion of footnotes, see *The Chicago Manual of Style*, which is published by the University of Chicago Press.

² Here is the sample footnote.

```
footnote.}; in the Texinfo source...
```

As you can see, this source includes two punctuation marks next to each other; in this case, ‘.};’ is the sequence. This is normal (the first ends the footnote and the second belongs to the sentence being footnoted), so don’t worry that it looks odd. (Another style, perfectly acceptable, is to put the footnote after punctuation belonging to the sentence, as in ‘;@footnote{...}’.)

In a printed manual or book, the reference mark for a footnote is a small, superscripted number; the text of the footnote appears at the bottom of the page, below a horizontal line.

In Info, the reference mark for a footnote is a pair of parentheses with the footnote number between them, like this: ‘(1)’. The reference mark is followed by a cross-reference link to the footnote text if footnotes are put in separate nodes (see Section 10.3.2 [Footnote Styles], page 95).

In the HTML output, footnote references are generally marked with a small, superscripted number which is rendered as a hypertext link to the footnote text.

Footnotes cannot be nested, and cannot appear in section headings of any kind or other “unusual” places.

A final tip: footnotes in the argument of an @item command for an @table must be entirely on the same line as the @item (as usual). See Section 9.4 [Two-column Tables], page 85.

10.3.2 Footnote Styles

Info has two footnote styles, which determine where the text of the footnote is located:

- In the ‘End’ node style, all the footnotes for a single node are placed at the end of that node. The footnotes are separated from the rest of the node by a line of dashes with the word ‘Footnotes’ within it. Each footnote begins with an ‘(n)’ reference mark.

Here is an example of the Info output for a single footnote in the end-of-node style:

```
----- Footnotes -----
```

```
(1) Here is a sample footnote.
```

- In the ‘Separate’ node style, all the footnotes for a single node are placed in an automatically constructed node of their own. In this style, a “footnote reference” follows each ‘(n)’ reference mark in the body of the node. The footnote reference is actually a cross-reference which you use to reach the footnote node.

The name of the node with the footnotes is constructed by appending ‘-Footnotes’ to the name of the node that contains the footnotes. (Consequently, the footnotes’ node for the Footnotes node is Footnotes-Footnotes!) The footnotes’ node has an ‘Up’ node pointer that leads back to its parent node.

Here is how the first footnote in this manual looks after being formatted for Info in the separate node style:

```
File: texinfo.info Node: Overview-Footnotes, Up: Overview
```

```
(1) The first syllable of "Texinfo" is pronounced like "speck", not
"hex". ...
```

Unless your document has long and important footnotes (as in, say, Gibbon’s *Decline and Fall* . . .), we recommend the ‘end’ style, as it is simpler for readers to follow.

Use the `@footnotestyle` command to specify an Info file's footnote style. Write this command at the beginning of a line followed by an argument, either `'end'` for the end node style or `'separate'` for the separate node style.

For example,

```
@footnotestyle end
```

or

```
@footnotestyle separate
```

Write a `@footnotestyle` command before or shortly after the end-of-header line at the beginning of a Texinfo file. (You should include any `@footnotestyle` command between the start-of-header and end-of-header lines, so the region formatting commands will format footnotes as specified.)

In HTML, when the footnote style is `'end'`, or if the output is not split, footnotes are put at the end of the output. If set to `'separate'`, and the output is split, they are placed in a separate file.

11 Indices

Using Texinfo, you can generate indices without having to sort and collate entries manually. In an index, the entries are listed in alphabetical order, together with information on how to find the discussion of each entry. In a printed manual, this information consists of page numbers. In an Info file, this information is a menu entry leading to the first node referenced.

Texinfo provides several predefined kinds of index: an index for functions, an index for variables, an index for concepts, and so on. You can combine indices or use them for other than their canonical purpose. Lastly, you can define your own new indices.

11.1 Predefined Indices

Texinfo provides six predefined indices. Here are their nominal meanings, abbreviations, and the corresponding index entry commands:

<code>'cp'</code>	(<code>@cindex</code>) concept index, for general concepts.
<code>'fn'</code>	(<code>@findex</code>) function index, for function and function-like names (such as entry points of libraries).
<code>'ky'</code>	(<code>@kindex</code>) keystroke index, for keyboard commands.
<code>'pg'</code>	(<code>@pindex</code>) program index, for names of programs.
<code>'tp'</code>	(<code>@tindex</code>) data type index, for type names (such as structures defined in header files).
<code>'vr'</code>	(<code>@vindex</code>) variable index, for variable names (such as global variables of libraries).

Not every manual needs all of these, and most manuals use only two or three at most. The present manual, for example, has two indices: a concept index and an `@-`command index (that is actually the function index but is called a command index in the chapter heading).

You are not required to use the predefined indices strictly for their canonical purposes. For example, suppose you wish to index some C preprocessor macros. You could put them in the function index along with actual functions, just by writing `@findex` commands for them; then, when you print the “Function Index” as an unnumbered chapter, you could give it the title ‘Function and Macro Index’ and all will be consistent for the reader.

On the other hand, it is best not to stray too far from the meaning of the predefined indices. Otherwise, in the event that your text is combined with other text from other manuals, the index entries will not match up. Instead, define your own new index (see Section 11.6 [New Indices], page 101).

We recommend having a single index in the final document whenever possible, however many source indices you use, since then readers have only one place to look. Two or more source indices can be combined into one output index using the `@synindex` or `@syncodeindex` commands (see Section 11.5 [Combining Indices], page 100).

11.2 Defining the Entries of an Index

The data to make an index come from many individual indexing commands scattered throughout the Texinfo source file. Each command says to add one entry to a particular index; after formatting, the index will give the current page number or node name as the reference.

An index entry consists of an indexing command at the beginning of a line followed, on the rest of the line, by the entry.

For example, this section begins with the following five entries for the concept index:

```
@cindex Defining indexing entries
@cindex Index entries, defining
@cindex Entries for an index
@cindex Specifying index entries
@cindex Creating index entries
```

Each predefined index has its own indexing command—`@cindex` for the concept index, `@findex` for the function index, and so on, as listed in the previous section.

Index entries should precede the visible material that is being indexed. For instance:

```
@cindex hello
Hello, there!
```

Among other reasons, that way following indexing links (in whatever context) ends up before the material, where readers want to be, instead of after.

By default, entries for a concept index are printed in a small roman font and entries for the other indices are printed in a small `@code` font. You may change the way part of an entry is printed with the usual Texinfo commands, such as `@file` for file names (see Chapter 7 [Marking Text], page 61), and `@r` for the normal roman font (see Section 7.2.3 [Fonts], page 70).

For the printed output, you may specify an explicit sort key for an index entry using `@sortas` immediately following the index command. For example: `'@findex @sortas{\} \@r{(literal \ in @code{@@math})}'` sorts the index entry this produces under backslash.

To reduce the quantity of sort keys you need to provide explicitly, you may choose to ignore certain characters in index entries for the purposes of sorting. The characters that you can currently choose to ignore are `'\'`, `'-'`, `'<'` and `'@'`, which are ignored by giving as an argument to the `@set` command, respectively, `txiindexbackslashignore`, `txiindexhyphenignore`, `txiindexlessthanignore` and `txiindexatsignignore`. For example, specifying `'@set txiindexbackslashignore'` causes the `'\mathop\sup'` entry in the index for this manual to be sorted as if it were `'mathop\sup'`, so that it appears among the other entries beginning `'M'`.

Caution: Do not use a colon in an index entry. In Info, a colon separates the menu entry name from the node name, so a colon in the entry itself confuses Info. See Section 4.9.4 [Menu Parts], page 40, for more information about the structure of a menu entry.

11.3 Making Index Entries

Concept index entries consist of text. The best way to write an index is to devise entries which are terse yet clear. If you can do this, the index usually looks better if the entries

are written just as they would appear in the middle of a sentence, that is, capitalizing only proper names and acronyms that always call for uppercase letters. This is the case convention we use in most GNU manuals' indices.

If you don't see how to make an entry terse yet clear, make it longer and clear—not terse and confusing. If many of the entries are several words long, the index may look better if you use a different convention: to capitalize the first word of each entry. Whichever case convention you use, use it consistently.

In any event, do not ever capitalize a case-sensitive name such as a C or Lisp function name or a shell command; that would be a spelling error. Entries in indices other than the concept index are symbol names in programming languages, or program names; these names are usually case-sensitive, so likewise use upper- and lowercase as required.

It is a good idea to make index entries unique wherever feasible. That way, people using the printed output or online completion of index entries don't see undifferentiated lists. Consider this an opportunity to make otherwise-identical index entries be more specific, so readers can more easily find the exact place they are looking for.

When you are making index entries, it is good practice to think of the different ways people may look for something. Different people *do not* think of the same words when they look something up. A helpful index will have items indexed under all the different words that people may use. For example, one reader may think it obvious that the two-letter names for indices should be listed under “Indices, two-letter names, since “Indices” are the general concept. But another reader may remember the specific concept of two-letter names and search for the entry listed as “Two letter names for indices”. A good index will have both entries and will help both readers.

Like typesetting, the construction of an index is a skilled art, the subtleties of which may not be appreciated until you need to do it yourself.

11.4 Printing Indices and Menus

To print an index means to include it as part of a manual or Info file. This does not happen automatically just because you use `@cindex` or other index-entry generating commands in the Texinfo file; those just cause the raw data for the index to be accumulated. To generate an index, you must include the `@printindex` command at the place in the document where you want the index to appear. Also, as part of the process of creating a printed manual, you must run a program called `texindex` (see Chapter 19 [Hardcopy], page 163) to sort the raw data to produce a sorted index file. The sorted index file is what is actually used to print the index.

Texinfo offers six separate types of predefined index, which suffice in most cases. See Chapter 11 [Indices], page 97, for information on this, as well defining your own new indices, combining indices, and, most importantly advice on writing the actual index entries. This section focuses on printing indices, which is done with the `@printindex` command.

`@printindex` takes one argument, a two-letter index abbreviation. It reads the corresponding sorted index file (for printed output), and formats it appropriately into an index.

The `@printindex` command does not generate a chapter heading for the index, since different manuals have different needs. Consequently, you should precede the `@printindex` command with a suitable section or chapter command (usually `@appendix` or `@unnumbered`)

to supply the chapter heading and put the index into the table of contents. Precede the chapter heading with an `@node` line as usual.

For example:

```
@node Variable Index
@unnumbered Variable Index

@printindex vr

@node Concept Index
@unnumbered Concept Index

@printindex cp
```

If you have more than one index, we recommend placing the concept index last.

- In printed output, `@printindex` produces a traditional two-column index, with dot leaders between the index terms and page numbers.
- In Info output, `@printindex` produces a special menu containing the line number of the entry, relative to the start of the node. Info readers can use this to go to the exact line of an entry, not just the containing node. (Older Info readers will just go to the node.) Here's an example:

```
* First index entry:  Top.  (line 7)
```

The actual number of spaces is variable, to right-justify the line number; it's been reduced here to make the line fit in the printed manual.

- In plain text output, `@printindex` produces the same menu, but the line numbers are relative to the start of the file, since that's more convenient for that format.
- In HTML output, `@printindex` produces links to the index entries.
- In XML and Docbook output, it simply records the index to be printed.

11.5 Combining Indices

Sometimes you will want to combine two disparate indices such as functions and concepts, perhaps because you have few enough entries that a separate index would look silly.

You could put functions into the concept index by writing `@cindex` commands for them instead of `@findex` commands, and produce a consistent manual by printing the concept index with the title 'Function and Concept Index' and not printing the 'Function Index' at all; but this is not a robust procedure. It works only if your document is never included as part of another document that is designed to have a separate function index; if your document were to be included with such a document, the functions from your document and those from the other would not end up together. Also, to make your function names appear in the right font in the concept index, you would need to enclose every one of them between the braces of `@code`.

11.5.1 `@syncodeindex`: Combining indices using `@code`

When you want to combine functions and concepts into one index, you should index the functions with `@findex` and index the concepts with `@cindex`, and use the `@syncodeindex` command to redirect the function index entries into the concept index.

The `@syncodeindex` command takes two arguments; they are the name of the index to redirect, and the name of the index to redirect it to. The template looks like this:


```
@syncodeindex from to
```

For this purpose, the indices are given two-letter names:

```
'cp'      concept index
'fn'      function index
'vr'      variable index
'ky'      key index
'pg'      program index
'tp'      data type index
```

Write a `@syncodeindex` command before or shortly after the end-of-header line at the beginning of a Texinfo file. For example, to merge a function index with a concept index, write the following:

```
@syncodeindex fn cp
```

This will cause all entries designated for the function index to merge in with the concept index instead.

To merge both a variables index and a function index into a concept index, write the following:

```
@syncodeindex vr cp
@syncodeindex fn cp
```

The `@syncodeindex` command puts all the entries from the ‘from’ index (the redirected index) into the `@code` font, overriding whatever default font is used by the index to which the entries are now directed. This way, if you direct function names from a function index into a concept index, all the function names are printed in the `@code` font as you would expect.

11.5.2 @synindex: Combining indices

The `@synindex` command is nearly the same as the `@syncodeindex` command, except that it does not put the ‘from’ index entries into the `@code` font; rather it puts them in the roman font. Thus, you use `@synindex` when you merge a concept index into a function index.

See Section 11.4 [Printing Indices & Menus], page 99, for information about printing an index at the end of a book or creating an index menu in an Info file.

11.6 Defining New Indices

In addition to the predefined indices (see Section 11.1 [Predefined Indices], page 97), you may use the `@defindex` and `@defcodeindex` commands to define new indices. These commands create new indexing `@`-commands with which you mark index entries. The `@defindex` command is used like this:

```
@defindex name
```

New index names are usually two-letter words, such as ‘au’. For example:

```
@defindex au
```

This defines a new index, called the ‘au’ index. At the same time, it creates a new indexing command, `@auindex`, that you can use to make index entries. Use this new indexing command just as you would use a predefined indexing command.

For example, here is a section heading followed by a concept index entry and two ‘au’ index entries.

```
@section Cognitive Semantics
@cindex kinesthetic image schemas
@auindex Johnson, Mark
@auindex Lakoff, George
```

(Evidently, ‘au’ serves here as an abbreviation for “author”.)

Texinfo constructs the new indexing command by concatenating the name of the index with ‘index’; thus, defining an ‘xy’ index leads to the automatic creation of an `@xyindex` command.

Use the `@printindex` command to print the index, as you do with the predefined indices. For example:

```
@node Author Index
@unnumbered Author Index

@printindex au
```

The `@defcodeindex` is like the `@defindex` command, except that, in the printed output, it prints entries in an `@code` font by default instead of a roman font.

You should define new indices before the end-of-header line of a Texinfo file, and (of course) before any `@synindex` or `@syncodeindex` commands (see Section 3.2 [Texinfo File Header], page 16).

As mentioned earlier (see Section 11.1 [Predefined Indices], page 97), we recommend having a single index in the final document whenever possible, however many source indices you use, since then readers have only one place to look.

When creating an index, \TeX creates a file whose extension is the name of the index (see [Names of index files], page 165). Therefore you should avoid using index names that collide with extensions used for other purposes, such as ‘.aux’ or ‘.xml’. `makeinfo` already reports an error if a new index conflicts well-known extension name.

12 Special Insertions

Texinfo provides several commands for inserting characters that have special meaning in Texinfo, such as braces, and for other graphic elements that do not correspond to simple characters you can type.

These are:

- The Texinfo special characters: ‘@ {} , \ #’.
- Whitespace within and around a sentence.
- Accents.
- Dots and bullets.
- The \TeX logo and the copyright symbol.
- The euro and pounds currency symbols.
- The degrees symbol.
- The minus sign.
- Mathematical expressions.
- Glyphs for examples of programming: evaluation, macros, errors, etc.
- Footnotes.

12.1 Special Characters: Inserting @ {} , \

‘@’ and curly braces are the basic special characters in Texinfo. To insert these characters so they appear in text, you must put an ‘@’ in front of these characters to prevent Texinfo from misinterpreting them. Alphabetic commands are also provided.

The other characters (comma, backslash, hash) are special only in restricted contexts, as explained in the respective sections.

12.1.1 Inserting ‘@’ with @@ and @atchar{}

@@ produces a single ‘@’ character in the output. Do not put braces after an @@ command.

@atchar{} also produces a single ‘@’ character in the output. It does need following braces, as usual for alphabetic commands. In inline conditionals (see Section 16.4 [Inline Conditionals], page 142), it can be necessary to avoid using the literal ‘@’ character in the source (and may be clearer in other contexts).

12.1.2 Inserting ‘{ ‘}’ with @{ @} and @l rbracechar{}

@{ produces a single ‘{’ in the output, and @} produces a single ‘}’. Do not put braces after either an @{ or an @} command.

@lbracechar{} and @rbracechar{} also produce single ‘{’ and ‘}’ characters in the output. They do need following braces, as usual for alphabetic commands. In inline conditionals (see Section 16.4 [Inline Conditionals], page 142), it can be necessary to avoid using literal brace characters in the source (and may be clearer in other contexts).

12.1.3 Inserting ‘,’ with `@comma{}`

Ordinarily, a comma ‘,’ is a normal character that can be simply typed in your input where you need it.

However, Texinfo uses the comma as a special character only in one context: to separate arguments to those Texinfo commands, such as `@acronym` (see Section 7.1.14 [`@acronym`], page 68) and `@xref` (see Chapter 6 [Cross References], page 49), as well as user-defined macros (see Section 17.1 [Defining Macros], page 149), which take more than one argument.

Since a comma character would confuse Texinfo’s parsing for these commands, you must use the command ‘`@comma{}`’ instead if you want to pass an actual comma. Here are some examples:

```
@acronym{ABC, A Bizarre @comma{}}
@xref{Comma,, The @comma{ } symbol}
@mymac{One argument@comma{ } containing a comma}
```

Although ‘`@comma{}`’ can be used nearly anywhere, there is no need for it anywhere except in this unusual case.

(Incidentally, the name ‘`@comma`’ lacks the ‘`char`’ suffix used in its companion commands only for historical reasons. It didn’t seem important enough to define a synonym.)

12.1.4 Inserting ‘\’ with `@backslashchar{}`

Ordinarily, a backslash ‘\’ is a normal character in Texinfo that can be simply typed in your input where you need it. The result is to typeset the backslash from the typewriter font.

However, Texinfo uses the backslash as a special character in one restricted context: to delimit formal arguments in the bodies of user-defined macros (see Section 17.1 [Defining Macros], page 149).

Due to the vagaries of macro argument parsing, it is more reliable to pass an alphabetic command that produces a backslash instead of using a literal `\`. Hence `@backslashchar{}`. Here is an example macro call:

```
@mymac{One argument@backslashchar{ } with a backslash}
```

Texinfo documents may also use `\` as a command character inside `@math` (see Section 12.7 [Inserting Math], page 111). In this case, `@\` or `\backslash` produces a “math” backslash (from the math symbol font), while `@backslashchar{}` produces a typewriter backslash as usual.

Although ‘`@backslashchar{}`’ can be used nearly anywhere, there is no need for it except in these unusual cases.

12.1.5 Inserting ‘#’ with `@hashchar{}`

Ordinarily, a hash ‘#’ is a normal character in Texinfo that can be simply typed in your input where you need it. The result is to typeset the hash character from the current font.

This character has many other names, varying by locale, such as “number sign”, “pound”, and “octothorp”. It is also sometimes called “sharp” or “sharp sign” since it vaguely resembles the musical symbol by that name. In situations where Texinfo is used, “hash” is the most common in our experience.

However, Texinfo uses the hash character as a special character in one restricted context: to introduce the so-called `#line` directive and variants (see Section 17.6 [External Macro Processors], page 156).

So, in order to typeset an actual hash character in such a place (for example, in a program that needs documentation about `#line`), it's necessary to use `@hashchar{}` or some other construct. Here's an example:

```
@hashchar{} 10 "example.c"
```

Although `@hashchar{}` can be used nearly anywhere, there is no need for it anywhere except this unusual case.

12.2 Inserting Quote Characters

As explained in the early section on general Texinfo input conventions (see Section 2.1 [Conventions], page 10), Texinfo source files use the ASCII character `'` (96 decimal) to produce a left quote (`'`), and ASCII `'` (39 decimal) to produce a right quote (`'`). Doubling these input characters (`'` and `'`) produces double quotes (`"` and `"`). These are the conventions used by `TEX`.

This works all right for text. However, in examples of computer code, readers are especially likely to cut and paste the text verbatim—and, unfortunately, some document viewers will mangle these characters. (The free PDF reader `xpdf` works fine, but other PDF readers, both free and nonfree, have problems.)

If this is a concern for you, Texinfo provides these two commands:

`@codequoteundirected` *on-off*

causes the output for the `'` character in code environments to be the undirected single quote, like this: `'`.

`@codequotebacktick` *on-off*

causes the output for the `'` character in code environments to be the backtick character (standalone grave accent), like this: ```.

If you want these settings for only part of the document, `@codequote... off` will restore the normal behavior, as in `@codequoteundirected off`.

These settings affect `@code`, `@example`, `@kbd`, `@samp`, `@verb`, and `@verbatim`. See Section 7.1.1 [Useful Highlighting], page 61.

This feature used to be controlled by using `@set` to change the values of the corresponding variables `txicodequoteundirected` and `txicodequotebacktick`; they are still supported, but the command interface is preferred.

12.3 Inserting Space

The following sections describe commands that control spacing of various kinds within and after sentences.

12.3.1 Multiple Spaces

Ordinarily, multiple whitespace characters (space, tab, and newline) are collapsed into a single space.

Occasionally, you may want to produce several consecutive spaces, either for purposes of example (e.g., what your program does with multiple spaces as input), or merely for purposes of appearance in headings or lists. Texinfo supports three commands: `@SPACE`, `@TAB`, and `@NL`, all of which insert a single space into the output. (Here, `@SPACE` represents an ‘@’ character followed by a space, i.e., ‘@ ’, `TAB` represents an actual tab character, and `@NL` represents an ‘@’ character and end-of-line, i.e., when ‘@’ is the last character on a line.)

For example,

```
Spacey@ @ @ @
example.
```

produces

```
Spacey    example.
```

Other possible uses of `@SPACE` have been subsumed by `@multitable` (see Section 9.5 [Multi-column Tables], page 87).

Do not follow any of these commands with braces.

To produce a non-breakable space, see Section 13.6 [`@tie`], page 121.

12.3.2 Not Ending a Sentence

When a period, exclamation point or question mark is at the end of a sentence, slightly more space is inserted after it in a typeset manual.

Usually, Texinfo can determine automatically when a period ends a sentence. However, special commands are needed in some circumstances. Use the `@:` command after a period, question mark, exclamation mark or colon that should not be followed by extra space. This is necessary in the following situations:

1. After a period that ends a lowercase abbreviation which is not at the end of a sentences.
2. When a parenthetical remark in the middle of a sentence (like this one!) ends with a period, exclamation point or question mark, `@:` should be used after the right parenthesis. Similarly for right brackets and right quotes (both single and double).

For example:

```
‘foo vs.@: bar (or?)@: baz’,
```

The first line below shows the output, and for comparison, the second line shows the spacing when the ‘@:’ commands were not used.

```
foo vs. bar (or?) baz
foo vs. bar (or?) baz
```

If you look carefully, you will see a bit of extraneous space after the ‘`vs.`’ and ‘`(or?)`’.

It may help you to remember what `@:` does by imagining that it stands for an invisible lower-case character that stops a word ending in a period.

A few Texinfo commands force normal interword spacing, so that you don’t have to insert `@:` where you otherwise would. These are the code-like highlighting commands, `@var`, `@abbr`, and `@acronym` (see Section 7.1.1 [Useful Highlighting], page 61). For example, in ‘`@code{foo. bar}`’ the period is not considered to be the end of a sentence, and no extra space is inserted.

`@:` has no effect on the HTML or Docbook output.

12.3.3 Ending a Sentence

As mentioned above, Texinfo normally inserts additional space after the end of a sentence. It uses the same heuristic for this as \TeX : a sentence ends with a period, exclamation point, or question mark, either preceded or followed by optional closing punctuation, and then whitespace, and *not* preceded by a capital letter.

Use `@.` instead of a period, `@!` instead of an exclamation point, and `@?` instead of a question mark at the end of a sentence that does end with a capital letter. Do not put braces after any of these commands. For example:

```
Give it to M.I.B. and to M.E.W@. Also, give it to R.J.C@.
Give it to M.I.B. and to M.E.W. Also, give it to R.J.C.
```

The output follows. In printed output and Info, you can see the desired extra whitespace after the ‘W’ in the first line.

```
Give it to M.I.B. and to M.E.W. Also, give it to R.J.C.
Give it to M.I.B. and to M.E.W. Also, give it to R.J.C.
```

In the HTML output, `@.` is equivalent to a simple ‘.’; likewise for `@!` and `@?`.

The “closing punctuation” mentioned above is defined as a right parenthesis (‘)’), right bracket (‘]’), or right quote, either single or double (‘’ and ‘’’’; the many possible additional Unicode right quotes are not included). These characters can be thought of as invisible with respect to whether a given period ends a sentence. (This is the same rule as \TeX .) For instance, the periods in ‘foo.) Bar’ and ‘foo.’’ Bar’ do end sentences.

The meanings of `@:` and `@.`, etc. in Texinfo are designed to work well with the Emacs sentence motion commands (see Section “Sentences” in *The GNU Emacs Manual*). It may help to imagine that the ‘@’ in ‘@.’, etc., is an invisible lower-case letter ‘a’ which makes an upper-case letter before it immaterial for the purposes of deciding whether the period ends the sentence.

A few Texinfo commands are not considered as being an abbreviation, even though they may end with a capital letter when expanded, so that you don’t have to insert `@.` and companions. Notably, this is the case for code-like highlighting commands, `@var` arguments ending with a capital letter, `@LaTeX`, and `@TeX`. For example, that sentence ended with ‘... `@code{@@TeX}.`’; `@.` was not needed. Similarly, in ... `@var{VARNAME}. Text` the period after `VARNAME` ends the sentence; there is no need to use `@.`

12.3.4 `@frenchspacing val`: Control Sentence Spacing

In American typography, it is traditional and correct to put extra space at the end of a sentence. This is the default in Texinfo (implemented in Info and printed output; for HTML, we don’t try to override the browser). In French typography (and others), this extra space is wrong; all spaces are uniform.

Therefore Texinfo provides the `@frenchspacing` command to control the spacing after punctuation. It reads the rest of the line as its argument, which must be the single word ‘on’ or ‘off’ (always these words, regardless of the language of the document). Here is an example:

```
@frenchspacing on
This is text. Two sentences. Three sentences. French spacing.
```

```
@frenchspacing off
```

```
This is text. Two sentences. Three sentences. Non-French spacing.
```

produces:

```
This is text. Two sentences. Three sentences. French spacing.
```

```
This is text. Two sentences. Three sentences. Non-French spacing.
```

`@frenchspacing` also affects the output after `@.`, `@!`, and `@?` (see Section 12.3.3 [Ending a Sentence], page 107).

`@frenchspacing` has no effect on the HTML or Docbook output; for XML, it outputs a transliteration of itself (see Section 1.2 [Output Formats], page 4).

12.3.5 `@dmn{dimension}`: Format a Dimension

You can use the `@dmn` command to format a dimension with a little extra space in the printed output. That is, on seeing `@dmn`, \TeX inserts just enough space for proper typesetting; in other output formats, the formatting commands insert no space at all.

To use the `@dmn` command, write the number and then follow it immediately, with no intervening space, by `@dmn`, and then by the dimension within braces. For example,

```
A4 paper is 8.27@dmn{in} wide.
```

produces

```
A4 paper is 8.27 in wide.
```

Not everyone uses this style. Some people prefer ‘8.27 in.’ or ‘8.27 inches’. In these cases, however, you need to use `@tie` (see Section 13.6 [`@tie`], page 121) or `@w` (see Section 13.5 [`@w`], page 120) so that no line break can occur between the number and the dimension. Also, if you write a period after an abbreviation within a sentence (as with the ‘in.’ above), you should write ‘@:’ after the period to prevent \TeX from inserting extra whitespace, as shown here. See Section 12.3.2 [Not Ending a Sentence], page 106.

12.4 Inserting Accents

Here is a table with the commands Texinfo provides for inserting floating accents. They all need an argument, the character to accent, which can either be given in braces as usual (`@{e}`), or, as a special case, the braces can be omitted, in which case the argument is the next character (`@e`). This is to make the source as convenient as possible to type and read, since accented characters are very common in some languages.

If the command is alphabetic, such as `@dotaccent`, then there must be a space between the command name and argument if braces are not used. If the command is non-alphabetic, such as `@'`, then there must *not* be a space; the argument is the very next character.

Exception: the argument to `@tieaccent` must be enclosed in braces (since it is two characters instead of one).

To get the true accented characters output in Info, not just the ASCII transliterations, it is necessary to specify `@documentencoding` with an encoding which supports the required characters (see Section 15.2 [`@documentencoding`], page 137). In this case, you can also use non-ASCII (e.g., pre-accented) characters in the source file.

Command	Output	What
@"o	ö	umlaut accent
@'o	ó	acute accent
@,{c}	ç	cedilla accent
@=o	ō	macron/overbar accent
@^o	ô	circumflex accent
@'o	ò	grave accent
@~o	õ	tilde accent
@dotaccent{o}	ô	overdot accent
@H{o}	ő	long Hungarian umlaut
@ogonek{a}	ą	ogonek
@ringaccent{o}	ô	ring accent
@tieaccent{oo}	oō	tie-after accent
@u{o}	ö	breve accent
@ubaraccent{o}	ō	underbar accent
@udotaccent{o}	ȯ	underdot accent
@v{o}	ö	caron/hacek/check accent

This table lists the Texinfo commands for inserting other characters commonly used in languages other than English.

@exclamdown{}	¡	upside-down !
@questiondown{}	¿	upside-down ?
@aa{} @AA{}	å Å	a,A with circle
@ae{} @AE{}	æ Æ	ae,AE ligatures
@dh{} @DH{}	ð Ð	Icelandic eth
@dotless{i}	ı	dotless i
@dotless{j}	ȷ	dotless j
@l{} @L{}	ł Ł	suppressed-L,l
@o{} @O{}	ø Ø	O,o with slash
@oe{} @OE{}	œ Œ	oe,OE ligatures
@ordf{} @ordm{}	ª º	Spanish ordinals
@ss{}	ß	es-zet or sharp S
@th{} @TH{}	þ Þ	Icelandic thorn

12.5 Inserting Quotation Marks

Use doubled single-quote characters to begin and end quotations: ‘ ‘...’ ’. T_EX converts two single quotes to left- and right-hand doubled quotation marks, “like this”, and Info converts doubled single-quote characters to ASCII double-quotes: ‘ ‘...’ ’ becomes "...".

You may occasionally need to produce two consecutive single quotes; for example, in documenting a computer language such as Maxima where ‘ ’ is a valid command. You can do this with the input ‘@w{ }’; the empty @w command stops the combination into the double-quote characters.

The left quote character (‘, ASCII code 96) used in Texinfo is a grave accent in ANSI and ISO character set standards. We use it as a quote character because that is how T_EX is set up, by default.

Texinfo supports several other quotation marks used in languages other than English. Below is a table with the commands Texinfo provides for inserting quotation marks.

In order to get the symbols for the quotation marks in encoded Info output, it is necessary to specify `@documentencoding UTF-8`. (See Section 15.2 [`@documentencoding`], page 137.) Double guillemets are also present in ISO 8859-1 (aka Latin 1) and ISO 8859-15 (aka Latin 9).

The standard \TeX fonts support the usual quotation marks used in English (the ones produced with single and doubled ASCII single-quotes). For the other quotation marks, \TeX uses European Computer Modern (EC) fonts (`ecrm1000` and other variants). These fonts are freely available, of course; you can download them from <http://ctan.org/pkg/ec>, among other places.

The free EC fonts are bitmap fonts created with Metafont. Especially for on-line viewing, Type 1 (vector) versions of the fonts are preferable; these are available in the CM-Super font package (<http://ctan.org/pkg/cm-super>).

Both distributions include installation instructions.

Command		Glyph	Unicode name (point)
<code>@quotedblleft{}</code>	<code>``</code>	“	Left double quotation mark (U+201C)
<code>@quotedblright{}</code>	<code>''</code>	”	Right double quotation mark (U+201D)
<code>@quoteleft{}</code>	<code>`</code>	‘	Left single quotation mark (U+2018)
<code>@quoteright{}</code>	<code>'</code>	’	Right single quotation mark (U+2019)
<code>@quotedblbase{}</code>		„	Double low-9 quotation mark (U+201E)
<code>@quotesinglbase{}</code>		,	Single low-9 quotation mark (U+201A)
<code>@guillemetleft{}</code>		«	Left-pointing double angle quotation mark (U+00AB)
<code>@guillemetright{}</code>		»	Right-pointing double angle quotation mark (U+00BB)
<code>@guilsinglleft{}</code>		‹	Single left-pointing angle quotation mark (U+2039)
<code>@guilsinglright{}</code>		›	Single right-pointing angle quotation mark (U+203A)

For the double angle quotation marks, Adobe and \LaTeX glyph names are also supported: `@guillemotleft` and `@guillemotright`. These names are incorrect; a “guillemot” is a bird species (a type of auk).

Traditions for quotation mark usage vary to a great extent between languages (http://en.wikipedia.org/wiki/Quotation_mark). Texinfo does not provide commands or configurations for typesetting quotation marks according to the numerous traditions. Therefore, you have to choose the commands appropriate for the language of your manual. Sometimes aliases (see Section 17.4 [`@alias`], page 154) can simplify the usage and make the source code more readable. For example, in German, `@quotedblbase` is used for the left double quote, and the right double quote is the glyph produced by `@quotedblleft`, which is counter-intuitive. Thus, in this case the following aliases would be convenient:

```
@alias lgqq = quotedblbase
@alias rgqq = quotedblleft
```

12.6 @sub and @sup: Inserting Subscripts and Superscripts

You can insert subscripts and superscripts, in either text or math, with the `@sub` and `@sup` commands. (For other mathematical expressions, see the next section.) For example, here is a purely textual subscript and superscript:

```
here@sub{below}@sup{above}
```

produces:

```
herebelowabove
```

Inside `@math`, `@sub` and `@sup` produce mathematical subscripts and superscripts. This uses a different font in the \TeX output (math italic instead of text italic); it makes no difference in the other output formats. Here's an example:

```
@math{e@sup{x}}
```

produces:

```
 $e^x$ 
```

In Info and plain text, regardless of being used inside `@math`, `@sub{text}` is output as ‘`_ {text}`’ and `@sup{text}` as ‘`^ {text}`’, including the literal braces (to mark the beginning and end of the “script” text to the reader).

When the output format (and display program) permit (\TeX math, HTML), the superscript is set above the subscript when both commands are given consecutively.

12.7 @math: Inserting Mathematical Expressions

You can write a short mathematical expression with the `@math` command. Write the mathematical expression between braces, like this:

```
@math{(a + b) = (b + a)}
```

This produces the following in \TeX :

```
 $(a + b) = (b + a)$ 
```

and the following in other formats:

```
(a + b) = (b + a)
```

The `@math` command has no special effect on the Info and HTML output. `makeinfo` expands any `@`-commands as usual, but it does not try to use produce good mathematical formatting in any way (no use of MathML, etc.). The HTML output is enclosed by `...`, but nothing more.

However, as far as the \TeX output is concerned, plain \TeX mathematical commands are allowed in `@math`, starting with ‘`\`’. In essence, `@math` switches into plain \TeX math mode. (Exception: the plain \TeX command `\sup`, which typesets the mathematical operator name ‘sup’, must be accessed as `\mathopsup`, due to the conflict with Texinfo’s `@sup` command.)

This allows you to use all the plain \TeX math control sequences for symbols, functions, and so on, and thus get proper formatting in the \TeX output, at least.

The `@sub` and `@sup` commands described in the previous section produce subscripts and superscripts in HTML output as well as \TeX ; the plain \TeX characters `_` and `^` for subscripts and superscripts are recognized by \TeX inside `@math`, but do nothing special in HTML or other output formats.

It's best to use `\` instead of `@` for any such mathematical commands; otherwise, `makeinfo` will complain. On the other hand, `makeinfo` does allow input with matching (but unescaped) braces, such as `'k_{75}'`; it complains about such bare braces in regular input.

Here's an example:

```
@math{\sin 2\pi \equiv \cos 3\pi}
```

which looks like this in `TEX`:

$$\sin 2\pi \equiv \cos 3\pi$$

but which looks like the input in Info and HTML:

```
\sin 2\pi \equiv \cos 3\pi
```

Since `\` is an escape character inside `@math`, you can use `@\` to get a literal backslash (`\\` will work in `TEX`, but you'd get the literal two characters `'\\'` in Info). `@\` is not defined outside of `@math`, since a `\` ordinarily produces a literal (typewriter) `'\'`. You can also use `@backslashchar{}` in any mode to get a typewriter backslash. See Section 12.1.4 [Inserting a Backslash], page 104.

For displayed equations, you must at present use `TEX` directly (see Section 16.3 [Raw Formatter Commands], page 141).

12.8 Glyphs for Text

Texinfo has support for a few additional glyphs that are commonly used in printed text but not available in ASCII. Of course, there are many thousands more. It is possible to use Unicode characters as-is as far as `makeinfo` is concerned, but `TEX` is not so lucky.

12.8.1 `@TeX{}` (`TEX`) and `@LaTeX{}` (`LATEX`)

Use the `@TeX{}` command to generate `'TEX'`. In a printed manual, this is a special logo that is different from three ordinary letters. In Info, it just looks like `'TeX'`.

Similarly, use the `@LaTeX{}` command to generate `'LATEX'`, which is even more special in printed manuals (and different from the incorrect `LaTeX{}`). In Info, the result is just `'LaTeX'`. (`LATEX` is another macro package built on top of `TEX`, very loosely analogous to Texinfo in that it emphasizes logical structure, but much (much) larger.)

The spelling of these commands are unusual for Texinfo, in that they use both uppercase and lowercase letters.

12.8.2 `@copyright{}` (`©`)

Use the `@copyright{}` command to generate the copyright symbol, `'©'`. Where possible, this is a `'c'` inside a circle; in Info, this is `'(C)'`.

Legally, it's not necessary to use the copyright symbol; the English word `'Copyright'` suffices, according to international treaty.

12.8.3 `@registeredsymbol{}` (`®`)

Use the `@registeredsymbol{}` command to generate the registered symbol, `'®'`. Where possible, this is an `'R'` inside a circle; in Info, this is `'(R)'`.

12.8.4 @dots (...) and @enddots (...)

An *ellipsis* (a sequence of dots) would be spaced wrong when typeset as a string of periods, so a special command is used in Texinfo: use the `@dots{}` command to generate a normal ellipsis, which is three dots in a row, appropriately spaced ... like so. To emphasize: do not simply write three periods in the input file; that would work for the Info file output, but would produce the wrong amount of space between the periods in the printed manual.

The `@enddots{}` command generates an end-of-sentence ellipsis, which also has three dots, but with different spacing afterwards, ... Look closely to see the difference.

Here is an ellipsis: ... Here are three periods in a row: ...

In printed (and usually HTML) output, the three periods in a row are much closer together than the dots in the ellipsis.

12.8.5 @bullet (●)

Use the `@bullet{}` command to generate a large round dot, or the closest possible thing to one. In Info, an asterisk is used. Here is a bullet: ●

When you use `@bullet` in `@itemize`, you do not need to type the braces, because `@itemize` supplies them. (see Section 9.2 [`@itemize`], page 83).

12.8.6 @euro (€): Euro Currency Symbol

Use the `@euro{}` command to generate ‘€’. Where possible, this is the symbol for the Euro currency. Otherwise, the word ‘Euro’ is used.

Texinfo cannot magically synthesize support for the Euro symbol where the underlying system (fonts, software, whatever) does not support it. Therefore, you may find it preferable to use the word “Euro”. (In banking contexts, the abbreviation for the Euro is EUR.)

In order to get the Euro symbol in encoded Info output, for example, it is necessary to specify `@documentencoding ISO-8859-15` or `@documentencoding UTF-8` (See Section 15.2 [`@documentencoding`], page 137.) The Euro symbol is in ISO 8859-15 (aka Latin 9), and is *not* in the more widely-used ISO 8859-1 (Latin 1).

The Euro symbol does not exist in the standard \TeX fonts (which were designed before the Euro was legislated into existence). Therefore, \TeX uses an additional font, named `feymr10` (along with other variables). It is freely available, of course; you can download it from <http://ctan.org/pkg/eurosym>, among other places. The distribution includes installation instructions.

12.8.7 @pounds (£): Pounds Sterling

Use the `@pounds{}` command to generate ‘£’. Where possible, this is the symbol for the pounds sterling British currency. Otherwise, it is ‘#’.

12.8.8 @textdegree (°): Degrees Symbol

Use the `@textdegree{}` command to generate ‘°’. Where possible, this is the normal symbol for degrees. Otherwise, it is an ‘o’.

12.8.9 @minus (−): Inserting a Minus Sign

Use the `@minus{}` command to generate a minus sign. In a fixed-width font, this is a single hyphen, but in a proportional font, the symbol is the customary length for a minus sign—a little longer than a hyphen, shorter than an em-dash:

‘−’ is a minus sign generated with ‘`@minus{}`’,

‘-’ is a hyphen generated with the character ‘-’,

‘—’ is an em-dash for text.

In the fixed-width font used by Info, `@minus{}` is the same as a hyphen.

You should not use `@minus{}` inside `@code` or `@example` because the width distinction is not made in the fixed-width font they use.

When you use `@minus` to specify the mark beginning each entry in an itemized list, you do not need to type the braces (see Section 9.2 [`@itemize`], page 83).

If you actually want to typeset some math that does a subtraction, it is better to use `@math`. Then the regular ‘-’ character produces a minus sign, as in `@math{a-b}` (see Section 12.7 [Inserting Math], page 111).

12.8.10 @geq (≥) and @leq (≤): Inserting Relations

Use the `@geq{}` and `@leq{}` commands to generate greater-than-or-equal and less-than-equal-signs, ‘≥’ and ‘≤’. When those symbols are not available, the ASCII sequences ‘>=’ and ‘<=’ are output.

12.9 Glyphs for Programming

In Texinfo, code is often illustrated in examples that are delimited by `@example` and `@end example`, or by `@lisp` and `@end lisp`. In such examples, you can indicate the results of evaluation or an expansion using ‘ \Rightarrow ’ or ‘ \mapsto ’. Likewise, there are commands to insert glyphs to indicate printed output, error messages, equivalence of expressions, the location of point in an editor, and GUI operation sequences.

The glyph-insertion commands do not need to be used within an example, but most often they are. All glyph-insertion commands are followed by empty braces.

12.9.1 Glyphs Summary

Here is a summary of the glyph commands:

- \Rightarrow `@result{}` indicates the result of an expression.
- \mapsto `@expansion{}` indicates the results of a macro expansion.
- ⊢ `@print{}` indicates printed output.
- error `@error{}` indicates the following text is an error message.
- ≡ `@equiv{}` indicates the exact equivalence of two forms.
- ★ `@point{}` shows the location of point.
- A → B `@clicksequence{A @click{ } B}` indicates a GUI operation sequence: first A, then clicking B, or choosing B from a menu, or otherwise selecting it.

12.9.2 @result{} (\Rightarrow): Result of an Expression

Use the `@result{}` command to indicate the result of evaluating an expression.

The `@result{}` command is displayed as ‘ \Rightarrow ’, either a double stemmed arrow or (when that is not available) the ASCII sequence ‘`=>`’.

Thus, the following,

```
(cdr '(1 2 3))
 $\Rightarrow$  (2 3)
```

may be read as “(cdr '(1 2 3)) evaluates to (2 3)”.

12.9.3 @expansion{} (\mapsto): Indicating an Expansion

When an expression is a macro call, it expands into a new expression. You can indicate the result of the expansion with the `@expansion{}` command.

The `@expansion{}` command is displayed as ‘ \mapsto ’, either a long arrow with a flat base or (when that is not available) the ASCII sequence ‘`==>`’.

For example, the following

```
@lisp
(third '(a b c))
  @expansion{} (car (cdr (cdr '(a b c))))
  @result{} c
@end lisp
```

produces

```
(third '(a b c))
 $\mapsto$  (car (cdr (cdr '(a b c))))
 $\Rightarrow$  c
```

which may be read as:

```
(third '(a b c)) expands to (car (cdr (cdr '(a b c)))); the result of evaluating the expression is c.
```

Often, as in this case, an example looks better if the `@expansion{}` and `@result{}` commands are indented.

12.9.4 @print{} (\dashv): Indicating Generated Output

Sometimes an expression will generate output during its execution. You can indicate such displayed output with the `@print{}` command.

The `@print{}` command is displayed as ‘ \dashv ’, either a horizontal dash butting against a vertical bar or (when that is not available) the ASCII sequence ‘`-|`’.

In the following example, the printed text is indicated with ‘ \dashv ’, and the value of the expression follows on the last line.

```
(progn (print 'foo) (print 'bar))
 $\dashv$  foo
 $\dashv$  bar
 $\Rightarrow$  bar
```

In a Texinfo source file, this example is written as follows:

```
@lisp
(progn (print 'foo) (print 'bar))
  @print{} foo
  @print{} bar
  @result{} bar
@end lisp
```

12.9.5 @error{} (error): Indicating an Error Message

A piece of code may cause an error when you evaluate it. You can designate the error message with the @error{} command.

The @error{} command is displayed as ‘error’, either the word ‘error’ in a box in the printed output, the word error followed by an arrow in other formats or (when no arrow is available) ‘error-->’.

Thus,

```
@lisp
(+ 23 'x)
@error{} Wrong type argument: integer-or-marker-p, x
@end lisp
```

produces

```
(+ 23 'x)
error Wrong type argument: integer-or-marker-p, x
```

This indicates that the following error message is printed when you evaluate the expression:

```
Wrong type argument: integer-or-marker-p, x
```

The word ‘error’ itself is not part of the error message.

12.9.6 @equiv{} (\equiv): Indicating Equivalence

Sometimes two expressions produce identical results. You can indicate the exact equivalence of two forms with the @equiv{} command. The @equiv{} command is displayed as ‘ \equiv ’, either a standard mathematical equivalence sign (three parallel horizontal lines) or (when that is not available) as the ASCII sequence ‘==’.

Thus,

```
@lisp
(make-sparse-keymap) @equiv{} (list 'keymap)
@end lisp
```

produces

```
(make-sparse-keymap)  $\equiv$  (list 'keymap)
```

This indicates that evaluating (make-sparse-keymap) produces identical results to evaluating (list 'keymap).

12.9.7 @point{} (*): Indicating Point in a Buffer

Sometimes you need to show an example of text in an Emacs buffer. In such examples, the convention is to include the entire contents of the buffer in question between two lines of dashes containing the buffer name.

You can use the ‘@point{’ command to show the location of point in the text in the buffer. (The symbol for point, of course, is not part of the text in the buffer; it indicates the place *between* two characters where point is located.)

The @point{ command is displayed as ‘*’, either a pointed star or (when that is not available) the ASCII sequence ‘-!-’.

The following example shows the contents of buffer foo before and after evaluating a Lisp command to insert the word `changed`.

```

----- Buffer: foo -----
This is the *contents of foo.
----- Buffer: foo -----

(insert "changed ")
  => nil
----- Buffer: foo -----
This is the changed *contents of foo.
----- Buffer: foo -----

```

In a Texinfo source file, the example is written like this:

```

@example
----- Buffer: foo -----
This is the @point{}contents of foo.
----- Buffer: foo -----

(insert "changed ")
  @result{} nil
----- Buffer: foo -----
This is the changed @point{}contents of foo.
----- Buffer: foo -----
@end example

```

12.9.8 Click Sequences

When documenting graphical interfaces, it is necessary to describe sequences such as ‘Click on ‘File’, then choose ‘Open’, then ...’. Texinfo offers commands @clicksequence and click to represent this, typically used like this:

```
... @clicksequence{File @click{} Open} ...
```

which produces:

```
... File → Open ...
```

The @click command produces a right arrow by default; this glyph is also available independently via the command @arrow{.

You can change the glyph produced by @click with the command @clickstyle, which takes a command name as its single argument on the rest of the line, much like @itemize and friends (see Section 9.2 [itemize], page 83). The command should produce a glyph, and the usual empty braces ‘{}’ are omitted. Here’s an example:

```
@clickstyle @result
```

```
... @clicksequence{File @click{ } Open} ...
```

now produces:

```
... File ⇒ Open ...
```

12.10 Inserting Unicode: @U

The command `@U{hex}` inserts a representation of the Unicode character `U+hex`. For example, `@U{0132}` inserts the Dutch ‘IJ’ ligature (poorly shown here as simply the two letters ‘I’ and ‘J’).

The *hex* value should be at least four hex digits; leading zeros are *not* added. In general, *hex* must specify a valid normal Unicode character; e.g., `U+10FFFF` (the very last code point) is invalid by definition, and thus cannot be inserted this way.

`@U` is useful for inserting occasional glyphs for which Texinfo has no dedicated command, while allowing the Texinfo source to remain purely 7-bit ASCII for maximum portability.

This command has many limitations—the same limitations as inserting Unicode characters in UTF-8 or another binary form. First and most importantly, `TEX` knows nothing about most of Unicode. Supporting specific additional glyphs upon request is possible, but it’s not viable for `texinfo.tex` to support whole additional scripts (Japanese, Urdu, ...). The `@U` command does nothing to change this. If the specified character is not supported in `TEX`, an error is given. (See Section 15.2 [`@documentencoding`], page 137.)

In HTML, XML, and Docbook, the output from `@U` is always an entity reference of the form ‘`&#xhex;`’, as in ‘`Ĳ`’ for the example above. This should work even when an HTML document uses some other encoding (say, Latin 1) and the given character is not supported in that encoding.

In Info and plain text, if the document encoding is specified explicitly to be UTF-8, the output will be the UTF-8 representation of the character `U+hex` (presuming it’s a valid character). In all other cases, the output is the ASCII sequence ‘`U+hex`’, as in the six ASCII characters ‘`U+0132`’ for the example above.

That’s all. No magic!

13 Forcing and Preventing Breaks

Line and page breaks can sometimes occur in the ‘wrong’ place in one or another form of output. It’s up to you to ensure that text looks right in all the output formats.

For example, in a printed manual, page breaks may occur awkwardly in the middle of an example; to prevent this, you can hold text together using a grouping command that keeps the text from being split across two pages. Conversely, you may want to force a page break where none would occur normally.

You can use the break, break prevention, or pagination commands to fix problematic line and page breaks.

13.1 Break Commands

The break commands create or allow line and paragraph breaks:

- `@*` Force a line break.
- `@sp n` Skip *n* blank lines.
- `@-` Insert a discretionary hyphen.
- `@hyphenation{hy-phen-a-ted words}`
Define hyphen points in *hy-phen-a-ted words*.

These commands hold text together on a single line:

- `@w{text}` Prevent *text* from being split and hyphenated across two lines.
- `@tie{}` Insert a normal interword space at which a line break may not occur.

The pagination commands apply only to printed output, since other output formats do not have pages.

- `@page` Start a new page.
- `@group` Hold text together that must appear on one page.
- `@need mils`
Start a new page if not enough space on this one.

13.2 @* and @/: Generate and Allow Line Breaks

The `@*` command forces a line break in all output formats. The `@/` command allows a line break (printed manual only).

Here is an example with `@*`:

```
This sentence is broken @*into two lines.
produces
This sentence is broken
into two lines.
```

The `@/` command can be useful within long urls or other identifiers where T_EX can’t find a good place to break. T_EX will automatically break urls at the natural places (see Section 6.10.2 [URL Line Breaking], page 58), so only use `@/` if you need it. `@/` has no effect in the other output format.

13.3 @- and @hyphenation: Helping T_EX Hyphenate

Although T_EX’s hyphenation algorithm is generally pretty good, it does miss useful hyphenation points from time to time. (Or, far more rarely, insert an incorrect hyphenation.) So, for documents with an unusual vocabulary or when fine-tuning for a printed edition, you may wish to help T_EX out. Texinfo supports two commands for this:

@- Insert a discretionary hyphen, i.e., a place where T_EX can (but does not have to) hyphenate. This is especially useful when you notice an overfull hbox is due to T_EX missing a hyphenation (see Section 19.10 [Overfull hboxes], page 172). T_EX will not insert any hyphenation points itself into a word containing @-.

@hyphenation{*hy-phen-a-ted words*}

Tell T_EX how to hyphenate *hy-phen-a-ted words*. As shown, you put a ‘-’ at each hyphenation point. For example:

```
@hyphenation{man-u-script man-u-scripts}
```

T_EX only uses the specified hyphenation points when the words match exactly, so give all necessary variants, such as plurals.

Info, HTML, and other non-T_EX output is not hyphenated, so none of these commands have any effect there.

13.4 @allowcodebreaks: Control Line Breaks in @code

Ordinarily, T_EX considers breaking lines at ‘-’ and ‘_’ characters within @code and related commands (see Section 7.1.2 [@code], page 62), more or less as if they were “empty” hyphenation points.

This is necessary since many manuals, especially for Lisp-family languages, must document very long identifiers. On the other hand, some manuals don’t have this problems, and you may not wish to allow a line break at the underscore in, for example, `SIZE_MAX`, or even worse, after any of the four underscores in `__typeof__`.

So Texinfo provides this command:

```
@allowcodebreaks false
```

to prevent from breaking at ‘-’ or ‘_’ within @code. You can go back to allowing such breaks with `@allowcodebreaks true`. Write these commands on lines by themselves.

These commands can be given anywhere in the document. For example, you may have just one problematic paragraph where you need to turn off the breaks, but want them in general, or vice versa.

This command has no effect except in HTML and T_EX output.

13.5 @w{*text*}: Prevent Line Breaks

`@w{text}` outputs *text*, while prohibiting line breaks within *text*.

Thus, you can use @w to produce a non-breakable space, fixed at the width of a normal interword space:

```
@w{ } @w{ } @w{ } indentation.
```

produces:

```
indentation.
```

The space from `@w{ }`, as well as being non-breakable, also will not stretch or shrink. Sometimes that is what you want, for instance if you're doing manual indenting. However, usually you want a normal interword space that does stretch and shrink (in the printed output); for that, see the `@tie` command in the next section.

You can also use the `@w` command to prevent \TeX from automatically hyphenating a long name or phrase that happens to fall near the end of a line. `makeinfo` does not ever hyphenate words.

You can also use `@w` to avoid unwanted keyword expansion in source control systems. For example, to literally write `Id` in your document, use `@w{$}Id$`. This trick isn't effective in Info or plain text output, though.

13.6 `@tie{}`: Inserting an Unbreakable Space

The `@tie{}` command produces a normal interword space at which a line break may not occur. Always write it with following (empty) braces, as usual for commands used within a paragraph. Here's an example:

```
@TeX{} was written by Donald E.@tie{}Knuth.
```

produces:

```
TeX was written by Donald E. Knuth.
```

There are two important differences between `@tie{}` and `@w{ }`:

- The space produced by `@tie{}` will stretch and shrink slightly along with the normal interword spaces in the paragraph; the space produced by `@w{ }` will not vary.
- `@tie{}` allows hyphenation of the surrounding words, while `@w{ }` inhibits hyphenation of those words (for \TeX nical reasons, namely that it produces an `'\hbox'`).

13.7 `@sp n`: Insert Blank Lines

A line beginning with and containing only `@sp n` generates n blank lines of space in both the printed manual and the Info file. `@sp` also forces a paragraph break. For example,

```
@sp 2
```

generates two blank lines.

The `@sp` command is most often used in the title page.

13.8 `@page`: Start a New Page

A line containing only `@page` starts a new page in a printed manual. In other formats, without the concept of pages, it starts a new paragraph. A `@page` command is often used in the `@titlepage` section of a Texinfo file to start the copyright page.

13.9 `@group`: Prevent Page Breaks

The `@group` command (on a line by itself) is used inside an `@example` or similar construct to begin an unsplittable vertical group, which will appear entirely on one page in the printed output. The group is terminated by a line containing only `@end group`. These two lines produce no output of their own, and in the Info file output they have no effect at all.

Although `@group` would make sense conceptually in a wide variety of contexts, its current implementation works reliably only within `@example` and variants, and within `@display`, `@format`, `@flushleft` and `@flushright`. See Chapter 8 [Quotations and Examples], page 72. (What all these commands have in common is that each line of input produces a line of output.) In other contexts, `@group` can cause anomalous vertical spacing.

This formatting requirement means that you should write:

```
@example
@group
...
@end group
@end example
```

with the `@group` and `@end group` commands inside the `@example` and `@end example` commands.

The `@group` command is most often used to hold an example together on one page. In this Texinfo manual, more than 100 examples contain text that is enclosed between `@group` and `@end group`.

If you forget to end a group, you may get strange and unfathomable error messages when you run `TEX`. This is because `TEX` keeps trying to put the rest of the Texinfo file onto the one page and does not start to generate error messages until it has processed considerable text. It is a good rule of thumb to look for a missing `@end group` if you get incomprehensible error messages in `TEX`.

13.10 `@need mils`: Prevent Page Breaks

A line containing only `@need n` starts a new page in a printed manual if fewer than n mils (thousandths of an inch) remain on the current page. Do not use braces around the argument n . The `@need` command has no effect on other output formats since they are not paginated.

This paragraph is preceded by a `@need` command that tells `TEX` to start a new page if fewer than 800 mils (eight-tenths inch) remain on the page. It looks like this:

```
@need 800
This paragraph is preceded by ...
```

The `@need` command is useful for preventing orphans: single lines at the bottoms of printed pages.

14 Definition Commands

The `@defn` command and the other *definition commands* enable you to describe functions, variables, macros, commands, user options, special forms and other such artifacts in a uniform format.

In the Info file, a definition causes the entity category—‘Function’, ‘Variable’, or whatever—to appear at the beginning of the first line of the definition, followed by the entity’s name and arguments. In the printed manual, the command causes T_EX to print the entity’s name and its arguments on the left margin and print the category next to the right margin. In both output formats, the body of the definition is indented. Also, the name of the entity is entered into the appropriate index: `@defn` enters the name into the index of functions, `@defvr` enters it into the index of variables, and so on (see Section 11.1 [Predefined Indices], page 97).

A manual need not and should not contain more than one definition for a given name. An appendix containing a summary should use `@table` rather than the definition commands.

14.1 The Template for a Definition

The `@defn` command is used for definitions of entities that resemble functions. To write a definition using the `@defn` command, write the `@defn` command at the beginning of a line and follow it on the same line by the category of the entity, the name of the entity itself, and its arguments (if any). Then write the body of the definition on succeeding lines. (You may embed examples in the body.) Finally, end the definition with an `@end defn` command written on a line of its own.

The other definition commands follow the same format: a line with the `@def...` command and whatever arguments are appropriate for that command; the body of the definition; and a corresponding `@end` line.

The template for a definition looks like this:

```
@defn category name arguments...
  body-of-definition
@end defn
```

For example,

```
@defn Command forward-word count
This command moves point forward @var{count} words
(or backward if @var{count} is negative). ...
@end defn
```

produces

```
forward-word count [Command]
  This command moves point forward count words (or backward if count
  is negative). ...
```

Capitalize the category name like a title. If the name of the category contains spaces, as in the phrase ‘Interactive Command’, enclose it in braces. For example:

```
@defn {Interactive Command} isearch-forward
...
@end defn
```

Otherwise, the second word will be mistaken for the name of the entity. As a general rule, when any of the arguments in the heading line *except* the last one are more than one word, you need to enclose them in braces. This may also be necessary if the text contains commands, for example, ‘`{declaraci@'on}`’ if you are writing in Spanish.

Some of the definition commands are more general than others. The `@defn` command, for example, is the general definition command for functions and the like—for entities that may take arguments. When you use this command, you specify the category to which the entity belongs. Three predefined, specialized variations (`@defun`, `@defmac`, and `@defspec`) specify the category for you: “Function”, “Macro”, and “Special Form” respectively. (In Lisp, a special form is an entity much like a function.) Similarly, the general `@defvr` command is accompanied by several specialized variations for describing particular kinds of variables.

See Section 14.7 [Sample Function Definition], page 133, for a detailed example of a function definition, including the use of `@example` inside the definition.

14.2 Definition Command Continuation Lines

The heading line of a definition command can get very long. Therefore, Texinfo has a special syntax allowing them to be continued over multiple lines of the source file: a lone ‘@’ at the end of each line to be continued. Here’s an example:

```
@defun fn-name @
  arg1 arg2 arg3
  This is the basic continued defun.
@end defun
```

produces:

```
fn-name arg1 arg2 arg3 [Function]
  This is the basic continued defun.
```

As you can see, the continued lines are combined, as if they had been typed on one source line.

Although this example only shows a one-line continuation, continuations may extend over any number of lines, in the same way; put an @ at the end of each line to be continued.

In general, any number of spaces or tabs before the @ continuation character are collapsed into a single space. There is one exception: the Texinfo processors will not fully collapse whitespace around a continuation inside braces. For example:

```
@defn {Category @
  Name} ...
```

The output (not shown) has excess space between ‘Category’ and ‘Name’. To avoid this, elide the unwanted whitespace in your input, or put the continuation @ outside braces.

@ does not function as a continuation character in *any* other context. Ordinarily, ‘@’ followed by a whitespace character (space, tab, newline) produces a normal interword space (see Section 12.3.1 [Multiple Spaces], page 105).

14.3 Optional and Repeated Arguments

Some entities take optional or repeated arguments, conventionally specified by using square brackets and ellipses: an argument enclosed within square brackets is optional, and an argument followed by an ellipsis is optional and may be repeated more than once.

Thus, [*optional-arg*] means that *optional-arg* is optional and *repeated-args...* stands for zero or more arguments. Parentheses are used when several arguments are grouped into additional levels of list structure in Lisp.

Here is the `@defspec` line of an example of an imaginary (complicated) special form:

```
foobar (var [from to [inc]]) body. . . [Special Form]
```

In this example, the arguments *from* and *to* are optional, but must both be present or both absent. If they are present, *inc* may optionally be specified as well. These arguments are grouped with the argument *var* into a list, to distinguish them from *body*, which includes all remaining elements of the form.

In a Texinfo source file, this `@defspec` line is written like this:

```
@defspec foobar (var [from to [inc]]) body@dots{}
```

The function is listed in the Command and Variable Index under ‘`foobar`’.

14.4 @deffnx, et al.: Two or More ‘First’ Lines

To create two or more ‘first’ or header lines for a definition, follow the first `@defn` line by a line beginning with `@deffnx`. The `@deffnx` command works exactly like `@defn` except that it does not generate extra vertical white space between it and the preceding line.

For example,

```
@defn {Interactive Command} isearch-forward
@deffnx {Interactive Command} isearch-backward
These two search commands are similar except ...
@end defn
```

produces

```
isearch-forward [Interactive Command]
isearch-backward [Interactive Command]
These two search commands are similar except ...
```

Each definition command has an ‘x’ form: `@defunx`, `@defvrnx`, `@deftypefunx`, etc.

The ‘x’ forms work similarly to `@itemx` (see Section 9.4.3 [`@itemx`], page 87).

14.5 The Definition Commands

Texinfo provides more than a dozen definition commands, all of which are described in this section.

The definition commands automatically enter the name of the entity in the appropriate index: for example, `@defn`, `@defun`, and `@defmac` enter function names in the index of functions; `@defvr` and `@defvar` enter variable names in the index of variables.

Although the examples that follow mostly illustrate Lisp, the commands can be used for other programming languages.

14.5.1 Functions and Similar Entities

This section describes the commands for describing functions and similar entities:

@deffn *category name arguments...*

The **@deffn** command is the general definition command for functions, interactive commands, and similar entities that may take arguments. You must choose a term to describe the category of entity being defined; for example, “Function” could be used if the entity is a function. The **@deffn** command is written at the beginning of a line and is followed on the same line by the category of entity being described, the name of this particular entity, and its arguments, if any. Terminate the definition with **@end deffn** on a line of its own.

For example, here is a definition:

```
@deffn Command forward-char nchars
  Move point forward @var{nchars} characters.
@end deffn
```

This shows a rather terse definition for a “command” named `forward-char` with one argument, `nchars`.

@deffn prints argument names such as `nchars` in slanted type in the printed output, because we think of these names as metasyntactic variables—they stand for the actual argument values. Within the text of the description, however, write an argument name explicitly with **@var** to refer to the value of the argument. In the example above, we used ‘**@var{nchars}**’ in this way.

In the extremely unusual case when an argument name contains ‘--’, or another character sequence which is treated specially (see Section 2.1 [Conventions], page 10), use **@code** around the special characters. This avoids the conversion to typographic en-dashes and em-dashes.

The template for **@deffn** is:

```
@deffn category name arguments...
  body-of-definition
@end deffn
```

@defun *name arguments...*

The **@defun** command is the definition command for functions. **@defun** is equivalent to ‘**@deffn** Function ...’. Terminate the definition with **@end defun** on a line of its own. Thus, the template is:

```
@defun function-name arguments...
  body-of-definition
@end defun
```

@defmac *name arguments...*

The **@defmac** command is the definition command for macros. **@defmac** is equivalent to ‘**@deffn** Macro ...’ and works like **@defun**.

@defspec *name arguments...*

The **@defspec** command is the definition command for special forms. (In Lisp, a special form is an entity much like a function; see Section “Special Forms” in *GNU Emacs Lisp Reference Manual*.) **@defspec** is equivalent to ‘**@deffn** {Special Form} ...’ and works like **@defun**.

All these commands create entries in the index of functions.

14.5.2 Variables and Similar Entities

Here are the commands for defining variables and similar entities:

`@defvr` *category name*

The `@defvr` command is a general definition command for something like a variable—an entity that records a value. You must choose a term to describe the category of entity being defined; for example, “Variable” could be used if the entity is a variable. Write the `@defvr` command at the beginning of a line and follow it on the same line by the category of the entity and the name of the entity.

We recommend capitalizing the category name like a title. If the name of the category contains spaces, as in the name “User Option”, enclose it in braces. Otherwise, the second word will be mistaken for the name of the entity. For example,

```
@defvr {User Option} fill-column
This buffer-local variable specifies
the maximum width of filled lines.
...
@end defvr
```

Terminate the definition with `@end defvr` on a line of its own.

The template is:

```
@defvr category name
body-of-definition
@end defvr
```

`@defvr` creates an entry in the index of variables for *name*.

`@defvar` *name*

The `@defvar` command is the definition command for variables. `@defvar` is equivalent to ‘`@defvr Variable ...`’.

For example:

```
@defvar kill-ring
...
@end defvar
```

The template is:

```
@defvar name
body-of-definition
@end defvar
```

`@defvar` creates an entry in the index of variables for *name*.

`@defopt` *name*

The `@defopt` command is the definition command for *user options*, i.e., variables intended for users to change according to taste; Emacs has many such (see Section “Variables” in *The GNU Emacs Manual*). `@defopt` is equivalent to ‘`@defvr {User Option} ...`’ and works like `@defvar`. It creates an entry in the index of variables.

14.5.3 Functions in Typed Languages

The `@deftypefn` command and its variations are for describing functions in languages in which you must declare types of variables and functions, such as C and C++.

`@deftypefn` *category data-type name arguments...*

The `@deftypefn` command is the general definition command for functions and similar entities that may take arguments and that are typed. The `@deftypefn` command is written at the beginning of a line and is followed on the same line by the category of entity being described, the type of the returned value, the name of this particular entity, and its arguments, if any.

For example,

```
@deftypefn {Library Function} int foobar @
  (int @var{foo}, float @var{bar})
...
@end deftypefn
```

produces:

```
int foobar (int foo, float bar)           [Library Function]
...
```

This means that `foobar` is a “library function” that returns an `int`, and its arguments are `foo` (an `int`) and `bar` (a `float`).

Since in typed languages, the actual names of the arguments are typically scattered among data type names and keywords, Texinfo cannot find them without help. You can either (a) write everything as straight text, and it will be printed in slanted type; (b) use `@var` for the variable names, which will uppercase the variable names in Info and use the slanted typewriter font in printed output; (c) use `@var` for the variable names and `@code` for the type names and keywords, which will be dutifully obeyed.

The template for `@deftypefn` is:

```
@deftypefn category data-type name arguments ...
body-of-description
@end deftypefn
```

Note that if the *category* or *data type* is more than one word then it must be enclosed in braces to make it a single argument.

If you are describing a procedure in a language that has packages, such as Ada, you might consider using `@deftypefn` in a manner somewhat contrary to the convention described in the preceding paragraphs. For example:

```
@deftypefn stacks private push @
  (@var{s}:in out stack; @
   @var{n}:in integer)
...
@end deftypefn
```

(In these examples the `@deftypefn` arguments are shown using continuations (see Section 14.2 [Def Cmd Continuation Lines], page 124), but could be on a single line.)

In this instance, the procedure is classified as belonging to the package `stacks` rather than classified as a ‘procedure’ and its data type is described as `private`. (The name of the procedure is `push`, and its arguments are `s` and `n`.)

`@deftypefn` creates an entry in the index of functions for `name`.

`@deftypefn` *data-type name arguments...*

The `@deftypefn` command is the specialized definition command for functions in typed languages. The command is equivalent to ‘`@deftypefn Function ...`’. The template is:

```
@deftypefn type name arguments...
  body-of-description
@end deftypefn
```

`@deftypefn` creates an entry in the index of functions for `name`.

Ordinarily, the return type is printed on the same line as the function name and arguments, as shown above. In source code, GNU style is to put the return type on a line by itself. So Texinfo provides an option to do that: `@deftypefnnewline on`.

This affects typed functions only—not untyped functions, not typed variables, etc.. Specifically, it affects the commands in this section, and the analogous commands for object-oriented languages, namely `@deftypeop` and `@deftypemethod` (see Section 14.5.6.2 [Object-Oriented Methods], page 132).

Specifying `@deftypefnnewline off` reverts to the default.

14.5.4 Variables in Typed Languages

Variables in typed languages are handled in a manner similar to functions in typed languages. See Section 14.5.3 [Typed Functions], page 128. The general definition command `@deftypevr` corresponds to `@deftypefn` and the specialized definition command `@deftypevar` corresponds to `@deftypefn`.

`@deftypevr` *category data-type name*

The `@deftypevr` command is the general definition command for something like a variable in a typed language—an entity that records a value. You must choose a term to describe the category of the entity being defined; for example, “Variable” could be used if the entity is a variable.

The `@deftypevr` command is written at the beginning of a line and is followed on the same line by the category of the entity being described, the data type, and the name of this particular entity.

For example:

```
@deftypevr {Global Flag} int enable
...
@end deftypevr
```

produces the following:

```
int enable [Global Flag]
...
```

The template is:

```
@deftypevr category data-type name
body-of-description
@end deftypevr
```

`@deftypevar` *data-type name*

The `@deftypevar` command is the specialized definition command for variables in typed languages. `@deftypevar` is equivalent to ‘`@deftypevr Variable ...`’.

The template is:

```
@deftypevar data-type name
body-of-description
@end deftypevar
```

These commands create entries in the index of variables.

14.5.5 Data Types

Here is the command for data types:

`@deftp` *category name attributes...*

The `@deftp` command is the generic definition command for data types. The command is written at the beginning of a line and is followed on the same line by the category, by the name of the type (which is a word like `int` or `float`), and then by names of attributes of objects of that type. Thus, you could use this command for describing `int` or `float`, in which case you could use `data type` as the category. (A data type is a category of certain objects for purposes of deciding which operations can be performed on them.)

In Lisp, for example, `pair` names a particular data type, and an object of that type has two slots called the `CAR` and the `CDR`. Here is how you would write the first line of a definition of `pair`.

```
@deftp {Data type} pair car cdr
...
@end deftp
```

The template is:

```
@deftp category name-of-type attributes...
body-of-definition
@end deftp
```

`@deftp` creates an entry in the index of data types.

14.5.6 Object-Oriented Programming

Here are the commands for formatting descriptions about abstract objects, such as are used in object-oriented programming. A class is a defined type of abstract object. An instance of a class is a particular object that has the type of the class. An instance variable is a variable that belongs to the class but for which each instance has its own value.

14.5.6.1 Object-Oriented Variables

These commands allow you to define different sorts of variables in object-oriented programming languages.

@defcv *category class name*

The **@defcv** command is the general definition command for variables associated with classes in object-oriented programming. The **@defcv** command is followed by three arguments: the category of thing being defined, the class to which it belongs, and its name. For instance:

```
@defcv {Class Option} Window border-pattern
...
@end defcv
```

produces:

```
border-pattern                                [Class Option of Window]
...
```

@defcv creates an entry in the index of variables.

@deftypecv *category class data-type name*

The **@deftypecv** command is the definition command for typed class variables in object-oriented programming. It is analogous to **@defcv** with the addition of the *data-type* parameter to specify the type of the instance variable. Ordinarily, the data type is a programming language construct that should be marked with **@code**. For instance:

```
@deftypecv {Class Option} Window @code{int} border-pattern
...
@end deftypecv
```

produces:

```
int border-pattern                            [Class Option of Window]
...
```

@deftypecv creates an entry in the index of variables.

@defivar *class name*

The **@defivar** command is the definition command for instance variables in object-oriented programming. **@defivar** is equivalent to '**@defcv** {Instance Variable} ...'. For instance:

```
@defivar Window border-pattern
...
@end defivar
```

produces:

```
border-pattern                                [Instance Variable of Window]
...
```

@defivar creates an entry in the index of variables.

@deftypeivar *class data-type name*

The **@deftypeivar** command is the definition command for typed instance variables in object-oriented programming. It is analogous to **@defivar** with the addition of the *data-type* parameter to specify the type of the instance

variable. Ordinarily, the data type is a programming language construct that should be marked with `@code`. For instance:

```
@deftypeivar Window @code{int} border-pattern
...
@end deftypeivar
```

produces:

```
int border-pattern [Instance Variable of Window]
...
```

`@deftypeivar` creates an entry in the index of variables.

14.5.6.2 Object-Oriented Methods

These commands allow you to define different sorts of function-like entities resembling methods in object-oriented programming languages. These entities take arguments, as functions do, but are associated with particular classes of objects.

`@defop category class name arguments...`

The `@defop` command is the general definition command for these method-like entities.

For example, some systems have constructs called *wrappers* that are associated with classes as methods are, but that act more like macros than like functions. You could use `@defop Wrapper` to describe one of these.

Sometimes it is useful to distinguish methods and *operations*. You can think of an operation as the specification for a method. Thus, a window system might specify that all window classes have a method named `expose`; we would say that this window system defines an `expose` operation on windows in general. Typically, the operation has a name and also specifies the pattern of arguments; all methods that implement the operation must accept the same arguments, since applications that use the operation do so without knowing which method will implement it.

Often it makes more sense to document operations than methods. For example, window application developers need to know about the `expose` operation, but need not be concerned with whether a given class of windows has its own method to implement this operation. To describe this operation, you would write:

```
@defop Operation windows expose
```

The `@defop` command is written at the beginning of a line and is followed on the same line by the overall name of the category of operation, the name of the class of the operation, the name of the operation, and its arguments, if any.

The template is:

```
@defop category class name arguments...
body-of-definition
@end defop
```

`@defop` creates an entry, such as ‘`expose on windows`’, in the index of functions.

`@deftypeop` *category class data-type name arguments...*

The `@deftypeop` command is the definition command for typed operations in object-oriented programming. It is similar to `@defop` with the addition of the *data-type* parameter to specify the return type of the method. `@deftypeop` creates an entry in the index of functions.

`@defmethod` *class name arguments...*

The `@defmethod` command is the definition command for methods in object-oriented programming. A method is a kind of function that implements an operation for a particular class of objects and its subclasses.

`@defmethod` is equivalent to ‘`@defop Method ...`’. The command is written at the beginning of a line and is followed by the name of the class of the method, the name of the method, and its arguments, if any.

For example:

```
@defmethod bar-class bar-method argument
...
@end defmethod
```

illustrates the definition for a method called `bar-method` of the class `bar-class`. The method takes an argument.

`@defmethod` creates an entry in the index of functions.

`@deftypemethod` *class data-type name arguments...*

The `@deftypemethod` command is the definition command for methods in object-oriented typed languages, such as C++ and Java. It is similar to the `@defmethod` command with the addition of the *data-type* parameter to specify the return type of the method. `@deftypemethod` creates an entry in the index of functions.

The typed commands are affected by the `@deftypefnnewline` option (see Section 14.5.3 [Functions in Typed Languages], page 128).

14.6 Conventions for Writing Definitions

When you write a definition using `@defn`, `@defun`, or one of the other definition commands, please take care to use arguments that indicate the meaning, as with the *count* argument to the `forward-word` function. Also, if the name of an argument contains the name of a type, such as *integer*, take care that the argument actually is of that type.

14.7 A Sample Function Definition

A function definition uses the `@defun` and `@end defun` commands. The name of the function follows immediately after the `@defun` command and it is followed, on the same line, by the parameter list.

Here is a definition from Section “Calling Functions” in *The GNU Emacs Lisp Reference Manual*.

```
apply function &rest arguments [Function]
  apply calls function with arguments, just like funcall but with one dif-
  ference: the last of arguments is a list of arguments to give to function,
```

rather than a single argument. We also say that this list is *appended* to the other arguments.

`apply` returns the result of calling *function*. As with `funcall`, *function* must either be a Lisp function or a primitive function; special forms and macros do not make sense in `apply`.

```
(setq f 'list)
⇒ list
(apply f 'x 'y 'z)
[error] Wrong type argument: listp, z
(apply '+ 1 2 '(3 4))
⇒ 10
(apply '+ '(1 2 3 4))
⇒ 10

(apply 'append '((a b c) nil (x y z) nil))
⇒ (a b c x y z)
```

An interesting example of using `apply` is found in the description of `mapcar`.

In the Texinfo source file, this example looks like this:

```
@defun apply function &rest arguments
@code{apply} calls @var{function} with
@var{arguments}, just like @code{funcall} but with one
difference: the last of @var{arguments} is a list of
arguments to give to @var{function}, rather than a single
argument. We also say that this list is @dfn{appended}
to the other arguments.
```

```
@code{apply} returns the result of calling
@var{function}. As with @code{funcall},
@var{function} must either be a Lisp function or a
primitive function; special forms and macros do not make
sense in @code{apply}.
```

```
@example
(setq f 'list)
  @result{} list
(apply f 'x 'y 'z)
@error{} Wrong type argument: listp, z
(apply '+ 1 2 '(3 4))
  @result{} 10
(apply '+ '(1 2 3 4))
  @result{} 10

(apply 'append '((a b c) nil (x y z) nil))
  @result{} (a b c x y z)
@end example
```

```
An interesting example of using @code{apply} is found
in the description of @code{mapcar}.
@end defun
```

In this manual, this function is listed in the Command and Variable Index under `apply`.

Ordinary variables and user options are described using a format like that for functions except that variables do not take arguments.

15 Internationalization

Texinfo has some support for writing in languages other than English, although this area still needs considerable work. (If you are the one helping to translate the fixed strings written to documents, see Section 20.7 [Internationalization of Document Strings], page 197.)

For a list of the various accented and special characters Texinfo supports, see Section 12.4 [Inserting Accents], page 108.

15.1 @documentlanguage *ll*[_cc]: Set the Document Language

The `@documentlanguage` command declares the current document locale. Write it on a line by itself, near the beginning of the file.

```
@documentlanguage ll[_cc]
```

Include a two-letter ISO 639-2 language code (*ll*) following the command name, optionally followed by an underscore and two-letter ISO 3166 two-letter country code (*cc*). If you have a multilingual document, the intent is to be able to use this command multiple times, to declare each language change. If the command is not used at all, the default is `en_US` for US English.

As with GNU Gettext (see *Gettext*), if the country code is omitted, the main dialect is assumed where possible. For example, `de` is equivalent to `de_DE` (German as spoken in Germany).

For Info and other online output, this command changes the translation of various *document strings* such as “see” in cross-references (see Chapter 6 [Cross References], page 49), “Function” in defuns (see Chapter 14 [Definition Commands], page 123), and so on. Some strings, such as “Node:”, “Next:”, “Menu:”, etc., are keywords in Info output, so are not translated there; they are translated in other output formats.

For T_EX, this command causes a file `tEX-locale.tex` to be read (if it exists). If `@documentlanguage` argument contains the optional ‘_cc’ suffix, this is tried first. For example, with `@documentlanguage de_DE`, T_EX first looks for `tEX-de_DE.tex`, then `tEX-de.tex`.

Such a `tEX-*` file is intended to redefine the various English words used in T_EX output, such as ‘Chapter’, ‘See’, and so on. We are aware that individual words like these cannot always be translated in isolation, and that a very different strategy would be required for ideographic (among other) scripts. Help in improving Texinfo’s language support is welcome.

`@documentlanguage` also changes T_EX’s current hyphenation patterns, if the T_EX program being run has the necessary support included. This will generally not be the case for `tex` itself, but will usually be the case for up-to-date distributions of the extended T_EX programs `etex` (DVI output) and `pdftex` (PDF output). `texi2dvi` will use the extended T_EXs if they are available (see Section 19.2 [Format with `texi2dvi`], page 163).

In September 2006, the W3C Internationalization Activity released a new recommendation for specifying languages: <http://www.rfc-editor.org/rfc/bcp/bcp47.txt>. When Gettext supports this new scheme, Texinfo will too.

Since the lists of language codes and country codes are updated relatively frequently, we don't attempt to list them here. The valid language codes are on the official home page for ISO 639, <http://www.loc.gov/standards/iso639-2/>. The country codes and the official web site for ISO 3166 can be found via http://en.wikipedia.org/wiki/ISO_3166.

15.2 @documentencoding enc: Set Input Encoding

The `@documentencoding` command declares the input document encoding, and can also affect the encoding of the output. Write it on a line by itself, with a valid encoding specification following, near the beginning of the file.

```
@documentencoding enc
```

Texinfo supports these encodings:

`US-ASCII` This has no particular effect, but it's included for completeness.

`UTF-8` The vast global character encoding, expressed in 8-bit bytes.

`ISO-8859-1`

`ISO-8859-15`

`ISO-8859-2`

These specify the standard encodings for Western European (the first two) and Eastern European languages (the third), respectively. ISO 8859-15 replaces some little-used characters from 8859-1 (e.g., precomposed fractions) with more commonly needed ones, such as the Euro symbol (€).

A full description of the encodings is beyond our scope here; one useful reference is <http://czyborra.com/charsets/iso8859.html>.

`koi8-r` This is the commonly used encoding for the Russian language.

`koi8-u` This is the commonly used encoding for the Ukrainian language.

Specifying an encoding *enc* has the following effects:

In Info output, a so-called 'Local Variables' section (see Section "File Variables" in *The GNU Emacs Manual*) is output including *enc*. This allows Info readers to set the encoding appropriately. It looks like this:

```
Local Variables:
coding: enc
End:
```

Also, in Info and plain text output, unless the option `--disable-encoding` is given to `makeinfo`, accent constructs and special characters, such as `@'e`, are output as the actual 8-bit or UTF-8 character in the given encoding where possible.

In HTML output, a `<meta>` tag is output, in the `<head>` section of the HTML, that specifies *enc*. Web servers and browsers cooperate to use this information so the correct encoding is used to display the page, if supported by the system. That looks like this:

```
<meta http-equiv="Content-Type" content="text/html;
      charset=enc">
```

In XML and Docbook output, UTF-8 is always used for the output, according to the conventions of those formats.

In T_EX output, the characters which are supported in the standard Computer Modern fonts are output accordingly. For example, this means using constructed accents rather than precomposed glyphs. Using a missing character generates a warning message, as does specifying an unimplemented encoding.

Although modern T_EX systems support nearly every script in use in the world, this wide-ranging support is not available in `texinfo.tex`, and it's not feasible to duplicate or incorporate all that effort. (Our plan to support other scripts is to create a L^AT_EX back-end to `texi2any`, where the support is already present.)

For maximum portability of Texinfo documents across the many different user environments in the world, we recommend sticking to 7-bit ASCII in the input unless your particular manual needs a substantial amount of non-ASCII, e.g., it's written in German. You can use the `@U` command to insert an occasional needed character (see Section 12.10 [Inserting Unicode], page 118).

16 Conditionally Visible Text

The *conditional commands* allow you to use different text for different output formats, or for general conditions that you define. For example, you can use them to specify different text for the printed manual and the Info output.

The conditional commands comprise the following categories.

- Commands specific to an output format (Info, T_EX, HTML, ...).
- Commands specific to any output format *excluding* a given one (e.g., not Info, not T_EX, ...).
- ‘Raw’ formatter text for any output format, passed straight through with minimal (but not zero) interpretation of @-commands.
- Format-independent variable substitutions, and testing if a variable is set or clear.

16.1 Conditional Commands

Texinfo has an `@ifformat` environment for each output format, to allow conditional inclusion of text for a particular output format.

`@ifinfo` begins segments of text that should be ignored by T_EX when it typesets the printed manual, and by `makeinfo` when not producing Info output. The segment of text appears only in the Info file and, for historical compatibility, the plain text output.

The environments for the other formats are analogous:

```
@ifdocbook ... @end ifdocbook
    Text to appear only in the Docbook output.
```

```
@ifhtml ... @end ifhtml
    Text to appear only in the HTML output.
```

```
@ifplaintext ... @end ifplaintext
    Text to appear only in the plain text output.
```

```
@iftex ... @end iftex
    Text to appear only in the printed manual.
```

```
@ifxml ... @end ifxml
    Text to appear only in the XML output.
```

The `@if...` and `@end if...` commands must appear on lines by themselves in your source file. The newlines following the commands are (more or less) treated as whitespace, so that the conditional text is flowed normally into a surrounding paragraph.

The `@if...` constructs are intended to conditionalize normal Texinfo source; see Section 16.3 [Raw Formatter Commands], page 141, for using underlying format commands directly.

Here is an example showing all these conditionals:

```
@iftex
    This text will appear only in the printed manual.
@end iftex
@ifinfo
```

```

However, this text will appear only in Info and plain text.
@end ifinfo
@ifhtml
And this text will only appear in HTML.
@end ifhtml
@ifplaintext
Whereas this text will only appear in plain text.
@end ifplaintext
@ifxml
Notwithstanding that this will only appear in XML.
@end ifxml
@ifdocbook
Nevertheless, this will only appear in Docbook.
@end ifdocbook

```

The preceding example produces the following line:

This text will appear only in the printed manual.

Notice that you only see one of the input lines, depending on which version of the manual you are reading.

In complex documents, you may want Texinfo to issue an error message in some conditionals that should not ever be processed. The `@errmsg{text}` command will do this; it takes one argument, the text of the error message.

We mention `@errmsg{}` here even though it is not strictly related to conditionals, since in practice it is most likely to be useful in that context. Technically, it can be used anywhere. See Section 17.6 [External Macro Processors], page 156, for a caveat regarding the line numbers which `@errmsg` emits in \TeX .

16.2 Conditional Not Commands

You can specify text to be included in any output format *other* than a given one with the `@ifnot...` environments:

```

@ifnotdocbook ... @end ifnotdocbook
@ifnohtml ... @end ifnohtml
@ifnotininfo ... @end ifnotininfo
@ifnotplaintext ... @end ifnotplaintext
@ifnottex ... @end ifnottex
@ifnotxml ... @end ifnotxml

```

The `@ifnot...` command and the `@end` command must appear on lines by themselves in your actual source file.

If the output file is being made in the given format, the region is *ignored*. Otherwise, it is included.

There is one exception (for historical compatibility): `@ifnotininfo` text is omitted for both Info and plain text output, not just Info. To specify text which appears only in Info and not in plain text, use `@ifnotplaintext`, like this:

```

@ifinfo
@ifnotplaintext

```



```

This will be in Info, but not plain text.
@end ifnotplaintext
@end ifinfo

```

The regions delimited by these commands are ordinary Texinfo source as with `@iftex`, not raw formatter source as with `@tex` (see Section 16.3 [Raw Formatter Commands], page 141).

16.3 Raw Formatter Commands

The `@if...` conditionals just described must be used only with normal Texinfo source. For instance, most features of plain T_EX will not work within `@iftex`. The purpose of `@if...` is to provide conditional processing for Texinfo source, not provide access to underlying formatting features. For that, Texinfo provides so-called *raw formatter commands*. They should only be used when truly required (most documents do not need them).

The first raw formatter command is `@tex`. You can enter plain T_EX completely, and use ‘\’ in the T_EX commands, by delineating a region with the `@tex` and `@end tex` commands. All plain T_EX commands and category codes are restored within a `@tex` region. The sole exception is that the `@` character still introduces a command, so that `@end tex` can be recognized. Texinfo processors will not output material in such a region, unless T_EX output is being produced.

In complex cases, you may wish to define new T_EX macros within `@tex`. You must use `\gdef` to do this, not `\def`, because `@tex` regions are processed in a T_EX group. If you need to make several definitions, you may wish to set `\globaldefs=1` (its value will be restored to zero as usual when the group ends at `@end tex`, so it won’t cause problems with the rest of the document).

As an example, here is a displayed equation written in plain T_EX:

```

@tex
$$ \chi^2 = \sum_{i=1}^N
      \left( \frac{y_i - (a + b x_i)}{\sigma_i} \right)^2 $$
@end tex

```

The output of this example will appear only in a printed manual. If you are reading this in a format not generated by T_EX, you will not see the equation that appears in the printed manual.

$$\chi^2 = \sum_{i=1}^N \left(\frac{y_i - (a + bx_i)}{\sigma_i} \right)^2$$

Analogously, you can use `@ifhtml ... @end ifhtml` to delimit Texinfo source to be included in HTML output only, and `@html ... @end html` for a region of raw HTML.

Likewise, you can use `@ifxml ... @end ifxml` to delimit Texinfo source to be included in XML output only, and `@xml ... @end xml` for a region of raw XML. Regions of raw text in other formats will also be present in the XML output, but with protection of XML characters and within corresponding elements. For example, the raw HTML text:

```
@html
<br />
@end html
```

will be included in the XML output as:

```
<html>
<lt;br /&gt;
</html>
```

Again likewise, you can use `@ifdocbook ... @end ifdocbook` to delimit Texinfo source to be included in Docbook output only, and `@docbook ... @end docbook` for a region of raw Docbook.

The behavior of newlines in raw regions is unspecified.

In all cases, in raw processing, `@` retains the same meaning as in the remainder of the document. Thus, the Texinfo processors must recognize and even execute, to some extent, the contents of the raw regions, regardless of the final output format. Therefore, specifying changes that globally affect the document inside a raw region leads to unpredictable and generally undesirable behavior. For example, using the `@kbdinputstyle` command inside a raw region is undefined.

The remedy is simple: don't do that. Use the raw formatter commands for their intended purpose, of providing material directly in the underlying format. When you simply want to give different Texinfo specifications for different output formats, use the `@if...` conditionals and stay in Texinfo syntax.

16.4 Inline Conditionals: `@inline`, `@inlineifelse`, `@inlineraw`

Texinfo provides a set of conditional commands with arguments given within braces:

```
@inlinefmt{format, text}
```

Process the Texinfo *text* if *format* output is being generated.

```
@inlinefmtifelse{format, then-text, else-text}
```

Process the Texinfo *then-text* if *format* output is being generated; otherwise, process *else-text*.

```
@inlineraw{format, text}
```

Similar, but for raw *text* (see Section 16.3 [Raw Formatter Commands], page 141).

The supported *format* names are:

```
docbook html info plaintext tex xml
```

For example,

```
@inlinefmt{html, @emph{HTML-only text}}
```

is nearly equivalent to

```
@ifhtml
@emph{HTML-only text}
@end ifhtml
```

except that no whitespace is added, as happens in the latter (environment) case.

In these commands, whitespace is ignored after the comma separating the arguments, as usual, but is *not* ignored at the end of *text*.

To insert a literal at sign, left brace, or right brace in one of the arguments, you must use the alphabetic commands `@atchar{}` (see Section 12.1.1 [Inserting an Atsign], page 103), and `@lbracechar{}` or `@rbracechar{}` (see Section 12.1.2 [Inserting Braces], page 103), or the parsing will become confused.

With `@inlinefmtifelse`, it is also necessary to use `@comma{}` to avoid mistaking a ‘,’ in the text for the delimiter. With `@inlinefmt` and `@inlineraw`, `@comma{}` is not required (though it’s fine to use it), since these commands always have exactly two arguments.

For \TeX , the processed *text* cannot contain newline-delimited commands. Text to be ignored (i.e., for non- \TeX) can, though.

Two other `@inline...` conditionals complement the `@ifset` and `@ifclear` commands; see the next section.

16.5 Flags: `@set`, `@clear`, conditionals, and `@value`

You can direct the Texinfo formatting commands to format or ignore parts of a Texinfo file with the `@set`, `@clear`, `@ifset`, and `@ifclear` commands.

Here are brief descriptions of these commands, see the following sections for more details:

`@set flag [value]`

Set the variable *flag*, to the optional *value* if specified.

`@clear flag`

Undefine the variable *flag*, whether or not it was previously defined.

`@ifset flag`

If *flag* is set, text through the next `@end ifset` command is formatted. If *flag* is clear, text through the following `@end ifset` command is ignored.

`@inlineifset{flag, text}`

Brace-delimited version of `@ifset`.

`@ifclear flag`

If *flag* is set, text through the next `@end ifclear` command is ignored. If *flag* is clear, text through the following `@end ifclear` command is formatted.

`@inlineifclear{flag, text}`

Brace-delimited version of `@ifclear`.

16.5.1 `@set` and `@value`

You use the `@set` command to specify a value for a flag, which is later expanded by the `@value` command.

A *flag* (aka *variable*) name is an identifier starting with an alphanumeric, ‘-’, or ‘_’. Subsequent characters, if any, may not be whitespace, ‘@’, braces, angle brackets, or any of ‘~^+|’; other characters, such as ‘%’, may work. However, it is best to use only letters and numerals in a flag name, not ‘-’ or ‘_’ or others—they will work in some contexts, but not all, due to limitations in \TeX .

The value is the remainder of the input line, and can contain anything. However, unlike most other commands which take the rest of the line as a value, `@set` need not appear at the beginning of a line.

Write the `@set` command like this:

```
@set foo This is a string.
```

This sets the value of the flag `foo` to “This is a string.”.

The Texinfo formatters then replace a `@value{flag}` command with the string to which *flag* is set. Thus, when `foo` is set as shown above, the Texinfo formatters convert this:

```
@value{foo}
```

to this:

```
This is a string.
```

You can write a `@value` command within a paragraph; but you must write a `@set` command on a line of its own.

If you write the `@set` command like this:

```
@set foo
```

without specifying a string, the value of `foo` is the empty string.

If you clear a previously set flag with `@clear flag`, a subsequent `@value{flag}` command will report an error.

For example, if you set `foo` as follows:

```
@set howmuch very, very, very
```

then the formatters transform

```
It is a @value{howmuch} wet day.
```

into

```
It is a very, very, very wet day.
```

If you write

```
@clear howmuch
```

then the formatters transform

```
It is a @value{howmuch} wet day.
```

into

```
It is a {No value for "howmuch"} wet day.
```

`@value` cannot be reliably used as the argument to an accent command (see Section 12.4 [Inserting Accents], page 108). For example, this fails:

```
@set myletter a
@'@value{myletter}
```

16.5.2 @ifset and @ifclear

When a *flag* is set, the Texinfo formatting commands format text between subsequent pairs of `@ifset flag` and `@end ifset` commands. When the *flag* is cleared, the Texinfo formatting commands do *not* format the text. `@ifclear` operates analogously.

Write the conditionally formatted text between `@ifset flag` and `@end ifset` commands, like this:

```
@ifset flag
conditional-text
@end ifset
```

For example, you can create one document that has two variants, such as a manual for a ‘large’ and ‘small’ model:

```
You can use this machine to dig up shrubs
without hurting them.
```

```
@set large
```

```
@ifset large
It can also dig up fully grown trees.
@end ifset
```

```
Remember to replant promptly ...
```

In the example, the formatting commands will format the text between `@ifset large` and `@end ifset` because the `large` flag is set.

When *flag* is cleared, the Texinfo formatting commands do *not* format the text between `@ifset flag` and `@end ifset`; that text is ignored and does not appear in either printed or Info output.

For example, if you clear the flag of the preceding example by writing an `@clear large` command after the `@set large` command (but before the conditional text), then the Texinfo formatting commands ignore the text between the `@ifset large` and `@end ifset` commands. In the formatted output, that text does not appear; in both printed and Info output, you see only the lines that say, “You can use this machine to dig up shrubs without hurting them. Remember to replant promptly ...”.

If a flag is cleared with a `@clear flag` command, then the formatting commands format text between subsequent pairs of `@ifclear` and `@end ifclear` commands. But if the flag is set with `@set flag`, then the formatting commands do *not* format text between an `@ifclear` and an `@end ifclear` command; rather, they ignore that text. An `@ifclear` command looks like this:

```
@ifclear flag
```

16.5.3 @inlineifset and @inlineifclear

`@inlineifset` and `@inlineifclear` provide brace-delimited alternatives to the `@ifset` and `@ifclear` forms, similar to the other `@inline...` Commands (see Section 16.4 [Inline Conditionals], page 142). The same caveats about argument parsing given there apply here too.

```
@inlineifset{var, text}
```

Process the Texinfo *text* if the flag *var* is defined.

```
@inlineifclear{var, text}
```

Process the Texinfo *text* if the flag *var* is not defined.

Except for the syntax, their general behavior and purposes is the same as with `@ifset` and `@ifclear`, described in the previous section.

16.5.4 @value Example

You can use the @value command to minimize the number of places you need to change when you record an update to a manual. See Section C.2 [GNU Sample Texts], page 253, for the full text of an example of using this to work with Automake distributions.

This example is adapted from *The GNU Make Manual*.

1. Set the flags:

```
@set EDITION 0.35 Beta
@set VERSION 3.63 Beta
@set UPDATED 14 August 1992
@set UPDATE-MONTH August 1992
```

2. Write text for the @copying section (see Section 3.3.1 [@copying], page 19):

```
@copying
This is Edition @value{EDITION},
last updated @value{UPDATED},
of @cite{The GNU Make Manual},
for @code{make}, version @value{VERSION}.
```

Copyright ...

```
Permission is granted ...
@end copying
```

3. Write text for the title page, for people reading the printed manual:

```
@titlepage
@title GNU Make
@subtitle A Program for Directing Recompilation
@subtitle Edition @value{EDITION}, ...
@subtitle @value{UPDATE-MONTH}
@page
@insertcopying
...
@end titlepage
```

(On a printed cover, a date listing the month and the year looks less fussy than a date listing the day as well as the month and year.)

4. Write text for the Top node, for people reading the Info file:

```
@ifnottex
@node Top
@top Make
```

```
This is Edition @value{EDITION},
last updated @value{UPDATED},
of @cite{The GNU Make Manual},
for @code{make}, version @value{VERSION}.
@end ifnottex
```

After you format the manual, the `@value` constructs have been expanded, so the output contains text like this:

```
This is Edition 0.35 Beta, last updated 14 August 1992,
of `The GNU Make Manual', for `make', Version 3.63 Beta.
```

When you update the manual, you change only the values of the flags; you do not need to edit the three sections.

16.6 Testing for Texinfo Commands: `@ifcommanddefined`, `@ifcommandnotdefined`

Occasionally, you may want to arrange for your manual to test if a given Texinfo command is available and (presumably) do some sort of fallback formatting if not. There are conditionals `@ifcommanddefined` and `@ifcommandnotdefined` to do this. For example:

```
@ifcommanddefined node
Good, @samp{@@node} is defined.
@end ifcommanddefined
```

will output the expected ‘Good, ‘`@node`’ is defined.’.

This conditional will also consider any new commands defined by the document via `@macro`, `@alias`, `@definfoenclose`, and `@def(code)index` (see Chapter 17 [Defining New Texinfo Commands], page 149) to be true. Caveat: the \TeX implementation reports internal \TeX commands, in addition to all the Texinfo commands, as being “defined”; the `makeinfo` implementation is reliable in this regard, however.

You can check the `NEWS` file in the Texinfo source distribution and linked from the Texinfo home page (<http://www.gnu.org/software/texinfo>) to see when a particular command was added.

These command-checking conditionals themselves were added in Texinfo 5.0, released in 2013—decades after Texinfo’s inception. In order to test if they themselves are available, the predefined flag `txicommandconditionals` can be tested, like this:

```
@ifset txicommandconditionals
@ifcommandnotdefined foobarnode
(Good, @samp{@@foobarnode} is not defined.)
@end ifcommandnotdefined
@end ifset
```

Since flags (see the previous section) were added early in the existence of Texinfo, there is no problem with assuming they are available.

We recommend avoiding these tests whenever possible—which is usually the case. For many software packages, it is reasonable for all developers to have a given version of Texinfo (or newer) installed, and thus no reason to worry about older versions. (It is straightforward for anyone to download and install the Texinfo source; it does not have any problematic dependencies.)

The issue of Texinfo versions does not generally arise for end-users. With properly distributed packages, users need not process the Texinfo manual simply to build and install the package; they can use preformatted Info (or other) output files. This is desirable in general, to avoid unnecessary dependencies between packages (see Section “Releases” in *GNU Coding Standards*).

16.7 Conditional Nesting

Conditionals can be nested; however, the details are a little tricky. The difficulty comes with failing conditionals, such as `@ifhtml` when HTML is not being produced, where the included text is to be ignored. However, it is not to be *completely* ignored, since it is useful to have one `@ifset` inside another, for example—that is a way to include text only if two conditions are met. Here’s an example:

```
@ifset somevar
@ifset anothervar
Both somevar and anothervar are set.
@end ifset
@ifclear anothervar
Somevar is set, anothervar is not.
@end ifclear
@end ifset
```

Technically, Texinfo requires that for a failing conditional, the ignored text must be properly nested with respect to that failing conditional. Unfortunately, it’s not always feasible to check that *all* conditionals are properly nested, because then the processors could have to fully interpret the ignored text, which defeats the purpose of the command. Here’s an example illustrating these rules:

```
@ifset a
@ifset b
@ifclear ok - ok, ignored
@end junky - ok, ignored
@end ifset
@c WRONG - missing @end ifset.
```

Finally, as mentioned above, all conditional commands must be on lines by themselves, with no text (even spaces) before or after. Otherwise, the processors cannot reliably determine which commands to consider for nesting purposes.

17 Defining New Texinfo Commands

Texinfo provides several ways to define new commands (in all cases, it's not recommended to try redefining existing commands):

- A Texinfo *macro* allows you to define a new Texinfo command as any sequence of text and/or existing commands (including other macros). The macro can have any number of *parameters*—text you supply each time you use the macro.

Incidentally, these macros have nothing to do with the `@defmac` command, which is for documenting macros in the subject area of the manual (see Section 14.1 [Def Cmd Template], page 123).

- ‘`@alias`’ is a convenient way to define a new name for an existing command.
- ‘`@definfoenclose`’ allows you to define new commands with customized output for all non-TeX output formats.

Most generally of all (not just for defining new commands), it is possible to invoke any external macro processor and have Texinfo recognize so-called `#line` directives for error reporting.

If you want to do simple text substitution, `@set` and `@value` is the simplest approach (see Section 16.5 [`@set @clear @value`], page 143).

17.1 Defining Macros

You use the Texinfo `@macro` command to define a macro, like this:

```
@macro macroname{param1, param2, ...}
  text ... \param1\ ...
@end macro
```

The *parameters* *param1*, *param2*, ... correspond to arguments supplied when the macro is subsequently used in the document (described in the next section).

For a macro to work consistently with TeX, *macroname* must consist entirely of letters: no digits, hyphens, underscores, or other special characters. So, we recommend using only letters. However, `makeinfo` will accept anything consisting of alphanumerics, and (except as the first character) ‘-’. The ‘_’ character is excluded so that macros can be called inside `@math` without a following space (see Section 12.7 [Inserting Math], page 111).

If a macro needs no parameters, you can define it either with an empty list (‘`@macro foo {}`’) or with no braces at all (‘`@macro foo`’).

The definition or *body* of the macro can contain most Texinfo commands, including macro invocations. However, a macro definition that defines another macro does not work in TeX due to limitations in the design of `@macro`.

In the macro body, instances of a parameter name surrounded by backslashes, as in ‘`\param1\`’ in the example above, are replaced by the corresponding argument from the macro invocation. You can use parameter names any number of times in the body, including zero.

To get a single ‘\’ in the macro expansion, use ‘`\\`’. Any other use of ‘\’ in the body yields a warning.

The newline characters after the `@macro` line and before the `@end macro` line are ignored, that is, not included in the macro body. All other whitespace is treated according to the usual Texinfo rules.

To allow a macro to be used recursively, that is, in an argument to a call to itself, you must define it with `@rmacro`, like this:

```
@rmacro rmac {arg}
a\arg\b
@end rmacro
...
@rmac{1@rmac{text}2}
```

This produces the output `'a1atextb2b'`. With `@macro` instead of `@rmacro`, an error message is given.

You can undefine a macro `foo` with `@unmacro foo`. It is not an error to undefine a macro that is already undefined. For example:

```
@unmacro foo
```

17.2 Invoking Macros

After a macro is defined (see the previous section), you can *invoke* (use) it in your document like this:

```
@macroname {arg1, arg2, ...}
```

and the result will be more or less as if you typed the body of `macroname` at that spot. For example:

```
@macro foo {p, q}
Together: \p\ & \q\.
@end macro
@foo{a, b}
```

produces:

```
Together: a & b.
```

Thus, the arguments and parameters are separated by commas and delimited by braces; any whitespace after (but not before) a comma is ignored. The braces are required in the invocation even when the macro takes no arguments, consistent with other Texinfo commands. For example:

```
@macro argless {}
No arguments here.
@end macro
@argless{}
```

produces:

```
No arguments here.
```

Passing macro arguments containing commas requires care, since commas also separate the arguments. To include a comma character in an argument, the most reliable method is to use the `@comma{}` command. For `makeinfo`, you can also prepend a backslash character, as in `'\,'`, but this does not work with `TEX`.

It's not always necessary to worry about commas. To facilitate use of macros, `makeinfo` implements two rules for *automatic quoting* in some circumstances:

1. If a macro takes only one argument, all commas in its invocation are quoted by default. For example:

```
@macro TRYME{text}
@strong{TRYME: \text\}
@end macro
```

```
@TRYME{A nice feature, though it can be dangerous.}
```

will produce the following output

TRYME: A nice feature, though it can be dangerous.

And indeed, it can. Namely, `makeinfo` does not control the number of arguments passed to one-argument macros, so be careful when you invoke them.

2. If a macro invocation includes another command (including a recursive invocation of itself), any commas in the nested command invocation(s) are quoted by default. For example, in

```
@say{@strong{Yes, I do}, person one}
```

the comma after 'Yes' is implicitly quoted. Here's another example, with a recursive macro:

```
@rmacro cat{a,b}
\a\\b\
@end rmacro
```

```
@cat{@cat{foo, bar}, baz}
```

will produce the string 'foobarbaz'.

3. Otherwise, a comma should be explicitly quoted, as above, for it to be treated as a part of an argument.

The backslash itself can be quoted in macro arguments with another backslash. For example:

```
@macname {\bleh}
```

will pass the argument '\bleh' to *macname*.

`makeinfo` also recognizes '{' and '}' sequences for curly braces, but these are not recognized by the implementation in `TEX`. There should, however, rarely be a need for these, as they are only needed when a macro argument contains unbalanced braces.

If a macro is defined to take exactly one argument, it can be invoked without any braces, taking all of the line after the macro name as the argument. For example:

```
@macro bar {p}
Twice: \p\ & \p\
@end macro
@bar aah
```

produces:

Twice: aah & aah.

In these arguments, there is no escaping of special characters, so each ‘\’ stands for itself.

If a macro is defined to take more than one argument, but is called with only one (in braces), the remaining arguments are set to the empty string, and no error is given. For example:

```
@macro addtwo {p, q}
Both: \p\\q\
@end macro
@addtwo{a}
```

produces simply:

```
Both: a.
```

17.3 Macro Details and Caveats

By design, macro expansion does not happen in the following contexts in `makeinfo`:

- `@macro` and `@unmacro` lines;
- `@if...` lines, including `@ifset` and similar;
- `@set`, `@clear`, `@value`;
- `@clickstyle` lines;
- `@end` lines.

Unfortunately, `TeX` may do some expansion in these situations, possibly yielding errors.

Also, quite a few macro-related constructs cause problems with `TeX`; some of the caveats are listed below. Thus, if you get macro-related errors when producing the printed version of a manual, you might try expanding the macros with `makeinfo` by invoking `texi2dvi` with the ‘-E’ option (see Section 19.2 [Format with `texi2dvi`], page 163). Or, more reliably, eschew Texinfo macros altogether and use a language designed for macro processing, such as M4 (see Section 17.6 [External Macro Processors], page 156).

- As mentioned earlier, macro names must consist entirely of letters.
- It is not advisable to redefine any `TeX` primitive, plain, or Texinfo command name as a macro. Unfortunately this is a large and open-ended set of names, and the possible resulting errors are unpredictable.
- Arguments to macros taking more than one argument cannot cross lines.
- Macros containing a command which must be on a line by itself, such as a conditional, cannot be invoked in the middle of a line. Similarly, macros containing line-oriented commands or text, such as `@example` environments, may behave unpredictably in `TeX`.
- If you have problems using conditionals within a macro, an alternative is to use separate macro definitions inside conditional blocks. For example, instead of

```
@macro Mac
@iftex
text for TeX output
@end iftex
@ifnottex
text for not TeX output
@end ifnottex
```

```
@end macro
```

you can do the following instead:

```
@iftex
@macro Mac
text for TeX output
@end macro
@end iftex
```

```
@ifnottex
@macro Mac
text for not TeX output
@end macro
@end ifnottex
```

- Texinfo commands in the expansion of a macro in the text of an index entry may end up being typeset as literal text (including an “@” sign), instead of being interpreted with their intended meaning.
- White space is ignored at the beginnings of lines.
- Macros can’t be reliably used in the argument to accent commands (see Section 12.4 [Inserting Accents], page 108).
- The backslash escape for commas in macro arguments does not work; `@comma{}` must be used.
- Likewise, if you want to pass an argument with the Texinfo command `@`, (to produce a cedilla, see Section 12.4 [Inserting Accents], page 108), you have to use `@value` or another work-around. Otherwise, the comma may be taken as separating the arguments. For example,

```
@macro mactwo{argfirst, argsecond}
\argfirst\+\argsecond\
@end macro
@set fc Fran@,cois
@mactwo{@value{fc},}
```

produces:

```
François+.
```

- Ending a macro body with ‘`@c`’ may cause text following the macro invocation to be ignored as a comment in `makeinfo`. This is not the case when processing with `TEX`. This was often done to “comment out” an unwanted newline at the end of a macro body, but this is not necessary any more, as the final newline before ‘`@end macro`’ is not included in the macro body anyway.
- In general, you can’t arbitrarily substitute a macro (or `@value`) call for Texinfo command arguments, even when the text is the same. Texinfo is not M4 (or even plain `TEX`). It might work with some commands, it fails with others. Best not to do it at all. For instance, this fails:

```
@macro offmacro
off
@end macro
```

```
@headings @offmacro
```

This looks equivalent to `@headings off`, but for T_EXnical reasons, it fails with a mysterious error message (namely, ‘Paragraph ended before `@headings` was complete’).

- Macros cannot define macros in the natural way. To do this, you must use conditionals and raw T_EX. For example:

```
@ifnottex
@macro ctor {name, arg}
@macro \name\
something involving \arg\ somehow
@end macro
@end macro
@end ifnottex
@tex
\gdef\ctor#1{\ctorx#1,}
\gdef\ctorx#1,#2,{\def#1{something involving #2 somehow}}
@end tex
```

The `makeinfo` implementation also has the following limitations (by design):

- `@verbatim` and macros do not mix; for instance, you can’t start a verbatim block inside a macro and end it outside (see Section 8.5 [`@verbatim`], page 75). Starting any environment inside a macro and ending it outside may or may not work, for that matter.
- Macros that completely define macros are ok, but it’s not possible to have incompletely nested macro definitions. That is, `@macro` and `@end macro` (likewise for `@rmacro`) must be correctly paired. For example, you cannot start a macro definition within a macro, and then end that nested definition outside the macro.

In the `makeinfo` implementation before Texinfo 5.0, ends of lines from expansion of a `@macro` definition did not end an `@-`command line-delimited argument (`@chapter`, `@center`, etc.). This is no longer the case. For example:

```
@macro twolines{}
aaa
bbb
@end macro
@center @twolines{}
```

In the current `makeinfo`, this is equivalent to:

```
@center aaa
bbb
```

with just ‘aaa’ as the argument to `@center`. In the earlier implementation, it would have been parsed as this:

```
@center aaa bbb
```

17.4 ‘`@alias new=existing`’

The ‘`@alias`’ command defines a new command to be just like an existing one. This is useful for defining additional markup names, thus preserving additional semantic information in the input even though the output result may be the same.

Write the ‘@alias’ command on a line by itself, followed by the new command name, an equals sign, and the existing command name. Whitespace around the equals sign is optional and ignored if present. Thus:

```
@alias new = existing
```

For example, if your document contains citations for both books and some other media (movies, for example), you might like to define a macro @moviecite{} that does the same thing as an ordinary @cite{} but conveys the extra semantic information as well. You’d do this as follows:

```
@alias moviecite = cite
```

Macros do not always have the same effect as aliases, due to vagaries of argument parsing. Also, aliases are much simpler to define than macros. So the command is not redundant.

Unfortunately, it’s not possible to alias Texinfo environments; for example, @alias lang=example is an error.

Aliases must not be recursive, directly or indirectly.

It is not advisable to redefine any T_EX primitive, plain T_EX, or Texinfo command name as an alias. Unfortunately this is a very large set of names, and the possible resulting errors from T_EX are unpredictable.

makeinfo will accept the same identifiers for aliases as it does for macro names, that is, alphanumerics and (except as the first character) ‘-’.

17.5 @definfoenclose: Customized Highlighting

An @definfoenclose command may be used to define a highlighting command for all the non-T_EX output formats. A command defined using @definfoenclose marks text by enclosing it in strings that precede and follow the text. You can use this to get closer control of your output.

Presumably, if you define a command with @definfoenclose, you will create a corresponding command for T_EX, either in texinfo.tex, texinfo.cnf, or within an ‘@iftex’ or ‘@tex’ in your document.

Write a @definfoenclose command at the beginning of a line followed by three comma-separated arguments. The first argument to @definfoenclose is the @-command name (without the @); the second argument is the start delimiter string; and the third argument is the end delimiter string. The latter two arguments enclose the highlighted text in the output.

A delimiter string may contain spaces. Neither the start nor end delimiter is required. If you do not want a start delimiter but do want an end delimiter, you must follow the command name with two commas in a row; otherwise, the end delimiter string you intended will naturally be (mis)interpreted as the start delimiter string.

If you do a @definfoenclose on the name of a predefined command (such as @emph, @strong, @t, or @i), the enclosure definition will override the built-in definition. We don’t recommend this.

An enclosure command defined this way takes one argument in braces, since it is intended for new markup commands (see Chapter 7 [Marking Text], page 61).

For example, you can write:

```
@definfoenclose phoo,/,,\
```

near the beginning of a Texinfo file to define `@phoo` as an Info formatting command that inserts `/'` before and `\'` after the argument to `@phoo`. You can then write `@phoo{bar}` wherever you want `/'bar\'` highlighted in Info.

For \TeX formatting, you could write

```
@iftex
@global@let@phoo=@i
@end iftex
```

to define `@phoo` as a command that causes \TeX to typeset the argument to `@phoo` in italics.

Each definition applies to its own formatter: one for \TeX , the other for everything else. The raw \TeX commands need to be in `@iftex`. `@definfoenclose` command need not be within `@ifinfo`, unless you want to use different definitions for different output formats.

Here is another example: write

```
@definfoenclose headword, , :
```

near the beginning of the file, to define `@headword` as an Info formatting command that inserts nothing before and a colon after the argument to `@headword`.

`@definfoenclose` definitions must not be recursive, directly or indirectly.

17.6 External Macro Processors: Line Directives

Texinfo macros (and its other text substitution facilities) work fine in straightforward cases. If your document needs unusually complex processing, however, their fragility and limitations can be a problem. In this case, you may want to use a different macro processor altogether, such as M4 (see *M4*) or CPP (see *The C Preprocessor*).

With one exception, Texinfo does not need to know whether its input is “original” source or preprocessed from some other source file. Therefore, you can arrange your build system to invoke whatever programs you like to handle macro expansion or other preprocessing needs. Texinfo does not offer built-in support for any particular preprocessor, since no one program seemed likely to suffice for the requirements of all documents.

The one exception is line numbers in error messages. In that case, the line number should refer to the original source file, whatever it may be. There’s a well-known mechanism for this: the so-called `#line` directive. Texinfo supports this.

17.6.1 `#line` Directive

An input line such as this:

```
#line 100 "foo.ptexi"
```

indicates that the next line was line 100 of the file `foo.ptexi`, and so that’s what an error message should refer to. Both M4 (see Section “Preprocessor features” in *GNU M4*) and CPP (see Section “Line Control” in *The C Preprocessor*, and Section “Preprocessor Output” in *The C Preprocessor*) can generate such lines.

The `makeinfo` program recognizes these lines by default, except within `@verbatim` blocks (see Section 8.5 [`@verbatim`], page 75). Their recognition can be turned off completely

with `CPP_LINE_DIRECTIVES` (see Section 20.6.4 [Other Customization Variables], page 192), though there is normally no reason to do so.

For those few programs (M4, CPP, Texinfo) which need to document ‘`#line`’ directives and therefore have examples which would otherwise match the pattern, the command `@hashchar{}` can be used (see Section 12.1.5 [Inserting a Hashsign], page 104). The example line above looks like this in the source for this manual:

```
@hashchar{ }line 100 "foo.ptexi"
```

The `@hashchar` command was added to Texinfo in 2013. If you don’t want to rely on it, you can also use `@set` and `@value` to insert the literal ‘`#`’:

```
@set hash #
@value{hash}line 1 "example.c"
```

Or, if suitable, a `@verbatim` environment can be used instead of `@example`. As mentioned above, `#line`-recognition is disabled inside `verbatim` blocks.

17.6.2 ‘`#line`’ and \TeX

As mentioned, `makeinfo` recognizes the ‘`#line`’ directives described in the previous section. However, `texinfo.tex` does not and cannot. Therefore, such a line will be incorrectly typeset `verbatim` if \TeX sees it. The solution is to use `makeinfo`’s macro expansion options before running \TeX . There are three approaches:

- If you run `texi2dvi` or its variants (see Section 19.2 [Format with `texi2dvi`], page 163), you can pass `-E` and `texi2dvi` will run `makeinfo` first to expand macros and eliminate ‘`#line`’.
- If you run `makeinfo` or its variants (see Chapter 20 [Generic Translator `texi2any`], page 176), you can specify `--no-ifinfo --iftex -E somefile.out`, and then give `somefile.out` to `texi2dvi` in a separate command.
- Or you can run `makeinfo --dvi --Xopt -E`. (Or `--pdf` instead of `--dvi`.) `makeinfo` will then call `texi2dvi -E`.

One last caveat regarding use with \TeX : since the `#line` directives are not recognized, the line numbers emitted by the `@errormsg{}` command (see Section 16.1 [Conditional Commands], page 139), or by \TeX itself, are the (incorrect) line numbers from the derived file which \TeX is reading, rather than the preprocessor-specified line numbers. This is another example of why we recommend running `makeinfo` for the best diagnostics (see Section 21.1.1 [makeinfo Advantages], page 201).

17.6.3 ‘`#line`’ Syntax Details

Syntax details for the ‘`#line`’ directive: the ‘`#`’ character can be preceded or followed by whitespace, the word ‘`line`’ is optional, and the file name can be followed by a whitespace-separated list of integers (these are so-called “flags” output by CPP in some cases). For those who like to know the gory details, the actual (Perl) regular expression which is matched is this:

```
/^\s*#\s*(line)? (\d+)(( "[^"]+")(\s+\d+)*)?\s*$/
```

As far as we’ve been able to tell, the trailing integer flags only occur in conjunction with a filename, so that is reflected in the regular expression.

As an example, the following is a syntactically valid `#line` directive, meaning line 1 of `/usr/include/stdio.h`:

```
# 1 "/usr/include/stdio.h" 2 3 4
```

Unfortunately, the quoted filename ("`...`") has to be optional, because M4 (especially) can often generate `#line` directives within a single file. Since the `line` is also optional, the result is that lines might match which you wouldn't expect, e.g.,

```
# 1
```

The possible solutions are described above (see Section 17.6.1 [`#line` Directive], page 156).

18 Include Files

When a Texinfo processor sees an `@include` command in a Texinfo file, it processes the contents of the file named by the `@include` and incorporates them into the output files being created. Include files thus let you keep a single large document as a collection of conveniently small parts.

18.1 How to Use Include Files

To include another file within a Texinfo file, write the `@include` command at the beginning of a line and follow it on the same line by the name of a file to be included. For example:

```
@include buffers.texi
```

`@`-commands are expanded in file names. The one most likely to be useful is `@value` (see Section 16.5.1 [`@set @value`], page 143), and even then only in complicated situations.

An included file should simply be a segment of text that you expect to be included as into the overall or *outer* Texinfo file; it should not contain the standard beginning and end parts of a Texinfo file. In particular, you should not start an included file with a line saying `\input texinfo`; if you do, that text is inserted into the output file literally. Likewise, you should not end an included file with a `@bye` command; nothing after `@bye` is formatted.

In the long-ago past, you were required to write an `@setfilename` line at the beginning of an included file, but no longer. Now, it does not matter whether you write such a line. If an `@setfilename` line exists in an included file, it is ignored.

18.2 texinfo-multiple-files-update

GNU Emacs Texinfo mode provides the `texinfo-multiple-files-update` command. This command creates or updates ‘Next’, ‘Previous’, and ‘Up’ pointers of included files as well as those in the outer or overall Texinfo file, and it creates or updates a main menu in the outer file. Depending on whether you call it with optional arguments, the command updates only the pointers in the first `@node` line of the included files or all of them:

M-x texinfo-multiple-files-update

Called without any arguments:

- Create or update the ‘Next’, ‘Previous’, and ‘Up’ pointers of the first `@node` line in each file included in an outer or overall Texinfo file.
- Create or update the ‘Top’ level node pointers of the outer or overall file.
- Create or update a main menu in the outer file.

C-u M-x texinfo-multiple-files-update

Called with *C-u* as a prefix argument:

- Create or update pointers in the first `@node` line in each included file.
- Create or update the ‘Top’ level node pointers of the outer file.
- Create and insert a master menu in the outer file. The master menu is made from all the menus in all the included files.

C-u 8 M-x texinfo-multiple-files-update

Called with a numeric prefix argument, such as *C-u 8*:

- Create or update *all* the ‘Next’, ‘Previous’, and ‘Up’ pointers of all the included files.
- Create or update *all* the menus of all the included files.
- Create or update the ‘Top’ level node pointers of the outer or overall file.
- And then create a master menu in the outer file. This is similar to invoking `texinfo-master-menu` with an argument when you are working with just one file.

Note the use of the prefix argument in interactive use: with a regular prefix argument, just *C-u*, the `texinfo-multiple-files-update` command inserts a master menu; with a numeric prefix argument, such as *C-u 8*, the command updates *every* pointer and menu in *all* the files and then inserts a master menu.

18.3 Include Files Requirements

If you plan to use the `texinfo-multiple-files-update` command, the outer Texinfo file that lists included files within it should contain nothing but the beginning and end parts of a Texinfo file, and a number of `@include` commands listing the included files. It should not even include indices, which should be listed in an included file of their own.

Moreover, each of the included files must contain exactly one highest level node (conventionally, `@chapter` or equivalent), and this node must be the first node in the included file. Furthermore, each of these highest level nodes in each included file must be at the same hierarchical level in the file structure. Usually, each is a `@chapter`, an `@appendix`, or an `@unnumbered` node. Thus, normally, each included file contains one, and only one, chapter or equivalent-level node.

The outer file should contain only *one* node, the ‘Top’ node. It should *not* contain any nodes besides the single ‘Top’ node. The `texinfo-multiple-files-update` command will not process them.

18.4 Sample File with @include

Here is an example of an outer Texinfo file with `@include` files within it before running `texinfo-multiple-files-update`, which would insert a main or master menu:

```
\input texinfo @c --texinfo--
@settitle Include Example

... See Appendix C [Sample Texinfo Files], page 252, for
examples of the rest of the frontmatter ...

@ifnottex
@node Top
@top Include Example
@end ifnottex
```

```

@include foo.texinfo
@include bar.texinfo
@include concept-index.texinfo
@bye

```

An included file, such as `foo.texinfo`, might look like this:

```

@node First
@chapter First Chapter

Contents of first chapter ...

```

The full contents of `concept-index.texinfo` might be as simple as this:

```

@node Concept Index
@unnumbered Concept Index

@printindex cp

```

The outer Texinfo source file for *The GNU Emacs Lisp Reference Manual* is named `elisp.texi`. This outer file contains a master menu with 417 entries and a list of 41 `@include` files.

18.5 `@verbatiminclude file`: Include a File Verbatim

You can include the exact contents of a file in the document with the `@verbatiminclude` command:

```

@verbatiminclude filename

```

The contents of `filename` is printed in a verbatim environment (see Section 8.5 [`@verbatim`], page 75). Generally, the file is printed exactly as it is, with all special characters and white space retained. No indentation is added; if you want indentation, enclose the `@verbatiminclude` within `@example` (see Section 8.4 [`@example`], page 74).

The name of the file is taken literally, with a single exception: `@value{var}` references are expanded. This makes it possible to include files in other directories within a distribution, for instance:

```

@verbatiminclude @value{top_srcdir}/NEWS

```

(You still have to get `top_srcdir` defined in the first place.)

For a method on printing the file contents in a smaller font size, see the end of the section on `@verbatim`.

18.6 Evolution of Include Files

When Info was first created, it was customary to create many small Info files on one subject. Each Info file was formatted from its own Texinfo source file. This custom meant that Emacs did not need to make a large buffer to hold the whole of a large Info file when someone wanted information; instead, Emacs allocated just enough memory for the small Info file that contained the particular information sought. This way, Emacs could avoid wasting memory.

References from one file to another were made by referring to the file name as well as the node name. (See Section 4.9.6 [Referring to Other Info Files], page 41. Also, see Section 6.4.4 [`@xref` with Four and Five Arguments], page 53.)

Include files were designed primarily as a way to create a single, large printed manual out of several smaller Info files. In a printed manual, all the references were within the same document, so \TeX could automatically determine the references' page numbers. The Info formatting commands used include files only for creating joint indices; each of the individual Texinfo files had to be formatted for Info individually. (Each, therefore, required its own `@setfilename` line.)

However, because large Info files are now split automatically, it is no longer necessary to keep them small.

Nowadays, multiple Texinfo files are used mostly for large documents, such as *The GNU Emacs Lisp Reference Manual*, and for projects in which several different people write different sections of a document simultaneously.

In addition, the Info formatting commands have been extended to work with the `@include` command so as to create a single large Info file that is split into smaller files if necessary. This means that you can write menus and cross-references without naming the different Texinfo files.

19 Formatting and Printing Hardcopy

Running the `texi2dvi` or `texi2pdf` command is the simplest way to create printable output. These commands are installed as part of the Texinfo package.

In more detail, three major shell commands are used to print formatted output from a Texinfo manual: one converts the Texinfo source into something printable, a second sorts indices, and a third actually prints the formatted document. When you use the shell commands, you can either work directly in the operating system shell or work within a shell inside GNU Emacs (or some other computing environment).

If you are using GNU Emacs, you can use commands provided by Texinfo mode instead of shell commands. In addition to the three commands to format a file, sort the indices, and print the result, Texinfo mode offers key bindings for commands to recenter the output buffer, show the print queue, and delete a job from the print queue.

Details are in the following sections.

19.1 Use T_EX

The typesetting program called T_EX is used to format a Texinfo document for printable output. T_EX is a very powerful typesetting program and, when used correctly, does an exceptionally good job.

See Section 19.16 [Obtaining T_EX], page 175, for information on how to obtain T_EX. It is not included in the Texinfo package, being a vast suite of software in itself.

19.2 Format with `texi2dvi`

The `texi2dvi` program takes care of all the steps for producing a T_EX DVI file from a Texinfo document. Similarly, `texi2pdf` produces a PDF file.

To run `texi2dvi` or `texi2pdf` on an input file `foo.texi`, do this (where ‘`prompt$`’ is your shell prompt):

```
prompt$ texi2dvi foo.texi
prompt$ texi2pdf foo.texi
```

As shown in this example, the input filenames to `texi2dvi` and `texi2pdf` must include any extension, such as ‘`.texi`’. (Under MS-DOS and perhaps in other circumstances, you may need to run ‘`sh texi2dvi foo.texi`’ instead of relying on the operating system to invoke the shell on the ‘`texi2dvi`’ script.)

For a list of all the options, run ‘`texi2dvi --help`’. Some of the options are discussed below.

With the `--pdf` option, `texi2dvi` produces PDF output instead of DVI (see Section 19.15 [PDF Output], page 174), by running `pdftex` instead of `tex`. Alternatively, the command `texi2pdf` is an abbreviation for running ‘`texi2dvi --pdf`’. The command `pdftexi2dvi` is also provided as a convenience for AUC-T_EX (see *AUC-T_EX*), as it prefers to merely prepend ‘`pdf`’ to DVI producing tools to have PDF producing tools.

With the `--dvi2pdf` option, `texi2dvi` produces PDF output by running T_EX and then a DVI-to-PDF program: if the `DVIPDF` environment variable is set, that value is used, else the first program extant among `dvi2pdfmx`, `dvi2pdfm`, `dvi2pdf`, `dvi2pdf`, `dvi2pdf`. This method generally supports CJK typesetting better than `pdftex`.

With the `--ps` option, `texi2dvi` produces PostScript instead of DVI, by running `tex` and then `dvips` (see *Dvips*). (Or the value of the `DVIPS` environment variable, if set.)

`texi2dvi` can also be used to process L^AT_EX files. Normally `texi2dvi` is able to guess the input file language by its contents and file name extension; however, if it guesses wrong you can explicitly specify the input language using `--language=lang` command line option, where *lang* is either ‘`latex`’ or ‘`texinfo`’.

One useful option to `texi2dvi` is ‘`--command=cmd`’. This inserts *cmd* on a line by itself, after a `@setfilename` line in a temporary copy of the input file, before running T_EX. With this, you can specify different printing formats, such as `@smallbook` (see Section 19.11 [`@smallbook`], page 172), `@fourpaper` (see Section 19.12 [A4 Paper], page 173), or `@pagesizes` (see Section 19.13 [`@pagesizes`], page 173), without actually changing the document source. (You can also do this on a site-wide basis with `texinfo.cnf`; see Section 19.9 [Preparing for T_EX], page 170).

The option `-E` (equivalently, `-e` and `--expand`) does Texinfo macro expansion using `makeinfo` instead of the T_EX implementation (see Section 17.3 [Macro Details], page 152). Each implementation has its own limitations and advantages. If this option is used, no line in the source file may begin with the string `@c _texi2dvi` or the string `@c (_texi2dvi)`.

`texi2dvi` takes the `--build=mode` option to specify where the T_EX compilation takes place, and, as a consequence, how auxiliary files are treated. The build mode can also be set using the environment variable `TEXI2DVI_BUILD_MODE`. The valid values for *mode* are:

- ‘`local`’ Compile in the current directory, leaving all the auxiliary files around. This is the traditional TeX use.
- ‘`tidy`’ Compile in a local `*.t2d` directory, where the auxiliary files are left. Output files are copied back to the original file.

Using the ‘`tidy`’ mode brings several advantages:

- the current directory is not cluttered with plethora of temporary files.
- clutter can be even further reduced using `--build-dir=dir`: all the `*.t2d` directories are stored there.
- clutter can be reduced to zero using, e.g., `--build-dir=/tmp/\$USER.t2d` or `--build-dir=\$HOME/.t2d`.
- the output file is updated after every successful T_EX run, for sake of concurrent visualization of the output. In a ‘`local`’ build the viewer stops during the whole T_EX run.
- if the compilation fails, the previous state of the output file is preserved.
- PDF and DVI compilation are kept in separate subdirectories preventing any possibility of auxiliary file incompatibility.

On the other hand, because ‘`tidy`’ compilation takes place in another directory, occasionally T_EX won’t be able to find some files (e.g., when using `\graphicspath`): in that case, use `-I` to specify the additional directories to consider.

- ‘`clean`’ Same as ‘`tidy`’, but remove the auxiliary directory afterwards. Every compilation therefore requires the full cycle.

`texi2dvi` will use `etex` (or `pdfetex`) if it is available, because it runs faster in some cases, and provides additional tracing information when debugging `texinfo.tex`. Nevertheless, this extended version of \TeX is not required, and the DVI output is identical. (These days, `pdftex` and `pdfetex` are exactly the same, but we still run `pdfetex` to cater to ancient \TeX installations.)

`texi2dvi` attempts to detect auxiliary files output by \TeX , either by using the `-recorder` option, or by scanning for `\openout` in the log file that a run of \TeX produces. You may control how `texi2dvi` does this with the `TEXI2DVI_USE_RECORDER` environment variable. Valid values are:

- `'yes'` use the `-recorder` option, no checks.
- `'no'` scan for `\openout` in the log file, no checks.
- `'yesmaybe'` check whether `-recorder` option is supported, and if yes use it, otherwise check for tracing `\openout` in the log file is supported, and if yes use it, else it is an error.
- `'nomaybe'` same as `'yesmaybe'`, except that the `\openout` trace in log file is checked first.

The default is `'nomaybe'`. This environment variable is provided for troubleshooting purposes, and may change or disappear in the future.

19.3 Format with `tex/texindex`

You can do the basic formatting of a Texinfo file with the shell command `tex` followed by the name of the Texinfo file. For example:

```
tex foo.texi
```

\TeX will produce a *DVI file* as well as several auxiliary files containing information for indices, cross-references, etc. The DVI file (for *DeVice Independent* file) can be printed on virtually any device, perhaps after a further conversion (see the previous section).

The `tex` formatting command itself does not sort the indices; it writes an output file of unsorted index data. To generate a printed index after running the `tex` command, you first need a sorted index to work from. The `texindex` command sorts indices. (`texi2dvi`, described in the previous section, runs `tex` and `texindex` as necessary.)

`tex` outputs unsorted index files under names following a standard convention: the name of your main input file with any `.texi` or similar extension replaced by the two letter index name. For example, the raw index output files for the input file `foo.texi` would be, by default, `foo.cp`, `foo.vr`, `foo.fn`, `foo.tp`, `foo.pg` and `foo.ky`. Those are exactly the arguments to give to `texindex`.

Instead of specifying all the unsorted index file names explicitly, it's typical to use `'??'` as shell wildcards and give the command in this form:

```
texindex foo.??
```

This command will run `texindex` on all the unsorted index files, including any two letter indices that you have defined yourself using `@defindex` or `@defcodeindex`. You can safely run `'texindex foo.??'` even if there are files with two letter extensions that are not index files, such as `'foo.el'`. The `texindex` command reports but otherwise ignores such files.

For each file specified, `texindex` generates a sorted index file whose name is made by appending ‘s’ to the input file name; for example, `foo.cps` is made from `foo.cp`. The `@printindex` command looks for a file with that name (see Section 11.4 [Printing Indices & Menus], page 99). `TEX` does not read the raw index output file, and `texindex` does not alter it.

After you have sorted the indices, you need to rerun `tex` on the Texinfo file. This regenerates the output file, this time with up-to-date index entries.

Finally, you may need to run `tex` one more time, to get the page numbers in the cross-references correct.

To summarize, this is a five step process. (Alternatively, it’s a one-step process: run `texi2dvi`; see the previous section.)

1. Run `tex` on your Texinfo file. This generates a DVI file (with undefined cross-references and no indices), and the raw index files (with two letter extensions).
2. Run `texindex` on the raw index files. This creates the corresponding sorted index files (with three letter extensions).
3. Run `tex` again on your Texinfo file. This regenerates the DVI file, this time with indices and defined cross-references, but with page numbers for the cross-references from the previous run, generally incorrect.
4. Sort the indices again, with `texindex`.
5. Run `tex` one last time. This time the correct page numbers are written for the cross-references.

19.3.1 Formatting Partial Documents

Sometimes you may wish to print a document while you know it is incomplete, or to print just one chapter of a document. In such a case, the usual auxiliary files that `TEX` creates and warnings `TEX` gives about undefined cross-references are just nuisances. You can avoid them with the `@novalidate` command, which you must give *before* any sectioning or cross-reference commands.

Thus, the beginning of your file would look approximately like this:

```
\input texinfo
@novalidate
...
```

`@novalidate` also turns off validation in `makeinfo`, just like its `--no-validate` option (see Section 20.5 [Pointer Validation], page 184).

Furthermore, you need not run `texindex` each time after you run `tex`. The `tex` formatting command simply uses whatever sorted index files happen to exist from a previous use of `texindex`. If those are out of date, that is usually ok while you are creating or debugging a document.

19.3.2 Details of `texindex`

In Texinfo version 6, released in 2015, the `texindex` program was completely reimplemented. The principal functional difference is that index entries beginning with a left brace or right brace (‘{’ resp. ‘}’) can work properly. For example, these simple index entries are processed correctly, including the “index initial” shown in the index:

```
@cindex @{
```

```
@cindex @}
...
@printindex cp
```

However, to enable this behavior, it's necessary (for the time being) to give a special option to \TeX early in a source document:

```
@tex
\global\usebracesinindexestru
@end tex
```

This is because the previous `texindex` implementation aborted with an incorrect error message ('No page number in \entry...') on such index entries when handled in the normal way. Therefore \TeX wrote out an incorrect "sort string" using the 'l' character; this did not affect the text of the entry, but the index initial was the incorrect 'l', and sorting was not perfect.

Because of that fatal error, and because relatively few documents have index entries beginning with braces, we want to provide some transition time for installations to have the new `texindex`. At some point in the future, we'll make `\usebracesinindexes` true by default (the above \TeX code will continue to work fine).

Although not a matter of functionality, readers may be interested to know that the new `texindex` is a literate program (http://en.wikipedia.org/wiki/Literate_programming) using Texinfo for documentation and (portable) `awk` for code. A single source file, `texindex/ti.twjr` in this case, produces the runnable program, a printable document, and an online document.

The system is called TexiWeb Jr. and was created by Arnold Robbins, who also wrote the new `texindex`. Not coincidentally, he is also the long-time maintainer of `gawk` (GNU Awk, see *The GNU Awk User's Guide*). The file `texindex/Makefile.am` shows example usage of the system.

19.4 Print with `lpr` from Shell

The way to print a DVI file depends on your system installation. Two common ones are '`dvips foo.dvi -o`' to make a PostScript file first and then print that, and '`lpr -d foo.dvi`' to print a DVI file directly.

For example, the following commands will (probably) suffice to sort the indices, format, and print this manual using the `texi2dvi` shell script (see Section 19.2 [Format with `texi2dvi`], page 163).

```
texi2dvi texinfo.texi
dvips texinfo.dvi -o
lpr texinfo.ps
```

Depending on the `lpr` setup on your machine, you might able to combine the last two steps into `lpr -d texinfo.dvi`.

You can also generate a PDF file by running `texi2pdf` instead of `texi2dvi`; a PDF is often directly printable. Or you can generate a PCL file by using `dvilj` instead of `dvips`, if you have a printer that prefers that format.

`lpr` is a standard program on Unix systems, but it is usually absent on MS-DOS/MS-Windows. If so, just create a PostScript or PDF or PCL file, whatever is most convenient,

and print that in the usual way for your machine (e.g., by sending to the appropriate port, usually ‘PRN’).

19.5 Printing From an Emacs Shell

You can give formatting and printing commands from a shell within GNU Emacs, just like any other shell command. To create a shell within Emacs, type *M-x shell* (see Section “Shell” in *The GNU Emacs Manual*). In this shell, you can format and print the document. See Chapter 19 [Format and Print Hardcopy], page 163, for details.

You can switch to and from the shell buffer while *tex* is running and do other editing. If you are formatting a long document on a slow machine, this can be very convenient.

For example, you can use *texi2dvi* from an Emacs shell. Here is one way to use *texi2pdf* to format and print *Using and Porting GNU CC* from a shell within Emacs:

```
texi2pdf gcc.texi
lpr gcc.pdf
```

See the next section for more information about formatting and printing in Texinfo mode.

19.6 Formatting and Printing in Texinfo Mode

Texinfo mode provides several predefined key commands for \TeX formatting and printing. These include commands for sorting indices, looking at the printer queue, killing the formatting job, and recentering the display of the buffer in which the operations occur.

C-c C-t C-b

M-x texinfo-tex-buffer

Run *texi2dvi* on the current buffer.

C-c C-t C-r

M-x texinfo-tex-region

Run \TeX on the current region.

C-c C-t C-i

M-x texinfo-texindex

Sort the indices of a Texinfo file formatted with *texinfo-tex-region*.

C-c C-t C-p

M-x texinfo-tex-print

Print a DVI file that was made with *texinfo-tex-region* or *texinfo-tex-buffer*.

C-c C-t C-q

M-x tex-show-print-queue

Show the print queue.

C-c C-t C-d

M-x texinfo-delete-from-print-queue

Delete a job from the print queue; you will be prompted for the job number shown by a preceding *C-c C-t C-q* command (*texinfo-show-tex-print-queue*).

C-c C-t C-k

M-x tex-kill-job

Kill the currently running T_EX job started by either `texinfo-tex-region` or `texinfo-tex-buffer`, or any other process running in the Texinfo shell buffer.

C-c C-t C-x

M-x texinfo-quit-job

Quit a T_EX formatting job that has stopped because of an error by sending an `x` to it. When you do this, T_EX preserves a record of what it did in a `.log` file.

C-c C-t C-l

M-x tex-recenter-output-buffer

Redisplay the shell buffer in which the T_EX printing and formatting commands are run to show its most recent output.

Thus, the usual sequence of commands for formatting a buffer is as follows (with comments to the right):

<i>C-c C-t C-b</i>	Run <code>texi2dvi</code> on the buffer.
<i>C-c C-t C-p</i>	Print the DVI file.
<i>C-c C-t C-q</i>	Display the printer queue.

The Texinfo mode T_EX formatting commands start a subshell in Emacs called the `*tex-shell*`. The `texinfo-tex-command`, `texinfo-texindex-command`, and `tex-dvi-print-command` commands are all run in this shell.

You can watch the commands operate in the `*tex-shell*` buffer, and you can switch to and from and use the `*tex-shell*` buffer as you would any other shell buffer.

The formatting and print commands depend on the values of several variables. The default values are:

Variable	Default value
<code>texinfo-texi2dvi-command</code>	<code>"texi2dvi"</code>
<code>texinfo-tex-command</code>	<code>"tex"</code>
<code>texinfo-texindex-command</code>	<code>"texindex"</code>
<code>texinfo-delete-from-print-queue-command</code>	<code>"lprm"</code>
<code>texinfo-tex-trailer</code>	<code>"@bye"</code>
<code>tex-start-of-header</code>	<code>"%**start"</code>
<code>tex-end-of-header</code>	<code>"%**end"</code>
<code>tex-dvi-print-command</code>	<code>"lpr -d"</code>
<code>tex-show-queue-command</code>	<code>"lpq"</code>

You can change the values of these variables with the *M-x set-variable* command (see Section “Examining and Setting Variables” in *The GNU Emacs Manual*), or with your `.emacs` initialization file (see Section “Init File” in *The GNU Emacs Manual*).

Beginning with version 20, GNU Emacs offers a user-friendly interface, called *Customize*, for changing values of user-definable variables. See Section “Easy Customization Interface” in *The GNU Emacs Manual*, for more details about this. The Texinfo variables can be found in the ‘Development/Docs/Texinfo’ group, once you invoke the *M-x customize* command.

19.7 Using the Local Variables List

Yet another way to apply the \TeX formatting command to a Texinfo file is to put that command in a *local variables list* at the end of the Texinfo file. You can then specify the `tex` or `texi2dvi` commands as a `compile-command` and have Emacs run it by typing `M-x compile`. This creates a special shell called the `*compilation*` buffer in which Emacs runs the compile command. For example, at the end of the `gdb.texi` file, after the `@bye`, you could put the following:

```
Local Variables:
compile-command: "texi2dvi gdb.texi"
End:
```

This technique is most often used by programmers who also compile programs this way; see Section “Compilation” in *The GNU Emacs Manual*.

19.8 \TeX Formatting Requirements Summary

Every Texinfo file that is to be input to \TeX must begin with a `\input texinfo` command:

```
\input texinfo
```

This instructs \TeX to load the macros it needs to process a Texinfo file.

Every Texinfo file must end with a line that terminates \TeX 's processing and forces out unfinished pages:

```
@bye
```

Strictly speaking, these two lines are all a Texinfo file needs to be processed successfully by \TeX .

Usually, however, the beginning includes a `@settitle` command to define the title of the printed manual, a title page, a copyright page, permissions, and a table of contents. Besides `@bye`, the end of a file usually includes indices. (Not to mention that most manuals contain a body of text as well.)

For more information, see:

- Section 3.2.4 [`@settitle`], page 18.
- Section 3.7.2 [`@setchapternewpage`], page 27.
- Appendix E [Headings], page 270.
- Section 3.4 [Titlepage & Copyright Page], page 20.
- Section 11.4 [Printing Indices & Menus], page 99.
- Section 3.5 [Contents], page 24.

19.9 Preparing for \TeX

\TeX needs to know where to find the `texinfo.tex` file that the `\input texinfo` command on the first line reads. The `texinfo.tex` file tells \TeX how to handle `@`-commands; it is included in all standard GNU distributions. The latest version released for general use is available from the usual GNU servers and mirrors:

```
http://ftp.gnu.org/gnu/texinfo/texinfo.tex
http://ftpmirror.gnu.org/texinfo/texinfo.tex
```

The latest development version is available from the Texinfo source repository:

```
http://svn.savannah.gnu.org/viewvc/trunk/doc/texinfo.tex?root=texinfo&view=log
```

`texinfo.tex` is essentially a standalone file, and compatibility is of utmost concern; so, if you need or want to try a newer version than came with your system, it nearly always suffices to download it and put it anywhere that \TeX will find it (first). You can replace any existing `texinfo.tex` with a newer version (of course saving the original in case of disaster).

Also, you should install `epsf.tex`, if it is not already installed from another distribution. More details are at the end of the description of the `@image` command (see Section 10.2 [Images], page 92).

To use quotation marks other than those used in English, you'll need to have the European Computer Modern fonts (e.g., `ecrm1000`) and (for PDF output) CM-Super fonts (see Section 12.5 [Inserting Quotation Marks], page 109).

To use the `@euro` command, you'll need the '`feym*`' fonts (e.g., `feymr10`). See Section 12.8.6 [`@euro`], page 113.

All of the above files (and a whole lot more) should be installed by default in a reasonable \TeX installation.

Optionally, you may create a file `texinfo.cnf` for site configuration. This file is read by \TeX at the beginning of a Texinfo file. You can put any commands you like there, according to local site-wide conventions. They will be read by \TeX when processing any Texinfo document. For example, if `texinfo.cnf` contains the line '`@afourpaper`' (see Section 19.12 [A4 Paper], page 173), then all Texinfo documents will be processed with that page size in effect. If you have nothing to put in `texinfo.cnf`, you do not need to create it.

If neither of the above locations for these system files suffice, you can specify the directories explicitly. For `texinfo.tex`, you can do this by writing the complete path for the file after the `\input` command. Another way, that works for both `texinfo.tex` and `texinfo.cnf` (and any other file \TeX might read), is to set the `TEXINPUTS` environment variable in your `.profile` or `.cshrc` file.

Whether you use `.profile` or `.cshrc` depends on whether you use a Bourne shell-compatible (`sh`, `bash`, `ksh`, ...) or C shell-compatible (`csh`, `tcsh`) command interpreter, respectively.

In a `.profile` file, you could use the following `sh` command sequence:

```
TEXINPUTS=./home/me/mylib:
export TEXINPUTS
```

While in a `.cshrc` file, you could use the following `csh` command sequence:

```
setenv TEXINPUTS ./home/me/mylib:
```

On MS-DOS/MS-Windows, you'd do this (note the use of the '`;`' character as directory separator, instead of '`:`')

```
set TEXINPUTS=.;d:/home/me/mylib;c:
```

It is customary for DOS/Windows users to put such commands in the `autoexec.bat` file, or in the Windows registry.

These settings would cause \TeX to look for `\input` file first in the current directory, indicated by the '`.`', then in a hypothetical user '`me`'s `mylib` directory, and finally in the system

directories. (A leading, trailing, or doubled ‘:’ indicates searching the system directories at that point.)

19.10 Overfull “hboxes”

TeX is sometimes unable to typeset a line within the normal margins. This most often occurs when TeX comes upon what it interprets as a long word that it cannot hyphenate, such as an electronic mail network address or a very long identifier. When this happens, TeX prints an error message like this:

```
Overfull @hbox (20.76302pt too wide)
```

(In TeX, lines are in “horizontal boxes”, hence the term, “hbox”. ‘@hbox’ is a TeX primitive not used in the Texinfo language.)

TeX also provides the line number in the Texinfo source file and the text of the offending line, which is marked at all the places that TeX considered hyphenation. See Section F.3 [Debugging with TeX], page 276, for more information about typesetting errors.

If the Texinfo file has an overfull hbox, you can rewrite the sentence so the overfull hbox does not occur, or you can decide to leave it. A small excursion into the right margin often does not matter and may not even be noticeable.

If you have many overfull boxes and/or an antipathy to rewriting, you can coerce TeX into greatly increasing the allowable interword spacing, thus (if you’re lucky) avoiding many of the bad line breaks, like this:

```
@tex
\global\emergencystretch = .9\hsize
@end tex
```

(You should adjust the fraction as needed.) This huge value for `\emergencystretch` cannot be the default, since then the typeset output would generally be of noticeably lower quality; its default value is ‘.15\hsize’. `\hsize` is the TeX dimension containing the current line width.

For any overfull boxes you do have, TeX will print a large, ugly, black rectangle beside the line that contains the overfull hbox unless told otherwise. This is so you will notice the location of the problem if you are correcting a draft.

To prevent such a monstrosity from marring your final printout, write the following in the beginning of the Texinfo file on a line of its own, before the `@titlepage` command:

```
@finalout
```

19.11 @smallbook: Printing “Small” Books

By default, TeX typesets pages for printing in an 8.5 by 11 inch format. However, you can direct TeX to typeset a document in a 7 by 9.25 inch format that is suitable for bound books by inserting the following command on a line by itself at the beginning of the Texinfo file, before the title page:

```
@smallbook
```

(Since many books are about 7 by 9.25 inches, this command might better have been called the `@regularbooksize` command, but it came to be called the `@smallbook` command by comparison to the 8.5 by 11 inch format.)

If you write the `@smallbook` command between the start-of-header and end-of-header lines, the Texinfo mode `TEX` region formatting command, `texinfo-tex-region`, will format the region in “small” book size (see Section 3.2.2 [Start of Header], page 17).

See Section 8.15 [`@small...`], page 80, for information about commands that make it easier to produce examples for a smaller manual.

See Section 19.2 [Format with `texi2dvi`], page 163, and Section 19.9 [Preparing for `TEX`], page 170, for other ways to format with `@smallbook` that do not require changing the source file.

19.12 Printing on A4 Paper

You can tell `TEX` to format a document for printing on European size A4 paper (or A5) with the `@afourpaper` (or `@afivepaper`) command. Write the command on a line by itself near the beginning of the Texinfo file, before the title page. For example, this is how you would write the header for this manual:

```
\input texinfo    @c --texinfo--
@c **start of header
@settitle Texinfo
@afourpaper
@c **end of header
```

See Section 19.2 [Format with `texi2dvi`], page 163, and Section 19.9 [Preparing for `TEX`], page 170, for other ways to format for different paper sizes that do not require changing the source file.

You may or may not prefer the formatting that results from the command `@afourlatex`. There’s also `@afourwide` for A4 paper in wide format.

19.13 `@pagesizes` [*width*][, *height*]: Custom Page Sizes

You can explicitly specify the height and (optionally) width of the main text area on the page with the `@pagesizes` command. Write this on a line by itself near the beginning of the Texinfo file, before the title page. The height comes first, then the width if desired, separated by a comma. Examples:

```
@pagesizes 200mm,150mm

and

@pagesizes 11.5in
```

This would be reasonable for printing on B5-size paper. To emphasize, this command specifies the size of the *text area*, not the size of the paper (which is 250 mm by 177 mm for B5, 14 in by 8.5 in for legal).

To make more elaborate changes, such as changing any of the page margins, you must define a new command in `texinfo.tex` or `texinfo.cnf`.

See Section 19.2 [Format with `texi2dvi`], page 163, and Section 19.9 [Preparing for `TEX`], page 170, for other ways to specify `@pagesizes` that do not require changing the source file.

19.14 Cropmarks and Magnification

You can (attempt to) direct \TeX to print cropmarks at the corners of pages with the `@cropmarks` command. Write the `@cropmarks` command on a line by itself near the beginning of the Texinfo file, before the title page, like this:

```
@cropmarks
```

This command is mainly for printers that typeset several pages on one sheet of film; but you can attempt to use it to mark the corners of a book set to 7 by 9.25 inches with the `@smallbook` command. (Printers will not produce cropmarks for regular sized output that is printed on regular sized paper.) Since different printing machines work in different ways, you should explore the use of this command with a spirit of adventure. You may have to redefine the command in `texinfo.tex`.

The `@cropmarks` command is recognized and ignored in non- \TeX output formats.

You can attempt to direct \TeX to typeset pages larger or smaller than usual with the `\mag` \TeX command. Everything that is typeset is scaled proportionally larger or smaller. (`\mag` stands for “magnification”.) This is *not* a Texinfo `@`-command, but is a raw \TeX command that is prefixed with a backslash. You have to write this command between `@tex` and `@end tex` (see Section 16.3 [Raw Formatter Commands], page 141).

Follow the `\mag` command with an ‘=’ and then a number that is 1000 times the magnification you desire. For example, to print pages at 1.2 normal size, write the following near the beginning of the Texinfo file, before the title page:

```
@tex
\global\mag=1200
@end tex
```

With some printing technologies, you can print normal-sized copies that look better than usual by giving a larger-than-normal master to your print shop. They do the reduction, thus effectively increasing the resolution.

Depending on your system, DVI files prepared with a nonstandard `\mag` may not print or may print only with certain magnifications. Be prepared to experiment.

19.15 PDF Output

The simplest way to generate PDF output from Texinfo source is to run the convenience script `texi2pdf` (or `pdftexi2dvi`); this executes the `texi2dvi` script with the `--pdf` option (see Section 19.2 [Format with `texi2dvi`], page 163). If for some reason you want to process the document by hand, you can run the `pdftex` program instead of plain `tex`. That is, run `pdftex foo.texi` instead of `tex foo.texi`.

PDF stands for ‘Portable Document Format’. It was invented by Adobe Systems some years ago for document interchange, based on their PostScript language. Related links:

- GNU GV, a Ghostscript-based PDF reader (<http://www.gnu.org/software/gv/>). (It can also preview PostScript documents.)
- `xpdf`, a freely available standalone PDF reader (<http://www.foolabs.com/xpdf/>) for the X window system.
- PDF at Wikipedia (https://en.wikipedia.org/wiki/Portable_Document_Format).

At present, Texinfo does not provide ‘`@ifpdf`’ or ‘`@pdf`’ commands as for the other output formats, since PDF documents contain many internal low-level offsets and cross-references that would be hard or impossible to specify at the Texinfo source level.

PDF files require dedicated software to be displayed, unlike the plain ASCII formats (Info, HTML) that Texinfo supports. They also tend to be much larger than the DVI files output by \TeX by default. Nevertheless, a PDF file does define an actual typeset document in a self-contained file, notably including all the fonts that are used, so it has its place.

19.16 Obtaining \TeX

\TeX is a document formatter that is used by the FSF for its documentation. It is the easiest way to get printed output (e.g., PDF and PostScript) for Texinfo manuals. \TeX is freely redistributable, and you can get it over the Internet or on physical media. See <http://tug.org/texlive>.

20 `texi2any`: The Generic Translator for Texinfo

`texi2any` is the generic translator for Texinfo that can produce different output formats and is highly customizable. It supports these formats:

Info (by default, or with `--info`),
 HTML (with `--html`),
 plain text (with `--plaintext`),
 Docbook (with `--docbook`),
 Texinfo XML (with `--xml`).

`makeinfo` is an alias for `texi2any`. By default, both `texi2any` and `makeinfo` generate Info output; indeed, there are no differences in behavior based on the name.

Beside these default formats, command line options to `texi2any` can change many aspects of the output. Beyond that, initialization files provide even more control over the final output—nearly anything not specified in the Texinfo input file. Initialization files are written in Perl, like the main program, and anything which can be specified on the command line can also be specified within a initialization file.

The rest of this chapter goes into the details.

20.1 `texi2any`: A Texinfo Reference Implementation

Above, we called `texi2any` “the” translator for Texinfo instead of just “a” translator, even though (of course) it’s technically and legally possible for other implementations to be written. The reason is that alternative implementations are very likely to have subtle, or not-so-subtle, differences in behavior, and thus Texinfo documents would become dependent on the processor. Therefore, it is important to have a reference implementation that defines parts of the language not fully specified by the manual (often intentionally so). It is equally important to have consistent command-line options and other behavior for all processors.

For this reason, the once-independent `texi2html` Perl Texinfo processor was made compatible with the C implementation of `makeinfo`, to avoid continuing with two different implementations (see Section 1.6 [History], page 7). The current implementation, `texi2any`, serves as the reference implementation. It inherited the design of customization and other features from `texi2html` (for more on `texi2html` compatibility, see Section 20.9 [`texi2html`], page 198). However, `texi2any` is a full reimplementaion: it constructs a tree-based representation of the input document for all back-ends to work from.

Extensive tests of the language were developed at the same time as `texi2any`; we plead with anyone thinking of writing a program to parse Texinfo input to at least make use of these tests.

The `texi2html` wrapper script (see Section 20.9 [`texi2html`], page 198) provides a very simple example of calling `texi2any` from a shell script; it’s in `util/texi2html` in the Texinfo sources. More consequentially, `texi-elements-by-size` is an example Perl script using the `Texinfo::Parser` module interface; it’s also in the `util` source directory. (Its functionality may also be useful to authors; see [`texi-elements-by-size`], page 250.)

With the release of `texi2any` as the reference implementation, development of both the C implementation of `makeinfo` and `texi2html` has been halted. Going forward, we ask authors of Texinfo documents to use only `texi2any`.

20.2 Invoking `texi2any`/`makeinfo` from a Shell

To process a Texinfo file, invoke `texi2any` or `makeinfo` (the two names are synonyms for the same program; we'll use the names interchangeably) followed by the name of the Texinfo file. Also select the format you want to output with the appropriate command line option (default is Info). Thus, to create the Info file for Bison, type the following to the shell:

```
texi2any --info bison.texinfo
```

You can specify more than one input file name; each is processed in turn. If an input file name is '-', standard input is read.

The `texi2any` program accepts many options. Perhaps the most basic are those that change the output format. By default, `texi2any` outputs Info.

Each command line option is either a long name preceded by '--' or a single letter preceded by '-'. You can use abbreviations for the long option names as long as they are unique.

For example, you could use the following shell command to create an Info file for `bison.texinfo` in which lines are filled to only 68 columns:

```
texi2any --fill-column=68 bison.texinfo
```

You can write two or more options in sequence, like this:

```
texi2any --no-split --fill-column=70 ...
```

(This would keep the Info file together as one possibly very long file and would also set the fill column to 70.)

The options are (approximately in alphabetical order):

`--commands-in-node-names`

This option now does nothing, but remains for compatibility. (It used to ensure that @-commands in node names were expanded throughout the document, especially @value. This is now done by default.)

`--conf-dir=path`

Prepend *path* to the directory search list for finding customization files that may be loaded with `--init-file` (see below). The *path* value can be a single directory, or a list of several directories separated by the usual path separator character (':' on Unix-like systems, ';' on Windows).

`--css-include=file`

When producing HTML, literally include the contents of *file*, which should contain W3C cascading style sheets specifications, in the '<style>' block of the HTML output. If *file* is '-', read standard input. See Section 22.3 [HTML CSS], page 213.

`--css-ref=url`

When producing HTML, add a '<link>' tag to the output which references a cascading style sheet at *url*. This allows using standalone style sheets.

`-D var`

`-D 'var value'`

Cause the Texinfo variable *var* to be defined. This is equivalent to `@set var` in the Texinfo file (see Section 16.5 [`@set @clear @value`], page 143).

The argument to the option is always one word to the shell; if it contains internal whitespace, the first word is taken as the variable name and the remainder as the value. For example, `-D 'myvar someval'` is equivalent to `@set myvar someval`.

`--disable-encoding`

`--enable-encoding`

By default, or with `--enable-encoding`, output accented and special characters in Info and plain text output based on `'@documentencoding'`. With `--disable-encoding`, 7-bit ASCII transliterations are output. See Section 15.2 [`@documentencoding`], page 137, and Section 12.4 [Inserting Accents], page 108.

`--docbook`

Generate Docbook output (rather than Info).

`--document-language=lang`

Use *lang* to translate Texinfo keywords which end up in the output document. The default is the locale specified by the `@documentlanguage` command if there is one, otherwise English (see Section 15.1 [`@documentlanguage`], page 136).

`--dvi` Generate a TeX DVI file using `texi2dvi`, rather than Info (see Section 20.4 [`texi2any` Printed Output], page 183).

`--dvipdf` Generate a PDF file using `texi2dvi --dvipdf`, rather than Info (see Section 20.4 [`texi2any` Printed Output], page 183).

`--error-limit=limit`

`-e limit` Report *LIMIT* errors before aborting (on the assumption that continuing would be useless); default 100.

`--fill-column=width`

`-f width` Specify the maximum number of columns in a line; this is the right-hand edge of a line. Paragraphs that are filled will be filled to this width. (Filling is the process of breaking up and connecting lines so that lines are the same length as or shorter than the number specified as the fill column. Lines are broken between words.) The default value is 72.

`--footnote-style=style`

`-s style` Set the footnote style to *style*: either `'end'` for the end node style (the default) or `'separate'` for the separate node style. The value set by this option overrides the value set in a Texinfo file by a `@footnotestyle` command (see Section 10.3.2 [Footnote Styles], page 95).

When the footnote style is `'separate'`, `makeinfo` makes a new node containing the footnotes found in the current node. When the footnote style is `'end'`, `makeinfo` places the footnote references at the end of the current node.

In HTML, when the footnote style is `'end'`, or if the output is not split, footnotes are put at the end of the output. If set to `'separate'`, and the output is split, they are placed in a separate file.

`--force`

`-F` Ordinarily, if the input file has errors, the output files are not created. With this option, they are preserved.

- `--help`
- `-h` Print a message with available options and basic usage, then exit successfully.
- `--html` Generate HTML output (rather than Info). By default, the HTML output is split into one output file per Texinfo source node, and the split output is written into a subdirectory based on the name of the top-level Info file. See Chapter 22 [Generating HTML], page 211.
- `-I path` Append *path* to the directory search list for finding files that are included using the `@include` command. By default, `texi2any` searches only the current directory. If *path* is not given, the current directory is appended. The *path* value can be a single directory or a list of several directories separated by the usual path separator character (‘:’ on Unix-like systems, ‘;’ on Windows).
- `--ifdocbook`
- `--ifhtml`
- `--ifinfo`
- `--ifplaintext`
- `--iftex`
- `--ifxml` For the given format, process ‘`@ifformat`’ and ‘`@format`’ commands, and do not process ‘`@ifnotformat`’, regardless of the format being output. For instance, if `--iftex` is given, then ‘`@iftex`’ and ‘`@tex`’ blocks will be read, and ‘`@ifnottex`’ blocks will be ignored.
- `--info` Generate Info output. By default, if the output file contains more than about 300,000 bytes, it is split into shorter subfiles of about that size. The name of the output file and any subfiles is determined by `@setfilename` (see Section 3.2.3 [`@setfilename`], page 17). See Section 21.1.5 [Tag and Split Files], page 203.
- `--init-file=file`
Load *file* as code to modify the behavior and output of the generated manual. It is customary to use the `.pm` or the `.init` extensions for these customization files, but that is not enforced; the *file* name can be anything. The `--conf-dir` option (see above) can be used to add to the list of directories in which these customization files are searched for.
- `--internal-links=file`
In HTML mode, output a tab-separated file containing three columns: the internal link to an indexed item or item in the table of contents, the name of the index (or table of contents) in which it occurs, and the term which was indexed or entered. The items are in the natural sorting order for the given element. This dump can be useful for post-processors.
- `--macro-expand=file`
- `-E file` Output the Texinfo source, with all Texinfo macros expanded, to *file*. Normally, the result of macro expansion is used internally by `makeinfo` and then discarded.
- `--no-headers`
Do not include menus or node separator lines in the output.
When generating Info, this is the same as using `--plaintext`, resulting in a simple plain text file. Furthermore, `@setfilename` is ignored, and output is

to standard output unless overridden with `-o`. (This behavior is for backward compatibility.)

When generating HTML, and output is split, also output navigation links only at the beginning of each file. If output is not split, do not include navigation links at the top of each node at all. See Chapter 22 [Generating HTML], page 211.

```
--no-ifdocbook
--no-ifhtml
--no-ifinfo
--no-ifplaintext
--no-iftex
--no-ifxml
```

For the given format, do not process `@ifformat` and `@format` commands, and do process `@ifnotformat`, regardless of the format being output. For instance, if `--no-ifhtml` is given, then `@ifhtml` and `@html` blocks will not be read, and `@ifnohtml` blocks will be.

```
--no-node-files
--node-files
```

When generating HTML, create redirection files for anchors and any nodes not already output with the file name corresponding to the node name (see Section 22.4.2 [HTML Xref Node Name Expansion], page 215). This makes it possible for section- and chapter-level cross-manual references to succeed (see Section 22.4.6 [HTML Xref Configuration], page 219).

If the output is split, this is enabled by default. If the output is not split, `--node-files` enables the creation of the redirection files, in addition to the monolithic main output file. `--no-node-files` suppresses the creation of redirection files in any case. This option has no effect with any output format other than HTML. See Chapter 22 [Generating HTML], page 211.

```
--no-number-footnotes
```

Suppress automatic footnote numbering. By default, footnotes are numbered sequentially within a node, i.e., the current footnote number is reset to 1 at the start of each node.

```
--no-number-sections
--number-sections
```

With `--number_sections` (the default), output chapter, section, and appendix numbers as in printed manuals. This works only with hierarchically-structured manuals. You should specify `--no-number-sections` if your manual is not normally structured.

```
--no-pointer-validate
--no-validate
```

Suppress the pointer-validation phase of `makeinfo`—a dangerous thing to do. This can also be done with the `@novalidate` command (see Section 19.1 [Use `TEX`], page 163). Normally, consistency checks are made to ensure that cross-references can be resolved, etc. See Section 20.5 [Pointer Validation], page 184.

- `--no-warn` Suppress warning messages (but not error messages).
- `--output=file`
- `-o file` Specify that the output should be directed to *file*. This overrides any file name specified in a `@setfilename` command found in the Texinfo source. If neither `@setfilename` nor this option are specified, the input file name is used to determine the output name. See Section 3.2.3 [`@setfilename`], page 17.
- If *file* is `'-'`, output goes to standard output and `'--no-split'` is implied.
- If *file* is a directory or ends with a `'/'` the usual rules are used to determine the output file name (namely, use `@setfilename` or the input file name) but the files are written to the *file* directory. For example, `'makeinfo -o bar/ foo.texi'`, with or without `--no-split`, will write `bar/foo.info`, and possibly other files, under `bar/`.
- When generating HTML and output is split, *file* is used as the name for the directory into which all files are written. For example, `'makeinfo -o bar --html foo.texi'` will write `bar/index.html`, among other files.
- `--output-indent=val` This option now does nothing, but remains for compatibility. (It used to alter indentation in XML/Docbook output.)
- `-P path` Prepend *path* to the directory search list for `@include`. If *path* is not given, the current directory is prepended. See `'-I'` above.
- `--paragraph-indent=indent`
- `-p indent` Set the paragraph indentation style to *indent*. The value set by this option overrides the value set in a Texinfo file by an `@paragraphindent` command (see Section 3.7.4 [`@paragraphindent`], page 29). The value of *indent* is interpreted as follows:
- `'asis'` Preserve any existing indentation (or lack thereof) at the beginnings of paragraphs.
 - `'0'` or `'none'` Delete any existing indentation.
 - num* Indent each paragraph by *num* spaces.
- The default is to indent by two spaces, except for paragraphs following a section heading, which are not indented.
- `--pdf` Generate a PDF file using `texi2dvi --pdf`, rather than Info (see Section 20.4 [`texi2any Printed Output`], page 183).
- `--plaintext` Output a plain text file (rather than Info): do not include menus or node separator lines in the output. This results in a straightforward plain text file that you can (for example) send in email without complications, or include in a distribution (for example, an `INSTALL` file).
- With this option, `@setfilename` is ignored and the output goes to standard output by default; this can be overridden with `-o`.

- `--ps` Generate a PostScript file using `texi2dvi --ps`, rather than Info (see Section 20.4 [texi2any Printed Output], page 183).
- `--set-customization-variable var=value`
`-c var=value`
 Set the customization variable `var` to `value`. The `=` is optional, but both `var` and `value` must be quoted to the shell as necessary so the result is a single word. Many aspects of `texi2any` behavior and output may be controlled by customization variables, beyond what can be set in the document by `@`-commands and with other command line switches. See Section 20.6 [Customization Variables], page 184.
- `--split=how`
`--no-split`
 When generating Info, by default large output files are split into smaller subfiles, of approximately 300k bytes. When generating HTML, by default each output file contains one node (see Chapter 22 [Generating HTML], page 211). `--no-split` suppresses this splitting of the output.
 Alternatively, `--split=how` may be used to specify at which level the HTML output should be split. The possible values for `how` are:
- ‘chapter’ The output is split at `@chapter` and other sectioning `@`-commands at this level (`@appendix`, etc.).
 - ‘section’ The output is split at `@section` and similar.
 - ‘node’ The output is split at every node. This is the default.
- Plain text output can be split similarly to HTML. This may be useful for extracting sections from a Texinfo document and making them available as separate files.
- `--split-size=num`
 Keep Info files to at most `num` characters if possible; default is 300,000. (However, a single node will never be split across Info files.)
- `--transliterate-file-names`
 Enable transliteration of 8-bit characters in node names for the purpose of file name creation. See Section 22.4.4 [HTML Xref 8-bit Character Expansion], page 218.
- `-U var` Cause `var` to be undefined. This is equivalent to `@clear var` in the Texinfo file (see Section 16.5 [`@set @clear @value`], page 143).
- `--verbose`
 Cause `makeinfo` to display messages saying what it is doing. Normally, `makeinfo` only outputs messages if there are errors or warnings.
- `--version`
`-V` Print the version number, then exit successfully.
- `--Xopt str`
 Pass `str` (a single shell word) to `texi2dvi`; may be repeated (see Section 20.4 [texi2any Printed Output], page 183).

`--xml` Generate Texinfo XML output (rather than Info).

20.3 Environment Variables Recognized by `texi2any`

`makeinfo` also reads the environment variable `TEXINFO_OUTPUT_FORMAT` to determine the output format, if not overridden by a command line option. The value should be one of:

```
docbook dvi dvipdf html info pdf plaintext ps xml
```

If not set or otherwise specified, Info output is the default.

The customization variable of the same name is also read; if set, that overrides an environment variable setting, but not a command-line option. See Section 20.6.2 [Customization Variables and Options], page 185.

You can control `texi2any`'s use of Perl extension modules by setting the `TEXINFO_XS` environment variable. These modules are compiled native code that the interpreted Perl code can use. Ideally, these extension modules should just work, and the only noticeable difference they should make is that `texi2any` finishes running sooner. However, you can use this environment variable for the purposes of troubleshooting: for example, if you have problems with the output of `texi2any` varying depending on whether the extension modules are in use.

The following values of `TEXINFO_XS` are recognized by `texi2any`:

- 'default' The default behavior. Try to load extension modules, and silently fall back to the interpreted Perl implementations if this fails.
- 'warn' Try to load extension modules, and if this fails, give a warning message before falling back to the interpreted Perl implementations.
- 'debug' Try to load extension modules, printing many messages while doing so.
- 'omit' Do not use extension modules.

20.4 `texi2any` Printed Output

To justify the name Texinfo-to-*any*, `texi2any` has basic support for creating printed output in the various formats: \TeX DVI, PDF, and PostScript. This is done via the simple method of executing the `texi2dvi` program when those output formats are requested, after checking the validity of the input to give users the benefit of `texi2any`'s error checking. If you don't want such error checking, perhaps because your manual plays advanced \TeX tricks together with `texinfo.tex`, just invoke `texi2dvi` directly.

The output format options for this are `--dvi`, `--dvipdf`, `--pdf`, and `--ps`. See Section 19.2 [Format with `texi2dvi`], page 163, for more details on these options and general `texi2dvi` operation. In addition, the `--verbose`, `--silent`, and `--quiet` options are passed on if specified; the `-I` and `-o` options are likewise passed on with their arguments, and `--debug` without its argument.

The only option remaining that is related to the `texi2dvi` invocation is `--Xopt`. Here, just the argument is passed on and multiple `--Xopt` options accumulate. This provides a way to construct an arbitrary command line for `texi2dvi`. For example, running

```
texi2any --Xopt -t --Xopt @a4paper --pdf foo.texi
```

is equivalent to running

```
texi2dvi -t @a4paper --pdf foo.texi
```

except for the validity check.

Although one might wish that other options to `texi2any` would take effect, they don't. For example, running '`texi2any --no-number-sections --dvi foo.texi`' still results in a DVI file with numbered sections. (Perhaps this could be improved in the future, if requests are received.)

The actual name of the command that is invoked is specified by the `TEXI2DVI` customization variable (see Section 20.6.4 [Other Customization Variables], page 192). As you might guess, the default is '`texi2dvi`'.

`texi2any` itself does not generate any normal output when it invokes `texi2dvi`, only diagnostic messages.

20.5 Pointer Validation

If you do not suppress pointer validation with the '`--no-validate`' option or the `@novalidate` command in the source file (see Section 19.1 [Use `TEX`], page 163), `makeinfo` will check the validity of the Texinfo file.

Most validation checks are different depending on whether node pointers are explicitly or implicitly determined. With explicit node pointers, here is the list of what is checked:

1. If a 'Next', 'Previous', or 'Up' node reference is a reference to a node in the current file and is not an external reference such as to `(dir)`, then the referenced node must exist.
2. Every node except the 'Top' node must have an 'Up' pointer.
3. The node referenced by an 'Up' pointer must itself reference the current node through a menu item, unless the node referenced by 'Up' has the form '`(file)`'.

With implicit node pointers, the above error cannot occur, as such. (Which is a major reason why we recommend using this feature of `makeinfo`, and not specifying any node pointers yourself.)

Instead, `makeinfo` checks that the tree constructed from the document's menus matches the tree constructed from the sectioning commands. For example, if a chapter-level menu mentions nodes `n1` and `n2`, in that order, nodes `n1` and `n2` must be associated with `@section` commands in the chapter.

Finally, with both explicit and implicit node pointers, `makeinfo` checks that every node except the 'Top' node is referenced in a menu.

20.6 Customization Variables

Warning: These customization variable names and meanings may change in any Texinfo release. We always try to avoid incompatible changes, but we cannot absolutely promise, since needs change over time.

Many aspects of the behavior and output of `texi2any` may be modified by modifying so-called *customization variables*. These fall into a few general categories:

- Those associated with @-commands; for example, `@documentlanguage`.

- Those associated with command-line options; for example, the customization variable `SPLIT` is associated with the `--split` command-line option, and `TEXINFO_OUTPUT_FORMAT` allows specifying the output format.
- Those associated with customizing the HTML output.
- Other ad hoc variables.

Customization variables may set on the command line using `--set-customization-variable 'var value'` (quoting the variable/value pair to the shell) or `--set-customization-variable var=value` (using `=`). A special *value* is `'undef'`, which sets the variable to this special “undefined” Perl value.

The sections below give the details for each of these.

20.6.1 Customization Variables for @-Commands

Each of the following @-commands has an associated customization variable with the same name (minus the leading @):

```
@allowcodebreaks @clickstyle @codequotebacktick
@codequoteundirected @contents @deftypefnnewline
@documentdescription @documentencoding @documentlanguage
@evenfooting @evenfootingmarks
@evenheading @evenheadingmarks
@everyfooting @everyfootingmarks
@everyheading @everyheadingmarks
@exampleindent @firstparagraphindent
@fonttextsize @footnotestyle @frenchspacing @headings
@kbdinputstyle @novalidate
@oddfooting @oddfootingmarks
@oddheading @oddheadingmarks
@pagesizes @paragraphindent
@setchapternewpage @setfilename
@shortcontents @urefbreakstyle
@validatemenus @xrefautomaticsectiontitle
```

Setting such a customization variable to a value `'foo'` is similar to executing `@cmd foo`. It is not exactly the same, though, since any side effects of parsing the Texinfo source are not redone. Also, some variables do not take Texinfo code when generating particular formats, but an argument that is already formatted. This is the case, for example, for HTML for `documentdescription`.

20.6.2 Customization Variables and Options

The following table gives the customization variables associated with some command line options. See Section 20.2 [Invoking `texi2any`], page 177, for the meaning of the options.

Option	Variable
<code>--enable-encoding</code>	<code>ENABLE_ENCODING</code>
<code>--document-language</code>	<code>documentlanguage</code>
<code>--error-limit</code>	<code>ERROR_LIMIT</code>
<code>--fill-column</code>	<code>FILLCOLUMN</code>
<code>--footnote-style</code>	<code>footnotestyle</code>
<code>--force</code>	<code>FORCE</code>
<code>--internal-links</code>	<code>INTERNAL_LINKS</code>

<code>--macro-expand</code>	<code>MACRO_EXPAND</code>
<code>--headers</code>	<code>HEADERS, SHOW_MENU</code>
<code>--no-warn</code>	<code>NO_WARN</code>
<code>--no-validate</code>	<code>novalidate</code>
<code>--number-footnotes</code>	<code>NUMBER_FOOTNOTES</code>
<code>--number-sections</code>	<code>NUMBER_SECTIONS</code>
<code>--node-files</code>	<code>NODE_FILES</code>
<code>--output</code>	<code>OUT, OUTFILE, SUBDIR</code>
<code>--paragraph-indent</code>	<code>paragraphindent</code>
<code>--silent</code>	<code>SILENT</code>
<code>--split</code>	<code>SPLIT</code>
<code>--split-size</code>	<code>SPLIT_SIZE</code>
<code>--transliterate-file-names</code>	<code>TRANSLITERATE_FILE_NAMES</code>
<code>--verbose</code>	<code>VERBOSE</code>

Setting such a customization variable to a value ‘foo’ is essentially the same as specifying the `--opt=foo` if the option takes an argument, or `--opt` if not.

In addition, the customization variable `TEXINFO_OUTPUT_FORMAT` allows specifying what `makeinfo` outputs, either one of the usual output formats that can be specified with options, or various other forms:

<code>‘docbook’</code>	
<code>‘dvi’</code>	
<code>‘dvi-pdf’</code>	
<code>‘html’</code>	
<code>‘info’</code>	
<code>‘pdf’</code>	
<code>‘plaintext’</code>	
<code>‘ps’</code>	
<code>‘xml’</code>	These correspond to the command-line options (and <code>TEXINFO_OUTPUT_FORMAT</code> environment variable values) of the same name. See Section 20.2 [Invoking <code>texi2any</code>], page 177.
<code>‘debugtree’</code>	Instead of generating a regular output format, output a text representation of the tree obtained by parsing the input texinfo document.
<code>‘parse’</code>	Do only Texinfo source parsing; there is no output.
<code>‘plaintexinfo’</code>	Output the Texinfo source with all the macros, <code>@include</code> and <code>@value{}</code> expanded. This is similar to setting <code>--macro-expand</code> , but instead of being output in addition to the normal conversion, output of Texinfo is the main output.
<code>‘rawtext’</code>	Output raw text, with minimal formatting. For example, footnotes are ignored and there is no paragraph filling. This is used by the parser for file names and copyright text in HTML comments, for example.
<code>‘structure’</code>	Do only Texinfo source parsing and determination of the document structure; there is no output.

`'texinfosxml'`

Output the document in TexinfoXML representation, a syntax for writing XML data using Lisp S-expressions.

`'textcontent'`

Output the text content only, stripped of commands; this is useful for spell checking or word counting, for example. The trivial `detexinfo` script setting this is in the `util` directory of the Texinfo source as an example. It's one line:

```
exec texi2any -c TEXINPUT_OUTPUT_FORMAT=textcontent "$@"
```

20.6.3 HTML Customization Variables

This table gives the customization variables which apply to HTML output only. A few other customization variables apply to both HTML and other output formats; those are given in the next section.

AVOID_MENU_REDUNDANCY

For HTML. If set, and the menu entry and menu description are the same, then do not print the menu description; default false.

AFTER_BODY_OPEN

For HTML. If set, the corresponding text will appear at the beginning of each HTML file; default unset.

AFTER_ABOUT

For HTML, when an About-element is output. If set, the corresponding text will appear at the end of the About element; default unset.

AFTER_OVERVIEW

AFTER_TOC_LINES

For HTML. If set, the corresponding text is output after the short table of contents for `AFTER_OVERVIEW` and after the table of contents for `AFTER_TOC_LINES`; otherwise, a default string is used. At the time of writing, a `</div>` element is closed.

In general, you should set `BEFORE_OVERVIEW` if `AFTER_OVERVIEW` is set, and you should set `BEFORE_TOC_LINES` if `AFTER_TOC_LINES` is set.

BASEFILENAME_LENGTH

For HTML. The maximum length of the base filenames; default 245. Changing this would make cross-manual references to such long node names invalid (see Section 22.4.1 [HTML Xref Link Basics], page 214).

BEFORE_OVERVIEW

BEFORE_TOC_LINES

For HTML. If set, the corresponding text is output before the short table of contents for `BEFORE_OVERVIEW` and before the table of contents for `BEFORE_TOC_LINES`, otherwise a default string is used. At the time of writing, a `<div ...>` element is opened.

In general you should set `AFTER_OVERVIEW` if `BEFORE_OVERVIEW` is set, and you should set `AFTER_TOC_LINES` if `BEFORE_TOC_LINES` is set.

- BIG_RULE** For HTML. Rule used after and before the top element and before special elements, but not for footers and headers; default `<hr>`.
- BODYTEXT** For HTML, the text appearing in `<body>`. By default, sets the HTML `lang` attribute to the document language (see Section 15.1 [`@documentlanguage`], page 136).
- CASE_INSENSITIVE_FILENAMES**
For HTML. Construct output file names as if the filesystem were case insensitive (see Section 22.2 [HTML Splitting], page 212); default false.
- CHAPTER_HEADER_LEVEL**
For HTML. Header formatting level used for chapter level sectioning commands; default '2'.
- CHECK_HTMLXREF**
For HTML. Check that manuals which are the target of external cross-references (see Section 6.4.4 [Four and Five Arguments], page 53) are present in `htmlxref.cnf` (see Section 22.4.6 [HTML Xref Configuration], page 219); default false.
- COMPLEX_FORMAT_IN_TABLE**
For HTML. If set, use tables for indentation of complex formats; default false.
- CSS_LINES**
For HTML. CSS output, automatically determined by default (see Section 22.3 [HTML CSS], page 213).
- DATE_IN_HEADER**
For HTML. Put the document generation date in the header; off by default.
- DEF_TABLE**
For HTML. If set, a `<table>` construction for `@deffn` and similar `@-`commands is used (looking more like the \TeX output), instead of definition lists; default false.
- DEFAULT_RULE**
For HTML. Rule used between element, except before and after the top element, and before special elements, and for footers and headers; default `<hr>`.
- DO_ABOUT** For HTML. If set to 0 never do an About special element; if set to 1 always do an About special element; default 0.
- EXTERNAL_DIR**
For HTML. Base directory for external manuals; default none. It is better to use the general external cross-reference mechanism (see Section 22.4.6 [HTML Xref Configuration], page 219) than this variable.
- EXTRA_HEAD**
For HTML. Additional text appearing within `<head>`; default unset.
- FOOTNOTE_END_HEADER_LEVEL**
For HTML. Header formatting level used for the footnotes header with the 'end' footnotestyle; default '4'. See Section 10.3.2 [Footnote Styles], page 95.

- FOOTNOTE_SEPARATE_HEADER_LEVEL**
For HTML. Header formatting level used for the footnotes header with the ‘separate’ footnotestyle; default ‘4’. See Section 10.3.2 [Footnote Styles], page 95.
- FRAMES**
For HTML. If set, a file describing the frame layout is generated, together with a file with the short table of contents; default false.
- FRAMESET_DOCTYPE**
For HTML. Same as DOCTYPE, but for the file containing the frame description.
- HEADER_IN_TABLE**
For HTML. Use tables for header formatting rather than a simple `<div>` element; default false.
- ICONS**
For HTML. Use icons for the navigation panel; default false.
- IMAGE_LINK_PREFIX**
For HTML. If set, the associated value is prepended to the image file links; default unset.
- INLINE_CONTENTS**
For HTML. If set, output the contents where the `@contents` and similar `@`-commands are located; default true. This is ignored if `@set*contentsaftertitlepage` is set (see Section 3.5 [Contents], page 24).
- INLINE_CSS_STYLE**
For HTML. Put CSS directly in HTML elements rather than at the beginning of the output; default false.
- KEEP_TOP_EXTERNAL_REF**
For HTML. If set, do not ignore ‘Top’ as the first argument for an external ref to a manual, as is done by default. See Section 6.5 [Referring to a Manual as a Whole], page 54.
- L2H**
For HTML. If set, `latex2html` is used to convert `@math` and `@tex` sections; default false. Best used with `--iftex`.
- L2H_CLEAN**
(Relevant only if L2H is set.) If set, the intermediate files generated in relation with `latex2html` are removed; default true.
- L2H_FILE**
(Relevant only if L2H is set.) If set, the given file is used as `latex2html`’s init file; default unset.
- L2H_HTML_VERSION**
(Relevant only if L2H is set.) The HTML version used in the `latex2html` call; default unset.
- L2H_L2H**
(Relevant only if L2H is set.) The program invoked as `latex2html`; default is `latex2html`.
- L2H_SKIP**
(Relevant only if L2H is set.) If set to a true value, the actual call to `latex2html` is skipped; previously generated content is reused instead. If set to 0, the cache is not used at all. If set to ‘undef’, the cache is used for as many \TeX fragments as possible and for any remaining the command is run. The default is ‘undef’.

- L2H_TMP** (Relevant only if `L2H` is set.) Set the directory used for temporary files. None of the file name components in this directory name may start with `'.'`; otherwise, `latex2html` will fail (because of `dvips`). The default is the empty string, which means the current directory.
- MAX_HEADER_LEVEL**
For HTML. Maximum header formatting level used (higher header formatting level numbers correspond to lower sectioning levels); default `'4'`.
- MENU_SYMBOL**
For HTML. Symbol used in front of menu entries when node names are used for menu entries formatting; default `'•'`.
- MONOLITHIC**
For HTML. Output only one file including the table of contents. Set by default, but only relevant when the output is not split.
- NO_CSS** For HTML. Do not use CSS; default false. See Section 22.3 [HTML CSS], page 213.
- NODE_FILE_EXTENSION**
For HTML. Extension for node files if `NODE_FILENAMES` is set; default `'html'`.
- PRE_ABOUT**
For HTML, when an About element is output. If set to a text string, this text will appear at the beginning of the About element. If set to a reference on a subroutine, the result of the subroutine call will appear at the beginning of the About element. If not set (the default), default text is used.
- PRE_BODY_CLOSE**
For HTML. If set, the given text will appear at the footer of each HTML file; default unset.
- PROGRAM_NAME_IN_FOOTER**
For HTML. If set, output the program name and miscellaneous related information in the page footers; default false.
- SHORTEXTN**
For HTML. If set, use `' .htm'` as extension; default false.
- SHOW_TITLE**
For HTML. If set, output the title at the beginning of the document; default true.
- SIMPLE_MENU**
For HTML. If set, use a simple preformatted style for the menu, instead of breaking down the different parts of the menu; default false. See Section 4.9.4 [Menu Parts], page 40.
- TOC_LINKS**
For HTML. If set, links from headings to toc entries are created; default false.
- TOP_FILE** This file name may be used for the top-level file. The extension is set appropriately, if necessary. This is used to override the default, and is, in general, only taken into account when output is split, and for HTML.

TOP_NODE_FILE

For HTML. File name used for the Top node, if `NODE_FILENAMES` is set; default is `index`.

TOP_NODE_FILE_TARGET

For HTML. File name used for the Top node in cross-references; default is `index`.

TOP_NODE_UP_URL

For HTML. A url used for `(dir)` references; the default is `undef`, meaning that the normal rules apply, typically leading to a link to `'dir.html'` from an implicit or explicit reference to `'(dir)'` (see Section 22.4 [HTML Xref], page 214). For more about the Top node pointers, see Section 4.5 [First Node], page 35. For overriding the Up pointer in other formats, see `TOP_NODE_UP` in Section 20.6.4 [Other Customization Variables], page 192.

USE_ACCESSKEY

For HTML. Use `accesskey` in cross-references; default true.

USE_ISO

For HTML. Use entities for doubled single-quote characters (see Section 12.5 [Inserting Quotation Marks], page 109), and `'---`' and `'--'` (see Section 2.1 [Conventions], page 10); default true.

USE_LINKS

For HTML. Generate `<link>` elements in the HTML `<head>` output; default true.

USE_REL_REV

For HTML. Use `rel` in cross-references; default true.

VERTICAL_HEAD_NAVIGATION

For HTML. If set, a vertical navigation panel is used; default false.

WORDS_IN_PAGE

For HTML, with output split at nodes. Specifies the approximate minimum page length at which a navigation panel is placed at the bottom of a page. To avoid ever having the navigation buttons at the bottom of a page, set this to a sufficiently large number. The default is 300.

XREF_USE_FLOAT_LABEL

For HTML. If set, for the float name in cross-references, use the float label instead of the type followed by the float number (see Section 10.1.1 [`@float`], page 90). The default is off.

XREF_USE_NODE_NAME_ARG

For HTML. Only relevant for cross-reference commands with no cross reference name (second argument). If set to 1, use the node name (first) argument in cross-reference `@`-commands for the text displayed as the hyperlink. If set to 0, use the node name if `USE_NODES` is set, otherwise the section name. If set to `'undef'`, use the first argument in preformatted environments, otherwise use the node name or section name depending on `USE_NODES`. The default is `'undef'`.

20.6.4 Other Customization Variables

This table gives the remaining customization variables, which apply to multiple formats, or affect global behavior, or otherwise don't fit into the categories of the previous sections.

`CLOSE_QUOTE_SYMBOL`

When a closing quote is needed, use this character; default `’` in HTML, `’` in Docbook. The default for Info is the same as `OPEN_QUOTE_SYMBOL` (see below).

`CPP_LINE_DIRECTIVES`

Recognize `#line` directives in a “preprocessing” pass (see Section 17.6 [External Macro Processors], page 156); on by default.

`DEBUG`

If set, debugging output is generated; default is off (zero).

`DOCTYPE`

For Docbook, HTML, XML. Specifies the `SystemLiteral`, the entity's system identifier. This is a URI which may be used to retrieve the entity, and identifies the canonical DTD for the document. The default value is different for each of HTML, Docbook and Texinfo XML.

`DUMP_TEXI`

For debugging. If set, no conversion is done, only parsing and macro expansion. If the option `--macro-expand` is set, the Texinfo source is also expanded to the corresponding file. Default false.

`DUMP_TREE`

For debugging. If set, the tree constructed upon parsing a Texinfo document is output to standard error; default false.

`ENABLE_ENCODING_USE_ENTITY`

For HTML, XML. If `--enable-encoding` is set, and there is an entity corresponding with the letter or the symbol being output, prefer the entity. Set by default for HTML, but not XML.

`EXTERNAL_CROSSREF_SPLIT`

For cross-references to other manuals, this determines if the other manual is considered to be split or monolithic. By default, it is set based on the value of `SPLIT`. See Section 22.4 [HTML Xref], page 214, and see Section 22.4.6 [HTML Xref Configuration], page 219.

`EXTENSION`

The extension added to the output file name. The default is different for each output format.

`FIX_TEXINFO`

For “plain Texinfo” (see the `PLAINTEXINFO` item). If set to false, the resulting Texinfo does not have all errors corrected, such as missing `@end`; default true. This variable is only relevant when expanding Texinfo; other converters always try to output something sane even if the input is erroneous.

`IGNORE_BEFORE_SETFILENAME`

If set, begin outputting at `@setfilename`, if `@setfilename` is present; default true.

IGNORE_SPACE_AFTER_BRACED_COMMAND_NAME

If set, spaces are ignored after an `@`-command that takes braces. Default true, matching the `TEX` behavior.

INDEX_ENTRY_COLON

Symbol used between the index entry and the associated node or section; default `‘:’`.

INDEX_SPECIAL_CHARS_WARNING

If set, warn about `‘:’` in index entry, as it leads to invalid entries in index menus in output Info files. For Info and plaintext only.

INFO_SPECIAL_CHARS_QUOTE

If set, whenever there are problematic characters for Info output in places such as node names or menu items, surround the part of the construct where they appear with quoting characters, as described in Appendix G [Info Format Specification], page 282. See Section 4.4 [Node Line Requirements], page 33.

INFO_SPECIAL_CHARS_WARNING

If set, warn about problematic constructs for Info output (such as the string `‘::’`) in node names, menu items, and cross-references; default true. Do not warn about index entries, since parsing problems there don’t prevent navigation; readers can still relatively easily find their way to the node in question.

INPUT_ENCODING_NAME

Normalized encoding name suitable for output. Should be a usable charset name in HTML, typically one of the preferred IANA encoding names. You should not need to use this variable, since it is set by `@documentencoding` (see Section 15.2 [`@documentencoding`], page 137).

INPUT_PERL_ENCODING

Perl encoding used to process the Texinfo source. You should not need to use that variable, since it is set by `@documentencoding` (see Section 15.2 [`@documentencoding`], page 137).

MAX_MACRO_CALL_NESTING

The maximal number of recursive calls of `@`-commands defined through `@macro`; default 100000. The purpose of this variable is to avoid infinite recursions.

MENU_ENTRY_COLON

Symbol used between the menu entry and the description; default `‘:’`.

NO_USE_SETFILENAME

If set, do not use `@setfilename` to set the document name; instead, base the output document name only on the input file name. The default is false.

NODE_FILENAMES

If set, node names are used to construct file names. By default, it is set if the output is split by node, or if `NODE_FILES` is set and the output is split in any way.

NODE_NAME_IN_INDEX

If set, use node names in index entries, otherwise prefer section names; default true.

NODE_NAME_IN_MENU

If set, use node names in menu entries, otherwise prefer section names; default true.

OPEN_QUOTE_SYMBOL

When an opening quote is needed, e.g., for ‘@samp’ output, use the specified character; default `‘`; for HTML, `‘`; for Docbook. For Info, the default depends on the enabled document encoding (see Section 15.2 [`@documentencoding`], page 137); if no document encoding is set, or the encoding is US-ASCII, etc., ‘`'`’ is used. This character usually appears as an undirected single quote on modern systems. If the document encoding is Unicode, the Info output uses a Unicode left quote.

OUTPUT_ENCODING_NAME

Normalized encoding name used for output files. Should be a usable charset name in HTML, typically one of the preferred IANA encoding names. By default, if an input encoding is set (typically through `@documentencoding` or `INPUT_ENCODING_NAME`), this information is used to set the output encoding name. If no input encoding is specified, the default output encoding name may be set by the output format. In particular, the XML-based formats use `utf-8` for `OUTPUT_ENCODING_NAME` if the encoding is not otherwise specified. See Section 15.2 [`@documentencoding`], page 137.

OVERVIEW_LINK_TO_TOC

If set, the cross-references in the Overview link to the corresponding Table of Contents entries; default true.

PACKAGE**PACKAGE_VERSION****PACKAGE_AND_VERSION****PACKAGE_URL****PACKAGE_NAME**

The implementation’s short package name, package version, package name and version concatenated, package url, and full package name, respectively. By default, these variables are all set through Autoconf, Automake, and `configure`.

PREFIX

The output file prefix, which is prepended to some output file names. By default it is set by `@setfilename` or from the input file (see Section 3.2.3 [`@setfilename`], page 17). How this value is used depends on the value of other customization variables or command line options, such as whether the output is split and `NODE_FILENAMES`. The default is unset.

PROGRAM

Name of the program used. By default, it is set to the name of the program launched, with a trailing ‘.pl’ removed.

RENAMED_NODES_FILE

If set, use the value for the renamed nodes description file. If not set, the file is `doc_basename-noderename.cnf`. See Section 22.4.7 [HTML Xref Link Preservation], page 220.

RENAMED_NODES_REDIRECTIONS

If set, create redirection files for renamed nodes. Set by default when generating HTML.

SHOW_MENU

If set, Texinfo menus are output. By default, it is set unless generating Docbook or if `--no-headers` is specified.

SORT_ELEMENT_COUNT

If set, the name of a file to which a list of elements (nodes or sections, depending on the output format) is dumped, sorted by the number of lines they contain after removal of `@`-commands; default unset. This is used by the program `texi-elements-by-size` in the `util/` directory of the Texinfo source distribution (see [texi-elements-by-size], page 250).

SORT_ELEMENT_COUNT_WORDS

When dumping the elements-by-size file (see preceding item), use word counts instead of line counts; default false.

TEST

If set to true, some variables which are normally dynamically generated anew for each run (date, program name, version) are set to fixed and given values. This is useful to compare the output to a reference file, as is done for the tests. The default is false.

TEXI2DVI Name of the command used to produce PostScript, PDF, and DVI; default `'texi2dvi'`. See Section 20.4 [texi2any Printed Output], page 183.

TEXI2HTML

Generate HTML and try to be as compatible as possible with `texi2html`; default false.

TEXINFO_DTD_VERSION

For XML. Version of the DTD used in the XML output preamble. The default is set based on a variable in `configure.ac`.

TEXTCONTENT_COMMENT

For stripped text content output (i.e., when `TEXINFO_OUTPUT_FORMAT` is set to `textcontent`). If set, also output comments. Default false.

TOP_NODE_UP

Up node for the Top node; default `'(dir)'`. For overriding the url in HTML output, see `TOP_NODE_UP_URL` in Section 20.6.3 [HTML Customization Variables], page 187.

TREE_TRANSFORMATIONS

The associated value is a comma separated list of transformations that can be applied to the Texinfo tree prior to outputting the result. If more than one is specified, the ordering is irrelevant; each is always applied at the necessary point during processing.

The only one executed by default is `'move_index_entries_after_items'` for HTML and Docbook output. Here's an example of updating the master menu in a document:

```
makeinfo \
  -c TREE_TRANSFORMATIONS=regenerate_master_menu \
  -c PLAINTEXINFO=1 \
  mydoc.texi \
  -o /tmp/out
```

(Caveat: Since `PLAINTEXINFO` output does expand Texinfo macros and conditionals, it's necessary to remove any such differences before installing the updates in the original document. This will be remedied in a future release.)

The following transformations are currently supported (many are used in the `pod2texi` utility distributed with Texinfo; see Section 20.8 [Invoking `pod2texi`], page 198):

`'complete_tree_nodes_menus'`

Add menu entries or whole menus for nodes associated with sections of any level, based on the sectioning tree.

`'fill_gaps_in_sectioning'`

Adds empty `@unnumbered...` sections in a tree to fill gaps in sectioning. For example, an `@unnumberedsec` will be inserted if a `@chapter` is followed by a `@subsection`.

`'insert_nodes_for_sectioning_commands'`

Insert nodes for sectioning commands lacking a corresponding node.

`'move_index_entries_after_items'`

In `@enumerate` and `@itemize`, move index entries appearing just before an `@item` to just after the `@item`. Comment lines between index entries are moved too. As mentioned, this is always done for HTML and Docbook output.

`'regenerate_master_menu'`

Update the Top node master menu, either replacing the (first) `@detailmenu` in the Top node menu, or creating it at the end of the Top node menu.

`'simple_menu'`

Mostly the same as `SIMPLE_MENU`: use a simple preformatted style for the menu. It differs from setting `SIMPLE_MENU` in that `SIMPLE_MENU` only has an effect in HTML output.

`USE_NODES`

Preferentially use nodes to decide where elements are separated. If set to false, preferentially use sectioning to decide where elements are separated. The default is true.

`USE_NODE_TARGET`

If set, use the node associated with a section for the section target in cross-references; default true.

USE_NUMERIC_ENTITY

For HTML and XML. If set, use numeric entities instead of ASCII characters when there is no named entity. By default, set to true for HTML.

USE_UP_NODE_FOR_ELEMENT_UP

Fill in up sectioning direction with node direction when there is no sectioning up direction. In practice this can only happen when there is no `@top` section. Not set by default.

USE_SETFILENAME_EXTENSION

Default is on for Info, off for other output. If set, use exactly what `@setfilename` gives for the output file name, including the extension. You should not need to explicitly set this variable.

USE_TITLEPAGE_FOR_TITLE

Use the full `@titlepage` as the title, not a simple title string; default false.

USE_UNIDECODE

If set to false, do not use the `Text::Unidecode` Perl module to transliterate more characters; default true.

20.7 Internationalization of Document Strings

`texi2any` writes fixed strings into the output document at various places: cross-references, page footers, the help page, alternate text for images, and so on. The string chosen depends on the value of the `documentlanguage` at the time of the string being output (see Section 15.1 [`@documentlanguage`], page 136, for the Texinfo command interface).

The Gettext framework is used for those strings (see *Gettext*). The `libintl-perl` package is used as the `gettext` implementation; more specifically, the pure Perl implementation is used, so Texinfo can support consistent behavior across all platforms and installations, which would not otherwise be possible. `libintl-perl` is included in the Texinfo distribution and always installed, to ensure that it is available if needed. It is also possible to use the system `gettext` (the choice can be made at build-time).

The Gettext domain ‘`texinfo_document`’ is used for the strings. Translated strings are written as Texinfo, and may include `@`-commands. In translated strings, the varying parts of the string are not usually denoted by `%s` and the like, but by ‘`{arg_name}`’. (This convention is common for `gettext` in Perl and is fully supported in GNU Gettext; see Section “Perl Format Strings” in *GNU Gettext*.) For example, in the following, ‘`{section}`’ will be replaced by the section name:

```
see {section}
```

These Perl-style brace format strings are used for two reasons: first, changing the order of `printf` arguments is only available since Perl 5.8.0; second, and more importantly, the order of arguments is unpredictable, since `@`-command expansion may lead to different orders depending on the output format.

The expansion of a translation string is done like this:

1. First, the string is translated. The locale is `@documentlanguage.@documentencoding`. If the `@documentlanguage` has the form ‘`ll_CC`’, that is tried first, and then just ‘`ll`’. If that does not exist, and the encoding is not `us-ascii`, then `us-ascii` is tried.

The idea is that if there is a `us-ascii` encoding, it means that all the characters in the charset may be expressed as `@`-commands. For example, there is a `fr.us-ascii` locale that can accommodate any encoding, since all the Latin 1 characters have associated `@`-commands. On the other hand, Japanese has only a translation `ja.utf-8`, since there are no `@`-commands for Japanese characters.

2. Next, the string is expanded as Texinfo, and converted. The arguments are substituted; for example, `{arg_name}` is replaced by the corresponding actual argument.

In the following example, `{date}`, `{program_homepage}` and `{program}` are the arguments of the string. Since they are used in `@uref`, their order is not predictable. `{date}`, `{program_homepage}` and `{program}` are substituted after the expansion:

```
Generated on @emph{{date}} using
@uref{{program_homepage}, @emph{{program}}}.
```

This approach is admittedly a bit complicated. Its usefulness is that it supports having translations available in different encodings for encodings which can be covered by `@`-commands, and also specifying how the formatting for some commands is done, independently of the output format—yet still be language-dependent. For example, the `@pxref` translation string can be like this:

```
see {node_file_href} section `{section}' in @cite{{book}}
```

which allows for specifying a string independently of the output format, while nevertheless with rich formatting it may be translated appropriately in many languages.

20.8 Invoking `pod2texi`: Convert POD to Texinfo

The `pod2texi` program translates Perl pod documentation file(s) to Texinfo. There are two basic modes of operation: generating a standalone manual from each input pod, or (if `--base-level=1` or higher is given) generating Texinfo subfiles suitable for use with `@include`.

Although ordinarily this documentation in the Texinfo manual would be the best place to look, in this case we have documented all the options and examples in the `pod2texi` program itself, since it may be useful outside of the rest of Texinfo. Thus, please see the output of `pod2texi --help`, the version on the web at <http://www.gnu.org/software/texinfo/manual/pod2texi.html>, etc.

For an example of using `pod2texi` to make Texinfo out of the Perl documentation itself, see `contrib/perl-doc-all` (<http://svn.savannah.gnu.org/viewvc/trunk/contrib/perl-doc-all/?root=texinfo>) in the Texinfo source distribution (the output is available at <http://www.gnu.org/software/perl/manual>).

20.9 `texi2html`: Ancestor of `texi2any`

Conceptually, the `texi2html` program is the parent of today's `texi2any` program. `texi2html` was developed independently, originally by Lionel Cons in 1998; at the time, `makeinfo` could not generate HTML. Many other people contributed to `texi2html` over the years.

The present `texi2any` uses little of the actual code of `texi2html`, and has quite a different basic approach to the implementation (namely, parsing the Texinfo document into a tree), but still, there is a family resemblance.

By design, `texi2any` supports nearly all the features of `texi2html` in some way. However, we did not attempt to maintain strict compatibility, so no `texi2html` executable is installed by the Texinfo package. An approximation can be run with an invocation like this (available as `util/texi2html` in the Texinfo source):

```
texi2any --set-customization-variable TEXI2HTML=1 ...
```

but, to emphasize, this is *not* a drop-in replacement for the previous `texi2html`. Here are the biggest differences:

- Most blatantly, the command line options of `texi2html` are now customization variables, for the most part. A table of approximate equivalents is given below.
- The program-level customization API is very different in `texi2any`.
- Indices cannot be split.
- Translated strings cannot be customized; we hope to introduce this feature in `texi2any` in the future.

Aside from the last, we do not intend to reimplement these differences. Therefore, the route forward for authors is alter manuals and build processes as necessary to use the new features and methods of `texi2any`. The `texi2html` maintainers (one of whom is the principal author of `texi2any`) do not intend to make further releases.

Here is the table showing `texi2html` options and corresponding `texi2any` customization variables.

<code>--toc-links</code>	<code>TOC_LINKS</code>
<code>--short-ext</code>	<code>SHORTEXTN</code>
<code>--prefix</code>	<code>PREFIX</code>
<code>--short-ref</code>	<code>SHORT_REF</code>
<code>--idx-sum</code>	<code>IDX_SUMMARY</code>
<code>--def-table</code>	<code>DEF_TABLE</code>
<code>--ignore-preamble-text</code>	<code>IGNORE_PREAMBLE_TEXT</code>
<code>--html-xref-prefix</code>	<code>EXTERNAL_DIR</code>
<code>--l2h</code>	<code>L2H</code>
<code>--l2h-l2h</code>	<code>L2H_L2H</code>
<code>--l2h-skip</code>	<code>L2H_SKIP</code>
<code>--l2h-tmp</code>	<code>L2H_TMP</code>
<code>--l2h-file</code>	<code>L2H_FILE</code>
<code>--l2h-clean</code>	<code>L2H_CLEAN</code>
<code>--use-nodes</code>	<code>USE_NODES</code>
<code>--monolithic</code>	<code>MONOLITHIC</code>
<code>--top-file</code>	<code>TOP_FILE</code>
<code>--toc-file</code>	<code>TOC_FILE</code>
<code>--frames</code>	<code>FRAMES</code>
<code>--menu</code>	<code>SHOW_MENU</code>
<code>--debug</code>	<code>DEBUG</code>
<code>--doctype</code>	<code>DOCTYPE</code>
<code>--frameset-doctype</code>	<code>FRAMESET_DOCTYPE</code>
<code>--test</code>	<code>TEST</code>

Finally, any `texi2html` users seeking more detailed information can check the draft file `doc/texi2oldapi.texi` in the Texinfo source repository. It consists mainly of very rough notes, but may still be useful to some.

21 Creating and Installing Info Files

This chapter describes how to create and install Info files. See Section 1.3 [Info Files], page 5, for general information about the file format itself.

21.1 Creating an Info File

`makeinfo` is a program that converts a Texinfo file into an Info file, HTML file, or plain text. `texinfo-format-region` and `texinfo-format-buffer` are GNU Emacs functions that convert Texinfo to Info.

For information on installing the Info file in the Info system, see Section 21.2 [Installing an Info File], page 204.

21.1.1 `makeinfo` Advantages

The `makeinfo` utility creates an Info file from a Texinfo source providing better error messages than either of the Emacs formatting commands. We recommend it. The `makeinfo` program is independent of Emacs. You can run `makeinfo` in any of three ways: from an operating system shell, from a shell inside Emacs, or by typing the `C-c C-m C-r` or the `C-c C-m C-b` command in Texinfo mode in Emacs.

The `texinfo-format-region` and the `texinfo-format-buffer` commands may be useful if you cannot run `makeinfo`.

21.1.2 Running `makeinfo` Within Emacs

You can run `makeinfo` in GNU Emacs Texinfo mode by using either the `makeinfo-region` or the `makeinfo-buffer` commands. In Texinfo mode, the commands are bound to `C-c C-m C-r` and `C-c C-m C-b` by default.

`C-c C-m C-r`

`M-x makeinfo-region`

Format the current region for Info.

`C-c C-m C-b`

`M-x makeinfo-buffer`

Format the current buffer for Info.

When you invoke `makeinfo-region` the output goes to a temporary buffer. When you invoke `makeinfo-buffer` output goes to the file set with `@setfilename` (see Section 3.2.3 [`@setfilename`], page 17).

The Emacs `makeinfo-region` and `makeinfo-buffer` commands run the `makeinfo` program in a temporary shell buffer. If `makeinfo` finds any errors, Emacs displays the error messages in the temporary buffer.

You can parse the error messages by typing `C-x `` (`next-error`). This causes Emacs to go to and position the cursor on the line in the Texinfo source that `makeinfo` thinks caused the error. See Section “Running `make` or Compilers Generally” in *The GNU Emacs Manual*, for more information about using the `next-error` command.

In addition, you can kill the shell in which the `makeinfo` command is running or make the shell buffer display its most recent output.

C-c C-m C-k

M-x makeinfo-kill-job

Kill the current running `makeinfo` job (from `makeinfo-region` or `makeinfo-buffer`).

C-c C-m C-l

M-x makeinfo-recenter-output-buffer

Redisplay the `makeinfo` shell buffer to display its most recent output.

(Note that the parallel commands for killing and recentering a `TEX` job are *C-c C-t C-k* and *C-c C-t C-l*. See Section 19.6 [Texinfo Mode Printing], page 168.)

You can specify options for `makeinfo` by setting the `makeinfo-options` variable with either the *M-x customize* or the *M-x set-variable* command, or by setting the variable in your `.emacs` initialization file.

For example, you could write the following in your `.emacs` file:

```
(setq makeinfo-options
      "--paragraph-indent=0 --no-split
      --fill-column=70 --verbose")
```

For more information, see [makeinfo Options], page 177, as well as “Easy Customization Interface,” “Examining and Setting Variables,” and “Init File” in *The GNU Emacs Manual*.

21.1.3 The `texinfo-format...` Commands

In GNU Emacs in Texinfo mode, you can format part or all of a Texinfo file with the `texinfo-format-region` command. This formats the current region and displays the formatted text in a temporary buffer called `*Info Region*`.

Similarly, you can format a buffer with the `texinfo-format-buffer` command. This command creates a new buffer and generates the Info file in it. Typing *C-x C-s* will save the Info file under the name specified by the `@setfilename` line which must be near the beginning of the Texinfo file.

C-c C-e C-r

`texinfo-format-region`

Format the current region for Info.

C-c C-e C-b

`texinfo-format-buffer`

Format the current buffer for Info.

The `texinfo-format-region` and `texinfo-format-buffer` commands provide you with some error checking, and other functions can provide you with further help in finding formatting errors. These procedures are described in an appendix; see Appendix F [Catching Mistakes], page 275. However, the `makeinfo` program provides better error checking (see Section 21.1.2 [makeinfo in Emacs], page 201).

A peculiarity of the `texinfo-format-buffer` and `texinfo-format-region` commands is that they do not indent (nor fill) paragraphs that contain `@w` or `@*` commands.

21.1.4 Batch Formatting

You can format Texinfo files for Info using `batch-texinfo-format` and Emacs batch mode. You can run Emacs in batch mode from any shell, including a shell inside of Emacs. (See Section “Initial Options” in *The GNU Emacs Manual*.)

Here is a shell command to format all the files that end in `.texinfo` in the current directory:

```
emacs -batch -funcall batch-texinfo-format *.texinfo
```

Emacs processes all the files listed on the command line, even if an error occurs while attempting to format some of them.

Run `batch-texinfo-format` only with Emacs in batch mode as shown; it is not interactive. It kills the batch mode Emacs on completion.

`batch-texinfo-format` is convenient if you lack `makeinfo` and want to format several Texinfo files at once. When you use Batch mode, you create a new Emacs process. This frees your current Emacs, so you can continue working in it. (When you run `texinfo-format-region` or `texinfo-format-buffer`, you cannot use that Emacs for anything else until the command finishes.)

21.1.5 Tag Files and Split Files

If a Texinfo file has more than 30,000 bytes, `texinfo-format-buffer` automatically creates a tag table for its Info file; `makeinfo` always creates a tag table. With a *tag table*, Info can jump to new nodes more quickly than it can otherwise.

In addition, if the Texinfo file contains more than about 300,000 bytes, `texinfo-format-buffer` and `makeinfo` split the large Info file into shorter *indirect* subfiles of about 300,000 bytes each. Big files are split into smaller files so that Emacs does not need to make a large buffer to hold the whole of a large Info file; instead, Emacs allocates just enough memory for the small, split-off file that is needed at the time. This way, Emacs avoids wasting memory when you run Info. (Before splitting was implemented, Info files were always kept short and *include files* were designed as a way to create a single, large printed manual out of the smaller Info files. See Chapter 18 [Include Files], page 159, for more information. Include files are still used for very large documents, such as *The Emacs Lisp Reference Manual*, in which each chapter is a separate file.)

When a file is split, Info itself makes use of a shortened version of the original file that contains just the tag table and references to the files that were split off. The split-off files are called *indirect* files.

The split-off files have names that are created by appending ‘-1’, ‘-2’, ‘-3’ and so on to the file name specified by the `@setfilename` command. The shortened version of the original file continues to have the name specified by `@setfilename`.

At one stage in writing this document, for example, the Info file was saved as the file `test-texinfo` and that file looked like this:

```

Info file: test-texinfo,    -*-Text-*-
produced by texinfo-format-buffer
from file: new-texinfo-manual.texinfo

^_
Indirect:
test-texinfo-1: 102
test-texinfo-2: 50422
test-texinfo-3: 101300
^_^L
Tag table:
(Indirect)
Node: overview^?104
Node: info file^?1271
Node: printed manual^?4853
Node: conventions^?6855
...

```

(But `test-texinfo` had far more nodes than are shown here.) Each of the split-off, indirect files, `test-texinfo-1`, `test-texinfo-2`, and `test-texinfo-3`, is listed in this file after the line that says ‘Indirect:’. The tag table is listed after the line that says ‘Tag table:’.

In the list of indirect files, the number following the file name records the cumulative number of bytes in the preceding indirect files, not counting the file list itself, the tag table, or any permissions text in the first file. In the tag table, the number following the node name records the location of the beginning of the node, in bytes from the beginning of the (unsplit) output.

If you are using `texinfo-format-buffer` to create Info files, you may want to run the `Info-validate` command. (The `makeinfo` command does such a good job on its own, you do not need `Info-validate`.) However, you cannot run the `M-x Info-validate` node-checking command on indirect files. For information on how to prevent files from being split and how to validate the structure of the nodes, see Section F.6.1 [Using `Info-validate`], page 280.

21.2 Installing an Info File

Info files are usually kept in the `info` directory. You can read Info files using the standalone Info program or the Info reader built into Emacs. (See *Info*, for an introduction to Info.)

21.2.1 The Directory File `dir`

For Info to work, the `info` directory must contain a file that serves as a top level directory for the Info system. By convention, this file is called `dir`. (You can find the location of this file within Emacs by typing `C-h i` to enter Info and then typing `C-x C-f` to see the pathname to the `info` directory.)

The `dir` file is itself an Info file. It contains the top level menu for all the Info files in the system. The menu looks like this:


```

* Menu:
* Info:   (info).      Documentation browsing system.
* Emacs:  (emacs).    The extensible, self-documenting
                    text editor.
* Texinfo: (texinfo). With one source file, make
                    either a printed manual using
                    @TeX{} or an Info file.
...

```

Each of these menu entries points to the ‘Top’ node of the Info file that is named in parentheses. (The menu entry does not need to specify the ‘Top’ node, since Info goes to the ‘Top’ node if no node name is mentioned. See Section 4.9.6 [Nodes in Other Info Files], page 41.)

Thus, the ‘Info’ entry points to the ‘Top’ node of the `info` file and the ‘Emacs’ entry points to the ‘Top’ node of the `emacs` file.

In each of the Info files, the ‘Up’ pointer of the ‘Top’ node refers back to the `dir` file. For example, the line for the ‘Top’ node of the Emacs manual looks like this in Info:

```
File: emacs Node: Top, Up: (DIR), Next: Distrib
```

In this case, the `dir` file name is written in uppercase letters—it can be written in either upper- or lowercase. This is not true in general, it is a special case for `dir`.

21.2.2 Listing a New Info File

To add a new Info file to your system, you must write a menu entry to add to the menu in the `dir` file in the `info` directory. For example, if you were adding documentation for GDB, you would write the following new entry:

```
* GDB: (gdb).          The source-level C debugger.
```

The first part of the menu entry is the menu entry name, followed by a colon. The second part is the name of the Info file, in parentheses, followed by a period. The third part is the description.

The name of an Info file often has a `.info` extension. Thus, the Info file for GDB might be called either `gdb` or `gdb.info`. The Info reader programs automatically try the file name both with and without `.info`¹; so it is better to avoid clutter and not to write ‘`.info`’ explicitly in the menu entry. For example, the GDB menu entry should use just ‘`gdb`’ for the file name, not ‘`gdb.info`’.

21.2.3 Info Files in Other Directories

If an Info file is not in the `info` directory, there are three ways to specify its location:

1. Write the pathname in the `dir` file as the second part of the menu.
2. Specify the Info directory name in the `INFOPATH` environment variable in your `.profile` or `.cshrc` initialization file. (Only you and others who set this environment variable will be able to find Info files whose location is specified this way.)
3. If you are using Emacs, list the name of the file in a second `dir` file, in its directory; and then add the name of that directory to the `Info-directory-list` variable in your personal or site initialization file.

¹ On MS-DOS/MS-Windows systems, Info will try the `.inf` extension as well.

This variable tells Emacs where to look for `dir` files (the files must be named `dir`). Emacs merges the files named `dir` from each of the listed directories. (In Emacs version 18, you can set the `Info-directory` variable to the name of only one directory.)

For example, to reach a test file in the `/home/bob/info` directory, you could add an entry like this to the menu in the standard `dir` file:

```
* Test: (/home/bob/info/info-test).  Bob's own test file.
```

In this case, the absolute file name of the `info-test` file is written as the second part of the menu entry.

If you don't want to edit the system `dir` file, you can tell Info where to look by setting the `INFOPATH` environment variable in your shell startup file. This works with both the Emacs and standalone Info readers.

Specifically, if you use a Bourne-compatible shell such as `sh` or `bash` for your shell command interpreter, you set the `INFOPATH` environment variable in the `.profile` initialization file; but if you use `csh` or `tcsh`, you set the variable in the `.cshrc` initialization file. On MS-DOS/MS-Windows systems, you must set `INFOPATH` in your `autoexec.bat` file or in the registry. Each type of shell uses a different syntax.

- In a `.cshrc` file, you could set the `INFOPATH` variable as follows:

```
setenv INFOPATH ~/.info:/usr/local/emacs/info
```

- In a `.profile` file, you would achieve the same effect by writing:

```
INFOPATH=.:$HOME/info:/usr/local/emacs/info
export INFOPATH
```

- In a `autoexec.bat` file, you write this command (note the use of `'`; as the directory separator, and a different syntax for using values of other environment variables):

```
set INFOPATH=.;%HOME%/info;c:/usr/local/emacs/info
```

The `'.'` indicates the current directory as usual. Emacs uses the `INFOPATH` environment variable to initialize the value of Emacs's own `Info-directory-list` variable. The standalone Info reader merges any files named `dir` in any directory listed in the `INFOPATH` variable into a single menu presented to you in the node called `'(dir)Top'`.

However you set `INFOPATH`, if its last character is a colon (on MS-DOS/MS-Windows systems, use a semicolon instead), this is replaced by the default (compiled-in) path. This gives you a way to augment the default path with new directories without having to list all the standard places. For example (using `sh` syntax):

```
INFOPATH=/home/bob/info:
export INFOPATH
```

will search `/home/bob/info` first, then the standard directories. Leading or doubled colons are not treated specially.

When you create your own `dir` file for use with `Info-directory-list` or `INFOPATH`, it's easiest to start by copying an existing `dir` file and replace all the text after the `'* Menu:'` with your desired entries. That way, the punctuation and special `CTRL_` characters that Info needs will be present.

As one final alternative, which works only with Emacs Info, you can change the `Info-directory-list` variable. For example:

```
(add-hook 'Info-mode-hook '(lambda ()
```

```
(add-to-list 'Info-directory-list
(expand-file-name "~/info"))))
```

21.2.4 Installing Info Directory Files

When you install an Info file onto your system, you can use the program `install-info` to update the Info directory file `dir`. Normally the makefile for the package runs `install-info`, just after copying the Info file into its proper installed location.

In order for the Info file to work with `install-info`, you include the commands `@dircategory` and `@direntry...@end direntry` in the Texinfo source file. Use `@direntry` to specify the menu entries to add to the Info directory file, and use `@dircategory` to specify which part of the Info directory to put it in. Here is how these commands are used in this manual:

```
@dircategory Texinfo documentation system
@direntry
* Texinfo: (texinfo).          The GNU documentation format.
* install-info: (texinfo)Invoking install-info. ...
...
@end direntry
```

Here's what this produces in the Info file:

```
INFO-DIR-SECTION Texinfo documentation system
START-INFO-DIR-ENTRY
* Texinfo: (texinfo).          The GNU documentation format.
* install-info: (texinfo)Invoking install-info. ...
...
END-INFO-DIR-ENTRY
```

The `install-info` program sees these lines in the Info file, and that is how it knows what to do.

Always use the `@direntry` and `@dircategory` commands near the beginning of the Texinfo input, before the first `@node` command. If you use them later on in the input, `install-info` will not notice them.

`install-info` will automatically reformat the description of the menu entries it is adding. As a matter of convention, the description of the main entry (above, ‘The GNU documentation format’) should start at column 32, starting at zero (as in `what-cursor-position` in Emacs). This will make it align with most others. Description for individual utilities best start in column 48, where possible. For more information about formatting see the ‘`--calign`’, ‘`--align`’, and ‘`--max-width`’ options in Section 21.2.5 [Invoking `install-info`], page 208.

If you use `@dircategory` more than once in the Texinfo source, each usage specifies the ‘current’ category; any subsequent `@direntry` commands will add to that category.

When choosing a category name for the `@dircategory` command, we recommend consulting the Free Software Directory (<http://www.gnu.org/directory>). If your program is not listed there, or listed incorrectly or incompletely, please report the situation to the directory maintainers (<http://directory.fsf.org>) so that the category names can be kept in sync.

Here are a few examples (see the `util/dir-example` file in the Texinfo distribution for large sample `dir` file):

```
Emacs
```

Localization
 Printing
 Software development
 Software libraries
 Text creation and manipulation

Each ‘Invoking’ node for every program installed should have a corresponding `@direntry`. This lets users easily find the documentation for the different programs they can run, as with the traditional `man` system.

21.2.5 Invoking `install-info`

`install-info` inserts menu entries from an Info file into the top-level `dir` file in the Info system (see the previous sections for an explanation of how the `dir` file works). `install-info` also removes menu entries from the `dir` file. It’s most often run as part of software installation, or when constructing a `dir` file for all manuals on a system. Synopsis:

```
install-info [option...] [info-file [dir-file]]
```

If *info-file* or *dir-file* are not specified, the options (described below) that define them must be. There are no compile-time defaults, and standard input is never used. `install-info` can read only one Info file and write only one `dir` file per invocation.

If *dir-file* (however specified) does not exist, `install-info` creates it if possible (with no entries).

If any input file is compressed with `gzip` (see *Gzip*), `install-info` automatically uncompresses it for reading. And if *dir-file* is compressed, `install-info` also automatically leaves it compressed after writing any changes. If *dir-file* itself does not exist, `install-info` tries to open *dir-file.gz*, *dir-file.xz*, *dir-file.bz2*, *dir-file.lz*, and *dir-file.lzma*, in that order.

Options:

`--add-once`

Specifies that the entry or entries will only be put into a single section.

`--align=column`

Specifies the column that the second and subsequent lines of menu entry’s description will be formatted to begin at. The default for this option is ‘35’. It is used in conjunction with the ‘`--max-width`’ option. *column* starts counting at 1.

`--append-new-sections`

Instead of alphabetizing new sections, place them at the end of the DIR file.

`--calign=column`

Specifies the column that the first line of menu entry’s description will be formatted to begin at. The default for this option is ‘33’. It is used in conjunction with the ‘`--max-width`’ option. When the name of the menu entry exceeds this column, entry’s description will start on the following line. *column* starts counting at 1.

`--debug` Report what is being done.

- delete** Delete the entries in *info-file* from *dir-file*. The file name in the entry in *dir-file* must be *info-file* (except for an optional `.info` in either one). Don't insert any new entries. Any empty sections that result from the removal are also removed.
- description=*text***
Specify the explanatory portion of the menu entry. If you don't specify a description (either via `--entry`, `--item` or this option), the description is taken from the Info file itself.
- dir-file=*name***
Specify file name of the Info directory file. This is equivalent to using the *dir-file* argument.
- dry-run**
Same as `--test`.
- entry=*text***
Insert *text* as an Info directory entry; *text* should have the form of an Info menu item line plus zero or more extra lines starting with whitespace. If you specify more than one entry, they are all added. If you don't specify any entries, they are determined from information in the Info file itself.
- help** Display a usage message with basic usage and all available options, then exit successfully.
- info-file=*file***
Specify Info file to install in the directory. This is equivalent to using the *info-file* argument.
- info-dir=*dir***
Specify the directory where the directory file *dir* resides. Equivalent to `--dir-file=dir/dir`.
- infodir=*dir***
Same as `--info-dir`.
- item=*text***
Same as `--entry=text`. An Info directory entry is actually a menu item.
- keep-old**
Do not replace pre-existing menu entries. When `--remove` is specified, this option means that empty sections are not removed.
- max-width=*column***
Specifies the column that the menu entry's description will be word-wrapped at. *column* starts counting at 1.
- maxwidth=*column***
Same as `--max-width`.
- menuentry=*text***
Same as `--name`.
- name=*text***
Specify the name portion of the menu entry. If the *text* does not start with an asterisk `*`, it is presumed to be the text after the `*` and before the parentheses

that specify the Info file. Otherwise *text* is taken verbatim, and is taken as defining the text up to and including the first period (a space is appended if necessary). If you don't specify the name (either via '`--entry`', '`--item`' or this option), it is taken from the Info file itself. If the Info does not contain the name, the basename of the Info file is used.

- `--no-indent`
Suppress formatting of new entries into the `dir` file.
- `--quiet`
- `--silent` Suppress warnings, etc., for silent operation.
- `--remove` Same as '`--delete`'.
- `--remove-exactly`
Also like '`--delete`', but only entries if the Info file name matches exactly; `.info` and/or `.gz` suffixes are *not* ignored.
- `--section=sec`
Put this file's entries in section *sec* of the directory. If you specify more than one section, all the entries are added in each of the sections. If you don't specify any sections, they are determined from information in the Info file itself. If the Info file doesn't specify a section, the menu entries are put into the Miscellaneous section.
- `--section regex sec`
Same as '`--regex=regex --section=sec --add-once`'.
`install-info` tries to detect when this alternate syntax is used, but does not always guess correctly. Here is the heuristic that `install-info` uses:
 1. If the second argument to `--section` starts with a hyphen, the original syntax is presumed.
 2. If the second argument to `--section` is a file that can be opened, the original syntax is presumed.
 3. Otherwise the alternate syntax is used.
 When the heuristic fails because your section title starts with a hyphen, or it happens to be a filename that can be opened, the syntax should be changed to '`--regex=regex --section=sec --add-once`'.
- `--regex=regex`
Put this file's entries into any section that matches *regex*. If more than one section matches, all of the entries are added in each of the sections. Specify *regex* using basic regular expression syntax, more or less as used with `grep`, for example.
- `--test` Suppress updating of the directory file.
- `--version`
Display version information and exit successfully.

22 Generating HTML

`makeinfo` generates Info output by default, but given the `--html` option, it will generate HTML, for web browsers and other programs. This chapter gives some details on such HTML output.

`makeinfo` has many user-definable customization variables with which you can influence the HTML output. See Section 20.6 [Customization Variables], page 184.

`makeinfo` can also produce output in XML and Docbook formats, but we do not as yet describe these in detail. See Section 1.2 [Output Formats], page 4, for a brief overview of all the output formats.

22.1 HTML Translation

First, the HTML generated by `makeinfo` is standard HTML 4. It also tries to be compatible with earlier standards (e.g., HTML 2.0, RFC-1866). Thus, please report output from an error-free run of `makeinfo` which has practical browser portability problems as a bug (see Section 1.1 [Reporting Bugs], page 3).

Some known exceptions to HTML 3.2 (using `'--init-file=html32.pm'` produces strict HTML 3.2 output; see Section 20.2 [Invoking `texi2any`], page 177):

1. HTML 3.2 tables are generated for the `@multitable` command (see Section 9.5 [Multi-column Tables], page 87), but they should degrade reasonably in browsers without table support.
2. The HTML 4 `'lang'` attribute on the `<html>` attribute is used.
3. Entities that are not in the HTML 3.2 standard are also used.
4. CSS is used (see Section 22.3 [HTML CSS], page 213).
5. A few HTML 4 elements are used: `thead`, `abbr`, `acronym`.

To achieve maximum portability and accessibility among browsers (both graphical and text-based), systems, and users, the HTML output is intentionally quite plain and generic. It has always been our goal for users to be able to customize the output to their wishes via CSS (see Section 22.3 [HTML CSS], page 213) or other means (see Section 20.6 [Customization Variables], page 184). If you cannot accomplish a reasonable customization, feel free to report that.

However, we do not wish to depart from our basic goal of widest readability for the core output. For example, using fancy CSS may make it possible for the HTML output to more closely resemble the `TEX` output in some details, but this result is not even close to being worth the ensuing difficulties.

It is also intentionally not our goal, and not even possible, to pass through every conceivable validation test without any diagnostics. Different validation tests have different goals, often about pedantic enforcement of some standard or another. Our overriding goal is to help users, not blindly comply with standards.

To repeat what was said at the top: please report output from an error-free run of `makeinfo` which has *practical* browser portability problems as a bug (see Section 1.1 [Reporting Bugs], page 3).

A few other general points about the HTML output follow.

Navigation bar: By default, a navigation bar is inserted at the start of each node, analogous to Info output. If the ‘`--no-headers`’ option is used, the navigation bar is only inserted at the beginning of split files. Header `<link>` elements in split output can support Info-like navigation with browsers like Lynx and Emacs W3 which implement this HTML 1.0 feature.

Footnotes: for HTML, when the footnote style is ‘`end`’, or if the output is not split, footnotes are put at the end of the output. If the footnote style is set to ‘`separate`’, and the output is split, they are placed in a separate file. See Section 10.3.2 [Footnote Styles], page 95.

Raw HTML: `makeinfo` will include segments of Texinfo source between `@ifhtml` and `@end ifhtml` in the HTML output (but not any of the other conditionals, by default). Source between `@html` and `@end html` is passed without change to the output (i.e., suppressing the normal escaping of input ‘`<`’, ‘`>`’ and ‘`&`’ characters which have special significance in HTML). See Section 16.1 [Conditional Commands], page 139.

22.2 HTML Splitting

When splitting output at nodes (which is the default), `makeinfo` writes HTML output into (basically) one output file per Texinfo source `@node`.

Each output file name is the node name with spaces replaced by ‘`-`’s and special characters changed to ‘`_`’ followed by their code point in hex (see Section 22.4 [HTML Xref], page 214). This is to make it portable and easy to use as a filename. In the unusual case of two different nodes having the same name after this treatment, they are written consecutively to the same file, with HTML anchors so each can be referred to independently.

If `makeinfo` is run on a system which does not distinguish case in file names, nodes which are the same except for case (e.g., ‘`index`’ and ‘`Index`’) will also be folded into the same output file with anchors. You can also pretend to be on a case insensitive filesystem by setting the customization variable `CASE_INSENSITIVE_FILENAMES`.

It is also possible to split at chapters or sections with `--split` (see Section 20.2 [Invoking `texi2any`], page 177). In that case, the file names are constructed after the name of the node associated with the relevant sectioning command. Also, unless `--no-node-files` is specified, a redirection file is output for every node in order to more reliably support cross-references to that manual (see Section 22.4 [HTML Xref], page 214).

When splitting, the HTML output files are written into a subdirectory, with the name chosen as follows:

1. `makeinfo` first tries the subdirectory with the base name from `@setfilename` (that is, any extension is removed). For example, HTML output for `@setfilename gcc.info` would be written into a subdirectory named ‘`gcc/`’.
2. If that directory cannot be created for any reason, then `makeinfo` tries appending ‘`.html`’ to the directory name. For example, output for `@setfilename texinfo` would be written to ‘`texinfo.html/`’.
3. If the ‘`name.html`’ directory can’t be created either, `makeinfo` gives up.

In any case, the top-level output file within the directory is always named ‘`index.html`’.

Monolithic output (`--no-split`) is named according to `@setfilename` (with any `.info` extension is replaced with `.html`), `--output` (the argument is used literally), or based on the input file name as a last resort (see Section 3.2.3 [`@setfilename`], page 17).

22.3 HTML CSS

Cascading Style Sheets (CSS for short) is an Internet standard for influencing the display of HTML documents: see <http://www.w3.org/Style/CSS/>.

By default, `makeinfo` includes a few simple CSS commands to better implement the appearance of some Texinfo environments. Here are two of them, as an example:

```
pre.display { font-family:inherit }
pre.smalldisplay { font-family:inherit; font-size:smaller }
```

A full explanation of CSS is (far) beyond this manual; please see the reference above. In brief, however, the above tells the web browser to use a ‘smaller’ font size for `@smalldisplay` text, and to use the same font as the main document for both `@smalldisplay` and `@display`. By default, the HTML `<pre>` command uses a monospaced font.

You can influence the CSS in the HTML output with two `makeinfo` options: `--css-include=file` and `--css-ref=url`.

The option `--css-ref=url` adds to each output HTML file a `<link>` tag referencing a CSS at the given *url*. This allows using external style sheets. You may find the file `texi2html/examples/texinfo-bright-colors.css` useful for visualizing the CSS elements in Texinfo output.

The option `--css-include=file` includes the contents *file* in the HTML output, as you might expect. However, the details are somewhat tricky, as described in the following, to provide maximum flexibility.

The CSS file may begin with so-called ‘`@import`’ directives, which link to external CSS specifications for browsers to use when interpreting the document. Again, a full description is beyond our scope here, but we’ll describe how they work syntactically, so we can explain how `makeinfo` handles them.

There can be more than one ‘`@import`’, but they have to come first in the file, with only whitespace and comments interspersed, no normal definitions. (Technical exception: a ‘`@charset`’ directive may precede the ‘`@import`’s. This does not alter `makeinfo`’s behavior, it just copies the ‘`@charset`’ if present.) Comments in CSS files are delimited by `/* ... */`, as in C. An ‘`@import`’ directive must be in one of these two forms:

```
@import url(http://example.org/foo.css);
@import "http://example.net/bar.css";
```

As far as `makeinfo` is concerned, the crucial characters are the ‘`@`’ at the beginning and the semicolon terminating the directive. When reading the CSS file, it simply copies any such ‘`@`’-directive into the output, as follows:

- If *file* contains only normal CSS declarations, it is included after `makeinfo`’s default CSS, thus overriding it.
- If *file* begins with ‘`@import`’ specifications (see below), then the ‘`import`’s are included first (they have to come first, according to the standard), and then `makeinfo`’s default

CSS is included. If you need to override `makeinfo`'s defaults from an `@import`, you can do so with the `! important` CSS construct, as in:

```
pre.smalllexample { font-size: inherit ! important }
```

- If *file* contains both `@import` and inline CSS specifications, the `@import`'s are included first, then `makeinfo`'s defaults, and lastly the inline CSS from *file*.
- Any `@`-directive other than `@import` and `@charset` is treated as a CSS declaration, meaning `makeinfo` includes its default CSS and then the rest of the file.

If the CSS file is malformed or erroneous, `makeinfo`'s output is unspecified. `makeinfo` does not try to interpret the meaning of the CSS file in any way; it just looks for the special `@` and `;` characters and blindly copies the text into the output. Comments in the CSS file may or may not be included in the output.

In addition to the possibilities offered by CSS, `makeinfo` has many user-definable customization variables with which you can influence the HTML output. See Section 20.6 [Customization Variables], page 184.

22.4 HTML Cross-references

Cross-references between Texinfo manuals in HTML format become, in the end, a standard HTML `<a>` link, but the details are unfortunately complex. This section describes the algorithm used in detail, so that Texinfo can cooperate with other programs, such as `texi2html`, by writing mutually compatible HTML files.

This algorithm may or may not be used for links *within* HTML output for a Texinfo file. Since no issues of compatibility arise in such cases, we do not need to specify this.

We try to support references to such “external” manuals in both monolithic and split forms. A *monolithic* (mono) manual is entirely contained in one file, and a *split* manual has a file for each node. (See Section 22.2 [HTML Splitting], page 212.)

The algorithm was primarily devised by Patrice Dumas in 2003–04.

22.4.1 HTML Cross-reference Link Basics

For our purposes, an HTML link consists of four components: a host name, a directory part, a file part, and a target part. We always assume the `http` protocol. For example:

```
http://host/dir/file.html#target
```

The information to construct a link comes from the node name and manual name in the cross-reference command in the Texinfo source (see Chapter 6 [Cross References], page 49), and from *external information* (see Section 22.4.6 [HTML Xref Configuration], page 219).

We now consider each part in turn.

The *host* is hardwired to be the local host. This could either be the literal string `localhost`, or, according to the rules for HTML links, the `http://localhost/` could be omitted entirely.

The *dir* and *file* parts are more complicated, and depend on the relative split/mono nature of both the manual being processed and the manual that the cross-reference refers to. The underlying idea is that there is one directory for Texinfo manuals in HTML, and

a given *manual* is either available as a monolithic file *manual.html*, or a split subdirectory *manual/*.html*. Here are the cases:

- If the present manual is split, and the referent manual is also split, the directory is ‘*../referent/*’ and the file is the expanded node name (described later).
- If the present manual is split, and the referent manual is mono, the directory is ‘*../*’ and the file is *referent.html*.
- If the present manual is mono, and the referent manual is split, the directory is *referent/* and the file is the expanded node name.
- If the present manual is mono, and the referent manual is also mono, the directory is *./* (or just the empty string), and the file is *referent.html*.

Another rule, that only holds for filenames, is that base filenames are truncated to 245 characters, to allow for an extension to be appended and still comply with the 255-character limit which is common to many filesystems. Although technically this can be changed with the `BASEFILENAME_LENGTH` customization variable (see Section 20.6.4 [Other Customization Variables], page 192), doing so would make cross-manual references to such nodes invalid.

Any directory part in the filename argument of the source cross reference command is ignored. Thus, `@xref{,,,../foo}` and `@xref{,,,foo}` both use ‘foo’ as the manual name. This is because any such attempted hardwiring of the directory is very unlikely to be useful for both Info and HTML output.

Finally, the *target* part is always the expanded node name.

Whether the present manual is split or mono is determined by user option; `makeinfo` defaults to split, with the `--no-split` option overriding this.

Whether the referent manual is split or mono, however, is another bit of the external information (see Section 22.4.6 [HTML Xref Configuration], page 219). By default, `makeinfo` uses the same form of the referent manual as the present manual.

Thus, there can be a mismatch between the format of the referent manual that the generating software assumes, and the format it’s actually present in. See Section 22.4.5 [HTML Xref Mismatch], page 218.

22.4.2 HTML Cross-reference Node Name Expansion

As mentioned in the previous section, the key part of the HTML cross reference algorithm is the conversion of node names in the Texinfo source into strings suitable for XHTML identifiers and filenames. The restrictions are similar for each: plain ASCII letters, numbers, and the ‘-’ and ‘_’ characters are all that can be used. (Although HTML anchors can contain most characters, XHTML is more restrictive.)

Cross-references in Texinfo can refer either to nodes or anchors (see Section 6.8 [`@anchor`], page 56). However, anchors are treated identically to nodes in this context, so we’ll continue to say “node” names for simplicity.

A special exception: the Top node (see Section 3.6 [The Top Node], page 25) is always mapped to the file *index.html*, to match web server software. However, the HTML *target* is ‘Top’. Thus (in the split case):

```
@xref{Top,,, emacs, The GNU Emacs Manual}.
```

⇒ ``

1. The standard ASCII letters (a-z and A-Z) are not modified. All other characters may be changed as specified below.
2. The standard ASCII numbers (0-9) are not modified except when a number is the first character of the node name. In that case, see below.
3. Multiple consecutive space, tab and newline characters are transformed into just one space. (It's not possible to have newlines in node names with the current implementation, but we specify it anyway, just in case.)
4. Leading and trailing spaces are removed.
5. After the above has been applied, each remaining space character is converted into a '-' character.
6. Other ASCII 7-bit characters are transformed into '_00xx', where xx is the ASCII character code in (lowercase) hexadecimal. This includes '_', which is mapped to '_005f'.
7. If the node name does not begin with a letter, the literal string 'g_t' is prefixed to the result. (Due to the rules above, that string can never occur otherwise; it is an arbitrary choice, standing for "GNU Texinfo".) This is necessary because XHTML requires that identifiers begin with a letter.

For example:

```
@node A node --- with _'%
⇒ A-node-_002d_002d_002d-with-_005f_0027_0025
```

Example translations of common characters:

- '_' ⇒ '_005f'
- '-' ⇒ '_002d'
- 'A node' ⇒ 'A-node'

On case-folding computer systems, nodes differing only by case will be mapped to the same file. In particular, as mentioned above, Top always maps to the file `index.html`. Thus, on a case-folding system, Top and a node named 'Index' will both be written to `index.html`. Fortunately, the targets serve to distinguish these cases, since HTML target names are always case-sensitive, independent of operating system.

22.4.3 HTML Cross-reference Command Expansion

Node names may contain @-commands (see Section 4.4 [Node Line Requirements], page 33). This section describes how they are handled.

First, comments are removed.

Next, any @value commands (see Section 16.5.1 [@set @value], page 143) and macro invocations (see Section 17.2 [Invoking Macros], page 150) are fully expanded.

Then, for the following commands, the command name and braces are removed, and the text of the argument is recursively transformed:

```
@asis @b @cite @code @command @dfn @dmn @dotless
@emph @env @file @i @indicateurl @kbd @key
@samp @sansserif @sc @slanted @strong @sub @sup
```

`@t @U @var @verb @w`

For `@sc`, any letters are capitalized.

In addition, the following commands are replaced by constant text, as shown below. If any of these commands have non-empty arguments, as in `@TeX{bad}`, it is an error, and the result is unspecified. In this table, ‘(space)’ means a space character and ‘(nothing)’ means the empty string. The notation ‘U+*hhhh*’ means Unicode code point *hhhh* (in hex, as usual).

There are further transformations of many of these expansions to yield the final file or other target name, such as space characters to ‘-’, etc., according to the other rules.

<code>@(newline)</code>	(space)
<code>@(space)</code>	(space)
<code>@(tab)</code>	(space)
<code>@!</code>	‘!’
<code>@*</code>	(space)
<code>@-</code>	(nothing)
<code>@.</code>	‘.’
<code>@:</code>	(nothing)
<code>@?</code>	‘?’
<code>@@</code>	‘@’
<code>@{</code>	‘{’
<code>@}</code>	‘}’
<code>@LaTeX</code>	‘LaTeX’
<code>@TeX</code>	‘TeX’
<code>@arrow</code>	U+2192
<code>@bullet</code>	U+2022
<code>@comma</code>	‘,’
<code>@copyright</code>	U+00A9
<code>@dots</code>	U+2026
<code>@enddots</code>	‘...’
<code>@equiv</code>	U+2261
<code>@error</code>	‘error-->’
<code>@euro</code>	U+20AC
<code>@exclamdown</code>	U+00A1
<code>@expansion</code>	U+21A6
<code>@geq</code>	U+2265
<code>@leq</code>	U+2264
<code>@minus</code>	U+2212
<code>@ordf</code>	U+00AA
<code>@ordm</code>	U+00BA
<code>@point</code>	U+2605
<code>@pounds</code>	U+00A3
<code>@print</code>	U+22A3
<code>@questiondown</code>	U+00BF
<code>@registeredsymbol</code>	U+00AE
<code>@result</code>	U+21D2
<code>@textdegree</code>	U+00B0

`@tie` (space)

Quotation mark @-commands (`@quotedblright{}` and the like), are likewise replaced by their Unicode values. Normal quotation *characters* (e.g., ASCII ‘ and ’) are not altered. See Section 12.5 [Inserting Quotation Marks], page 109.

Any `@acronym`, `@abbr`, `@email`, and `@image` commands are replaced by their first argument. (For these commands, all subsequent arguments are optional, and ignored here.) See Section 7.1.14 [`@acronym`], page 68, and Section 7.1.16 [`@email`], page 69, and Section 10.2 [Images], page 92.

Accents are handled according to the next section.

Any other command is an error, and the result is unspecified.

22.4.4 HTML Cross-reference 8-bit Character Expansion

Usually, characters other than plain 7-bit ASCII are transformed into the corresponding Unicode code point(s) in Normalization Form C, which uses precomposed characters where available. (This is the normalization form recommended by the W3C and other bodies.) This holds when that code point is `0xffff` or less, as it almost always is.

These will then be further transformed by the rules above into the string ‘`_hhhh`’, where `hhhh` is the code point in hex.

For example, combining this rule and the previous section:

```
@node @b{A} @TeX{} @u{B} @point{}@enddots{}
⇒ A-TeX-B_0306-_2605_002e_002e_002e
```

Notice: 1) `@enddots` expands to three periods which in turn expands to three ‘`_002e`’s; 2) `@u{B}` is a ‘B’ with a breve accent, which does not exist as a pre-accented Unicode character, therefore expands to ‘`B_0306`’ (B with combining breve).

When the Unicode code point is above `0xffff`, the transformation is ‘`__xxxxxx`’, that is, two leading underscores followed by six hex digits. Since Unicode has declared that their highest code point is `0x10ffff`, this is sufficient. (We felt it was better to define this extra escape than to always use six hex digits, since the first two would nearly always be zeros.)

This method works fine if the node name consists mostly of ASCII characters and contains only few 8-bit ones. But if the document is written in a language whose script is not based on the Latin alphabet (for example, Ukrainian), it will create file names consisting almost entirely of ‘`_xxxx`’ notations, which is inconvenient and all but unreadable. To handle such cases, `makeinfo` offers the `--transliterate-file-names` command line option. This option enables *transliteration* of node names into ASCII characters for the purposes of file name creation and referencing. The transliteration is based on phonetic principles, which makes the generated file names more easily understandable.

For the definition of Unicode Normalization Form C, see Unicode report UAX#15, <http://www.unicode.org/reports/tr15/>. Many related documents and implementations are available elsewhere on the web.

22.4.5 HTML Cross-reference Mismatch

As mentioned earlier (see Section 22.4.1 [HTML Xref Link Basics], page 214), the generating software may need to guess whether a given manual being cross referenced is available in

split or monolithic form—and, inevitably, it might guess wrong. However, when the *referent* manual is generated, it is possible to handle at least some mismatches.

In the case where we assume the referent is split, but it is actually available in mono, the only recourse would be to generate a `manual/` subdirectory full of HTML files which redirect back to the monolithic `manual.html`. Since this is essentially the same as a split manual in the first place, it's not very appealing.

On the other hand, in the case where we assume the referent is mono, but it is actually available in split, it is possible to use JavaScript to redirect from the putatively monolithic `manual.html` to the different `manual/node.html` files. Here's an example:

```
function redirect() {
  switch (location.hash) {
    case "#Node1":
      location.replace("manual/Node1.html#Node1"); break;
    case "#Node2" :
      location.replace("manual/Node2.html#Node2"); break;
    ...
    default;;
  }
}
```

Then, in the `<body>` tag of `manual.html`:

```
<body onLoad="redirect();">
```

Once again, this is something the software which generated the *referent* manual has to do in advance, it's not something the software generating the cross-reference in the present manual can control.

22.4.6 HTML Cross-reference Configuration: `htmlxref.cnf`

`makeinfo` reads a file named `htmlxref.cnf` to gather information for cross-references to other manuals in HTML output. It is looked for in the following directories:

`./` (the current directory)

`./.texinfo/`
(under the current directory)

`~/.texinfo/`
(where `~` is the current user's home directory)

`sysconfdir/texinfo/`
(where `sysconfdir` is the system configuration directory specified at compile-time, e.g., `/usr/local/etc`)

`datadir/texinfo/`
(likewise specified at compile time, e.g., `/usr/local/share`)

All files found are used, with earlier entries overriding later ones. The Texinfo distribution includes a default file which handles many GNU manuals; it is installed in the last of the above directories, i.e., `datadir/texinfo/htmlxref.cnf`.

The file is line-oriented. Lines consisting only of whitespace are ignored. Comments are indicated with a ‘#’ at the beginning of a line, optionally preceded by whitespace. Since ‘#’ can occur in urls (like almost any character), it does not otherwise start a comment.

Each non-blank non-comment line must be either a *variable assignment* or *manual information*.

A variable assignment line looks like this:

```
varname = varvalue
```

Whitespace around the ‘=’ is optional and ignored. The *varname* should consist of letters; case is significant. The *varvalue* is an arbitrary string, continuing to the end of the line. Variables are then referenced with ‘*{varname}*’; variable references can occur in the *varvalue*.

A manual information line looks like this:

```
manual keyword urlprefix
```

with *manual* the short identifier for a manual, *keyword* being one of: *mono*, *node*, *section*, *chapter*, and *urlprefix* described below. Variable references can occur only in the *urlprefix*. For example (used in the canonical `htmlxref.cnf`):

```
G = http://www.gnu.org
GS = ${G}/software
hello mono    ${GS}/hello/manual/hello.html
hello chapter ${GS}/hello/manual/html_chapter/
hello section ${GS}/hello/manual/html_section/
hello node    ${GS}/hello/manual/html_node/
```

If the keyword is *mono*, *urlprefix* gives the host, directory, and file name for *manual* as one monolithic file.

If the keyword is *node*, *section*, or *chapter*, *urlprefix* gives the host and directory for *manual* split into nodes, sections, or chapters, respectively.

When available, `makeinfo` will use the “corresponding” value for cross-references between manuals. That is, when generating monolithic output (`--no-split`), the *mono* url will be used, when generating output that is split by node, the *node* url will be used, etc. However, if a manual is not available in that form, anything that is available can be used. Here is the search order for each style:

```
node    ⇒ node,    section, chapter, mono
section ⇒ section, chapter, node,    mono
chapter ⇒ chapter, section, node,    mono
mono    ⇒ mono,    chapter, section, node
```

These section- and chapter-level cross-manual references can succeed only when the target manual was created using `--node-files`; this is the default for split output.

If you have additions or corrections to the `htmlxref.cnf` distributed with Texinfo, please email `bug-texinfo@gnu.org` as usual. You can get the latest version from `http://ftpmirror.gnu.org/texinfo/htmlxref.cnf`.

22.4.7 HTML Cross-reference Link Preservation:

manual-noderename.cnf

Occasionally changes in a program require removing (or renaming) nodes in the manual in order to have the best documentation. Given the nature of the web, however, links may

exist anywhere to such a removed node (renaming appears the same as removal for this purpose), and it's not ideal for those links to simply break.

Therefore, Texinfo provides a way for manual authors to specify old node names and the new nodes to which the old names should be redirected, via the file *manual-noderename.cnf*, where *manual* is the base name of the manual. For example, the manual `texinfo.texi` would be supplemented by a file `texinfo-noderename.cnf`. (This name can be overridden by setting the `RENAMED_NODES_FILE` customization variable; see Section 20.6 [Customization Variables], page 184).

The file is read in pairs of lines, as follows:

```
old-node-name
@@{} new-node-name
```

The usual conversion from Texinfo node names to HTML names is applied; see this entire section for details (see Section 22.4 [HTML Xref], page 214). The unusual '@@{}' separator is used because it is not a valid Texinfo construct, so can't appear in the node names.

The effect is that `makeinfo` generates a redirect from *old-node-name* to *new-node-name* when producing HTML output. Thus, external links to the old node are preserved.

Lines consisting only of whitespace are ignored. Comments are indicated with a '@c' at the beginning of a line, optionally preceded by whitespace.

Another approach to preserving links to deleted or renamed nodes is to use anchors (see Section 6.8 [`@anchor`], page 56). There is no effective difference between the two approaches.

Appendix A @-Command Details

Here are the details of @-commands: information about their syntax, a list of commands, and information about where commands can appear.

A.1 @-Command Syntax

Texinfo has the following types of @-command:

1. Brace commands

These commands start with @ followed by a letter or a word, followed by an argument within braces. For example, the command `@dfn` indicates the introductory or defining use of a term; it is used as follows: ‘In Texinfo, @-commands are @dfn{mark-up} commands.’

2. Line commands

These commands occupy an entire line. The line starts with @, followed by the name of the command (a word); for example, `@center` or `@cindex`. If no argument is needed, the word is followed by the end of the line. If there is an argument, it is separated from the command name by a space. Braces are not used.

3. Block commands

These commands are written at the start of a line, with general text on following lines, terminated by a matching `@end` command on a line of its own. For example, `@example`, then the lines of a coding example, then `@end example`. Some of these block commands take arguments as line commands do; for example, `@enumerate A` opening an environment terminated by `@end enumerate`. Here ‘A’ is the argument.

4. Symbol insertion commands with no arguments

These commands start with @ followed by a word followed by a left and right-brace. These commands insert special symbols in the document; they do not take arguments. Some examples: `@dots{}` ⇒ ‘...’, `@equiv{}` ⇒ ‘≡’, `@TeX{}` ⇒ ‘TEX’, and `@bullet{}` ⇒ ‘•’.

5. Non-alphabetic commands

The names of commands in all of the above categories consist of alphabetic characters, almost entirely in lower-case. Unlike those, the non-alphabetic commands consist of an @ followed by a punctuation mark or other character that is not part of the Latin alphabet. Non-alphabetic commands are almost always part of text within a paragraph. The non-alphabetic commands include `@@`, `@{`, `@}`, `@.`, `@SPACE`, and most of the accent commands.

6. Miscellaneous commands

There are a handful of commands that don’t fit into any of the above categories; for example, the obsolete command `@refill`, which is always used at the end of a paragraph immediately following the final period or other punctuation character. `@refill` takes no argument and does not require braces. Likewise, `@tab` used in a `@multitable` block does not take arguments, and is not followed by braces.

Thus, the alphabetic commands fall into classes that have different argument syntaxes. You cannot tell to which class a command belongs by the appearance of its name, but you can tell by the command's meaning: if the command stands for a glyph, it is in class 4 and does not require an argument; if it makes sense to use the command among other text as part of a paragraph, the command is in class 1 and must be followed by an argument in braces. The non-alphabetic commands, such as @:, are exceptions to the rule; they do not need braces.

The purpose of having different syntax for commands is to make Texinfo files easier to read, and also to help the GNU Emacs paragraph and filling commands work properly.

A.2 @-Command List

Here is an alphabetical list of the @-commands in Texinfo. Square brackets, [], indicate optional arguments; an ellipsis, '...', indicates repeated text.

@whitespace

An @ followed by a space, tab, or newline produces a normal, stretchable, interword space. See Section 12.3.1 [Multiple Spaces], page 105.

@! Produce an exclamation point that ends a sentence (usually after an end-of-sentence capital letter). See Section 12.3.3 [Ending a Sentence], page 107.

@"

@' Generate an umlaut or acute accent, respectively, over the next character, as in ö and ó. See Section 12.4 [Inserting Accents], page 108.

@* Force a line break. See Section 13.2 [Line Breaks], page 119.

@,{c} Generate a cedilla accent under *c*, as in ç. See Section 12.4 [Inserting Accents], page 108.

@- Insert a discretionary hyphenation point. See Section 13.3 [@- @hyphenation], page 120.

@. Produce a period that ends a sentence (usually after an end-of-sentence capital letter). See Section 12.3.3 [Ending a Sentence], page 107.

@/ Produces no output, but allows a line break. See Section 13.2 [Line Breaks], page 119.

@: Tell T_EX to refrain from inserting extra whitespace after an immediately preceding period, question mark, exclamation mark, or colon, as T_EX normally would. See Section 12.3.2 [Not Ending a Sentence], page 106.

@= Generate a macron (bar) accent over the next character, as in ō. See Section 12.4 [Inserting Accents], page 108.

@? Produce a question mark that ends a sentence (usually after an end-of-sentence capital letter). See Section 12.3.3 [Ending a Sentence], page 107.

@@

@atchar{}

Insert an at sign, '@'. See Section 12.1.1 [Inserting an Atsign], page 103.

@\

`@backslashchar{}`

Insert a backslash, ‘\’; `@backslashchar{}` works anywhere, while `@\` works only inside `@math`. See Section 12.1.4 [Inserting a Backslash], page 104, and Section 12.7 [Inserting Math], page 111.

@~

@`

Generate a circumflex (hat) or grave accent, respectively, over the next character, as in ô and è. See Section 12.4 [Inserting Accents], page 108.

@{

`@lbracechar{}`

Insert a left brace, ‘{’. See Section 12.1.2 [Inserting Braces], page 103.

@}

`@rbracechar{}`

Insert a right brace, ‘}’. See Section 12.1.2 [Inserting Braces], page 103.

@~

Generate a tilde accent over the next character, as in Ñ. See Section 12.4 [Inserting Accents], page 108.

`@AA{}`

`@aa{}`

Generate the uppercase and lowercase Scandinavian A-ring letters, respectively: Å, å. See Section 12.4 [Inserting Accents], page 108.

`@abbr{abbreviation}`

Indicate a general abbreviation, such as ‘Comput.’. See Section 7.1.13 [`@abbr`], page 68.

`@acronym{acronym}`

Indicate an acronym in all capital letters, such as ‘NASA’. See Section 7.1.14 [`@acronym`], page 68.

`@AE{}`

`@ae{}`

Generate the uppercase and lowercase AE ligatures, respectively: Æ, æ. See Section 12.4 [Inserting Accents], page 108.

`@afivepaper`

Change page dimensions for the A5 paper size. See Section 19.12 [A4 Paper], page 173.

`@afourlatex`

`@afourpaper`

`@afourwide`

Change page dimensions for the A4 paper size. See Section 19.12 [A4 Paper], page 173.

`@alias new=existing`

Make the command ‘`@new`’ a synonym for the existing command ‘`@existing`’. See Section 17.4 [`@alias`], page 154.

`@allowcodebreaks true-false`

Control breaking at ‘-’ and ‘_’ in T_EX. See Section 13.4 [`@allowcodebreaks`], page 120.

- @anchor{*name*}**
Define *name* as the current location for use as a cross-reference target. See Section 6.8 [**@anchor**], page 56.
- @appendix *title***
Begin an appendix. The title appears in the table of contents. In Info, the title is underlined with asterisks. See Section 5.4 [**@unnumbered @appendix**], page 44.
- @appendixsec *title***
@appendixsection *title*
Begin an appendix section within an appendix. The section title appears in the table of contents. In Info, the title is underlined with equal signs. **@appendixsection** is a longer spelling of the **@appendixsec** command. See Section 5.7 [**@unnumberedsec @appendixsec @heading**], page 45.
- @appendixsubsec *title***
Begin an appendix subsection. The title appears in the table of contents. In Info, the title is underlined with hyphens. See Section 5.9 [**@unnumberedsubsec @appendixsubsec @subheading**], page 45.
- @appendixsubsubsec *title***
Begin an appendix subsubsection. The title appears in the table of contents. In Info, the title is underlined with periods. See Section 5.10 [**@subsubsection**], page 46.
- @arrow{}** Generate a right arrow glyph: ‘→’. Used by default for **@click**. See Section 12.9.8 [Click Sequences], page 117.
- @asis** Used following **@table**, **@ftable**, and **@vtable** to print the table’s first column without highlighting (“as is”). See [**@asis**], page 86.
- @author *author***
Typeset *author* flushleft and underline it. See Section 3.4.3 [**@title @subtitle @author**], page 22.
- @b{*text*}** Set *text* in a **bold** font. No effect in Info. See Section 7.2.3 [Fonts], page 70.
- @bullet{}**
Generate a large round dot, • (* in Info). Often used with **@table**. See Section 12.8.5 [**@bullet**], page 113.
- @bye** Stop formatting a file. The formatters do not see anything in the input file following **@bye**. See Section 3.8 [Ending a File], page 30.
- @c *comment***
Begin a comment in Texinfo. The rest of the line does not appear in any output. A synonym for **@comment**. **DEL** also starts a comment. See Section 2.2 [Comments], page 11.
- @caption** Define the full caption for a **@float**. See Section 10.1.2 [**@caption @shortcaption**], page 91.

@cartouche

Highlight an example or quotation by drawing a box with rounded corners around it. Pair with `@end cartouche`. No effect in Info. See Section 8.14 [`@cartouche`], page 79.

@center *line-of-text*

Center the line of text following the command. See Section 3.4.2 [`@titlefont @center @sp`], page 21.

@centerchap *line-of-text*

Like `@chapter`, but centers the chapter title. See Section 5.3 [`@chapter`], page 43.

@chapheading *title*

Print an unnumbered chapter-like heading, but omit from the table of contents. In Info, the title is underlined with asterisks. See Section 5.5 [`@majorheading @chapheading`], page 44.

@chapter *title*

Begin a numbered chapter. The chapter title appears in the table of contents. In Info, the title is underlined with asterisks. See Section 5.3 [`@chapter`], page 43.

@cindex *entry*

Add *entry* to the index of concepts. See Section 11.3 [Defining the Entries of an Index], page 98.

@cite{*reference*}

Highlight the name of a book or other reference that has no companion Info file. See Section 6.11 [`@cite`], page 60.

@clear *flag*

Unset *flag*, preventing the Texinfo formatting commands from formatting text between subsequent pairs of `@ifset flag` and `@end ifset` commands, and preventing `@value{flag}` from expanding to the value to which *flag* is set. See Section 16.5 [`@set @clear @value`], page 143.

@click{} Represent a single “click” in a GUI. Used within `@clicksequence`. See Section 12.9.8 [Click Sequences], page 117.

@clicksequence{*action @click{}* *action*}

Represent a sequence of clicks in a GUI. See Section 12.9.8 [Click Sequences], page 117.

@clickstyle *@cmd*

Execute *@cmd* for each `@click`; the default is `@arrow`. The usual following empty braces on *@cmd* are omitted. See Section 12.9.8 [Click Sequences], page 117.

@code{*sample-code*}

Indicate an expression, a syntactically complete token of a program, or a program name. Unquoted in Info output. See Section 7.1.2 [`@code`], page 62.

`@codequotebacktick` *on-off*

`@codequoteundirected` *on-off*

Control output of ``` and `'` in code examples. See Section 12.2 [Inserting Quote Characters], page 105.

`@comma{}` Insert a comma `,` character; only needed when a literal comma would be taken as an argument separator. See Section 12.1.3 [Inserting a Comma], page 104.

`@command{command-name}`

Indicate a command name, such as `ls`. See Section 7.1.10 [`@command`], page 67.

`@comment` *comment*

Begin a comment in Texinfo. The rest of the line does not appear in any output. A synonym for `@c`. See Section 2.2 [Comments], page 11.

`@contents`

Print a complete table of contents. Has no effect in Info, which uses menus instead. See Section 3.5 [Generating a Table of Contents], page 24.

`@copying` Specify copyright holders and copying conditions for the document. Pair with `@end copying`. See Section 3.3.1 [`@copying`], page 19.

`@copyright{}`

Generate the copyright symbol ©. See Section 12.8.2 [`@copyright`], page 112.

`@defcodeindex` *index-name*

Define a new index and its indexing command. Print entries in an `@code` font. See Section 11.6 [Defining New Indices], page 101.

`@defcv` *category class name*

`@defcvx` *category class name*

Format a description for a variable associated with a class in object-oriented programming. Takes three arguments: the category of thing being defined, the class to which it belongs, and its name. See Chapter 14 [Definition Commands], page 123.

`@deffn` *category name arguments...*

`@deffnx` *category name arguments...*

Format a description for a function, interactive command, or similar entity that may take arguments. `@deffn` takes as arguments the category of entity being described, the name of this particular entity, and its arguments, if any. See Chapter 14 [Definition Commands], page 123.

`@defindex` *index-name*

Define a new index and its indexing command. Print entries in a roman font. See Section 11.6 [Defining New Indices], page 101.

`@definfoenclose` *newcmd, before, after*

Must be used within `@ifinfo`; create a new command `@newcmd` for Info that marks text by enclosing it in strings that precede and follow the text. See Section 17.5 [`@definfoenclose`], page 155.

`@defivar class instance-variable-name`

`@defivarx class instance-variable-name`

Format a description for an instance variable in object-oriented programming. The command is equivalent to ‘`@defcv {Instance Variable} ...`’. See Chapter 14 [Definition Commands], page 123.

`@defmac macroname arguments...`

`@defmacx macroname arguments...`

Format a description for a macro; equivalent to ‘`@deffn Macro ...`’. See Chapter 14 [Definition Commands], page 123.

`@defmethod class method-name arguments...`

`@defmethodx class method-name arguments...`

Format a description for a method in object-oriented programming; equivalent to ‘`@defop Method ...`’. See Chapter 14 [Definition Commands], page 123.

`@defop category class name arguments...`

`@defopx category class name arguments...`

Format a description for an operation in object-oriented programming. `@defop` takes as arguments the name of the category of operation, the name of the operation’s class, the name of the operation, and its arguments, if any. See Chapter 14 [Definition Commands], page 123, and Section 14.5.6 [Abstract Objects], page 130.

`@defopt option-name`

`@defoptx option-name`

Format a description for a user option; equivalent to ‘`@defvr {User Option} ...`’. See Chapter 14 [Definition Commands], page 123.

`@defspec special-form-name arguments...`

`@defspecx special-form-name arguments...`

Format a description for a special form; equivalent to ‘`@deffn {Special Form} ...`’. See Chapter 14 [Definition Commands], page 123.

`@deftp category name-of-type attributes...`

`@deftpx category name-of-type attributes...`

Format a description for a data type; its arguments are the category, the name of the type (e.g., ‘`int`’), and then the names of attributes of objects of that type. See Chapter 14 [Definition Commands], page 123, and Section 14.5.5 [Data Types], page 130.

`@deftypecv category class data-type name`

`@deftypecvx category class data-type name`

Format a description for a typed class variable in object-oriented programming. See Chapter 14 [Definition Commands], page 123, and Section 14.5.6 [Abstract Objects], page 130.

`@deftypefn category data-type name arguments...`

`@deftypefnx category data-type name arguments...`

Format a description for a function or similar entity that may take arguments and that is typed. `@deftypefn` takes as arguments the category of entity being

described, the type, the name of the entity, and its arguments, if any. See Chapter 14 [Definition Commands], page 123.

@deftypefnnewline *on-off*

Specifies whether return types for **@deftypefn** and similar are printed on lines by themselves; default is off. See Section 14.5.3 [Functions in Typed Languages], page 128.

@deftypefun *data-type function-name arguments...*

@deftypefunx *data-type function-name arguments...*

Format a description for a function in a typed language. The command is equivalent to ‘**@deftypefn** Function ...’. See Chapter 14 [Definition Commands], page 123.

@deftypeivar *class data-type variable-name*

@deftypeivarx *class data-type variable-name*

Format a description for a typed instance variable in object-oriented programming. See Chapter 14 [Definition Commands], page 123, and Section 14.5.6 [Abstract Objects], page 130.

@deftypemethod *class data-type method-name arguments...*

@deftypemethodx *class data-type method-name arguments...*

Format a description for a typed method in object-oriented programming. See Chapter 14 [Definition Commands], page 123.

@deftypeop *category class data-type name arguments...*

@deftypeopx *category class data-type name arguments...*

Format a description for a typed operation in object-oriented programming. See Chapter 14 [Definition Commands], page 123, and Section 14.5.6 [Abstract Objects], page 130.

@deftypevar *data-type variable-name*

@deftypevarx *data-type variable-name*

Format a description for a variable in a typed language. The command is equivalent to ‘**@deftypevr** Variable ...’. See Chapter 14 [Definition Commands], page 123.

@deftypevr *category data-type name*

@deftypevrx *category data-type name*

Format a description for something like a variable in a typed language—an entity that records a value. Takes as arguments the category of entity being described, the type, and the name of the entity. See Chapter 14 [Definition Commands], page 123.

@defun *function-name arguments...*

@defunx *function-name arguments...*

Format a description for a function; equivalent to ‘**@deffn** Function ...’. See Chapter 14 [Definition Commands], page 123.

@defvar *variable-name*

@defvarx *variable-name*

Format a description for a variable; equivalent to ‘**@defvr** Variable ...’. See Chapter 14 [Definition Commands], page 123.

`@defvr` *category name*

`@defvr`*x* *category name*

Format a description for any kind of variable. `@defvr` takes as arguments the category of the entity and the name of the entity. See Chapter 14 [Definition Commands], page 123.

`@detailmenu`

Mark the (optional) detailed node listing in a master menu. See Section 3.6.2 [Master Menu Parts], page 26.

`@dfn{term}`

Indicate the introductory or defining use of a term. See Section 7.1.12 [`@dfn`], page 67.

`@DH{}`

`@dh{}` Generate the uppercase and lowercase Icelandic letter eth, respectively: Ð, ð. See Section 12.4 [Inserting Accents], page 108.

`@dircategory` *dirpart*

Specify a part of the Info directory menu where this file's entry should go. See Section 21.2.4 [Installing Dir Entries], page 207.

`@direntry`

Begin the Info directory menu entry for this file. Pair with `@end direntry`. See Section 21.2.4 [Installing Dir Entries], page 207.

`@display`

Begin a kind of example. Like `@example` (indent text, do not fill), but do not select a new font. Pair with `@end display`. See Section 8.7 [`@display`], page 76.

`@dmn{dimension}`

Format a unit of measure, as in 12pt. Causes T_EX to insert a thin space before *dimension*. No effect in Info. See Section 12.3.5 [`@dmn`], page 108.

`@docbook`

Enter Docbook completely. Pair with `@end docbook`. See Section 16.3 [Raw Formatter Commands], page 141.

`@documentdescription`

Set the document description text, included in the HTML output. Pair with `@end documentdescription`. See Section 3.7.1 [`@documentdescription`], page 27.

`@documentencoding` *enc*

Declare the input encoding to be *enc*. See Section 15.2 [`@documentencoding`], page 137.

`@documentlanguage` *CC*

Declare the document language as the two-character ISO-639 abbreviation *CC*. See Section 15.1 [`@documentlanguage`], page 136.

`@dotaccent{c}`

Generate a dot accent over the character *c*, as in *ó*. See Section 12.4 [Inserting Accents], page 108.

- `@dotless{i-or-j}`
Generate dotless i (‘i’) and dotless j (‘j’). See Section 12.4 [Inserting Accents], page 108.
- `@dots{}` Generate an ellipsis, ‘...’. See Section 12.8.4 [`@dots`], page 113.
- `@email{address[, displayed-text]}`
Indicate an electronic mail address. See Section 7.1.16 [`@email`], page 69.
- `@emph{text}`
Emphasize *text*, by using *italics* where possible, and enclosing in asterisks in Info. See Section 7.2 [Emphasizing Text], page 69.
- `@end environment`
Ends *environment*, as in ‘`@end example`’. See [`@-commands`], page 10.
- `@enddots{}`
Generate an end-of-sentence ellipsis, like this: ... See Section 12.8.4 [`@dots`], page 113.
- `@enumerate [number-or-letter]`
Begin a numbered list, using `@item` for each entry. Optionally, start list with *number-or-letter*. Pair with `@end enumerate`. See Section 9.3 [`@enumerate`], page 84.
- `@env{environment-variable}`
Indicate an environment variable name, such as `PATH`. See Section 7.1.8 [`@env`], page 66.
- `@equiv{}` Indicate to the reader the exact equivalence of two forms with a glyph: ‘ \equiv ’. See Section 12.9.6 [`@equiv`], page 116.
- `@error{}` Indicate to the reader with a glyph that the following text is an error message: ‘`error`’. See Section 12.9.5 [`@error`], page 116.
- `@errormsg{msg}`
Report *msg* as an error to standard error, and exit unsuccessfully. Texinfo commands within *msg* are expanded to plain text. See Chapter 16 [Conditionals], page 139, and Section 17.6 [External Macro Processors], page 156.
- `@euro{}` Generate the Euro currency sign. See Section 12.8.6 [`@euro`], page 113.
- `@evenfooting [left] @| [center] @| [right]`
`@evenheading [left] @| [center] @| [right]`
Specify page footings resp. headings for even-numbered (left-hand) pages. See Section E.4 [How to Make Your Own Headings], page 272.
- `@everyfooting [left] @| [center] @| [right]`
`@everyheading [left] @| [center] @| [right]`
Specify page footings resp. headings for every page. Not relevant to Info. See Section E.4 [How to Make Your Own Headings], page 272.
- `@example` Begin an example. Indent text, do not fill, and select fixed-width font. Pair with `@end example`. See Section 8.4 [`@example`], page 74.

@exampleindent *indent*

Indent example-like environments by *indent* number of spaces (perhaps 0). See Section 3.7.6 [**@exampleindent**], page 30.

@exclamdown{}

Generate an upside-down exclamation point. See Section 12.4 [Inserting Accents], page 108.

@exdent *line-of-text*

Remove any indentation a line might have. See Section 8.9 [**@exdent**], page 77.

@expansion{}

Indicate the result of a macro expansion to the reader with a special glyph: ‘↦’. See Section 12.9.3 [**@expansion**], page 115.

@file{*filename*}

Highlight the name of a file, buffer, node, directory, etc. See Section 7.1.9 [**@file**], page 67.

@finalout

Prevent T_EX from printing large black warning rectangles beside over-wide lines. See Section 19.10 [Overfull hboxes], page 172.

@index *entry*

Add *entry* to the index of functions. See Section 11.3 [Defining the Entries of an Index], page 98.

@firstparagraphindent *word*

Control indentation of the first paragraph after section headers according to *word*, one of ‘none’ or ‘insert’. See Section 3.7.5 [**@firstparagraphindent**], page 29.

@float

Environment to define floating material. Pair with **@end float**. See Section 10.1 [Floats], page 90.

@flushleft**@flushright**

Do not fill text; left (right) justify every line while leaving the right (left) end ragged. Leave font as is. Pair with **@end flushleft** (**@end flushright**). See Section 8.10 [**@flushleft @flushright**], page 77.

@fonttextsize *10-11*

Change the size of the main body font in the T_EX output. See Section 7.2.3 [Fonts], page 70.

@footnote{*text-of-footnote*}

Enter a footnote. Footnote text is printed at the bottom of the page by T_EX; Info may format in either ‘End’ node or ‘Separate’ node style. See Section 10.3 [Footnotes], page 94.

@footnotestyle *style*

Specify an Info file’s footnote style, either ‘end’ for the end node style or ‘separate’ for the separate node style. See Section 10.3 [Footnotes], page 94.

- @format** Begin a kind of example. Like `@display`, but do not indent. Pair with `@end format`. See Section 8.4 [`@example`], page 74.
- @frenchspacing** *on-off*
Control spacing after punctuation. See Section 12.3.4 [`@frenchspacing`], page 107.
- @ftable** *formatting-command*
Begin a two-column table, using `@item` for each entry. Automatically enter each of the items in the first column into the index of functions. Pair with `@end ftable`. The same as `@table`, except for indexing. See Section 9.4.2 [`@ftable @vtable`], page 87.
- @geq{}** Generate a greater-than-or-equal sign, ‘ \geq ’. See Section 12.8.10 [`@geq @leq`], page 114.
- @group** Disallow page breaks within following text. Pair with `@end group`. Ignored in Info. See Section 13.9 [`@group`], page 121.
- @guillemetleft{}**
@guillemetright{}
@guillemotleft{}
@guillemotright{}
@guilsinglleft{}
@guilsinglright{}
Double and single angle quotation marks: « » ‹ ›. `@guillemotleft` and `@guillemotright` are synonyms for `@guillemetleft` and `@guillemetright`. See Section 12.5 [Inserting Quotation Marks], page 109.
- @H{c}** Generate the long Hungarian umlaut accent over *c*, as in *ő*.
- @hashchar{}**
Insert a hash ‘#’ character; only needed when a literal hash would introduce `#line` directive. See Section 12.1.5 [Inserting a Hashsign], page 104, and Section 17.6 [External Macro Processors], page 156.
- @heading** *title*
Print an unnumbered section-like heading, but omit from the table of contents. In Info, the title is underlined with equal signs. See Section 5.7 [`@unnumberedsec @appendixsec @heading`], page 45.
- @headings** *on-off-single-double*
Turn page headings on or off, and/or specify single-sided or double-sided page headings for printing. See Section 3.7.3 [`@headings`], page 28.
- @headitem**
Begin a heading row in a multitable. See Section 9.5.2 [Multitable Rows], page 88.
- @headitemfont{*text*}**
Set *text* in the font used for multitable heading rows; mostly useful in multitable templates. See Section 9.5.2 [Multitable Rows], page 88.

- @html** Enter HTML completely. Pair with **@end html**. See Section 16.3 [Raw Formatter Commands], page 141.
- @hyphenation{*hy-phen-a-ted words*}**
Explicitly define hyphenation points. See Section 13.3 [@- @hyphenation], page 120.
- @i{*text*}** Set *text* in an *italic* font. No effect in Info. See Section 7.2.3 [Fonts], page 70.
- @ifclear *txivar***
If the Texinfo variable *txivar* is not set, format the following text. Pair with **@end ifclear**. See Section 16.5 [@set @clear @value], page 143.
- @ifcommanddefined *txicmd***
@ifcommandnotdefined *txicmd*
If the Texinfo code '*@txicmd*' is (not) defined, format the follow text. Pair with the corresponding **@end ifcommand...** See Section 16.6 [Testing for Texinfo Commands], page 147.
- @ifdocbook**
@ifhtml
@ifinfo Begin text that will appear only in the given output format. **@ifinfo** output appears in both Info and (for historical compatibility) plain text output. Pair with **@end ifdocbook** resp. **@end ifhtml** resp. **@end ifinfo**. See Chapter 16 [Conditionals], page 139.
- @ifnotdocbook**
@ifnohtml
@ifnotplaintext
@ifnottex
@ifnotxml
Begin text to be ignored in one output format but not the others. **@ifnohtml** text is omitted from HTML output, etc. Pair with the corresponding **@end ifnotformat**. See Chapter 16 [Conditionals], page 139.
- @ifnotinfo**
Begin text to appear in output other than Info and (for historical compatibility) plain text. Pair with **@end ifnotinfo**. See Chapter 16 [Conditionals], page 139.
- @ifplaintext**
Begin text that will appear only in the plain text output. Pair with **@end ifplaintext**. See Chapter 16 [Conditionals], page 139.
- @ifset *txivar***
If the Texinfo variable *txivar* is set, format the following text. Pair with **@end ifset**. See Section 16.5 [@set @clear @value], page 143.
- @iftex** Begin text to appear only in the T_EX output. Pair with **@end iftex**. See Chapter 16 [Conditionally Visible Text], page 139.
- @ifxml** Begin text that will appear only in the XML output. Pair with **@end ifxml**. See Chapter 16 [Conditionals], page 139.

- @ignore** Begin text that will not appear in any output. Pair with `@end ignore`. See Section 2.2 [Comments and Ignored Text], page 11.
- @image{*filename*, [*width*], [*height*], [*alt*], [*ext*]}**
 Include graphics image in external *filename* scaled to the given *width* and/or *height*, using *alt* text and looking for '*filename.ext*' in HTML. See Section 10.2 [Images], page 92.
- @include *filename***
 Read the contents of Texinfo source file *filename*. See Chapter 18 [Include Files], page 159.
- @indent** Insert paragraph indentation. See Section 8.13 [`@indent`], page 79.
- @indentedblock**
 Indent a block of arbitrary text on the left. Pair with `@end indentedblock`. See Section 8.3 [`@indentedblock`], page 74.
- @indicateurl{*indicateurl*}**
 Indicate text that is a uniform resource locator for the World Wide Web. See Section 7.1.15 [`@indicateurl`], page 69.
- @inforef{*node-name*, [*entry-name*], *info-file-name*}**
 Make a cross-reference to an Info file for which there is no printed manual. See Section 6.9 [`@inforef`], page 57.
- @inlinefmt{*fmt*, *text*}**
 Insert *text* only if the output format is *fmt*. See Section 16.4 [Inline Conditionals], page 142.
- @inlinefmtifelse{*fmt*, *text*, *else-text*}**
 Insert *text* if the output format is *fmt*, else *else-text*.
- @inlineifclear{*var*, *text*}**
@inlineifset{*var*, *text*}
 Insert *text* only if the Texinfo variable *var* is (not) set.
- @inlineraw{*fmt*, *raw-text*}**
 Insert *text* as in a raw conditional, only if the output format is *fmt*.
- \input *macro-definitions-file***
 Use the specified macro definitions file. This command is used only in the first line of a Texinfo file to cause T_EX to make use of the `texinfo` macro definitions file. The `\` in `\input` is used instead of an `@` because T_EX does not recognize `@` until after it has read the definitions file. See Section 3.2 [Texinfo File Header], page 16.
- @insertcopying**
 Insert the text previously defined with the `@copying` environment. See Section 3.3.2 [`@insertcopying`], page 20.
- @item** Indicate the beginning of a marked paragraph for `@itemize` and `@enumerate`; indicate the beginning of the text of a first column entry for `@table`, `@ftable`, and `@vtable`. See Chapter 9 [Lists and Tables], page 82.

- @itemize** *mark-generating-character-or-command*
 Begin an unordered list: indented paragraphs with a mark, such as @bullet, inside the left margin at the beginning of each item. Pair with @end itemize. See Section 9.2 [itemize], page 83.
- @itemx** Like @item but do not generate extra vertical space above the item text. Thus, when several items have the same description, use @item for the first and @itemx for the others. See Section 9.4.3 [itemx], page 87.
- @kbd{keyboard-characters}**
 Indicate characters of input to be typed by users. See Section 7.1.3 [kbd], page 63.
- @kbdinputstyle style**
 Specify when @kbd should use a font distinct from @code according to *style*: code, distinct, example. See Section 7.1.3 [kbd], page 63.
- @key{key-name}**
 Indicate the name of a key on a keyboard. See Section 7.1.4 [key], page 64.
- @kindex entry**
 Add *entry* to the index of keys. See Section 11.3 [Defining the Entries of an Index], page 98.
- @L{}**
@l{} Generate the uppercase and lowercase Polish suppressed-L letters, respectively: L, l.
- @LaTeX{}** Generate the L^AT_EX logo. See Section 12.8.1 [TeX @LaTeX], page 112.
- @leq{}** Generate a less-than-or-equal sign, ‘≤’. See Section 12.8.10 [geq @leq], page 114.
- @lisp** Begin an example of Lisp code. Indent text, do not fill, and select fixed-width font. Pair with @end lisp. See Section 8.6 [lisp], page 76.
- @listoffloats**
 Produce a table-of-contents-like listing of @floats. See Section 10.1.3 [listoffloats], page 91.
- @lowersections**
 Change subsequent chapters to sections, sections to subsections, and so on. See Section 5.12 [raisesections and @lowersections], page 47.
- @macro macroname {params}**
 Define a new Texinfo command @macroname{params}. Pair with @end macro. See Section 17.1 [Defining Macros], page 149.
- @majorheading title**
 Print an unnumbered chapter-like heading, but omit from the table of contents. This generates more vertical whitespace before the heading than the @chapheading command. See Section 5.5 [majorheading @chapheading], page 44.

- @math***{mathematical-expression}*
Format a mathematical expression. See Section 12.7 [Inserting Math], page 111.
- @menu** Mark the beginning of a menu of nodes. No effect in a printed manual. Pair with **@end menu**. See Section 4.9 [Menus], page 38.
- @minus***{}* Generate a minus sign, ‘-’. See Section 12.8.9 [**@minus**], page 114.
- @multitable** *column-width-spec*
Begin a multi-column table. Begin each row with **@item** or **@headitem**, and separate columns with **@tab**. Pair with **@end multitable**. See Section 9.5.1 [Multitable Column Widths], page 88.
- @need n** Start a new page in a printed manual if fewer than *n* mils (thousandths of an inch) remain on the current page. See Section 13.10 [**@need**], page 122.
- @node** *name, next, previous, up*
Begin a new node. See Section 4.3 [Writing a Node], page 32.
- @noindent**
Prevent text from being indented as if it were a new paragraph. See Section 8.12 [**@noindent**], page 78.
- @novalidate**
Suppress validation of node references and omit creation of auxiliary files with TeX. Use before any sectioning or cross-reference commands. See Section 20.5 [Pointer Validation], page 184.
- @O***{}*
@o*{}* Generate the uppercase and lowercase O-with-slash letters, respectively: Ø, ø.
- @oddfooting** [*left*] @| [*center*] @| [*right*]
@oddheading [*left*] @| [*center*] @| [*right*]
Specify page footings resp. headings for odd-numbered (right-hand) pages. See Section E.4 [How to Make Your Own Headings], page 272.
- @OE***{}*
@oe*{}* Generate the uppercase and lowercase OE ligatures, respectively: Œ, œ. See Section 12.4 [Inserting Accents], page 108.
- @ogonek***{c}*
Generate an ogonek diacritic under the next character, as in ą. See Section 12.4 [Inserting Accents], page 108.
- @option***{option-name}*
Indicate a command-line option, such as **-1** or **--help**. See Section 7.1.11 [**@option**], page 67.
- @ordf***{}*
@ordm*{}* Generate the feminine and masculine Spanish ordinals, respectively: ^a, ^o. See Section 12.4 [Inserting Accents], page 108.
- @page** Start a new page in a printed manual. No effect in Info. See Section 13.8 [**@page**], page 121.

- @pagesizes** [*width*] [, *height*]
Change page dimensions. See [pagesizes], page 173.
- @paragraphindent** *indent*
Indent paragraphs by *indent* number of spaces (perhaps 0); preserve source file indentation if *indent* is *asis*. See Section 3.7.4 [paragraphindent], page 29.
- @part** *title*
Begin a group of chapters or appendixes; included in the tables of contents and produces a page of its own in printed output. See Section 5.11 [part], page 46.
- @pindex** *entry*
Add *entry* to the index of programs. See Section 11.3 [Defining the Entries of an Index], page 98.
- @point**{*point*}
Indicate the position of *point* in a buffer to the reader with a glyph: ‘*’. See Section 12.9.7 [point], page 116.
- @pounds**{*point*}
Generate the pounds sterling currency sign. See Section 12.8.7 [pounds], page 113.
- @print**{*point*}
Indicate printed output to the reader with a glyph: ‘+’. See Section 12.9.4 [print], page 115.
- @printindex** *index-name*
Generate the alphabetized index for *index-name* (using two columns in a printed manual). See Section 11.4 [Printing Indices & Menus], page 99.
- @pxref**{*node*, [*entry*], [*node-title*], [*info-file*], [*manual*]}
Make a reference that starts with a lowercase ‘see’ in a printed manual. Use within parentheses only. Only the first argument is mandatory. See Section 6.7 [pxref], page 55.
- @questiondown**{*point*}
Generate an upside-down question mark. See Section 12.4 [Inserting Accents], page 108.
- @quotation**
Narrow the margins to indicate text that is quoted from another work. Takes optional argument specifying prefix text, e.g., an author name. Pair with @end quotation. See Section 8.2 [quotation], page 73.
- @quotedblleft**{*text*}
- @quotedblright**{*text*}
- @quoteleft**{*text*}
- @quoteright**{*text*}
- @quotedblbase**{*text*}
- @quotesinglbase**{*text*}
- Produce various quotation marks: “ ” ‘ ’ „ „. See Section 12.5 [Inserting Quotation Marks], page 109.
- @r**{*text*}
Set *text* in the regular roman font. No effect in Info. See Section 7.2.3 [Fonts], page 70.

@raggedright

Fill text; left justify every line while leaving the right end ragged. Leave font as is. Pair with `@end raggedright`. No effect in Info. See Section 8.11 [`@raggedright`], page 78.

@raisesections

Change subsequent sections to chapters, subsections to sections, and so on. See Section 5.12 [Raise/lower sections], page 47.

@ref{node, [entry], [node-title], [info-file], [manual]}

Make a plain reference that does not start with any special text. Follow command with a punctuation mark. Only the first argument is mandatory. See Section 6.6 [`@ref`], page 55.

@refill

This command used to refill and indent the paragraph after all the other processing has been done. It is no longer needed, since all formatters now automatically refill as needed, but you may still see it in the source to some manuals, as it does no harm.

@registeredsymbol{}

Generate the legal symbol $\text{\textcircled{R}}$. See Section 12.8.3 [`@registeredsymbol`], page 112.

@result{}

Indicate the result of an expression to the reader with a special glyph: ‘ \Rightarrow ’. See Section 12.9.2 [`@result`], page 115.

@ringaccent{c}

Generate a ring accent over the next character, as in $\text{\textcircled{o}}$. See Section 12.4 [Inserting Accents], page 108.

@samp{text}

Indicate a literal example of a sequence of characters, in general. Quoted in Info output. See Section 7.1.5 [`@samp`], page 65.

@sansserif{text}

Set *text* in a sans serif font if possible. No effect in Info. See Section 7.2.3 [Fonts], page 70.

@sc{text}

Set *text* in a small caps font in printed output, and uppercase in Info. See Section 7.2.2 [Smallcaps], page 70.

@section title

Begin a section within a chapter. The section title appears in the table of contents. In Info, the title is underlined with equal signs. Within `@chapter` and `@appendix`, the section title is numbered; within `@unnumbered`, the section is unnumbered. See Section 5.6 [`@section`], page 44.

@set txivar [string]

Define the Texinfo variable *txivar*, optionally to the value *string*. See Section 16.5 [`@set @clear @value`], page 143.

@setchapternewpage *on-off-odd*

Specify whether chapters start on new pages, and if so, whether on odd-numbered (right-hand) new pages. See Section 3.7.2 [**@setchapternewpage**], page 27.

@setfilename *info-file-name*

Provide a name to be used for the output files. This command is ignored for T_EX formatting. See Section 3.2.3 [**@setfilename**], page 17.

@settitle *title*

Specify the title for page headers in a printed manual, and the default document title for HTML ‘<head>’. See Section 3.2.4 [**@settitle**], page 18.

@shortcaption

Define the short caption for a **@float**. See Section 10.1.2 [**@caption** **@shortcaption**], page 91.

@shortcontents

Print a short table of contents, with chapter-level entries only. Not relevant to Info, which uses menus rather than tables of contents. See Section 3.5 [Generating a Table of Contents], page 24.

@shorttitlepage *title*

Generate a minimal title page. See Section 3.4.1 [**@titlepage**], page 20.

@slanted{*text*}

Set *text* in a *slanted* font if possible. No effect in Info. See Section 7.2.3 [Fonts], page 70.

@smallbook

Cause T_EX to produce a printed manual in a 7 by 9.25 inch format rather than the regular 8.5 by 11 inch format. See Section 19.11 [**@smallbook**], page 172. Also, see Section 8.15 [**@small...**], page 80.

@smalldisplay

Begin a kind of example. Like **@display**, but use a smaller font size where possible. Pair with **@end smalldisplay**. See Section 8.15 [**@small...**], page 80.

@smallexample

Begin an example. Like **@example**, but use a smaller font size where possible. Pair with **@end smallexample**. See Section 8.15 [**@small...**], page 80.

@smallformat

Begin a kind of example. Like **@format**, but use a smaller font size where possible. Pair with **@end smallformat**. See Section 8.15 [**@small...**], page 80.

@smallindentedblock

Like **@indentedblock**, but use a smaller font size where possible. Pair with **@end smallindentedblock**. See Section 8.15 [**@small...**], page 80.

@smalllisp

Begin an example of Lisp code. Same as **@smallexample**. Pair with **@end smalllisp**. See Section 8.15 [**@small...**], page 80.

@smallquotation

Like `@quotation`, but use a smaller font size where possible. Pair with `@end smallquotation`. See Section 8.15 [`@small...`], page 80.

@sortas {key}

Used in the arguments to index commands to give a string by which the index entry should be sorted. See Section 11.2 [Indexing Commands], page 98.

@sp *n* Skip *n* blank lines. See Section 13.7 [`@sp`], page 121.

@ss{} Generate the German sharp-S es-zet letter, ß. See Section 12.4 [Inserting Accents], page 108.

@strong {text}

Emphasize *text* more strongly than `@emph`, by using **boldface** where possible; enclosed in asterisks in Info. See [Emphasizing Text], page 70.

@sub {text}

Set *text* as a subscript. See Section 12.6 [Inserting Subscripts and Superscripts], page 111.

@subheading *title*

Print an unnumbered subsection-like heading, but omit from the table of contents of a printed manual. In Info, the title is underlined with hyphens. See Section 5.9 [`@unnumberedsubsec @appendixsubsec @subheading`], page 45.

@subsection *title*

Begin a subsection within a section. The subsection title appears in the table of contents. In Info, the title is underlined with hyphens. Same context-dependent numbering as `@section`. See Section 5.8 [`@subsection`], page 45.

@subsubheading *title*

Print an unnumbered subsubsection-like heading, but omit from the table of contents of a printed manual. In Info, the title is underlined with periods. See Section 5.10 [`@subsubsection`], page 46.

@subsubsection *title*

Begin a subsubsection within a subsection. The subsubsection title appears in the table of contents. In Info, the title is underlined with periods. Same context-dependent numbering as `@section`. See Section 5.10 [`@subsubsection`], page 46.

@subtitle *title*

In a printed manual, set a subtitle in a normal sized font flush to the right-hand side of the page. Not relevant to Info, which does not have title pages. See Section 3.4.3 [`@title @subtitle @author`], page 22.

@summarycontents

Print a short table of contents. Synonym for `@shortcontents`. See Section 3.5 [Generating a Table of Contents], page 24.

@sup {text}

Set *text* as a superscript. See Section 12.6 [Inserting Subscripts and Superscripts], page 111.

@syncodeindex *from-index to-index*

Merge the index named in the first argument into the index named in the second argument, formatting the entries from the first index with `@code`. See Section 11.5 [Combining Indices], page 100.

@synindex *from-index to-index*

Merge the index named in the first argument into the index named in the second argument. Do not change the font of *from-index* entries. See Section 11.5 [Combining Indices], page 100.

@t{*text*} Set *text* in a *fixed-width*, typewriter-like font. No effect in Info. See Section 7.2.3 [Fonts], page 70.

@tab Separate columns in a row of a multitable. See Section 9.5.2 [Multitable Rows], page 88.

@table *formatting-command*

Begin a two-column table (description list), using `@item` for each entry. Write each first column entry on the same line as `@item`. First column entries are printed in the font resulting from *formatting-command*. Pair with `@end table`. See Section 9.4 [Making a Two-column Table], page 85. Also see Section 9.4.2 [`@ftable @vtable`], page 87, and Section 9.4.3 [`@itemx`], page 87.

@TeX{} Generate the T_EX logo. See Section 12.8.1 [`@TeX @LaTeX`], page 112.

@tex Enter T_EX completely. Pair with `@end tex`. See Section 16.3 [Raw Formatter Commands], page 141.

@textdegree{}

Generate the degree symbol. See Section 12.8.8 [`@textdegree`], page 113.

@thischapter**@thischaptername****@thischapternum****@thisfile****@thispage****@thistitle**

Only allowed in a heading or footing. Stands for, respectively, the number and name of the current chapter (in the format ‘Chapter 1: Title’), the current chapter name only, the current chapter number only, the filename, the current page number, and the title of the document, respectively. See Section E.4 [How to Make Your Own Headings], page 272.

@TH{}

@th{} Generate the uppercase and lowercase Icelandic letter thorn, respectively: Þ, þ. See Section 12.4 [Inserting Accents], page 108.

@tie{} Generate a normal interword space at which a line break is not allowed. See Section 13.6 [`@tie`], page 121.

@tieaccent{*cc*}

Generate a tie-after accent over the next two characters *cc*, as in ‘ôô’. See Section 12.4 [Inserting Accents], page 108.

@tindex entry

Add *entry* to the index of data types. See Section 11.3 [Defining the Entries of an Index], page 98.

@title title

In a printed manual, set a title flush to the left-hand side of the page in a larger than normal font and underline it with a black rule. Not relevant to Info, which does not have title pages. See Section 3.4.3 [**@title @subtitle @author**], page 22.

@titlefont{text}

In a printed manual, print *text* in a larger than normal font. See Section 3.4.2 [**@titlefont @center @sp**], page 21.

@titlepage

Begin the title page. Write the command on a line of its own, paired with **@end titlepage**. Nothing between **@titlepage** and **@end titlepage** appears in Info. See Section 3.4.1 [**@titlepage**], page 20.

@today{} Insert the current date, in ‘1 Jan 1900’ style. See Section E.4 [How to Make Your Own Headings], page 272.

@top title

Mark the topmost **@node** in the file, which must be defined on the line immediately preceding the **@top** command. The title is formatted as a chapter-level heading. The entire top node, including the **@node** and **@top** lines, are normally enclosed with **@ifnottex ... @end ifnottex**. In \TeX and **texinfo-format-buffer**, the **@top** command is merely a synonym for **@unnumbered**. See Section 4.8 [makeinfo Pointer Creation], page 37.

@U{hex} Output a representation of Unicode character U+*hex*. See Section 12.10 [Inserting Unicode], page 118.

@u{c}**@ubaraccent{c}****@udotaccent{c}**

Generate a breve, underbar, or underdot accent, respectively, over or under the character *c*, as in *ö, o, o*. See Section 12.4 [Inserting Accents], page 108.

@unmacro macroname

Undefine the macro **@macroname** if it has been defined. See Section 17.1 [Defining Macros], page 149.

@unnumbered title

Begin a chapter that appears without chapter numbers of any kind. The title appears in the table of contents. In Info, the title is underlined with asterisks. See Section 5.4 [**@unnumbered @appendix**], page 44.

@unnumberedsec title

Begin a section that appears without section numbers of any kind. The title appears in the table of contents of a printed manual. In Info, the title is underlined with equal signs. See Section 5.7 [**@unnumberedsec @appendixsec @heading**], page 45.

@unnumberedsubsec *title*

Begin an unnumbered subsection. The title appears in the table of contents. In Info, the title is underlined with hyphens. See Section 5.9 [unnumberedsubsec appendixsubsec subheading], page 45.

@unnumberedsubsubsec *title*

Begin an unnumbered subsubsection. The title appears in the table of contents. In Info, the title is underlined with periods. See Section 5.10 [subsubsection], page 46.

@uref{*url* [, *displayed-text*] [, *replacement*] }**@url{*url* [, *displayed-text*] [, *replacement*] }**

Define a cross-reference to an external uniform resource locator, e.g., for the World Wide Web. See Section 6.10 [url], page 57.

@urefbreakstyle *style*

Specify how @uref/@url should break at special characters: *after*, *before*, *none*. See Section 6.10 [url], page 57.

@v{*c*} Generate check accent over the character *c*, as in ö. See Section 12.4 [Inserting Accents], page 108.

@validatemenus *on-off*

Control whether menus can be automatically generated. See Section 4.9.1 [Writing a Menu], page 38.

@value{*txivar*}

Insert the value, if any, of the Texinfo variable *txivar*, previously defined by @set. See Section 16.5 [set clear value], page 143.

@var{*metasyntactic-variable*}

Highlight a metasyntactic variable, which is something that stands for another piece of text. See Section 7.1.7 [var], page 66.

@verb{*delim literal delim*}

Output *literal*, delimited by the single character *delim*, exactly as is (in the fixed-width font), including any whitespace or Texinfo special characters. See Section 7.1.6 [verb], page 65.

@verbatim

Output the text of the environment exactly as is (in the fixed-width font). Pair with @end verbatim. See Section 8.5 [verbatim], page 75.

@verbatiminclude *filename*

Output the contents of *filename* exactly as is (in the fixed-width font). See Section 18.5 [verbatiminclude], page 161.

@vindex *entry*

Add *entry* to the index of variables. See Section 11.3 [Defining the Entries of an Index], page 98.

@vskip *amount*

In a printed manual, insert whitespace so as to push text on the remainder of the page towards the bottom of the page. Used in formatting the copyright

page with the argument ‘Opt plus 1filll’. (Note spelling of ‘filll’.) `@vskip` may be used only in contexts ignored for Info. See Section 3.4.4 [Copyright], page 23.

@vtable *formatting-command*

Begin a two-column table, using `@item` for each entry. Automatically enter each of the items in the first column into the index of variables. Pair with `@end vtable`. The same as `@table`, except for indexing. See Section 9.4.2 [`@ftable @vtable`], page 87.

`@w{text}` Disallow line breaks within *text*. See Section 13.5 [`@w`], page 120.

`@xml` Enter XML completely. Pair with `@end xml`. See Section 16.3 [Raw Formatter Commands], page 141.

`@xref{node, [entry], [node-title], [info-file], [manual]}`

Make a reference that starts with ‘See’ in a printed manual. Follow command with a punctuation mark. Only the first argument is mandatory. See Section 6.4 [`@xref`], page 51.

`@xrefautomaticsectiontitle on-off`

By default, use the section title instead of the node name in cross references. See Section 6.4.3 [Three Arguments], page 52.

A.3 @-Command Contexts

Here we describe approximately which @-commands can be used in which contexts. It not exhaustive or meant to be a complete reference. Discrepancies between the information here and the `makeinfo` or `TEX` implementations are most likely to be resolved in favor of the implementation.

By *general text* below, we mean anything except sectioning and other such outer-level document commands, such as `@section`, `@node`, and `@setfilename`.

`@c`, `@comment` and `@if ... @end if` conditional commands may appear anywhere (except the conditionals must still be on lines by themselves). `@caption` may only appear in `@float` but may contain general text. `@footnote` content likewise.

@-commands with braces marking text (such as `@strong`, `@sc`, `@asis`) may contain raw formatter commands such as `@html` but no other block commands (other commands terminated by `@end`) and may not be split across paragraphs, but may otherwise contain general text.

In addition to the block command restriction, on `@center`, `@exdent` and `@item` in `@table` lines, @-commands that makes only sense in a paragraph are not accepted, such as `@indent`.

In addition to the above, sectioning commands cannot contain `@anchor`, `@footnote` or `@verb`.

In addition to the above, remaining commands (`@node`, `@anchor`, `@printindex`, `@ref`, `@math`, `@cindex`, `@url`, `@image`, and so on) cannot contain cross-reference commands (`@ref`, `@xref`, `@pxref` and `@inforef`). In one last addition, `@shortcaption` may only appear inside `@float`.

For precise and complete information, we suggest looking into the test suite in the sources, which exhaustively tries combinations.

A.4 Obsolete @-Commands

Here are Texinfo @-commands which are obsolete or have been removed completely. This section is for historical purposes.

`@setcontentsaftertitlepage`

In the past, the contents commands were sometimes placed at the end of the file, after any indices and just before the `@bye`, but we no longer recommend this. This command could be used by a user printing a manual, to force the contents to be printed after the title page (after the `'@end titlepage'` line) even if the `@contents` command was at the end of the manual. It now does nothing.

`@setshortcontentsaftertitlepage`

This placed the short table of contents after the `'@end titlepage'` command even if the `@shortcontents` command was at the end. It now does nothing.

Appendix B Tips and Hints

Here are some tips for writing Texinfo documentation:

- Write in the present tense, not in the past or the future.
- Write actively! For example, write “We recommend that . . .” rather than “It is recommended that . . .”.
- Use 70 or 72 as your fill column. Longer lines are hard to read.
- Include a copyright notice and copying permissions.

Index, Index, Index!

Write many index entries, in different ways. Readers like indices; they are helpful and convenient.

Although it is easiest to write index entries as you write the body of the text, some people prefer to write entries afterwards. In either case, write an entry before the paragraph to which it applies. This way, an index entry points to the first page of a paragraph that is split across pages.

Here are more index-related hints we have found valuable:

- Write each index entry differently, so each entry refers to a different place in the document.
- Write index entries only where a topic is discussed significantly. For example, it is not useful to index “debugging information” in a chapter on reporting bugs. Someone who wants to know about debugging information will certainly not find it in that chapter.
- Consistently capitalize the first word of every concept index entry, or else consistently use lowercase. Terse entries often call for lowercase; longer entries for capitalization. Whichever case convention you use, please use one or the other consistently! Mixing the two styles looks bad.
- Always capitalize or use uppercase for those words in an index for which this is proper, such as names of countries or acronyms. Always use the appropriate case for case-sensitive names, such as those in C or Lisp.
- Write the indexing commands that refer to a whole section immediately after the section command, and write the indexing commands that refer to a paragraph before that paragraph.

In the example that follows, a blank line comes after the index entry for “Leaping”:

```
@section The Dog and the Fox
@cindex Jumping, in general
@cindex Leaping

@cindex Dog, lazy, jumped over
@cindex Lazy dog jumped over
@cindex Fox, jumps over dog
@cindex Quick fox jumps over dog
The quick brown fox jumps over the lazy dog.
```

(Note that the example shows entries for the same concept that are written in different ways—‘Lazy dog’, and ‘Dog, lazy’—so readers can look up the concept in different ways.)

Blank Lines

- Insert a blank line between a sectioning command and the first following sentence or paragraph, or between the indexing commands associated with the sectioning command and the first following sentence or paragraph, as shown in the tip on indexing. It makes the source easier to read.
- Always insert a blank line before a `@table` command and after an `@end table` command; but never insert a blank line after an `@table` command.

For example,

```
Types of fox:

@table @samp
@item Quick
Jump over lazy dogs.

@item Brown
Also jump over lazy dogs.
@end table

@noindent
On the other hand, ...
```

Insert blank lines before and after `@itemize ... @end itemize` and `@enumerate ... @end enumerate` in the same way.

Complete Phrases

Complete phrases are easier to read than ...

- Write entries in an itemized list as complete sentences; or at least, as complete phrases. Incomplete expressions ... awkward ... like this.
- Write the prefatory sentence or phrase for a multi-item list or table as a complete expression. Do not write “You can set:”; instead, write “You can set these variables:”. The former expression sounds cut off.

Editions, Dates and Versions

Include edition numbers, version numbers, and dates in the `@copying` text (for people reading the Texinfo file, and for the legal copyright in the output files). Then use `@insertcopying` in the `@titlepage` section for people reading the printed output (see Section 2.4 [Short Sample], page 12).

It is easiest to handle such version information using `@set` and `@value`. See Section 16.5.4 [`@value Example`], page 146, and Section C.2 [GNU Sample Texts], page 253.

Definition Commands

Definition commands are `@defn`, `@defun`, `@defmac`, and the like, and enable you to write descriptions in a uniform format.

- Write just one definition command for each entity you define with a definition command. The automatic indexing feature creates an index entry that leads the reader to the definition.

- Use `@table ... @end table` in an appendix that contains a summary of functions, not `@defn` or other definition commands.

Capitalization

- Capitalize “Texinfo”; it is a name. Do not write the ‘x’ or ‘i’ in uppercase.
- Capitalize “Info”; it is a name.
- Write \TeX using the `@TeX{}` command. Note the uppercase ‘T’ and ‘X’. This command causes the formatters to typeset the name according to the wishes of Donald Knuth, who wrote \TeX . (Likewise `@LaTeX{}` for \LaTeX .)

Spaces

Do not use spaces to format a Texinfo file, except inside of `@example ... @end example` and other literal environments and commands.

For example, \TeX fills the following:

```
@kbd{C-x v}
@kbd{M-x vc-next-action}
  Perform the next logical operation
  on the version-controlled file
  corresponding to the current buffer.
```

so it looks like this:

```
C-x v M-x vc-next-action Perform the next logical operation on the version-
controlled file corresponding to the current buffer.
```

In this case, the text should be formatted with `@table`, `@item`, and `@itemx`, to create a table.

@code, @samp, @var, and ‘---’

- Use `@code` around Lisp symbols, including command names. For example,


```
The main function is @code{vc-next-action}, ...
```
- Avoid putting letters such as ‘s’ immediately after an ‘@code’. Such letters look bad.
- Use `@var` around meta-variables. Do not write angle brackets around them.
- Use three hyphens in a row, ‘---’, to indicate a long dash. \TeX typesets these as a long dash and the Info formatters reduce three hyphens to two.

Periods Outside of Quotes

Place periods and other punctuation marks *outside* of quotations, unless the punctuation is part of the quotation. This practice goes against some publishing conventions in the United States, but enables the reader to distinguish between the contents of the quotation and the whole passage.

For example, you should write the following sentence with the period outside the end quotation marks:

```
Evidently, ‘au’ is an abbreviation for ``author''.
```

since ‘au’ does *not* serve as an abbreviation for ‘author.’ (with a period following the word).

Introducing New Terms

- Introduce new terms so that a reader who does not know them can understand them from context; or write a definition for the term.

For example, in the following, the terms “check in”, “register” and “delta” are all appearing for the first time; the example sentence should be rewritten so they are understandable.

The major function assists you in checking in a file to your version control system and registering successive sets of changes to it as deltas.

- Use the `@dfn` command around a word being introduced, to indicate that the reader should not expect to know the meaning already, and should expect to learn the meaning from this passage.

Program Invocation Nodes

You can invoke programs such as Emacs, GCC, and `gawk` from a shell. The documentation for each program should contain a section that describes this. Unfortunately, if the node names and titles for these sections are all different, they are difficult for users to find.

So, there is a convention to name such sections with a phrase beginning with the word ‘Invoking’, as in ‘Invoking Emacs’; this way, users can find the section easily.

ANSI C Syntax

When you use `@example` to describe a C function’s calling conventions, use the ANSI C syntax, like this:

```
void dld_init (char *@var{path});
```

And in the subsequent discussion, refer to the argument values by writing the same argument names, again highlighted with `@var`.

Avoid the obsolete style that looks like this:

```
#include <dld.h>
```

```
dld_init (path)
char *path;
```

Also, it is best to avoid writing `#include` above the declaration just to indicate that the function is declared in a header file. The practice may give the misimpression that the `#include` belongs near the declaration of the function. Either state explicitly which header file holds the declaration or, better yet, name the header file used for a group of functions at the beginning of the section that describes the functions.

Node Length

Keep nodes (sections) to a reasonable length, whatever reasonable might be in the given context. Don’t hesitate to break up long nodes into subnodes and have an extensive tree structure; that’s what it’s there for. Many times, readers will probably try to find a single specific point in the manual, using search, indexing, or just plain guessing, rather than reading the whole thing from beginning to end.

You can use the `texi-elements-by-size` utility to see a list of all nodes (or sections) in the document, sorted by size (either lines or words), to find candidates for splitting. It’s in the `util/` subdirectory of the Texinfo sources.

Bad Examples

Here are several examples of bad writing to avoid:

In this example, say, “. . . you must `@dfn{check in}` the new version.” That flows better.

When you are done editing the file, you must perform a `@dfn{check in}`.

In the following example, say, “. . . makes a unified interface such as VC mode possible.”

SCCS, RCS and other version-control systems all perform similar functions in broadly similar ways (it is this resemblance which makes a unified control mode like this possible).

And in this example, you should specify what ‘it’ refers to:

If you are working with other people, it assists in coordinating everyone’s changes so they do not step on each other.

And Finally . . .

- Pronounce `TEX` as if the ‘X’ were a Greek ‘chi’, as the last sound in the name ‘Bach’. But pronounce `Texinfo` as in ‘speck’: “teckinfo”.
- Write notes for yourself at the very end of a `Texinfo` file after the `@bye`. None of the formatters process text after the `@bye`; it is as if the text were within `@ignore . . . @end ignore`.

Appendix C Sample Texinfo Files

The first example from the first chapter (see Section 2.4 [Short Sample], page 12) is given here in its entirety, without commentary. The second example includes the full texts to be used in GNU manuals.

C.1 Short Sample

Here is a complete, short sample Texinfo file. You can see this file, with comments, in the first chapter. See Section 2.4 [Short Sample], page 12.

In a nutshell: The `makeinfo` program transforms a Texinfo source file such as this into an Info file or HTML; and `TEX` typesets it for a printed manual.

```

\input texinfo
@settitle Sample Manual 1.0

@copying
This is a short example of a complete Texinfo file.

Copyright @copyright{} 2016 Free Software Foundation, Inc.
@end copying

@titlepage
@title Sample Title
@page
@vskip 0pt plus 1filll
@insertcopying
@end titlepage

@c Output the table of the contents at the beginning.
@contents

@ifnottex
@node Top
@top GNU Sample

This manual is for GNU Sample
(version @value{VERSION}, @value{UPDATED}).
@end ifnottex

@menu
* First Chapter::   The first chapter is the
                    only chapter in this sample.
* Index::          Complete index.
@end menu

```



```

@node First Chapter
@chapter First Chapter

@cindex chapter, first

This is the first chapter.
@cindex index entry, another

Here is a numbered list.

@enumerate
@item
This is the first item.

@item
This is the second item.
@end enumerate

@node Index
@unnumbered Index

@printindex cp

@bye

```

C.2 GNU Sample Texts

Following is a sample Texinfo document with the full texts that should be used (adapted as necessary) in GNU manuals.

As well as the legal texts, it also serves as a practical example of how many elements in a GNU system can affect the manual. If you're not familiar with all these different elements, don't worry. They're not required and a perfectly good manual can be written without them. They're included here nonetheless because many manuals do (or could) benefit from them.

See Section 2.4 [Short Sample], page 12, for a minimal example of a Texinfo file. See Chapter 3 [Beginning and Ending a File], page 15, for a full explanation of that minimal example.

Here are some notes on the example:

- The '\$Id:' comment is for the CVS (<http://www.nongnu.org/cvs/>), RCS (see *Revision Control System*) and other version control systems, which expand it into a string such as:

```
$Id: texinfo.texi 7927 2017-08-11 12:08:40Z mthl $
```

(This is potentially useful in all sources that use version control, not just manuals.) You may wish to include the '\$Id:' comment in the @copying text, if you want a completely unambiguous reference to the documentation source version.

If you want to literally write `Id`, use `@w: @w{$}Id$`. Unfortunately, this technique does not work in plain text output, where it's not clear what should be done.

- The `version.texi` in the `@include` command is maintained automatically by Automake (see *GNU Automake*). It sets the ‘VERSION’ and ‘UPDATED’ values used elsewhere. If your distribution doesn't use Automake, but you do use Emacs, you may find the `time-stamp.el` package helpful (see Section “Time Stamps” in *The GNU Emacs Manual*).
- The `@syncodeindex` command reflects the recommendation to use only one index where possible, to make it easier for readers to look up index entries.
- The `@dircategory` is for constructing the Info directory. See Section 21.2.4 [Installing Dir Entries], page 207, which includes a variety of recommended category names.
- The ‘Invoking’ node is a GNU standard to help users find the basic information about command-line usage of a given program. See Section “Manual Structure Details” in *GNU Coding Standards*.
- It is best to include the entire GNU Free Documentation License in a GNU manual, unless the manual is only a few pages long. Of course this sample is even shorter than that, but it includes the FDL anyway in order to show one conventional way to do so. The `fdl.texi` file is available on the GNU machines and in the Texinfo and other GNU source distributions.

The FDL provides for omitting itself under certain conditions, but in that case the sample texts given here have to be modified. See Appendix H [GNU Free Documentation License], page 289.

- If the FSF is not the copyright holder, then use the appropriate name.
- If your manual is published on paper by the FSF or is longer than 400 pages, you should include the standard FSF cover texts (see Section “License Notices for Documentation” in *GNU Maintainer Information*).
- For documents that express your personal views, feelings or experiences, it is more appropriate to use a license permitting only verbatim copying, rather than the FDL. See Section C.3 [Verbatim Copying License], page 256.

Here is the sample document:

```
\input texinfo @c -*-texinfo-*-
@comment $Id@w{$}
@comment %**start of header
@include version.texi
@settitle GNU Sample @value{VERSION}
@syncodeindex pg cp
@comment %**end of header
@copying
This manual is for GNU Sample (version @value{VERSION}, @value{UPDATED}),
which is an example in the Texinfo documentation.
```

```
Copyright @copyright{} 2016 Free Software Foundation, Inc.
```

```
@quotation
```

Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.3 or any later version published by the Free Software Foundation; with no Invariant Sections, with no Front-Cover Texts, and with no Back-Cover Texts. A copy of the license is included in the section entitled ``GNU Free Documentation License''.

@end quotation

@end copying

@dircategory Texinfo documentation system

@direntry

* sample: (sample)Invoking sample.

@end direntry

@titlepage

@title GNU Sample

@subtitle for version @value{VERSION}, @value{UPDATED}

@author A.U. Thor (@email{bug-sample@gnu.org})

@page

@vskip 0pt plus 1filll

@insertcopying

@end titlepage

@contents

@ifnottex

@node Top

@top GNU Sample

This manual is for GNU Sample (version @value{VERSION}, @value{UPDATED}).

@end ifnottex

@menu

* Invoking sample::

* GNU Free Documentation License::

* Index::

@end menu

@node Invoking sample

@chapter Invoking sample

@pindex sample

@cindex invoking @command{sample}

This is a sample manual. There is no sample program to invoke, but if there were, you could see its basic usage

and command line options here.

```
@node GNU Free Documentation License
@appendix GNU Free Documentation License
```

```
@include fdl.texi
```

```
@node Index
@unnumbered Index
```

```
@printindex cp
```

```
@bye
```

C.3 Verbatim Copying License

For software manuals and other documentation, it is critical to use a license permitting free redistribution and updating, so that when a free program is changed, the documentation can be updated as well.

On the other hand, for documents that express your personal views, feelings or experiences, it is more appropriate to use a license permitting only verbatim copying.

Here is sample text for such a license permitting verbatim copying only. This is just the license text itself. For a complete sample document, see the previous sections.

```
@copying
```

```
This document is a sample for allowing verbatim copying only.
```

```
Copyright @copyright{} 2016 Free Software Foundation, Inc.
```

```
@quotation
```

```
Permission is granted to make and distribute verbatim copies
of this entire document without royalty provided the
copyright notice and this permission notice are preserved.
```

```
@end quotation
```

```
@end copying
```

C.4 All-permissive Copying License

For software manuals and other documentation, it is important to use a license permitting free redistribution and updating, so that when a free program is changed, the documentation can be updated as well.

On the other hand, for small supporting files, short manuals (under 300 lines long) and rough documentation (README files, INSTALL files, etc.), the full FDL would be overkill. They can use a simple all-permissive license.

Here is sample text for such an all-permissive license. This is just the license text itself. For a complete sample document, see the previous sections.

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Appendix D Using Texinfo Mode

You may edit a Texinfo file with any text editor you choose. A Texinfo file is no different from any other ASCII file. However, GNU Emacs comes with a special mode, called Texinfo mode, that provides Emacs commands and tools to help ease your work.

D.1 Texinfo Mode Overview

Texinfo mode provides special features for working with Texinfo files. You can:

- Insert frequently used @-commands.
- Automatically create @node lines.
- Show the structure of a Texinfo source file.
- Automatically create or update the ‘Next’, ‘Previous’, and ‘Up’ pointers of a node.
- Automatically create or update menus.
- Automatically create a master menu.
- Format a part or all of a file for Info.
- Typeset and print part or all of a file.

Perhaps the two most helpful features are those for inserting frequently used @-commands and for creating node pointers and menus.

D.2 The Usual GNU Emacs Editing Commands

In most cases, the usual Text mode commands work the same in Texinfo mode as they do in Text mode. Texinfo mode adds new editing commands and tools to GNU Emacs’ general purpose editing features. The major difference concerns filling. In Texinfo mode, the paragraph separation variable and syntax table are redefined so that Texinfo commands that should be on lines of their own are not inadvertently included in paragraphs. Thus, the *M-q* (`fill-paragraph`) command will refill a paragraph but not mix an indexing command on a line adjacent to it into the paragraph.

In addition, Texinfo mode sets the `page-delimiter` variable to the value of `texinfo-chapter-level-regexp`; by default, this is a regular expression matching the commands for chapters and their equivalents, such as appendices. With this value for the page delimiter, you can jump from chapter title to chapter title with the *C-x]* (`forward-page`) and *C-x [* (`backward-page`) commands and narrow to a chapter with the *C-x n p* (`narrow-to-page`) command. (See Section “Pages” in *The GNU Emacs Manual*, for details about the page commands.)

You may name a Texinfo file however you wish, but the convention is to end a Texinfo file name with one of the extensions `.texinfo`, `.texi`, `.txi`, or `.tex`. A longer extension is preferred, since it is explicit, but a shorter extension may be necessary for operating systems that limit the length of file names. GNU Emacs automatically enters Texinfo mode when you visit a file with a `.texinfo`, `.texi` or `.txi` extension. Also, Emacs switches to Texinfo mode when you visit a file that has ‘`-*-texinfo*-*`’ in its first line. If ever you are in another mode and wish to switch to Texinfo mode, type *M-x texinfo-mode*.

Like all other Emacs features, you can customize or enhance Texinfo mode as you wish. In particular, the keybindings are very easy to change. The keybindings described here are the default or standard ones.

D.3 Inserting Frequently Used Commands

Texinfo mode provides commands to insert various frequently used @-commands into the buffer. You can use these commands to save keystrokes.

The insert commands are invoked by typing *C-c* twice and then the first letter of the @-command:

C-c C-c c

M-x texinfo-insert-@code

Insert @code{} and put the cursor between the braces.

C-c C-c d

M-x texinfo-insert-@dfn

Insert @dfn{} and put the cursor between the braces.

C-c C-c e

M-x texinfo-insert-@end

Insert @end and attempt to insert the correct following word, such as ‘example’ or ‘table’. (This command does not handle nested lists correctly, but inserts the word appropriate to the immediately preceding list.)

C-c C-c i

M-x texinfo-insert-@item

Insert @item and put the cursor at the beginning of the next line.

C-c C-c k

M-x texinfo-insert-@kbd

Insert @kbd{} and put the cursor between the braces.

C-c C-c n

M-x texinfo-insert-@node

Insert @node and a comment line listing the sequence for the ‘Next’, ‘Previous’, and ‘Up’ nodes. Leave point after the @node.

C-c C-c o

M-x texinfo-insert-@noindent

Insert @noindent and put the cursor at the beginning of the next line.

C-c C-c s

M-x texinfo-insert-@samp

Insert @samp{} and put the cursor between the braces.

C-c C-c t

M-x texinfo-insert-@table

Insert @table followed by a SPC and leave the cursor after the SPC.

C-c C-c v

M-x texinfo-insert-@var

Insert @var{} and put the cursor between the braces.

C-c C-c x

M-x texinfo-insert-@example

Insert @example and put the cursor at the beginning of the next line.

`C-c C-c {`

`M-x texinfo-insert-braces`

Insert `{}` and put the cursor between the braces.

`C-c }`

`C-c]`

`M-x up-list`

Move from between a pair of braces forward past the closing brace. Typing `C-c]` is easier than typing `C-c }`, which is, however, more mnemonic; hence the two keybindings. (Also, you can move out from between braces by typing `C-f`.)

To put a command such as `@code{...}` around an *existing* word, position the cursor in front of the word and type `C-u 1 C-c C-c c`. This makes it easy to edit existing plain text. The value of the prefix argument tells Emacs how many words following point to include between braces—‘1’ for one word, ‘2’ for two words, and so on. Use a negative argument to enclose the previous word or words. If you do not specify a prefix argument, Emacs inserts the `@`-command string and positions the cursor between the braces. This feature works only for those `@`-commands that operate on a word or words within one line, such as `@kbd` and `@var`.

This set of insert commands was created after analyzing the frequency with which different `@`-commands are used in the *GNU Emacs Manual* and the *GDB Manual*. If you wish to add your own insert commands, you can bind a keyboard macro to a key, use abbreviations, or extend the code in `texinfo.el`.

`C-c C-c C-d` (`texinfo-start-menu-description`) is an insert command that works differently from the other insert commands. It inserts a node’s section or chapter title in the space for the description in a menu entry line. (A menu entry has three parts, the entry name, the node name, and the description. Only the node name is required, but a description helps explain what the node is about. See Section 4.9.4 [The Parts of a Menu], page 40.)

To use `texinfo-start-menu-description`, position point in a menu entry line and type `C-c C-c C-d`. The command looks for and copies the title that goes with the node name, and inserts the title as a description; it positions point at beginning of the inserted text so you can edit it. The function does not insert the title if the menu entry line already contains a description.

This command is only an aid to writing descriptions; it does not do the whole job. You must edit the inserted text since a title tends to use the same words as a node name but a useful description uses different words.

D.4 Showing the Sectioning Structure of a File

You can show the sectioning structure of a Texinfo file by using the `C-c C-s` command (`texinfo-show-structure`). This command lists the lines that begin with the `@`-commands for `@chapter`, `@section`, and the like. It constructs what amounts to a table of contents. These lines are displayed in another buffer called the ‘*Occur*’ buffer. In that buffer, you can position the cursor over one of the lines and use the `C-c C-c` command (`occur-mode-goto-occurrence`), to jump to the corresponding spot in the Texinfo file.

C-c C-s

M-x texinfo-show-structure

Show the `@chapter`, `@section`, and such lines of a Texinfo file.

C-c C-c

M-x occur-mode-goto-occurrence

Go to the line in the Texinfo file corresponding to the line under the cursor in the `*Occur*` buffer.

If you call `texinfo-show-structure` with a prefix argument by typing `C-u C-c C-s`, it will list not only those lines with the `@`-commands for `@chapter`, `@section`, and the like, but also the `@node` lines. You can use `texinfo-show-structure` with a prefix argument to check whether the ‘Next’, ‘Previous’, and ‘Up’ pointers of an `@node` line are correct.

Often, when you are working on a manual, you will be interested only in the structure of the current chapter. In this case, you can mark off the region of the buffer that you are interested in by using the `C-x n n` (`narrow-to-region`) command and `texinfo-show-structure` will work on only that region. To see the whole buffer again, use `C-x n w` (`widen`). (See Section “Narrowing” in *The GNU Emacs Manual*, for more information about the narrowing commands.)

In addition to providing the `texinfo-show-structure` command, Texinfo mode sets the value of the page delimiter variable to match the chapter-level `@`-commands. This enables you to use the `C-x]` (`forward-page`) and `C-x [` (`backward-page`) commands to move forward and backward by chapter, and to use the `C-x n p` (`narrow-to-page`) command to narrow to a chapter. See Section “Pages” in *The GNU Emacs Manual*, for more information about the page commands.

D.5 Updating Nodes and Menus

Texinfo mode provides commands for automatically creating or updating menus and node pointers. The commands are called “update” commands because their most frequent use is for updating a Texinfo file after you have worked on it; but you can use them to insert the ‘Next’, ‘Previous’, and ‘Up’ pointers into an `@node` line that has none and to create menus in a file that has none.

If you do not use any updating commands, you need to write menus by hand, which is a tedious task.

D.5.1 The Updating Commands

You can use the updating commands to:

- insert or update the ‘Next’, ‘Previous’, and ‘Up’ pointers of a node,
- insert or update the menu for a section, and
- create a master menu for a Texinfo source file.

You can also use the commands to update all the nodes and menus in a region or in a whole Texinfo file.

The updating commands work only with conventional Texinfo files, which are structured hierarchically like books. In such files, a structuring command line must follow closely after each `@node` line, except for the ‘Top’ `@node` line. (A *structuring command line* is a line beginning with `@chapter`, `@section`, or other similar command.)

You can write the structuring command line on the line that follows immediately after an `@node` line or else on the line that follows after a single `@comment` line or a single `@ifinfo` line. You cannot interpose more than one line between the `@node` line and the structuring command line; and you may interpose only a `@comment` line or an `@ifinfo` line.

Commands which work on a whole buffer require that the ‘Top’ node be followed by a node with a `@chapter` or equivalent-level command. The menu updating commands will not create a main or master menu for a Texinfo file that has only `@chapter`-level nodes! The menu updating commands only create menus *within* nodes for lower level nodes. To create a menu of chapters, you must provide a ‘Top’ node.

The menu updating commands remove menu entries that refer to other Info files since they do not refer to nodes within the current buffer. This is a deficiency. Rather than use menu entries, you can use cross references to refer to other Info files. None of the updating commands affect cross-references.

Texinfo mode has five updating commands that are used most often: two are for updating the node pointers or menu of a single node (or a region); two are for updating every node pointer and menu in a file; and one, the `texinfo-master-menu` command, is for creating a master menu for a complete file, and optionally, for updating every node and menu in the whole Texinfo file.

The `texinfo-master-menu` command is the primary command:

C-c C-u m

M-x texinfo-master-menu

Create or update a master menu that includes all the other menus (incorporating the descriptions from pre-existing menus, if any).

With an argument (prefix argument, `C-u`, if interactive), first create or update all the nodes and all the regular menus in the buffer before constructing the master menu. (See Section 3.6 [The Top Node and Master Menu], page 25, for more about a master menu.)

For `texinfo-master-menu` to work, the Texinfo file must have a ‘Top’ node and at least one subsequent node.

After extensively editing a Texinfo file, you can type the following:

`C-u M-x texinfo-master-menu`

or

`C-u C-c C-u m`

This updates all the nodes and menus completely and all at once.

The other major updating commands do smaller jobs and are designed for the person who updates nodes and menus as he or she writes a Texinfo file.

The commands are:

C-c C-u C-n

M-x texinfo-update-node

Insert the ‘Next’, ‘Previous’, and ‘Up’ pointers for the node that point is within (i.e., for the `@node` line preceding point). If the `@node` line has pre-existing ‘Next’, ‘Previous’, or ‘Up’ pointers in it, the old pointers are removed and new ones inserted. With an argument (prefix argument, `C-u`, if interactive), this

command updates all `@node` lines in the region (which is the text between point and mark).

C-c C-u C-m

M-x texinfo-make-menu

Create or update the menu in the node that point is within. With an argument (*C-u* as prefix argument, if interactive), the command makes or updates menus for the nodes which are either within or a part of the region.

Whenever `texinfo-make-menu` updates an existing menu, the descriptions from that menu are incorporated into the new menu. This is done by copying descriptions from the existing menu to the entries in the new menu that have the same node names. If the node names are different, the descriptions are not copied to the new menu.

C-c C-u C-e

M-x texinfo-every-node-update

Insert or update the ‘Next’, ‘Previous’, and ‘Up’ pointers for every node in the buffer.

C-c C-u C-a

M-x texinfo-all-menus-update

Create or update all the menus in the buffer. With an argument (*C-u* as prefix argument, if interactive), first insert or update all the node pointers before working on the menus.

If a master menu exists, the `texinfo-all-menus-update` command updates it; but the command does not create a new master menu if none already exists. (Use the `texinfo-master-menu` command for that.)

When working on a document that does not merit a master menu, you can type the following:

`C-u C-c C-u C-a`

or

`C-u M-x texinfo-all-menus-update`

This updates all the nodes and menus.

The `texinfo-column-for-description` variable specifies the column to which menu descriptions are indented. By default, the value is 32 although it can be useful to reduce it to as low as 24. You can set the variable via customization (see Section “Customization” in *The GNU Emacs Manual*) or with the *M-x set-variable* command (see Section “Examining and Setting Variables” in *The GNU Emacs Manual*).

Also, the `texinfo-indent-menu-description` command may be used to indent existing menu descriptions to a specified column. Finally, if you wish, you can use the `texinfo-insert-node-lines` command to insert missing `@node` lines into a file. (See Section D.5.3 [Other Updating Commands], page 264, for more information.)

D.5.2 Updating Requirements

To use the updating commands, you must organize the Texinfo file hierarchically with chapters, sections, subsections, and the like. When you construct the hierarchy of the manual, do not ‘jump down’ more than one level at a time: you can follow the ‘Top’ node

with a chapter, but not with a section; you can follow a chapter with a section, but not with a subsection. However, you may ‘jump up’ any number of levels at one time—for example, from a subsection to a chapter.

Each `@node` line, with the exception of the line for the ‘Top’ node, must be followed by a line with a structuring command such as `@chapter`, `@section`, or `@unnumberedsubsec`.

Each `@node` line/structuring-command line combination must look either like this:

```
@node      Comments,  Minimum,  Conventions,  Overview
@comment  node-name, next,    previous,    up
@section  Comments
```

or like this (without the `@comment` line):

```
@node Comments,  Minimum,  Conventions,  Overview
@section Comments
```

or like this (without the explicit node pointers):

```
@node Comments
@section Comments
```

In this example, ‘Comments’ is the name of both the node and the section. The next node is called ‘Minimum’ and the previous node is called ‘Conventions’. The ‘Comments’ section is within the ‘Overview’ node, which is specified by the ‘Up’ pointer. (Instead of an `@comment` line, you may also write an `@ifinfo` line.)

If a file has a ‘Top’ node, it must be called ‘top’ or ‘Top’ and be the first node in the file.

The menu updating commands create a menu of sections within a chapter, a menu of subsections within a section, and so on. This means that you must have a ‘Top’ node if you want a menu of chapters.

Incidentally, the `makeinfo` command will create an Info file for a hierarchically organized Texinfo file that lacks ‘Next’, ‘Previous’ and ‘Up’ pointers. Thus, if you can be sure that your Texinfo file will be formatted with `makeinfo`, you have no need for the update node commands. (See Section 21.1 [Creating an Info File], page 201, for more information about `makeinfo`.)

D.5.3 Other Updating Commands

In addition to the five major updating commands, Texinfo mode possesses several less frequently used updating commands:

M-x texinfo-insert-node-lines

Insert `@node` lines before the `@chapter`, `@section`, and other sectioning commands wherever they are missing throughout a region in a Texinfo file.

With an argument (`C-u` as prefix argument, if interactive), the command `texinfo-insert-node-lines` not only inserts `@node` lines but also inserts the chapter or section titles as the names of the corresponding nodes. In addition, it inserts the titles as node names in pre-existing `@node` lines that lack names. Since node names should be more concise than section or chapter titles, you must manually edit node names so inserted.

For example, the following marks a whole buffer as a region and inserts `@node` lines and titles throughout:

```
C-x h C-u M-x texinfo-insert-node-lines
```

This command inserts titles as node names in `@node` lines; the `texinfo-start-menu-description` command (see Section D.3 [Inserting], page 259) inserts titles as descriptions in menu entries, a different action. However, in both cases, you need to edit the inserted text.

M-x texinfo-multiple-files-update

Update nodes and menus in a document built from several separate files. With `C-u` as a prefix argument, create and insert a master menu in the outer file. With a numeric prefix argument, such as `C-u 2`, first update all the menus and all the ‘Next’, ‘Previous’, and ‘Up’ pointers of all the included files before creating and inserting a master menu in the outer file. The `texinfo-multiple-files-update` command is described in the appendix on `@include` files. See Section 18.2 [`texinfo-multiple-files-update`], page 159.

M-x texinfo-indent-menu-description

Indent every description in the menu following point to the specified column. You can use this command to give yourself more space for descriptions. With an argument (`C-u` as prefix argument, if interactive), the `texinfo-indent-menu-description` command indents every description in every menu in the region. However, this command does not indent the second and subsequent lines of a multi-line description.

M-x texinfo-sequential-node-update

Insert the names of the nodes immediately following and preceding the current node as the ‘Next’ or ‘Previous’ pointers regardless of those nodes’ hierarchical level. This means that the ‘Next’ node of a subsection may well be the next chapter. Sequentially ordered nodes are useful for novels and other documents that you read through sequentially. (However, in Info, the `g *` command lets you look through the file sequentially, so sequentially ordered nodes are not strictly necessary.) With an argument (prefix argument, if interactive), the `texinfo-sequential-node-update` command sequentially updates all the nodes in the region.

D.6 Formatting for Info

Texinfo mode provides several commands for formatting part or all of a Texinfo file for Info. Often, when you are writing a document, you want to format only part of a file—that is, a region.

You can use either the `texinfo-format-region` or the `makeinfo-region` command to format a region:

C-c C-e C-r

M-x texinfo-format-region

C-c C-m C-r

M-x makeinfo-region

Format the current region for Info.

You can use either the `texinfo-format-buffer` or the `makeinfo-buffer` command to format a whole buffer:

C-c C-e C-b

M-x texinfo-format-buffer

C-c C-m C-b

M-x makeinfo-buffer

Format the current buffer for Info.

For example, after writing a Texinfo file, you can type the following:

C-u C-c C-u m

or

C-u M-x texinfo-master-menu

This updates all the nodes and menus. Then type the following to create an Info file:

C-c C-m C-b

or

M-x makeinfo-buffer

See Section 21.1 [Creating an Info File], page 201, for details about Info formatting.

D.7 Printing

Typesetting and printing a Texinfo file is a multi-step process in which you first create a file for printing (called a DVI file), and then print the file. Optionally, you may also create indices. To do this, you must run the `texindex` command after first running the `tex` typesetting command; and then you must run the `tex` command again. Or else run the `texi2dvi` command which automatically creates indices as needed (see Section 19.2 [Format with `texi2dvi`], page 163).

Often, when you are writing a document, you want to typeset and print only part of a file to see what it will look like. You can use the `texinfo-tex-region` and related commands for this purpose. Use the `texinfo-tex-buffer` command to format all of a buffer.

C-c C-t C-b

M-x texinfo-tex-buffer

Run `texi2dvi` on the buffer. In addition to running `TEX` on the buffer, this command automatically creates or updates indices as needed.

C-c C-t C-r

M-x texinfo-tex-region

Run `TEX` on the region.

C-c C-t C-i

M-x texinfo-texindex

Run `texindex` to sort the indices of a Texinfo file formatted with `texinfo-tex-region`. The `texinfo-tex-region` command does not run `texindex` automatically; it only runs the `tex` typesetting command. You must run the `texinfo-tex-region` command a second time after sorting the raw index files with the `texindex` command. (Usually, you do not format an index when you format a region, only when you format a buffer. Now that the `texi2dvi` command exists, there is little or no need for this command.)

`C-c C-t C-p`

`M-x texinfo-tex-print`

Print the file (or the part of the file) previously formatted with `texinfo-tex-buffer` or `texinfo-tex-region`.

For `texinfo-tex-region` or `texinfo-tex-buffer` to work, the file *must* start with a `\input texinfo` line and must include a `@settitle` line. The file must end with `@bye` on a line by itself. (When you use `texinfo-tex-region`, you must surround the `@settitle` line with `start-of-header` and `end-of-header` lines.)

See Chapter 19 [Hardcopy], page 163, for a description of the other T_EX related commands, such as `tex-show-print-queue`.

D.8 Texinfo Mode Summary

In Texinfo mode, each set of commands has default keybindings that begin with the same keys. All the commands that are custom-created for Texinfo mode begin with `C-c`. The keys are somewhat mnemonic.

Insert Commands

The insert commands are invoked by typing `C-c` twice and then the first letter of the `@`-command to be inserted. (It might make more sense mnemonically to use `C-c C-i`, for ‘custom insert’, but `C-c C-c` is quick to type.)

<code>C-c C-c c</code>	Insert ‘ <code>@code</code> ’.
<code>C-c C-c d</code>	Insert ‘ <code>@dfn</code> ’.
<code>C-c C-c e</code>	Insert ‘ <code>@end</code> ’.
<code>C-c C-c i</code>	Insert ‘ <code>@item</code> ’.
<code>C-c C-c n</code>	Insert ‘ <code>@node</code> ’.
<code>C-c C-c s</code>	Insert ‘ <code>@samp</code> ’.
<code>C-c C-c v</code>	Insert ‘ <code>@var</code> ’.
<code>C-c {</code>	Insert braces.
<code>C-c]</code>	
<code>C-c }</code>	Move out of enclosing braces.
<code>C-c C-c C-d</code>	Insert a nodefls section title in the space for the description in a menu entry line.

Show Structure

The `texinfo-show-structure` command is often used within a narrowed region.

<code>C-c C-s</code>	List all the headings.
----------------------	------------------------

The Master Update Command

The `texinfo-master-menu` command creates a master menu; and can be used to update every node and menu in a file as well.

`C-c C-u m`

`M-x texinfo-master-menu`

Create or update a master menu.

`C-u C-c C-u m` With `C-u` as a prefix argument, first create or update all nodes and regular menus, and then create a master menu.

Update Pointers

The update pointer commands are invoked by typing `C-c C-u` and then either `C-n` for `texinfo-update-node` or `C-e` for `texinfo-every-node-update`.

`C-c C-u C-n` Update a node.
`C-c C-u C-e` Update every node in the buffer.

Update Menus

Invoke the update menu commands by typing `C-c C-u` and then either `C-m` for `texinfo-make-menu` or `C-a` for `texinfo-all-menus-update`. To update both nodes and menus at the same time, precede `C-c C-u C-a` with `C-u`.

`C-c C-u C-m` Make or update a menu.

`C-c C-u C-a` Make or update all menus in a buffer.

`C-u C-c C-u C-a` With `C-u` as a prefix argument, first create or update all nodes and then create or update all menus.

Format for Info

The Info formatting commands that are written in Emacs Lisp are invoked by typing `C-c C-e` and then either `C-r` for a region or `C-b` for the whole buffer.

The Info formatting commands that are written in C and based on the `makeinfo` program are invoked by typing `C-c C-m` and then either `C-r` for a region or `C-b` for the whole buffer.

Use the `texinfo-format...` commands:

`C-c C-e C-r` Format the region.
`C-c C-e C-b` Format the buffer.

Use `makeinfo`:

`C-c C-m C-r` Format the region.
`C-c C-m C-b` Format the buffer.
`C-c C-m C-l` Recenter the `makeinfo` output buffer.
`C-c C-m C-k` Kill the `makeinfo` formatting job.

Typeset and Print

The $\text{T}_{\text{E}}\text{X}$ typesetting and printing commands are invoked by typing `C-c C-t` and then another control command: `C-r` for `texinfo-tex-region`, `C-b` for `texinfo-tex-buffer`, and so on.

`C-c C-t C-r` Run $\text{T}_{\text{E}}\text{X}$ on the region.
`C-c C-t C-b` Run `texi2dvi` on the buffer.
`C-c C-t C-i` Run `texindex`.

<code>C-c C-t C-p</code>	Print the DVI file.
<code>C-c C-t C-q</code>	Show the print queue.
<code>C-c C-t C-d</code>	Delete a job from the print queue.
<code>C-c C-t C-k</code>	Kill the current \TeX formatting job.
<code>C-c C-t C-x</code>	Quit a currently stopped \TeX formatting job.
<code>C-c C-t C-l</code>	Recenter the output buffer.

Other Updating Commands

The remaining updating commands do not have standard keybindings because they are rarely used.

<code>M-x texinfo-insert-node-lines</code>	Insert missing <code>@node</code> lines in region. With <code>C-u</code> as a prefix argument, use section titles as node names.
<code>M-x texinfo-multiple-files-update</code>	Update a multi-file document. With <code>C-u 2</code> as a prefix argument, create or update all nodes and menus in all included files first.
<code>M-x texinfo-indent-menu-description</code>	Indent descriptions.
<code>M-x texinfo-sequential-node-update</code>	Insert node pointers in strict sequence.

Appendix E Page Headings

Most printed manuals contain headings along the top of every page except the title and copyright pages. Some manuals also contain footings. Headings and footings have no meaning in Info or the other output formats.

E.1 Headings Introduced

Texinfo provides standard page heading formats for manuals that are printed on one side of each sheet of paper and for manuals that are printed on both sides of the paper. Typically, you will use these formats, but you can specify your own format if you wish.

In addition, you can specify whether chapters should begin on a new page, or merely continue the same page as the previous chapter; and if chapters begin on new pages, you can specify whether they must be odd-numbered pages.

By convention, a book is printed on both sides of each sheet of paper. When you open a book, the right-hand page is odd-numbered, and chapters begin on right-hand pages—a preceding left-hand page is left blank if necessary. Reports, however, are often printed on just one side of paper, and chapters begin on a fresh page immediately following the end of the preceding chapter. In short or informal reports, chapters often do not begin on a new page at all, but are separated from the preceding text by a small amount of whitespace.

The `@setchapternewpage` command controls whether chapters begin on new pages, and whether one of the standard heading formats is used. In addition, Texinfo has several heading and footing commands that you can use to generate your own heading and footing formats.

In Texinfo, headings and footings are single lines at the tops and bottoms of pages; you cannot create multiline headings or footings. Each header or footer line is divided into three parts: a left part, a middle part, and a right part. Any part, or a whole line, may be left blank. Text for the left part of a header or footer line is set flushleft; text for the middle part is centered; and, text for the right part is set flushright.

E.2 Standard Heading Formats

Texinfo provides two standard heading formats, one for manuals printed on one side of each sheet of paper, and the other for manuals printed on both sides of the paper.

By default, nothing is specified for the footing of a Texinfo file, so the footing remains blank.

The standard format for single-sided printing consists of a header line in which the left-hand part contains the name of the chapter, the central part is blank, and the right-hand part contains the page number.

A single-sided page looks like this:

```

-----
|                |
| chapter   page number |
|                |
| Start of text ...    |
| ...                |
|                |

```

The standard format for two-sided printing depends on whether the page number is even or odd. By convention, even-numbered pages are on the left- and odd-numbered pages are on the right. (T_EX will adjust the widths of the left- and right-hand margins. Usually, widths are correct, but during double-sided printing, it is wise to check that pages will bind properly—sometimes a printer will produce output in which the even-numbered pages have a larger right-hand margin than the odd-numbered pages.)

In the standard double-sided format, the left part of the left-hand (even-numbered) page contains the page number, the central part is blank, and the right part contains the title (specified by the `@settitle` command). The left part of the right-hand (odd-numbered) page contains the name of the chapter, the central part is blank, and the right part contains the page number.

Two pages, side by side as in an open book, look like this:

```

-----
| page number      title | | chapter  page number |
|                  |   |                  |
| Start of text ... | | More text ...      |
| ...              |   | ...              |
|                  |   |                  |
-----

```

The chapter name is preceded by the word “Chapter”, the chapter number and a colon. This makes it easier to keep track of where you are in the manual.

E.3 Specifying the Type of Heading

T_EX does not begin to generate page headings for a standard Texinfo file until it reaches the `@end titlepage` command. Thus, the title and copyright pages are not numbered. The `@end titlepage` command causes T_EX to begin to generate page headings according to a standard format specified by the `@setchapternewpage` command that precedes the `@titlepage` section.

There are four possibilities:

No `@setchapternewpage` command

Cause T_EX to specify the single-sided heading format, with chapters on new pages. This is the same as `@setchapternewpage on`.

`@setchapternewpage on`

Specify the single-sided heading format, with chapters on new pages.

`@setchapternewpage off`

Cause T_EX to start a new chapter on the same page as the last page of the preceding chapter, after skipping some vertical whitespace. Also cause T_EX to typeset for single-sided printing. (You can override the headers format with the `@headings double` command; see Section 3.7.3 [`@headings`], page 28.)

`@setchapternewpage odd`

Specify the double-sided heading format, with chapters on new pages.

Texinfo lacks a `@setchapternewpage even` command.

E.4 How to Make Your Own Headings

You can use the standard headings provided with Texinfo or specify your own. By default, Texinfo has no footers, so if you specify them, the available page size for the main text will be slightly reduced.

Texinfo provides six commands for specifying headings and footings:

- `@everyheading` and `@everyfooting` generate page headers and footers that are the same for both even- and odd-numbered pages.
- `@evenheading` and `@evenfooting` command generate headers and footers for even-numbered (left-hand) pages.
- `@oddheading` and `@oddfooting` generate headers and footers for odd-numbered (right-hand) pages.

Write custom heading specifications in the Texinfo file immediately after the `@end titlepage` command. You must cancel the predefined heading commands with the `@headings off` command before defining your own specifications.

Here is how to tell T_EX to place the chapter name at the left, the page number in the center, and the date at the right of every header for both even- and odd-numbered pages:

```
@headings off
@everyheading @thischapter @| @thispage @| @today{}
```

You need to divide the left part from the central part and the central part from the right part by inserting ‘@|’ between parts. Otherwise, the specification command will not be able to tell where the text for one part ends and the next part begins.

Each part can contain text or @-commands. The text is printed as if the part were within an ordinary paragraph in the body of the page. The @-commands replace themselves with the page number, date, chapter name, or whatever.

Here are the six heading and footing commands:

```
@everyheading left @| center @| right
@everyfooting left @| center @| right
```

The ‘every’ commands specify the format for both even- and odd-numbered pages. These commands are for documents that are printed on one side of each sheet of paper, or for documents in which you want symmetrical headers or footers.

```
@evenheading left @| center @| right
@oddheading left @| center @| right
@evenfooting left @| center @| right
@oddfooting left @| center @| right
```

The ‘even’ and ‘odd’ commands specify the format for even-numbered pages and odd-numbered pages. These commands are for books and manuals that are printed on both sides of each sheet of paper.

Use the ‘@this...’ series of @-commands to provide the names of chapters and sections and the page number. You can use the ‘@this...’ commands in the left, center, or right portions of headers and footers, or anywhere else in a Texinfo file so long as they are between `@iftex` and `@end iftex` commands.

Here are the ‘@this...’ commands:

- @thispage**
Expands to the current page number.
- @thissectionname**
Expands to the name of the current section.
- @thissectionnum**
Expands to the number of the current section.
- @thissection**
Expands to the number and name of the current section, in the format ‘Section 1: Title’.
- @thischaptername**
Expands to the name of the current chapter.
- @thischapternum**
Expands to the number of the current chapter, or letter of the current appendix.
- @thischapter**
Expands to the number and name of the current chapter, in the format ‘Chapter 1: Title’.
- @thistitle**
Expands to the name of the document, as specified by the @settitle command.
- @thisfile**
For @include files only: expands to the name of the current @include file. If the current Texinfo source file is not an @include file, this command has no effect. This command does *not* provide the name of the current Texinfo source file unless it is an @include file. (See Chapter 18 [Include Files], page 159, for more information about @include files.)

You can also use the @today{} command, which expands to the current date, in ‘1 Jan 1900’ format.

Other @-commands and text are printed in a header or footer just as if they were in the body of a page. It is useful to incorporate text, particularly when you are writing drafts:

```
@headings off
@everyheading @emph{Draft!} @| @thispage @| @thischapter
@everyfooting @| @| Version: 0.27: @today{}
```

Beware of overlong titles: they may overlap another part of the header or footer and blot it out.

If you have very short chapters and/or sections, several of them can appear on a single page. You can specify which chapters and sections you want @thischapter, @thissection and other such macros to refer to on such pages as follows:

```
@everyheadingmarks ref
@everyfootingmarks ref
```

The *ref* argument can be either **top** (the @this... commands will refer to the chapter/section at the top of a page) or **bottom** (the commands will reflect the

situation at the bottom of a page). These ‘@every...’ commands specify what to do on both even- and odd-numbered pages.

`@evenheadingmarks ref`

`@oddheadingmarks ref`

`@evenfootingmarks ref`

`@oddfootingmarks ref`

These ‘@even...’ and ‘@odd...’ commands specify what to do on only even- or odd-numbered pages, respectively. The *ref* argument is the same as with the ‘@every...’ commands.

Write these commands immediately after the `@...contents` commands, or after the `@end titlepage` command if you don’t have a table of contents or if it is printed at the end of your manual.

By default the `@this...` commands reflect the situation at the bottom of a page both in headings and in footings.

Appendix F Catching Mistakes

Besides mistakes in the content of your documentation, there are two kinds of mistake you can make with Texinfo: you can make mistakes with @-commands, and you can make mistakes with the structure of the nodes and chapters.

Emacs has two tools for catching the @-command mistakes and two for catching structuring mistakes.

For finding problems with @-commands, you can run `TEX` or a region formatting command on the region that has a problem; indeed, you can run these commands on each region as you write it.

For finding problems with the structure of nodes and chapters, you can use `C-c C-s` (`texinfo-show-structure`) and the related `occur` command and you can use the `M-x Info-validate` command.

F.1 makeinfo Preferred

The `makeinfo` program does an excellent job of catching errors and reporting them—far better than `texinfo-format-region` or `texinfo-format-buffer`. In addition, the various functions for automatically creating and updating node pointers and menus remove many opportunities for human error.

If you can, use the updating commands to create and insert pointers and menus. These prevent many errors. Then use `makeinfo` (or its Texinfo mode manifestations, `makeinfo-region` and `makeinfo-buffer`) to format your file and check for other errors. This is the best way to work with Texinfo. But if you cannot use `makeinfo`, or your problem is very puzzling, then you may want to use the tools described in this appendix.

F.2 Catching Errors with Info Formatting

After you have written part of a Texinfo file, you can use the `texinfo-format-region` or the `makeinfo-region` command to see whether the region formats properly.

Most likely, however, you are reading this section because for some reason you cannot use the `makeinfo-region` command; therefore, the rest of this section presumes that you are using `texinfo-format-region`.

If you have made a mistake with an @-command, `texinfo-format-region` will stop processing at or after the error and display an error message. To see where in the buffer the error occurred, switch to the `*Info Region*` buffer; the cursor will be in a position that is after the location of the error. Also, the text will not be formatted after the place where the error occurred (or more precisely, where it was detected).

For example, if you accidentally end a menu with the command `@end menus` with an ‘s’ on the end, instead of with `@end menu`, you will see an error message that says:

```
@end menus is not handled by texinfo
```

The cursor will stop at the point in the buffer where the error occurs, or not long after it. The buffer will look like this:

```

----- Buffer: *Info Region* -----
* Menu:

* Using texinfo-show-structure::  How to use
                                  `texinfo-show-structure'
                                  to catch mistakes.
* Running Info-validate::        How to check for
                                  unreferenced nodes.

@end menus
*
----- Buffer: *Info Region* -----

```

The `texinfo-format-region` command sometimes provides slightly odd error messages. For example, the following cross-reference fails to format:

```
(@xref{Catching Mistakes, for more info.})
```

In this case, `texinfo-format-region` detects the missing closing brace but displays a message that says ‘Unbalanced parentheses’ rather than ‘Unbalanced braces’. This is because the formatting command looks for mismatches between braces as if they were parentheses.

Sometimes `texinfo-format-region` fails to detect mistakes. For example, in the following, the closing brace is swapped with the closing parenthesis:

```
(@xref{Catching Mistakes), for more info.}
```

Formatting produces:

```
(*Note for more info.: Catching Mistakes)
```

The only way for you to detect this error is to realize that the reference should have looked like this:

```
(*Note Catching Mistakes::, for more info.)
```

Incidentally, if you are reading this node in Info and type `f RET` (`Info-follow-reference`), you will generate an error message that says:

```
No such node: "Catching Mistakes) The only way ...
```

This is because Info perceives the example of the error as the first cross-reference in this node and if you type a `RET` immediately after typing the Info `f` command, Info will attempt to go to the referenced node. If you type `f catch TAB RET`, Info will complete the node name of the correctly written example and take you to the ‘Catching Mistakes’ node. (If you try this, you can return from the ‘Catching Mistakes’ node by typing `l` (`Info-last`).)

F.3 Debugging with T_EX

You can also catch mistakes when you format a file with T_EX.

Usually, you will want to do this after you have run `texinfo-format-buffer` (or, better, `makeinfo-buffer`) on the same file, because `texinfo-format-buffer` sometimes displays error messages that make more sense than T_EX. (See Section F.2 [Debugging with Info], page 275, for more information.)

For example, T_EX was run on a Texinfo file, part of which is shown here:

```
----- Buffer: texinfo.texi -----
```



```

name of the Texinfo file as an extension. The
@samp{??} are `wildcards' that cause the shell to
substitute all the raw index files. (@xref{sorting
indices, for more information about sorting
indices.}@refill
----- Buffer: texinfo.texi -----

```

(The cross-reference lacks a closing brace.) T_EX produced the following output, after which it stopped:

```

----- Buffer: *tex-shell* -----
Runaway argument?
{sorting indices, for more information about sorting
indices.} @refill @ETC.
! Paragraph ended before @xref was complete.
<to be read again>
      @par
1.27
?
----- Buffer: *tex-shell* -----

```

In this case, T_EX produced an accurate and understandable error message:

```
Paragraph ended before @xref was complete.
```

‘@par’ is an internal T_EX command of no relevance to Texinfo. ‘1.27’ means that T_EX detected the problem on line 27 of the Texinfo file. The ‘?’ is the prompt T_EX uses in this circumstance.

Unfortunately, T_EX is not always so helpful, and sometimes you must truly be a Sherlock Holmes to discover what went wrong.

In any case, if you run into a problem like this, you can do one of three things.

1. You can tell T_EX to continue running and ignore just this error by typing `RET` at the ‘?’ prompt.
2. You can tell T_EX to continue running and to ignore all errors as best it can by typing `r RET` at the ‘?’ prompt.

This is often the best thing to do. However, beware: the one error may produce a cascade of additional error messages as its consequences are felt through the rest of the file. To stop T_EX when it is producing such an avalanche of error messages, type `C-c` (or `C-c C-c`, if you are running a shell inside Emacs).

3. You can tell T_EX to stop this run by typing `x RET` at the ‘?’ prompt.

If you are running T_EX inside Emacs, you need to switch to the shell buffer and line at which T_EX offers the ‘?’ prompt.

Sometimes T_EX will format a file without producing error messages even though there is a problem. This usually occurs if a command is not ended but T_EX is able to continue processing anyhow. For example, if you fail to end an itemized list with the `@end itemize` command, T_EX will write a DVI file that you can print out. The only error message that T_EX will give you is the somewhat mysterious comment:

```
(@end occurred inside a group at level 1)
```

However, if you print the DVI file, you will find that the text of the file that follows the itemized list is entirely indented as if it were part of the last item in the itemized list. The error message is the way T_EX says that it expected to find an @end command somewhere in the file; but that it could not determine where it was needed.

Another source of notoriously hard-to-find errors is a missing @end group command. If you ever are stumped by incomprehensible errors, look for a missing @end group command first.

If the Texinfo file lacks header lines, T_EX may stop in the beginning of its run and display output that looks like the following. The ‘*’ indicates that T_EX is waiting for input.

```
This is TeX, Version 3.14159 (Web2c 7.0)
(test.texinfo [1])
*
```

In this case, simply type `\end RET` after the asterisk. Then write the header lines in the Texinfo file and run the T_EX command again. (Note the use of the backslash, ‘\’. T_EX uses ‘\’ instead of ‘@’; and in this circumstance, you are working directly with T_EX, not with Texinfo.)

F.4 Using texinfo-show-structure

It is not always easy to keep track of the nodes, chapters, sections, and subsections of a Texinfo file. This is especially true if you are revising or adding to a Texinfo file that someone else has written.

In GNU Emacs, in Texinfo mode, the `texinfo-show-structure` command lists all the lines that begin with the @-commands that specify the structure: @chapter, @section, @appendix, and so on. With an argument (`C-u` as prefix argument, if interactive), the command also shows the @node lines. The `texinfo-show-structure` command is bound to `C-c C-s` in Texinfo mode, by default.

The lines are displayed in a buffer called the ‘*0ccur*’ buffer, indented by hierarchical level. For example, here is a part of what was produced by running `texinfo-show-structure` on this manual:

```
Lines matching "^@\\(chapter \\|sect\\|subs\\|subh\\|
unnum\\|major\\|chapheading \\|heading \\|appendix\\)"
in buffer texinfo.texi.
...
4177:@chapter Nodes
4198:   @heading Two Paths
4231:   @section Node and Menu Illustration
4337:   @section The @code{@@node} Command
4393:     @subheading Choosing Node and Pointer Names
4417:     @subsection How to Write a @code{@@node} Line
4469:     @subsection @code{@@node} Line Tips
...
```

This says that lines 4337, 4393, and 4417 of `texinfo.texi` begin with the @section, @subheading, and @subsection commands respectively. If you move your cursor into the ‘*0ccur*’ window, you can position the cursor over one of the lines and use the `C-c C-c` command (`occur-mode-goto-occurrence`), to jump to the corresponding spot in the

Texinfo file. See Section “Using Occur” in *The GNU Emacs Manual*, for more information about `occur-mode-goto-occurrence`.

The first line in the ‘*Occur*’ window describes the *regular expression* specified by *texinfo-heading-pattern*. This regular expression is the pattern that `texinfo-show-structure` looks for. See Section “Using Regular Expressions” in *The GNU Emacs Manual*, for more information.

When you invoke the `texinfo-show-structure` command, Emacs will display the structure of the whole buffer. If you want to see the structure of just a part of the buffer, of one chapter, for example, use the `C-x n n` (`narrow-to-region`) command to mark the region. (See Section “Narrowing” in *The GNU Emacs Manual*.) This is how the example used above was generated. (To see the whole buffer again, use `C-x n w` (`widen`).)

If you call `texinfo-show-structure` with a prefix argument by typing `C-u C-c C-s`, it will list lines beginning with `@node` as well as the lines beginning with the `@`-sign commands for `@chapter`, `@section`, and the like.

You can remind yourself of the structure of a Texinfo file by looking at the list in the ‘*Occur*’ window; and if you have mis-named a node or left out a section, you can correct the mistake.

F.5 Using occur

Sometimes the `texinfo-show-structure` command produces too much information. Perhaps you want to remind yourself of the overall structure of a Texinfo file, and are overwhelmed by the detailed list produced by `texinfo-show-structure`. In this case, you can use the `occur` command directly. To do this, type:

```
M-x occur
```

and then, when prompted, type a *regexp*, a regular expression for the pattern you want to match. (See Section “Regular Expressions” in *The GNU Emacs Manual*.) The `occur` command works from the current location of the cursor in the buffer to the end of the buffer. If you want to run `occur` on the whole buffer, place the cursor at the beginning of the buffer.

For example, to see all the lines that contain the word ‘`@chapter`’ in them, just type ‘`@chapter`’. This will produce a list of the chapters. It will also list all the sentences with ‘`@chapter`’ in the middle of the line.

If you want to see only those lines that start with the word ‘`@chapter`’, type ‘`^@chapter`’ when prompted by `occur`. If you want to see all the lines that end with a word or phrase, end the last word with a ‘`$`’; for example, ‘`catching mistakes$`’. This can be helpful when you want to see all the nodes that are part of the same chapter or section and therefore have the same ‘Up’ pointer.

See Section “Using Occur” in *The GNU Emacs Manual*, for more information.

F.6 Finding Badly Referenced Nodes

You can use the `Info-validate` command to check whether any of the ‘Next’, ‘Previous’, ‘Up’ or other node pointers fail to point to a node. This command checks that every node pointer points to an existing node. The `Info-validate` command works only on Info files, not on Texinfo files.

The `makeinfo` program validates pointers automatically, so you do not need to use the `Info-validate` command if you are using `makeinfo`. You only may need to use `Info-validate` if you are unable to run `makeinfo` and instead must create an Info file using `texinfo-format-region` or `texinfo-format-buffer`, or if you write an Info file from scratch.

F.6.1 Using Info-validate

To use `Info-validate`, visit the Info file you wish to check and type:

```
M-x Info-validate
```

Note that the `Info-validate` command requires an uppercase ‘I’. You may also need to create a tag table before running `Info-validate`. See Section F.6.3 [Tagifying], page 281.

If your file is valid, you will receive a message that says “File appears valid”. However, if you have a pointer that does not point to a node, error messages will be displayed in a buffer called ‘*problems in info file*’.

For example, `Info-validate` was run on a test file that contained only the first node of this manual. One of the messages said:

```
In node "Overview", invalid Next: Texinfo Mode
```

This meant that the node called ‘Overview’ had a ‘Next’ pointer that did not point to anything (which was true in this case, since the test file had only one node in it).

Now suppose we add a node named ‘Texinfo Mode’ to our test case but we do not specify a ‘Previous’ for this node. Then we will get the following error message:

```
In node "Texinfo Mode", should have Previous: Overview
```

This is because every ‘Next’ pointer should be matched by a ‘Previous’ (in the node where the ‘Next’ points) which points back.

`Info-validate` also checks that all menu entries and cross-references point to actual nodes.

`Info-validate` requires a tag table and does not work with files that have been split. (The `texinfo-format-buffer` command automatically splits large files.) In order to use `Info-validate` on a large file, you must run `texinfo-format-buffer` with an argument so that it does not split the Info file; and you must create a tag table for the unsplit file.

F.6.2 Creating an Unsplit File

You can run `Info-validate` only on a single Info file that has a tag table. The command will not work on the indirect subfiles that are generated when a master file is split. If you have a large file (longer than 300,000 bytes or so), you need to run the `texinfo-format-buffer` or `makeinfo-buffer` command in such a way that it does not create indirect subfiles. You will also need to create a tag table for the Info file. After you have done this, you can run `Info-validate` and look for badly referenced nodes.

The first step is to create an unsplit Info file. To prevent `texinfo-format-buffer` from splitting a Texinfo file into smaller Info files, give a prefix to the `M-x texinfo-format-buffer` command:

```
C-u M-x texinfo-format-buffer
```

or else

```
C-u C-c C-e C-b
```

When you do this, Texinfo will not split the file and will not create a tag table for it.

F.6.3 Tagifying a File

After creating an unsplit Info file, you must create a tag table for it. Visit the Info file you wish to tagify and type:

```
M-x Info-tagify
```

(Note the uppercase ‘I’ in `Info-tagify`.) This creates an Info file with a tag table that you can validate.

The third step is to validate the Info file:

```
M-x Info-validate
```

(Note the uppercase ‘I’ in `Info-validate`.) In brief, the steps are:

```
C-u M-x texinfo-format-buffer
```

```
M-x Info-tagify
```

```
M-x Info-validate
```

After you have validated the node structure, you can rerun `texinfo-format-buffer` in the normal way so it will construct a tag table and split the file automatically, or you can make the tag table and split the file manually.

F.6.4 Splitting a File Manually

You should split a large file or else let the `texinfo-format-buffer` or `makeinfo-buffer` command do it for you automatically. (Generally you will let one of the formatting commands do this job for you. See Section 21.1 [Creating an Info File], page 201.)

The split-off files are called the indirect subfiles.

Info files are split to save memory. With smaller files, Emacs does not have make such a large buffer to hold the information.

If an Info file has more than 30 nodes, you should also make a tag table for it. See Section F.6.1 [Using `Info-validate`], page 280, for information about creating a tag table. (Again, tag tables are usually created automatically by the formatting command; you only need to create a tag table yourself if you are doing the job manually. Most likely, you will do this for a large, unsplit file on which you have run `Info-validate`.)

Visit the Info file you wish to tagify and split and type the two commands:

```
M-x Info-tagify
```

```
M-x Info-split
```

(Note that the ‘I’ in ‘Info’ is uppercase.)

When you use the `Info-split` command, the buffer is modified into a (small) Info file which lists the indirect subfiles. This file should be saved in place of the original visited file. The indirect subfiles are written in the same directory the original file is in, with names generated by appending ‘-’ and a number to the original file name.

The primary file still functions as an Info file, but it contains just the tag table and a directory of subfiles.

Appendix G Info Format Specification

Here we describe the technical details of the Info format.

In this formal description, the characters `<>*()|=#` are used for the language of the description itself. Other characters are literal. The formal constructs used are typical: `<...>` indicates a metavariable name, `'='` means definition, `'*'` repetition, `'?'` optional, `'()'` grouping, `'|'` alternation, `'#'` comment. Exception: `'*'` at the beginning of a line is literal.

In general, programs that read Info files should try to be case-insensitive to keywords that occur in the file (for example, `'Tag Table'` and `'Tag table'` should be equivalent) in order to support Info-generating programs that use different capitalization.

The sections in an Info file (such as nodes or tag tables) are separated with a sequence:

```
(^L)?^(^L)?^J
```

That is, a `'CTRL-_'` character followed by a newline, with optional formfeed characters. We refer to such sequences as `<separator>`.

We specify literal parentheses (those that are part of the Info format) with `<lparen>` and `<rparen>`, meaning the single characters `'('` and `')'` respectively. We specify the `'CTRL-?'` character (character number 127) ``. Finally, the two-character sequence `'^x'` means the single character `'CTRL-x'`, for any `x`.

This format definition was written some 25 years after the Info format was first devised. So in the event of conflicts between this definition and actual practice, practice wins. It also assumes some general knowledge of Texinfo; it is meant to be a guide for implementors rather than a rigid technical standard. We often refer back to other parts of this manual for examples and definitions, rather than redundantly spelling out every detail.

G.1 Info Format General Layout

This section describes the overall layout of Info manuals.

Info Format: A Whole Manual

To begin, an Info manual is either *nonsplit* (contained wholly within a single file) or *split* (across several files).

The syntax for a nonsplit manual is:

```
<nonsplit info file> =
<preamble>
<node>*
<tag table>?
<local variables>?
```

When split, there is a *main file*, which contains only pointers to the nodes given in other *subfiles*. The main file looks like this:

```
<split info main file> =
<preamble>
<indirect table>
<tag table>
<local variables>?
```

The subfiles in a split manual have the following syntax:

```
<split info subfile> =
  <preamble>
  <node>*
```

Note that the tag table is not optional for split files, as it is used with the indirect table to deduce which subfile a particular node is in.

Info Format: Preamble

The `<preamble>` is text at the beginning of all output files. It is not intended to be visible by default in an Info viewer, but may be displayed upon user request.

```
<preamble> =
  <identification>      # "This is FILENAME, produced by ..."
  <copying text>        # Expansion of @copying text.
  <dir entries>         # Derived from @dircategory and @direntry.
```

These pieces are:

`<identification line>`

An arbitrary string beginning the output file, followed by a blank line.

`<copying text>`

The expansion of a `@copying` environment, if the manual has one (see Section 3.3.1 [`@copying`], page 19).

`<dir entries>`

The result of any `@dircategory` and `@direntry` commands present in the manual (see Section 21.2.4 [Installing Dir Entries], page 207).

Info Format: Indirect Table

```
<indirect table> =
  <separator>
  Indirect:
  (<filename>: <bytepos>)*
```

The indirect table is written to the main file in the case of split output only. It specifies, as a decimal integer, the starting byte position (zero-based) that the first node of each subfile would have if the subfiles were concatenated together in order, not including the top-level file. The first node of actual content is pointed to by the first entry.

As an example, suppose split output is generated for the GDB manual. The top-level file `gdb.info` will contain something like this:

```
<separator>
Indirect:
gdb.info-1: 1878
gdb.info-2: 295733
...
```

This tells Info viewers that the first node of the manual occurs at byte 1878 of the file `gdb.info-1` (which would be after that file's preamble.) The first node in the `gdb.info-2` subfile would start at byte 295733 if `gdb.info-2` were appended to `gdb.info-1`, including any preamble sections in both files.

Unfortunately, Info-creating programs such as `makeinfo` have not always implemented these rules perfectly, due to various bugs and oversights. Therefore, robust Info viewers should fall back to searching “nearby” the given position for a node, instead of giving up immediately if the position is not exactly at a node beginning.

Info Format: Tag Table

```
<tag table> =
<separator>
Tag Table:
(<lparen>Indirect<rparen>)?
(Node|Ref): <nodeid>^?<bytepos>
<separator>
End Tag Table
```

The ‘(Indirect)’ line appears in the case of split output only.

The tag table specifies the starting byte position of each node and anchor in the file. In the case of split output, it is only written in the main output file.

Each line defines an identifier as either an anchor or a node, as specified. For example, ‘Node: Top^?1647’ says that the node named ‘Top’ starts at byte 1647 while ‘Ref: Overview-Footnote-1^?30045’ says that the anchor named ‘Overview-Footnote-1’ starts at byte 30045. It is an error to define the same identifier both ways.

In the case of nonsplit output, the byte positions simply refer to the location in the output file. In the case of split output, the byte positions refer to an imaginary file created by concatenating all the split files (but not the top-level file). See the previous section.

Here is an example:

```
^_
Tag Table:
Node: Top^?89
Node: Ch1^?292
^_
End Tag Table
```

This specifies a manual with two nodes, ‘Top’ and ‘Ch1’, at byte positions 89 and 292 respectively. Because the ‘(Indirect)’ line is not present, the manual is not split.

Preamble sections or other non-node sections of files do not have a tag table entry.

Info Format: Local Variables

The local variables section is optional and is currently used to give the encoding information. It may be augmented in the future.

```
<local variables> =
<separator>
Local Variables:
coding: <encoding>
End:
```

See Section 15.2 [`@documentencoding`], page 137.

Info Format: Regular Nodes

Regular nodes look like this:

```

<node> =
<separator>
File: <fn>, Node: <id1>, (Next: <id2>, )? (Prev: <id3>, )? Up: <id4>

<general text, until the next ^_ or end-of-file>

```

At least one space or tab must be present after each colon and comma, but any number of spaces are ignored. The <id> node identifiers have following format:

```

<id> = (<lparen><infofile><rparen>)?(<del>?<nodename><del>)?
| <id> = (<lparen><infofile><rparen>)?(<nodename>)?

```

This <node> defines <id1> in file <fn>, which is typically either ‘manualname’ or ‘manualname.info’. No parenthesized <infofile> component may appear within <id1>.

Each of the identifiers after *Next*, *Prev* and *Up* refer to nodes or anchors within a file. These pointers normally refer within the same file, but ‘(dir)’ is often used to point to the top-level dir file. If an <infofile> component is used then the node name may be omitted, in which case the node identifier refers to the ‘Top’ node within the referenced file.

The *Next* and *Prev* pointers are optional. The *Up* pointer is technically also optional, although most likely this indicates a mistake in the node structuring. Conventionally, the nodes are arranged to form a tree, but this is not a requirement of the format.

Node names containing periods, commas, colons or parentheses (including @-commands which produce any of these) can confuse Info readers. If it is necessary to refer to a node whose name contains any of these, the <nodename> should be surrounded by a pair of characters. There is support in `makeinfo` for adding these characters (see [INFO_SPECIAL_CHARS_QUOTE], page 193); however, we don’t recommend you make use of this support until such time as Info-reading programs that recognize this syntax are common. See Section 4.4 [Node Line Requirements], page 33.

The use of non-ASCII characters in the names of nodes is permitted, but can cause problems in cross-references between nodes in Info files with different character encodings, and also when node names from many different files are listed (for example, with the `--apropos` option to the standalone Info browser), so we recommend avoiding them whenever feasible. For example, prefer the use of the ASCII apostrophe character (’) to Unicode directional quotes.

The <general text> of the node can include the special constructs described next.

G.2 Info Format Text Constructs

These special Info constructs can appear within the text of a node.

G.2.1 Info Format: Menu

Conventionally menus appear at the end of nodes, but the Info format places no restrictions on their location.

```

<menu> =
* Menu:

```

```
(<menu entry> | <menu comment>)*
```

The parts of a `<menu entry>` are also described in Section 4.9.4 [Menu Parts], page 40. They have the same syntax as cross-references (see Section G.2.4 [Info Format Cross Reference], page 287). Indices extend the menu format to specify the destination line; see Section G.2.3 [Info Format Printindex], page 286.

A `<menu comment>` is any line not beginning with ‘*’ that appears either at the beginning of the menu or is separated from a menu entry by one or more blank lines. These comments are intended to be displayed as part of the menu, as-is (see Section 4.9.1 [Writing a Menu], page 38).

G.2.2 Info Format: Image

The `@image` command results in the following special directive within the Info file (see Section 10.2 [Images], page 92):

```
<image> =
  ^@^H[image src="<image file>"
    (text="<txt file contents>")?
    (alt="<alt text>")?
  ^@^H]
```

The line breaks and indentation in this description are editorial; the whitespace between the different parts of the directive in Info files is arbitrary.

In the strings `<image file>`, `<txt file contents>` and `<alt text>`, ‘”’ is quoted as ‘\”’ and ‘\’ is quoted as ‘\\’. The `txt` and `alt` specifications are optional.

The `alt` value serves the same purpose as in HTML: A prose description of the image. In text-only displays or speech systems, for example, the `alt` value may be used instead of displaying the (typically graphical) `<image file>`.

The `<txt file contents>`, if present, should be taken as an ASCII representation of the image, for possible use on a text-only display.

The format does not prescribe the choice between displaying the `<image file>`, the `<alt text>` or the `<txt file contents>`.

G.2.3 Info Format: Printindex

Indices in Info format are generally written as a menu (see Chapter 11 [Indices], page 97), but with an additional directive at the beginning marking this as an index node:

```
<printindex> =
  ^@^H[index^@^H]
  * Menu:

  <index entry>*
```

The `<index entry>` items are similar to normal menu entries, but the free-format description is replaced by the line number of where the entries occurs in the text:

```
<index entry> =
  * <entry text>: <entry node>. <lparen>line <lineno><rparen>
```

The `<entry text>` is the index term. The `<lineno>` is an unsigned integer, given relative to the start of the `<entry node>`. There may be arbitrary whitespace after the colon and period, as usual in menus, and may be broken across lines. Here is an example:

```

~@~H[index~@~H]
* Menu:

* thunder:           Weather Phenomena.           (line 5)

```

This means that an index entry for ‘thunder’ appears at line 5 of the node ‘Weather Phenomena’.

G.2.4 Info Format: Cross-reference

A general cross-reference in Info format has one of the following two forms:

```

<cross-reference> =
* (N|n)ote <id>::
| * (N|n)ote <label>:<id>(.,)

    <id> = (<lparen><infofile><rparen>)?(<del>?<nodename><del>)?
|    <id> = (<lparen><infofile><rparen>)?(<nodename>)?
    <label> = <del>?<label text><del>?

```

No space should occur between the ‘*’ character and the following ‘N’ or ‘n’. ‘*Note’ should be used at the start of a sentence, otherwise ‘*note’ should be used. (Some Info readers, such as the one in Emacs, can display ‘*Note’ and ‘*note’ as ‘See’ and ‘see’ respectively.) In both cases, `<label text>` is descriptive text.

In both forms the `<id>` refers to a node or anchor, in the same way as a reference in the node information line does (see [Info Format Regular Nodes], page 285). The optional parenthesized ‘`<infofile>`’ is the filename of the manual being referenced, and the `<nodename>` is the node or anchor within that manual,

The second form has a descriptive label. A cross-reference in this form should usually be terminated with a comma or period, to make it feasible to find the end of the `<id>`.

If `<label>` contains a colon character (:), it should be surrounded with a pair of `` characters. Likewise, if `<nodename>` contains problematic characters (such as commas or periods), it should be surrounded by a pair of `` characters; then a terminating comma or period is not needed.

As with node names, this quoting mechanism has as of the time of writing limited support in Info-reading programs; hence we do not recommend using it until this changes.

The format does not prescribe how to find other manuals to resolve such references.

Here are some examples:

```

*note GNU Free Documentation License::
*note Tag table: Info Format Tag Table, for details.
*Note Overview: (make)Top.
*Note ^?:^?: (bash) Bourne Shell Builtins.
*Note alloca.h: (gnulib)^?alloca.h^?.

```

The first shows a reference to a node in the current manual using the short form.

The second also refers to a node in the current manual, namely ‘Info Format Tag Table’; the ‘Tag table’ before the ‘:’ is only a label on this particular reference, and the ‘**for details.**’ is text belonging to the sentence, not part of the reference.

The third example refers to the node ‘Top’ in another manual, namely ‘**make**’, with ‘Overview’ being the label for this cross-reference.

The fourth example shows a colon character being quoted in a label, and the fifth example shows a period being quoted in a node name.

See Chapter 6 [Cross References], page 49.

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Version 1.3, 3 November 2008

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Command and Variable Index

This is an alphabetical list of all the @-commands, assorted Emacs Lisp functions, and several variables. To make the list easier to use, the commands are listed without their preceding '@'.

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