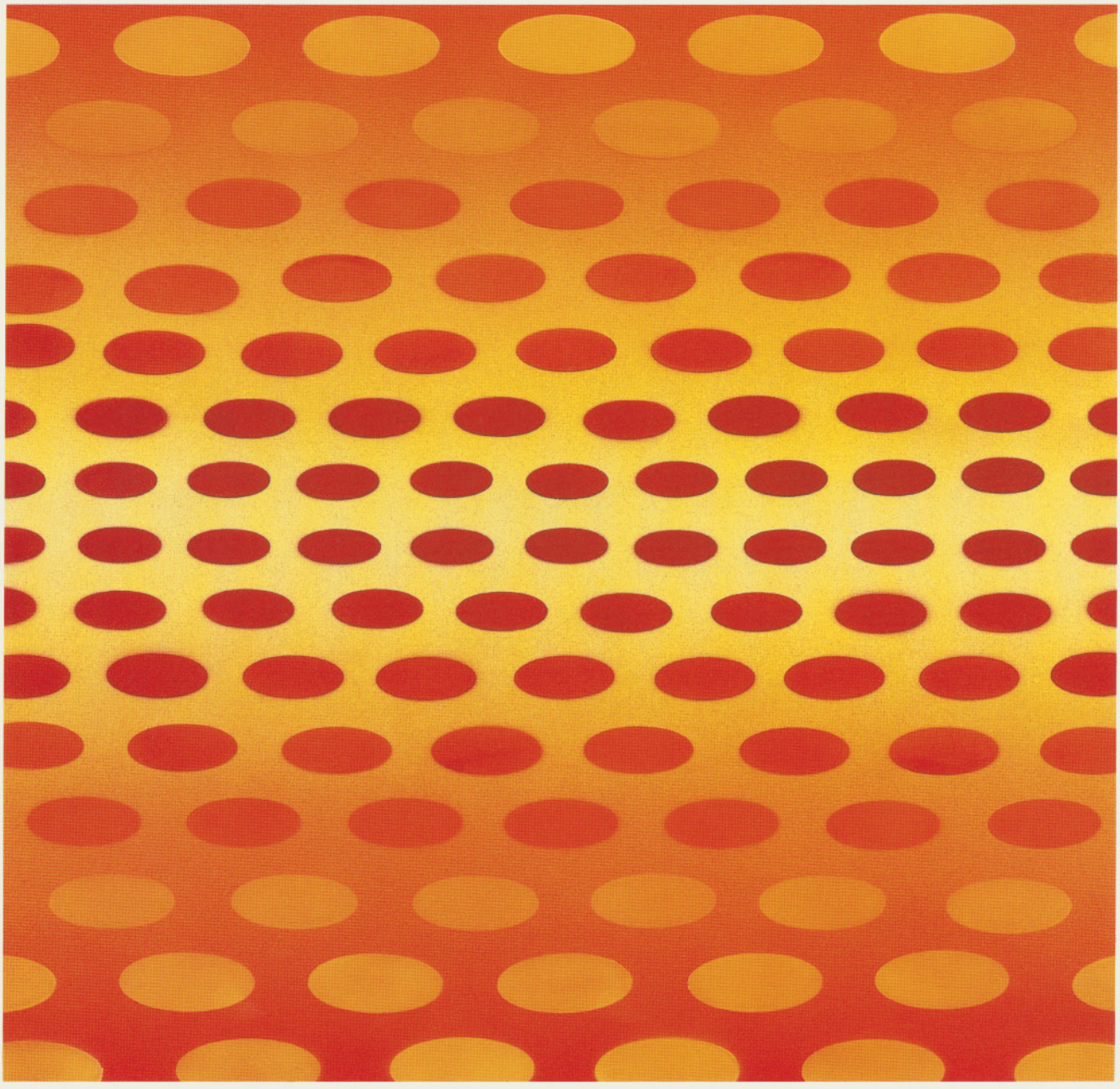
Macmillan Modern Office

Series Editor: Christine Simons

Easily into Lotus 1-2-3™



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BIOGRAPHY

Jim Gilligan entered computing as a programmer for British Aerospace, but soon moved into systems analysis. When the IBM PC arrived in the UK he was given the responsibility of setting up an Information Centre based mostly around the use of PCs using Lotus 1-2-3. He has also taught on professional and vocational courses at Bristol Polytechnic and other institutions. He is managing director of a systems consultancy, and founder member of a software development and training partnership. He spends his spare time writing terrible libels about his experiences for the popular computer press. He is indeed married, does actually have two children, but wants to live in Scotland.

INTRODUCTION

The Macmillan Modern Office series is designed especially to meet the increasing demand for training in office technology in a business world where rapid changes are taking place all the time.

Users of word processing and data processing software often find the manufacturers' manuals daunting and although programs are often described as 'user friendly', one is never quite sure how to become friendly with *them*! With this problem in mind, we have produced a number of instruction books for a range of the most widely used word processing and data processing programs, which can be used either for group teaching or for self-study. We have made every effort to write in clear, straightforward language, avoiding jargon wherever possible.

A training disk is included which contains plenty of exercise material, and will save valuable time and effort spent in keying-in exercise text, especially if students are not trained keyboard operators. At this early stage, it is essential to concentrate on program functions, and learn them before anything else.

Such subjects as disk management, installation procedures and hardware systems are outside the scope of this book and readers who are using the course for self-study should ensure that they either have a basic knowledge of the formatting of work diskettes, or have access to a teacher or knowledgeable colleague who can see that the system is set up for them before they can begin.

This course has been designed for maximum practicality of use as a stand-up text. It also includes essential learning aids such as a Glossary, an Index and cross-referencing. With such comprehensive learning material at hand, readers should find that acquiring fluency and understanding of the technique of Lotus 1–2–3 is as enjoyable as it is profitable to them.

Christine Simons

ACKNOWLEDGEMENTS

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CONTENTS

WORKING WITH LOTUS 1–2–3

Before you plunge into this book, be warned! The one qualification you need is that you should want to stop spending precious time at your desk chewing pencils, burning out desk calculators, erasing erasers and consuming a small forest with the reams of paper you use just to do your business sums!

Replace the above desktop essentials now with a Personal Computer and Lotus 1–2–3, and in return you will be able to spend more time using your real skills, rather than wasting yourself on the number-crunching that you always thought should have been put onto a computer.

If you come to this book with no experience of computers at all, then you will be impressed by the power and flexibility of Lotus 1–2–3. Those readers with some experience of computers, perhaps those with a home computer or who have programmed a little, are likely to be even more astonished at what can be done. The simple truth is that the more knowledge of computing you have, the more astonishing it is that Lotus 1–2–3 exists, and that it should be so suitable for anyone with business problems to solve. There are no assumptions made in this book about your previous experience or knowledge of computing. Instead, we start with a general explanation of some basic facts and first principles. This is not an attempt to cover the theory of computing, merely an overview of the equipment that you will be using.

Wherever possible, we have tried to avoid unnecessary jargon: we know how off-putting it is to talk with computer buffs who seem incapable of expressing two words without including a multi-syllabled utterance. However, computer terms *are* a part of understanding Lotus 1–2–3 and so you will meet them, and we will use them here. To help you become used to these terms, each one is explained as it occurs for the first time, and if you do forget it, you can look it up in the Glossary at the end of the book.

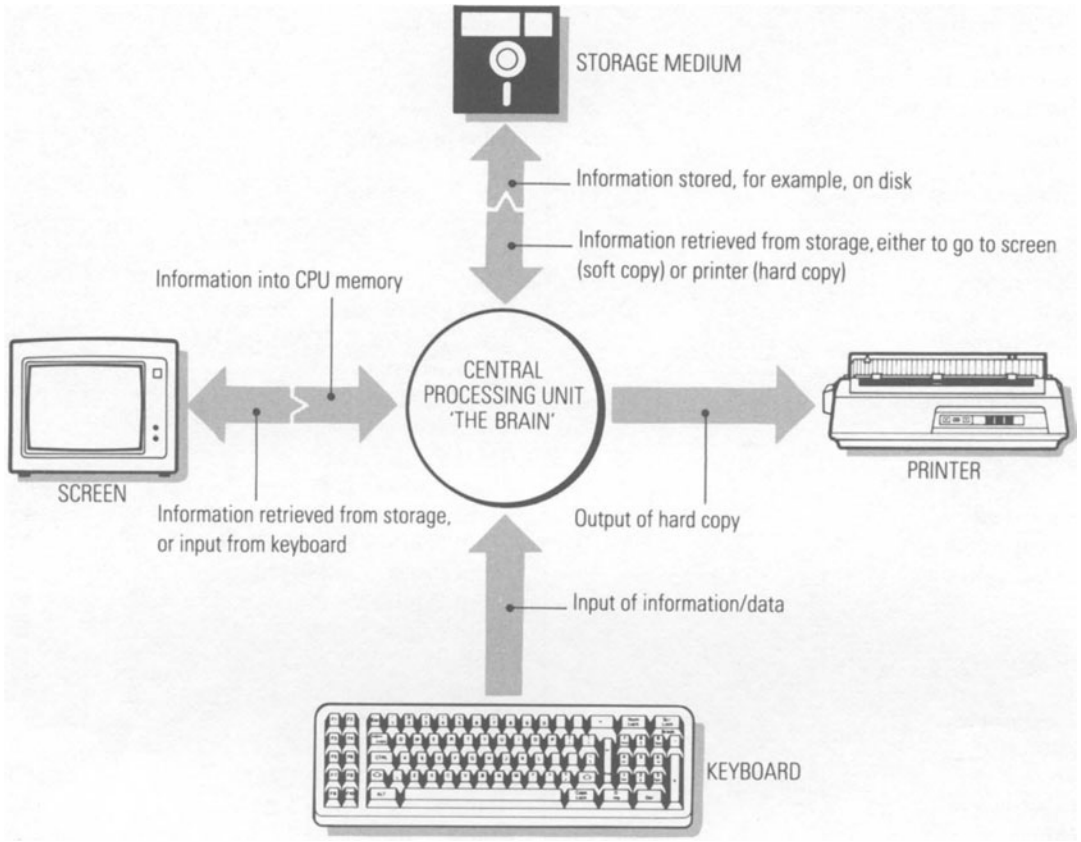
WHAT IS A PERSONAL COMPUTER?

A Personal Computer is only complete with both HARDWARE and SOFTWARE. The hardware is made up of all the machinery, wires, and other bits and pieces which come in the boxes. Software is made up of the programmed instructions which allow the machine to perform some work for you. Like a television in the night, your Personal Computer is a piece of useless electronics without a program to make it worth having!
Here is some more information on HARDWARE, and then SOFTWARE.

HARDWARE

A typical Personal Computer will be made up from the following hardware components as you will see in the diagram:

* System Unit
* Disk Drives
* Monitor or VDU
* Keyboard
* Printer



Component parts of a Personal Computer

The System Unit

The **System Unit** houses the working electronics of the machine and the disk drives. The only part of the computer electronics which matters much to you is the size of the work space available inside the System Unit. This work space is sometimes called the 'memory' of the machine, or better, 'working storage'. This is where your spreadsheet will be while you work on it. Anything in this area which you want to keep has to be copied to a disk, because switching the machine off erases everything inside the working storage.

The size of this working storage area matters to you. The bigger the storage area of your computer, the more data you can have in your spreadsheet. The size of computer storage is measured by the number of characters which can be

held. As the storage size is normally hundreds of thousands of characters, we abbreviate by counting in multiples of 'K', where 1K is 1024 characters. A typical Personal Computer will have a capacity of 512K – over half a million characters of internal working storage!

The **Disk Drives** are for the long-term storage of information. There are two main types of disk storage: **FLOPPY DISKS** and **FIXED DISKS** and although you will have at least one floppy disk drive on your machine, it is possible that you have a second drive of either type. For Lotus 1–2–3 you must have either 2 floppy disk drives, or one floppy disk and one fixed disk. What are the differences in these disks?

Floppy Disks

These are the most common form of Personal Computer storage. The standard 5.25 inch circular disks have a magnetic coating similar to that on music recording tape. This magnetic disk is held inside a stiff square card case. Once placed in the drive, the magnetic disk is spun beneath the 'read/write' heads which, as the name suggests, read information from the disk, or write information to it. The main advantage of floppy disks is that they are cheap and you have virtually unlimited storage available to the computer – when one disk is full, you use another!

In capacity, floppy disks are rather small in computing terms. The standard floppy disk used with Lotus 1–2–3 will only hold 360K (remember, that's 360×1024 characters) of data. If this seems to be a lot, remember that your computer's working storage may well be over 500K! In more conventional office terms, the standard floppy disk can hold about 150 full A4 pages of information.

The main disadvantage of floppy disks is that they are easily damaged. It is always wise to keep your floppy disks inside their paper sleeve, and keep those inside a box or container which protects them from dust or spilled coffee. . .

Another main use for floppy disks is the supply of software programs. Almost all packages which you can buy for your Personal Computer will come in the form of a Reference manual and one or many floppy disks. The disks used for software programs are very often special and should never be used for storing data. Lotus is supplied on several disks:

Lotus System Disk
Lotus System Disk Backup
Lotus Printgraph Disk
Lotus Utility Disk

Notice that you are supplied with a 'Backup' or copy of the main System Disk. This is because the Lotus 1–2–3 System Disk cannot be copied by the owner. If the System Disk is damaged you must use the Backup until you receive a replacement from Lotus Corporation. A final point on floppy disks. As they are so vulnerable, it is always wise to keep **a second copy** of any spreadsheet **on a separate 'backup' disk**. Then if anything happens to the first disk you are able to save much work, frustration, and embarrassment by using your backup copy. Beware the thought that a damaged disk will never happen to you – computers may be inanimate, but they do seem to know just when to corrupt that most valuable spreadsheet!

Fixed Disks

These are sometimes known as 'Winchester' or 'Hard' Disks. They differ from floppy disks in that they have very much greater capacity, are sealed within the computer, and are rather more expensive.

A fixed disk is encased within a sealed unit, and consists of one or more rigid, spinning magnetic disks. As they are never removed from the machine they can be designed to spin very much faster, and so information can be made available to your program much more quickly than from floppy disks.

A typical fixed disk today will hold between 10 million and 40 million characters. We abbreviate a million characters to '1 Megabyte' or 1Mb, and so a typical disk will hold between 10Mb and 40Mb. That's 30 to 120 times as much as one floppy disk.

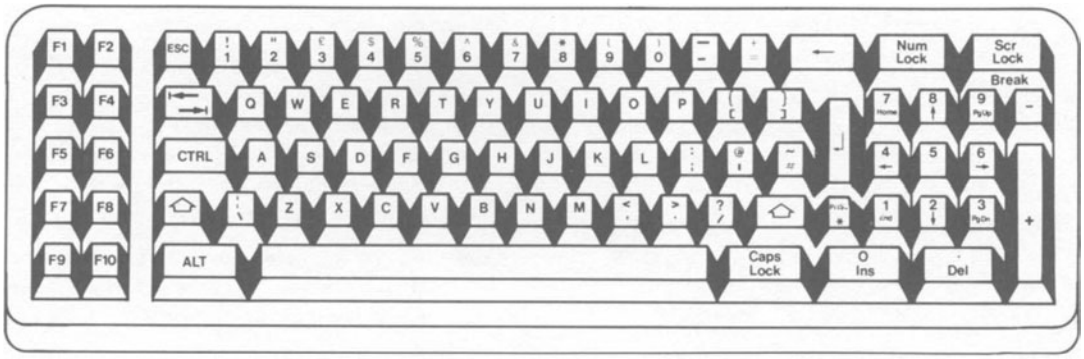
Fixed within the machine, these disks are not so likely to be damaged by mishandling. However they *are* damaged by sudden shock. The point to note here is that the loss of one 360K floppy disk may be disastrous – how much worse to lose a 40Mb fixed disk! The moral is clear: you still need to keep copies of your spreadsheets on some external and secure source, perhaps floppy disk.

The Monitor or VDU

The **Monitor** or **Visual Display Unit** for the Personal Computer will be colour graphics, monochrome, or monochrome graphics. Lotus 1–2–3 will work on any of these with the additional feature of graphics for any of the standard graphic screens. However, you should note that in order to provide this flexibility, Lotus 1–2–3 has to be 'installed' for your particular computer configuration. This is not something we will cover in this book, but your supplier should be able to help with any problems that arise.

The Keyboard

The keyboard on a Personal Computer is a little different from a typewriter keyboard. Here is an example of a typical Personal Computer Keyboard:



A typical Keyboard

As you see, there are many more keys than on a typewriter. The extra keys instruct the computer to carry out certain functions. All of these keys have a particular function within Lotus 1–2–3, many of which will become clear as you proceed through the book. There are several keys which are not used in this book but which will prove to be of value once you are familiar with Lotus 1–2–3. These are the keys on the left of the keyboard and are labelled 'F1' to 'F10'. These **Function** keys have a particular meaning for Lotus 1–2–3, and the most important of these is 'F1' – which means 'Help!'. If you ever find that you have forgotten something, or want to know a little more about a feature of the software, tap F1. Immediately you will be shown one of many **Help Screens** each of which describes a particular topic in detail. In practice most people find that these Help Screens provide the answers they need, without them having to look at the reference manual. An additional feature is that the **Help** facility will try to take you to the screen which is relevant to the command or function you were trying to use. To come back to work on your spreadsheet, tap the **ESC** key. This is the Escape key, and is the most useful key on the machine! If ever you find yourself hopelessly lost within a command, or if the program doesn't seem to want to let go, tap **ESC** – it will usually save the day.

The computer keyboard **Shift** and **Caps Lock** keys work in the same way as on a typewriter. However, it is important to know that computer commands within Lotus are **always read as capitals no matter how the command is keyed-in**. To Lotus 'COPY' is the same as 'copy' when used as a command. In this text we use capitals for keys, file names, commands and symbols in the activity column to give emphasis, and to reflect what you will usually see on your screen. But you need merely tap the appropriate key when working; only use Shift or Caps Lock when you specifically want capitals to appear in the text or data.

Notice that on the right hand side of your keyboard, there is a block of keys with numbers and arrows. This is called the **numeric pad**. In many packages, especially accounting packages, these keys are used for rapid entry of numbers. However they can be switched to be used as the arrowed **Cursor Movement** keys. In Lotus 1–2–3 these keys are used in this latter way to move around the screen when working on a spreadsheet. To enter numbers use the numeric keys along the top edge of the 'QWERTY' block.

The key which starts the computer processing your instruction is called the '**RETURN**' key. It is sometimes also known as the **Enter** key, or **Carriage Return**. On your keyboard it may look like this: ↵ .

The '←' key, which is above the **RETURN** key, is used in Lotus to backspace over a command which has not yet been entered into the computer. As the backspace movement erases characters it passes, this is called a 'destructive backspace'. The left Arrow key on the numeric pad is used as a 'non-destructive backspace'.

The Printer

A printer is an almost indispensable part of any computer system which allows you to copy spreadsheets, documents, graphs or files onto paper. There are many different types of printer, reflecting varying quality, speed, cost and reliability. The first rule in purchasing a printer is to give careful consideration to the needs of the person using the computer. For example, is speed more important than print quality? Is continuous paper acceptable or will a sheet-feed mechanism be required? Once the printing requirements are established, the matter of deciding which machine to purchase will be a great deal easier.

Low cost printer options include **dot-matrix** printers, which produce variable fonts, with low quality print, at speeds often above 150 characters per second. **Daisywheel** printers produce typewriter quality, but cost several times as much as the cheapest matrix printers and run more slowly, at speeds of about 35–60 characters per second. At the top in terms of quality and speed, **laser printers** may produce 8 × A4 pages per minute with the very highest quality of print.

Now, some notes on the software – **LOTUS 1–2–3.**

SOFTWARE

There are three general applications for personal computers: **word-processing, database** and **spreadsheet**. Each replaces a traditional office practice with a computer system capable of much more than the original manual system. **Word-processing** supplements pen and paper, and ultimately, replaces the typewriter. A **database** package replaces the card index by allowing you to store large numbers of records with the ability to retrieve one or many using your chosen selection criteria.

Spreadsheets

A **spreadsheet** replaces that other office essential combination: pencil, paper and calculator. Wherever you would have to use pencil and paper to note, calculate, check out assumptions, plan forecasts or budgets – that is where spreadsheets provide the most powerful individual tools yet produced for the Personal Computer. Lotus 1–2–3, available for the most popular Personal Computer standards, has led the way in introducing the power of computers to the desks of office staff and managers who might once have thought computers too complex for their personal use. Once introduced to Lotus 1–2–3, the Personal Computer is not just an everyday tool, but as indispensable to business as the telephone!

Just what is a **spreadsheet**? In simple terms, it is an empty display of rows and columns. The **grid** made from these rows and columns is a structure onto which you key **names**, **numbers**, and, especially important, the **formulae** to perform any calculations you choose to do on the data. Whenever you change a value on the spreadsheet, every formulae using that value will instantly and automatically be recalculated to reflect that change. Once completed, the spreadsheet can be saved onto a computer disk to be used again, or have the final results copied onto a printer.

How do other people use 1–2–3? In many cases it is used for accounts, particularly in forecasting and summary account analysis. This is because of the spreadsheet's ability to rapidly recalculate using different values or assumptions. But this is by no means the only use for 1–2–3: managers often use it to hold personnel records; a lecturer might collect, sort, and print students' examination marks; a laboratory scientist or technician might store and analyse experimental data; the secretary of a bridge club might record competition results. 1–2–3 can even help you to manage your household budget.

ABOUT THIS BOOK

This training course will give you sufficient instruction to enable you to operate Lotus 1–2–3 with fluency and confidence. If, at that stage, you wish to complement or deepen your knowledge of the program then you should turn to the *Lotus 1–2–3 Reference Manual.*

WORK AT YOUR OWN PACE

The training of Lotus 1–2–3 here has been divided into Sessions which break down the facilities into easily digested parts. You should work through each Session at your own pace, then carefully go through the Check at the end of each Session – being honest with yourself about whether or not you really understand what you have done. If you're not sure of a particular point, go back to it and work on it before you move on to the next Session.

DESIGN OF THE SESSIONS

The objectives are given at the beginning of each Session. The training material is divided into two columns: the left column, ***This is what you do,*** tells you exactly what steps you must carry out, and instructions to key-in are given in bold typeface: the right column, ***This is what will happen,*** shows you what will happen as a result of the action you have taken. Words which will actually appear on your screen are again in bold typeface. General theory points and exercise texts use the full width of the page.

LOTUS 1–2–3 ON DIFFERENT SYSTEMS

Lotus 1–2–3 may be used on a wide variety of computer hardware. The computer itself must be an IBM PC, PC–XT, or PC/AT; or a compatible MS–DOS based machine. At least 256Kb of Random Access Memory will be required, and a minimum configuration of two disk drives.

The main difference between machines is likely to be on the use of different disk drive configurations – twin floppy drives, or one floppy drive and one fixed. To allow for this, the instructions will refer to (F) whenever it is specific to twin-floppy systems, and to (H) when fixed or 'Hard' disks are being used. When the instructions rejoin for both systems, (F/H) will appear.

Lotus 1–2–3 Version 1A is assumed as this is **the most common version of the software, and is the basis of Version 2.** The most important matter is that Lotus 1–2–3 should have been installed for the machine you will use for this training. If you feel unable to do this yourself, you should contact your dealer or the person responsible for installing software on the machine.

AND FINALLY. . . .

The limits of Lotus 1–2–3 are those of your own business imagination. No single text can hope to teach more than a small portion of what can be done with Lotus 1–2–3. This is in part because the spreadsheet has, quite literally, many hundreds of facilities and features, but also because the use of the software will depend on the nature of the problems you are trying to solve! What this book *can* do is to take you through the most commonly used features of Lotus 1–2–3 and give you the familiarity with the command structure that you need to be able to use Lotus 1–2–3 well. Perhaps, like many Lotus 1–2–3 users, you will go on to become an expert in your own particular use of spreadsheets. One thing is certain: combine Lotus 1–2–3 with your own special skills, and business is never going to be quite the same again!

1 SESSION ONE

In this Session you will:

- Start the Lotus 1–2–3 program on your computer
- Discover some useful spreadsheet screen information
- Move the cursor around the spreadsheet using the 'cursor movement' arrow keys
- Key onto spreadsheet cells
- Discover how a Lotus 1–2–3 Session should end

Work at your own pace, and try to avoid doing too much at a single sitting. Learning will be most effective when taken in short concentrated bursts, allowing you to absorb between topics what you have learned. At the end of each Session the above objectives will be reviewed. If you feel unsure about any one then take the time to review the topic. The extra effort will soon be repaid!

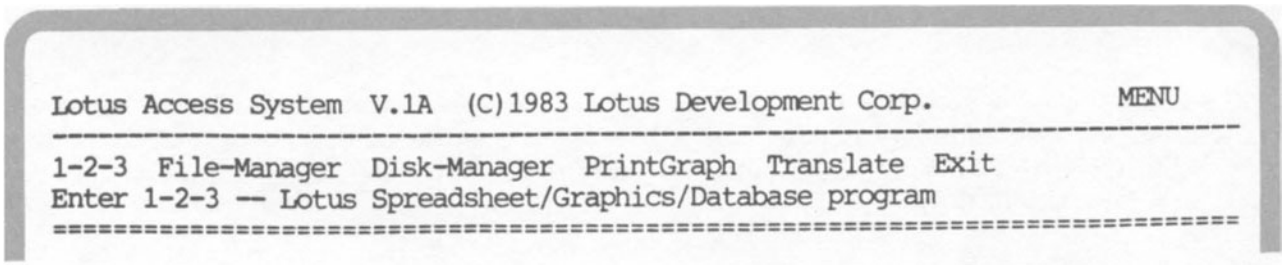
In this Session you will need a **Lotus 1–2–3 System Disk** which has been installed to work on your computer, and your copy of the **Training Disk** which is to be found in the back of this book.

STARTING LOTUS 1–2–3 ON YOUR COMPUTER

The starting procedures for Lotus 1–2–3 will be different according to the type of disk drives on the computer you are using. The following general rules will usually be sufficient, however in the case of computers with fixed disk drives it may be necessary to consult the person who installed Lotus onto the computer.

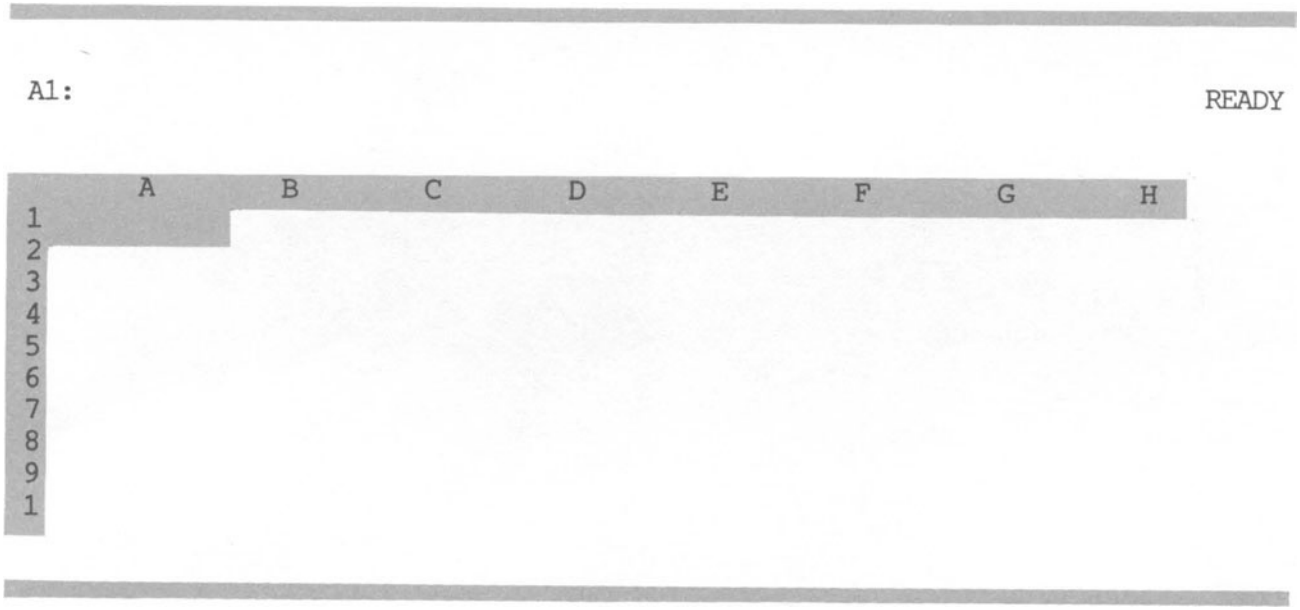
This is what you do	*This is what will happen*
(F)	
The computer should be switched off before you begin. Place the **Lotus 1–2–3 System Disk** into **drive A**, label up and to the front, and close the drive.	
Place your copy of the **Training Disk** into **drive B** and close the drive.	
Switch on the computer.	The computer takes some moments performing a silent self-check. All being well, **the light on drive A** will glow, indicating that the computer is reading your disk. You may be asked to key-in the date and time.

This is what you do	*This is what will happen*
Key-in any date and time information requested and tap the **RETURN** key. From now on this action is described simply as 'tap **RETURN**' or by a command followed by **RETURN**.	After a few moments the **Lotus Access Menu** will appear. This is shown below after the starting instructions for fixed disks.
(H) With **drive A** open and empty, switch on the computer.	The computer takes some moments performing a silent self-check. All being well, **the light on drive A** and then **drive C** (the fixed disk) will glow, indicating that the computer is reading the disk. You may be asked to key-in the date and time.
Key-in any date and time information requested.	After a few moments the C> prompt will appear.
The **Lotus System Disk** should now be placed in **drive A** and the drive closed. The Lotus program may be stored on the fixed disk, in a 'sub-directory' of the disk. This normally will be found by keying-in the command: **C>CD\LOTUS and tap RETURN**	If an error message results, consult the person who installed Lotus onto the computer. The result should be that the C> appears again below your command.
Key-in the command to start the Lotus program: **C>LOTUS and tap RETURN**	After a few moments, the **Lotus Access Menu** will appear. It looks like this:



The first line on this screen is the copyright information for Lotus Development Corporation, together with the version number of the Lotus software you are using. The second line of information is the Lotus Access Menu. Notice that '1–2–3' appears to be highlighted. This is because the cursor (or pointer) is positioned over the '1–2–3' option on this menu.

This is what you do	*This is what will happen*
Using the **Right Arrow key** on the computer's numeric pad, move the highlighting cursor across the other options.	As you tap the Right Arrow **each option one to the right is highlighted**. Note that the line below contains a brief description of the purpose of each highlighted option.
Tap the **Right Arrow** again when you are over the **Exit** option.	As you reach the end of the option line, tapping the Right Arrow results in you being returned to the first option: '1–2–3' itself.
Once back above the '1–2–3' option, tap the **RETURN** key.	After a few moments the **Lotus Access Menu** screen will be replaced by **the borders of an empty spreadsheet**. Here is what you will see on the top half of your screen.



Even this empty spreadsheet contains some useful information. Notice the letters across the top and the numbers down the left side of the screen. These form the grid onto which you type your data. At the point of crossing of each column letter and row number there exists one 'cell'. Each cell is named by the letter of the column and name of the row shown on the border.

So how do we know which cell we are in? Look at **cell A1** on your screen. That is, the cell in **column A row 1**. This cell is highlighted by the **Spreadsheet Cursor**. When you move to another cell this cursor highlight moves with you to show you where you are. Another way of knowing which cell you are in is to look at the top left corner of the screen. You will always see the current cell address in that corner. Right now it will say **A1**. Try this short exercise in moving around on the spreadsheet.

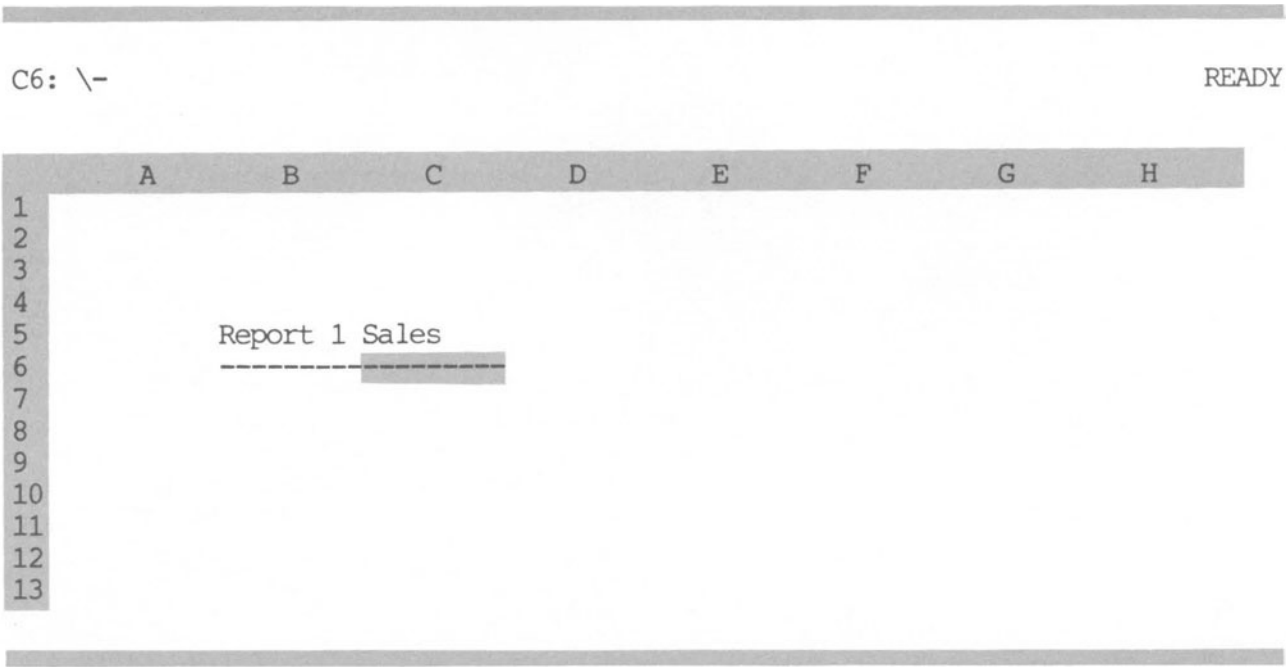
This is what you do	*This is what will happen*
Tap the **Down Arrow** on the numeric pad of the keyboard.	The Spreadsheet Cursor will move down one row. Note that the cell address on the top left of the screen has changed from A1 to **A2**.
Tap the **Right Arrow** on the numeric pad twice.	The cursor now moves two columns to the right, and the cell address changes to **C2**.
Tap the **Up Arrow** on the numeric pad.	The cursor moves up to row 1, and the cell address changes to **C1**.
Tap the **Left Arrow** key twice.	You return to **A1**.

Try moving around on the screen a little, using the arrow keys on the numeric pad on the keyboard.

Each cell may be used to enter data: words, numbers or calculations. Go to cell **B5** and then try the following short exercise.

This is what you do	*This is what will happen*
Once in **cell B5**, key-in the following: **Report 1**	As you key-in an entry, the letters appear at the flashing cursor on the second line of the screen. This is the **'Command Line' Cursor**.
Now tap the **RETURN** key.	The entry is placed in the current cell, **B5**, and can be seen on the spreadsheet.
Move to cell **C5** using the **Right Arrow**. Key-in the following: **Sales** and tap **RETURN**.	
In **B6** and **C6** key in the following: Tap **RETURN** after each entry.	Notice that each cell is filled with '**---------**'. The character \ means: fill the current cell with the next characters typed.

Your screen will now look like this:



Try keying-in a few more words into cells.

If the Lotus 1–2–3 spreadsheet only allowed you to work with a single screen at a time then it would be too small to meet most requirements. However the spreadsheet is much larger than it appears.

This is what you do	*This is what will happen*
Using the **Right Arrow**, move along to **column H** on your screen.	
Now tap the **Right Arrow** again.	The entire screen shifts leftwards, and now shows columns **B to I**.
Tap the **Right Arrow** key a dozen or so times.	As you will see, **the spreadsheet extends far beyond columns A-H.** In fact, it extends for a full **256 columns!** After **Z** is reached, the columns repeat with **AA-AZ, BA-BZ**, and so on, right through to **IV**.

If you had to tap the **Arrow** keys repeatedly to move around the spreadsheet, it would soon become quite tiring. There is another key on the numeric pad which allows you to return to **A1** from any other point – it is called the **Home** key.

This is what you do	*This is what will happen*
Tap the **Home** Key.	The Spreadsheet Cursor is immediately returned to **cell A1**.

This is what you do	*This is what will happen*
Tap the **Down Arrow** key until you go beyond **row 20**.	The **screen scrolls upwards** showing rows 21 and onwards. If you were to carry on to the bottom of the spreadsheet, you would discover there are **2048 rows** in version 1A of the 1–2–3 spreadsheet.

The spreadsheet has **256 cell columns** by **2048 rows**. This is more than **500,000 cells.** If each cell were to contain one word, this capacity would be equivalent to more than eight full length novels!

However, the number of cells which actually can be used depends on the amount of **Random Access Memory (RAM)** on your machine. A typical business Personal Computer might have 256Kb of RAM and will be able to use approximately 100 × 100 cells. 1–2–3 will tell you when it runs out of memory and the only permanent cure is to increase the RAM on your machine.

ENDING A LOTUS 1–2–3 SESSION

While you are working on the spreadsheet, all of your data is held in the memory of the computer and is lost when the power is switched off or the 1–2–3 program ended. When you have completed your work on a spreadsheet, you will usually want to save the work onto a disk. Session Two will deal with saving spreadsheets but for the moment we have no need to keep what is on the screen. We can come out of 1–2–3 by ending the program.

This is what you do	*This is what will happen*
At this stage, don't be concerned about any changes on the screen while you are keying commands. Key-in the following 1–2–3 command: **/ QY and tap RETURN**	This is the 1–2–3 **QUIT** command which we will see again in Session Six. The current spreadsheet data is lost and you will be returned to the **Lotus Access Menu**.
Tap the Right Arrow key until the cursor is positioned over the **EXIT** option. Tap the **RETURN** key to leave Lotus. Once you have been returned to the DOS prompt, A> or C>, then the machine may be switched off.	

Session Check

In this Session you have:

- Started the Lotus 1–2–3 program on your computer
- Discovered some useful spreadsheet screen information
- Moved the cursor around the spreadsheet using the 'cursor movement' arrow keys
- Typed onto spreadsheet cells
- Discovered how a Lotus 1–2–3 Session should end

If you are clear on all of these matters, take a break before moving on to Session Two.

2 SESSION TWO

In this Session you will:

- Retrieve a spreadsheet from the Training Disk
- Key-in labels, numbers and formulae onto the spreadsheet
- Store the new spreadsheet onto the Training Disk

Spreadsheets are created directly onto the screen of your computer, but must be stored onto disk if they are to be used again.

For both floppy disk and hard disk based computers, there must be two drives, and the drive containing the Training Disk is the one from which we will retrieve spreadsheets and later store or 'save' them.

1–2–3 has the flexibility to save spreadsheets on any available disk, and so we must first ensure that the program knows the disk onto which we want to look for spreadsheets. This is done by setting the **Directory** option within 1–2–3. A 'directory' in this case is just the name of the disk drive. It is possible to subdivide a hard disk into several 'sub-directories' which are also recognised by 1–2–3. As we are using the Training Disk for these exercises, this latter feature is unnecessary.

This is what you do

Start your computer and 1–2–3 as described in Session One.

To check the current disk which 1–2–3 expects to be used for spreadsheets, key in the following command:

/FD

(F) The displayed drive should be as follows:

B: \

If so, then tap **RETURN.** If it is not then key-in the following:

B: \ and tap RETURN

This is what will happen

You will see the 1–2–3 Command menu appear as you key-in the /. This menu is dealt with in following Sessions. After a moment, 1–2–3 will display the following:

Enter current directory:

followed by the directory 1–2–3 has been set to use.

1–2–3 will change the directory setting **for the current session only** to the drive containing the Training Disk.

1–2–3 will change the directory setting for the current Session to the drive containing the Training Disk.

This is what you do

(H) The displayed drive may well be as follows:

C: \ LOTUS

To set the directory to the correct drive, key-in the following:

A: \ and tap RETURN

(F/H)
To retrieve the spreadsheet we will use in this Session key-in the command:

/FR

Using the **Right Arrow** key, position the cursor above the name 'BUDGET'. Tap **RETURN**.

This is what will happen

This 1–2–3 command displays the names of spreadsheet files on your copy of the Training Disk.

After a few moments, the empty spreadsheet screen will be replaced by the following spreadsheet.

A1: READY

	A	B	C	D	E	F	G	H	I	J	K	L	M
1					HOUSEHOLD BUDGET 1987								
2													
3	Item	J	F	M	A	M	J	J	A	S	O	N	D
4	----------												
5	Mortgage	120	120	120	120	120	120	120	120	120	120	120	120
6	Rates				275						275		
7	Gas			120			70			50			90
8	Electricity		70			50			30			45	
9	Telephone	45			45			45			45		
10	Water Rate				55						55		
11	--->												
12	--->												
13	--->												
14	--->												
15	----------												
16	Total	165	190	240	495	170	190	165	150	170	495	165	210
17	Income	650	650	650	650	650	650	650	650	650	650	650	650
18	M/Bal	485	460	410	155	480	460	485	500	480	155	485	440
19													
20	----------												

As you can see, this spreadsheet is intended to keep a simple domestic cashflow account. By listing outgoings by month we can balance each month's expenses against income. Rows 5 to 14 are available for listing items of expenditure, and rows 16 to 19 are for any calculations we want to include.

At the moment, this spreadsheet is incomplete, and you will be able to think of a great many items of expenditure not included. Try the next exercise in which you can add some Items and Values to the spreadsheet.

This is what you do

As you start, the Spreadsheet Cursor will be in **cell A1.** Using the Arrow keys move down to **cell A5.**

This is what will happen

The **A5 cell** is highlighted, and the content of the cell is shown in the top left of the screen, beside the cell address.

Note: The content of A5 is prefixed by a single quotation mark. This is generated automatically by 1–2–3 when you start an entry to a cell with a letter. This mark is known as the 'label-prefix' because 'labels' are the name given in 1–2–3 to cell contents which are never used for calculation. Examples of labels are names (Mary Smith), and codes such as a vehicle registration (D123 ABC), where numbers and letters are mixed but the numbers are never used for calculations.

This is what you do

Move down to A11. This is the first 'empty' cell and can be used to enter the label for the new item. Key-in the following:

Petrol and tap RETURN

Tap the Right Arrow key to move into cell B11. Now key-in the cost of petrol used in the month of January, say £50. Note that when entering a value such as this it is not possible to key-in the preceding £ or any other non-arithmetic symbol, and so you will simply type 50 into the cell representing £50.

This is what will happen

The word **Petrol** is shown on the top of the screen, and, together with a generated label-prefix, is placed in the cell **A11** when the **RETURN** key is tapped.

The number 50 is placed in cell B11.

It is important to notice several aspects of this latest entry. In the first place, as the entry began with a number, 1–2–3 assumed that it would be used for calculation. Where labels usually are left-justified in a cell, numbers are always right-justified. Next, notice that as a number your entry has no prefix in the display at the top left of the screen. Finally, but most important, the spreadsheet has recalculated *all* of the arithmetic on the spreadsheet.

Now move across through the other months, adding the appropriate amounts for petrol. Notice how the Totals and Monthly Balance (M/Bal) at the bottom of the spreadsheet change with each entry.

Try the next exercise which shows how 1–2–3 can perform calculations for you.

In this spreadsheet, line 16 totals the expenses listed; line 17 is income; and line 18 is the balance between the two for each month. What might be more interesting would be to show the *ongoing* balance. So the balance for January is added to the balance for February, and so on.

This is what you do

Move to cell **B19**. In this cell we will store a simple formula or calculation to create a running balance.

To start a simple formula we must key-in the arithmetic plus sign, +. 1–2–3 then understands that what follows will be a formula. We want to follow this by showing the balance at the end of the current month, January. In this case it is simple – just the cell above, **B18**. So, key-in the following:

+B18 and tap RETURN

Now, move to **C19** which is the balance for February. In this case we want to add January's balance to the monthly balance for February. Thus, we want to add **B19** to **C18**. Key-in the following:

+B19+C18 and tap RETURN

To show that the formula is working, return to **B11** and change the value you created earlier.

This is what will happen

When RETURN is tapped, the 'calculation' is transferred from the command line to the top left of the screen, beside the cell address. However, the content of the cell itself does not appear as the formula, but as the result of the required calculation being performed. In this case, cell **B19** will contain the same value as **B18**.

The result is that 1–2–3 calculates the total of the two cells and displays the result.

Notice that as well as the January totals being altered, the formula in **B19** has recalculated the new balance.

In many ways this is the most important and useful feature of 1–2–3. With any change to the spreadsheet, 1–2–3 will recalculate all of the spreadsheet formulae to produce an instantly revised view of the data.

Finally in this Session, as the spreadsheet will be used again in the next Session, it is important to know how to store or **SAVE** the spreadsheet onto the Training Disk.

This is what you do	*This is what will happen*
Key-in the following 1–2–3 commmand: **/ FS**	1–2–3 will display the message **Enter save file name: BUDGET**

As the current spreadsheet was retrieved from disk under the name of 'BUDGET', 1–2–3 assumes that it should be replaced under the same name. However, this would involve overwriting the original file which is not what is wanted. Instead, save this modified spreadsheet under the name '**BUDGET1**'.

This is what you do	*This is what will happen*
Key in the name of the new file **BUDGET1 and tap RETURN**	1–2–3 will display the new name as it is keyed, and when RETURN is tapped, the spreadsheet is written to the disk as a file named 'BUDGET1.WKS' on the disk. The unseen '.WKS' suffix tells 1–2–3 that the file is a spreadsheet file.

The spreadsheet has now been **SAVED** onto the disk. **Any further changes you make to the working copy on the screen will not be recorded until you SAVE the file again.** Whenever you end a 1–2–3 Session or switch off the computer, your spreadsheet is stored only at the level of the last **SAVE** command.

Session Check

In this Session you have:

- Retrieved a spreadsheet from the Training Disk
- Keyed-in labels, numbers and formulae onto the spreadsheet
- Stored the new spreadsheet onto the Training Disk

3 SESSION THREE

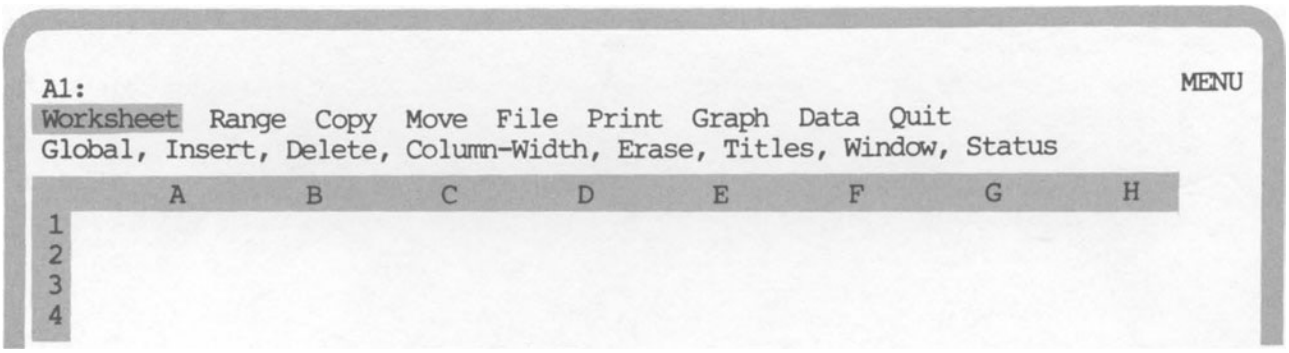
In this Session you will:

- Look at and use the 1–2–3 command menus
- Use commands to change the format of cells
- Use commands to alter column-width
- Make use of some more cursor movement keys

This Session begins with a look at one of the most important features of 1–2–3: the **Command and Menu Structure**.

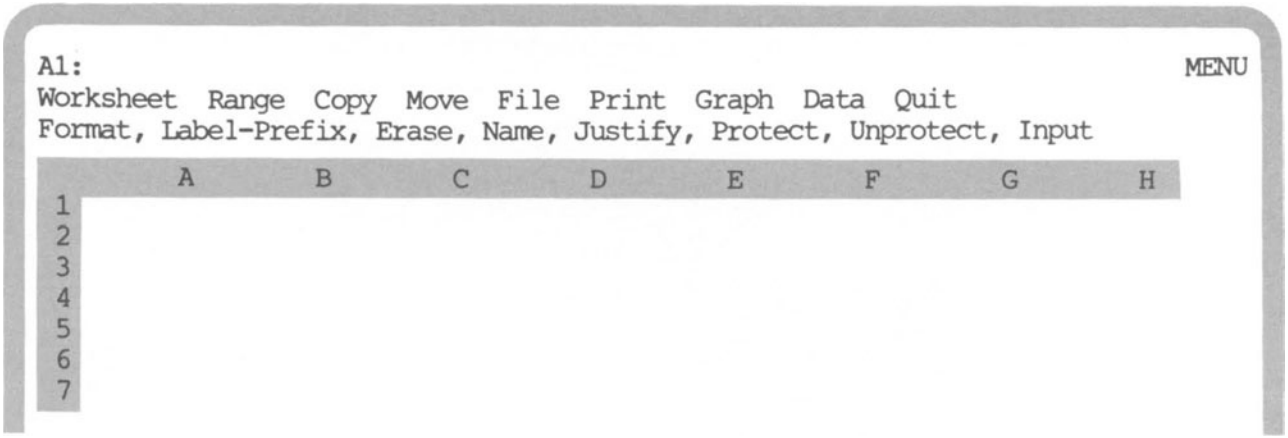
In Sessions One and Two you entered data into the 1–2–3 spreadsheet. But a program also needs commands to instruct it when to perform certain tasks, for example, to retrieve a file. In previous Sessions you have entered commands using such characters as / **FD**, but now you should get to know more about how these instructions operate.

The first thing to know is that the / key is of special significance in 1–2–3. It tells 1–2–3 'I want you to do something'. In response to the / key, 1–2–3 presents the first of many **menus** from which you can choose the instruction or selection you require. The menus appear across the second and third lines of the screen, like this:



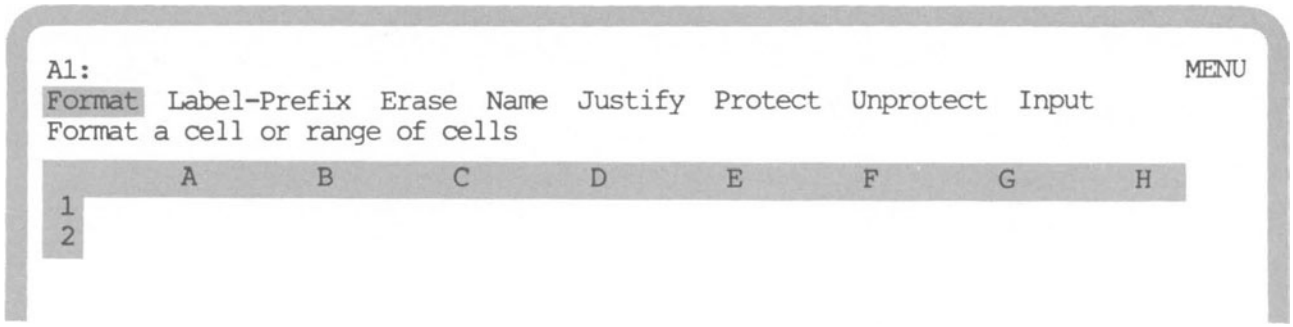
The first **Command Line** shows the available choices. The **Command Line Cursor** is now a **highlight cursor** positioned over the first of the choices. The line below is used to show *either* the further options available within the choice over which the cursor is positioned, *or* to describe that option.

Use the right arrow key to move the highlight cursor to the RANGE option.



Note how, with the highlight cursor on the second option, the second line now contains different choices. These are the options which would become available if RETURN were tapped while the highlight is in this position.

Using the left arrow cursor movement key, position the cursor over 'Worksheet' and press RETURN.



As you can see, what was the second line is now on top, with yet a further set of descriptions beneath. 1–2–3 has many commands within this 'family tree' structure.

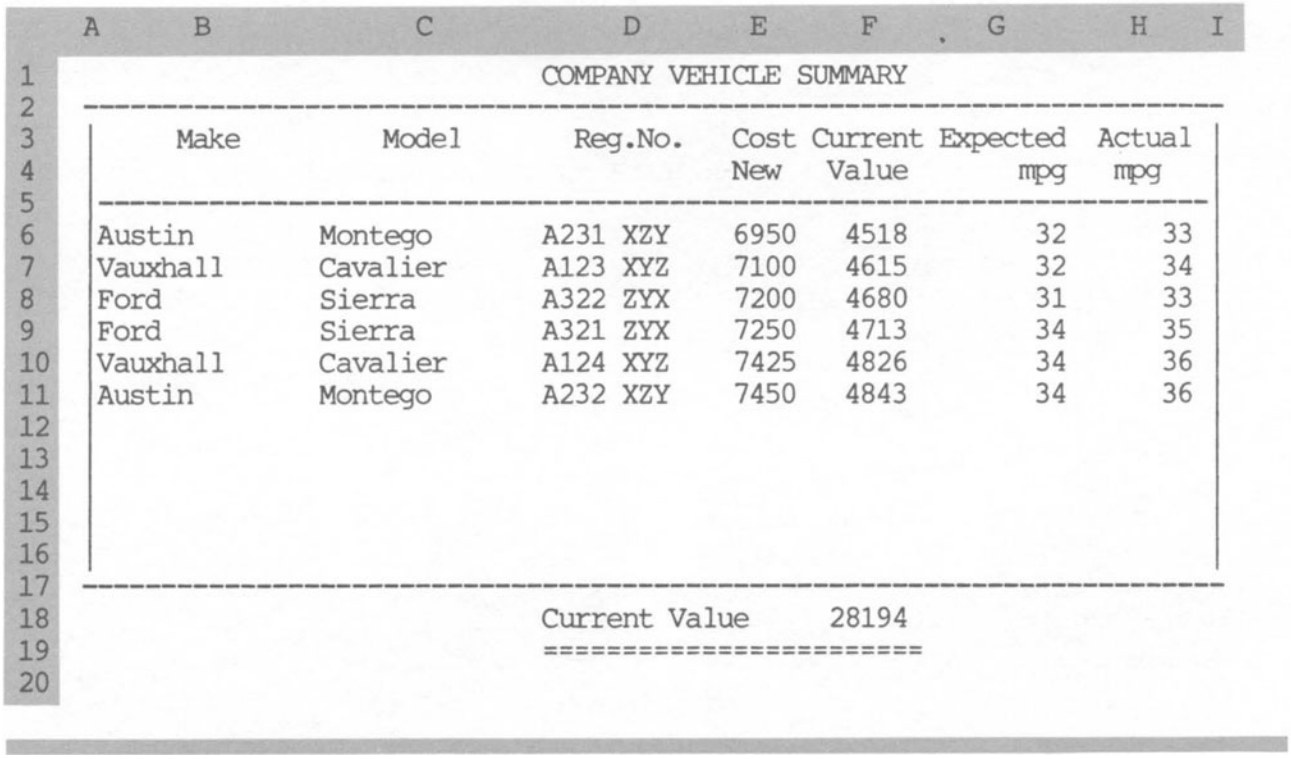
Make a special note of the fact that you can use the **ESC**ape key if you want to come out from any choice which you have inadvertently selected. In fact, this is one of the most important keys to learn to find quickly on the keyboard! For most difficult situations, **ESC** will see you returned safely to where you started.

Until now you have entered commands in a 'shorthand' fashion by keying-in a code. That code is based upon the initial letter of each option within these menus. So **/ FD** is really **/ FILE DIRECTORY**. In future, and until you are fully familiar with the command structure, it is better to point to the commands on the menu line before you confirm your choice with the RETURN key. In this book we will now indicate all commands with the **full menu name** rather than the abbreviated code. To begin the practical part of this Session you should switch on your computer (if necessary) and ensure that 1–2–3 is looking at the Training Disk file directory. If you are unsure about any of this, please review Session Two.

For this Session we are going to use another simple spreadsheet on the Training Disk called 'FLEET'. This represents a simplified Fleet Management record for company cars. In this spreadsheet are columns for the Make and Model of Car, Registration Number, Purchase Price, Current Value, and Anticipated and Actual Miles per Gallon. Use the method described in Session Two to retrieve the spreadsheet file called 'FLEET'. General instructions on these matters are included at the beginning of the following exercise.

This is what you do	***This is what will happen***
Start the computer and select 1–2–3. Check that the directory is set for the correct drive by keying-in the command: **/ FD**	The current directory will be shown.
(F) If the directory is not **b:** \ , key this in and tap **RETURN**.	The directory will be changed.
(H) If the directory is not **a:** \ , key this in and tap **RETURN**.	The directory will be changed.
(F/H) Retrieve the file called '**FLEET**' by using the command: **/FILE** and tap return	The list of files on the Training Disk will be shown.
RETRIEVE and tap **RETURN**.	
Point to '**FLEET**' and tap **RETURN**.	In a few moments the screen will show the contents of '**FLEET**'.

A1: READY



COMPANY VEHICLE SUMMARY

Make	Model	Reg.No.	Cost New	Current Value	Expected mpg	Actual mpg
Austin	Montego	A231 XZY	6950	4518	32	33
Vauxhall	Cavalier	A123 XYZ	7100	4615	32	34
Ford	Sierra	A322 ZYX	7200	4680	31	33
Ford	Sierra	A321 ZYX	7250	4713	34	35
Vauxhall	Cavalier	A124 XYZ	7425	4826	34	36
Austin	Montego	A232 XZY	7450	4843	34	36

Current Value 28194

Notice that although all information of the same type is contained under a column heading, the columns themselves are of different widths. This facility allows 1–2–3 to make best use of the available screen to show as much information as possible.

Using the skills you used in Session One and Two, enter the following additional car to the fleet:

Make	**Jaguar**
Model	**XJS**
Reg.No.	**NUM 1**
Cost New	**£14,500**
Current value	**£9,500**

Notice that both values should have been entered without the preceding '£' symbol and the (,) showing thousands.

Add another record or two of your own, and watch how the bottom line of 'Current Value' changes.

The next thing we might want to do is to tidy the presentation of the numbers a little. For example, we might want to include those commas for thousands. The **/ WORKSHEET GLOBAL FORMAT** commands allow us to choose from many different cell presentations. While the cell contents do not change by placing a format 'mask' over them, the presentation on the screen is modified.

This is what you do

To alter *all* of the numeric cells to include commas for thousands, the following command is used:

/ WORKSHEET GLOBAL FORMAT

From this menu select the ',' option and tap **RETURN**.

Key-in **0** and **RETURN**.
Pence are unlikely to matter here.

This is what will happen

That is, the '/' presents the first menu from which '**WORKSHEET**' must be chosen, which causes a second menu from which '**GLOBAL**' is chosen, leading to a third menu where '**FORMAT**' is chosen.

This option places parentheses around negative values as well as inserting commas and is a format often used by accountants. As well as the format choice, you will now be asked for the number of places after the decimal.

The format of all numbers over 999 will now include commas.

Something else has happened! The new cost of the Jaguar has disappeared to be replaced with *******. This is because the comma has made the number too wide for the column width. Lotus will never truncate a value arbitrarily, instead it will show that the number cannot be displayed by this asterisk-filled warning. This is where we need to be able to make some adjustments.

This is what you do

To change the width of **column E**, move to that column with the Cursor. The command to set the current (rather than every) column-width is:

/ WORKSHEET COLUMN-WIDTH SET

Tap the **Right Arrow** two or three times.

This is what will happen

1–2–3 will display the current column-width and request a new value.

Watch as with every tap the particular column becomes one character wider, until the largest number fits comfortably inside.

This is what you do	*This is what will happen*
Tap the **Left Arrow** Tap the **Right Arrow** Tap **RETURN** to confirm. But now we have lost the rightmost column, **I**, from the visible portion of the spreadsheet. Go to **column B** and narrow the column width until **column I** is again displayed. Use the command: **/ WORKSHEET GLOBAL COLUMN-WIDTH SET** and tap **RETURN** to confirm.	The cell becomes more narrow. The cell widens again.

Finally in this Session, there are some extra cursor movement keys worth knowing about. This particular spreadsheet is two 'pages' long. If one page is from row 1 to row 20, page 2 is from row 21 to row 40. We could move down to row 21 using the arrow keys, but a more effective means is to use the **PgDn (Page Down)** and **PgUp (Page Up)** keys on the numeric pad. Have a look at the second page, which is a summary based on information taken from the first page.

Before this Session ends, **SAVE** the spreadsheet you have modified under the filename '**CARS1**', using the procedure explained in Session Two.

Session Check

In this Session you have:

- Looked at and used the 1–2–3 command menus
- Used commands to change the format of cells
- Used commands to alter column-width
- Made use of some more cursor movement keys

4 SESSION FOUR

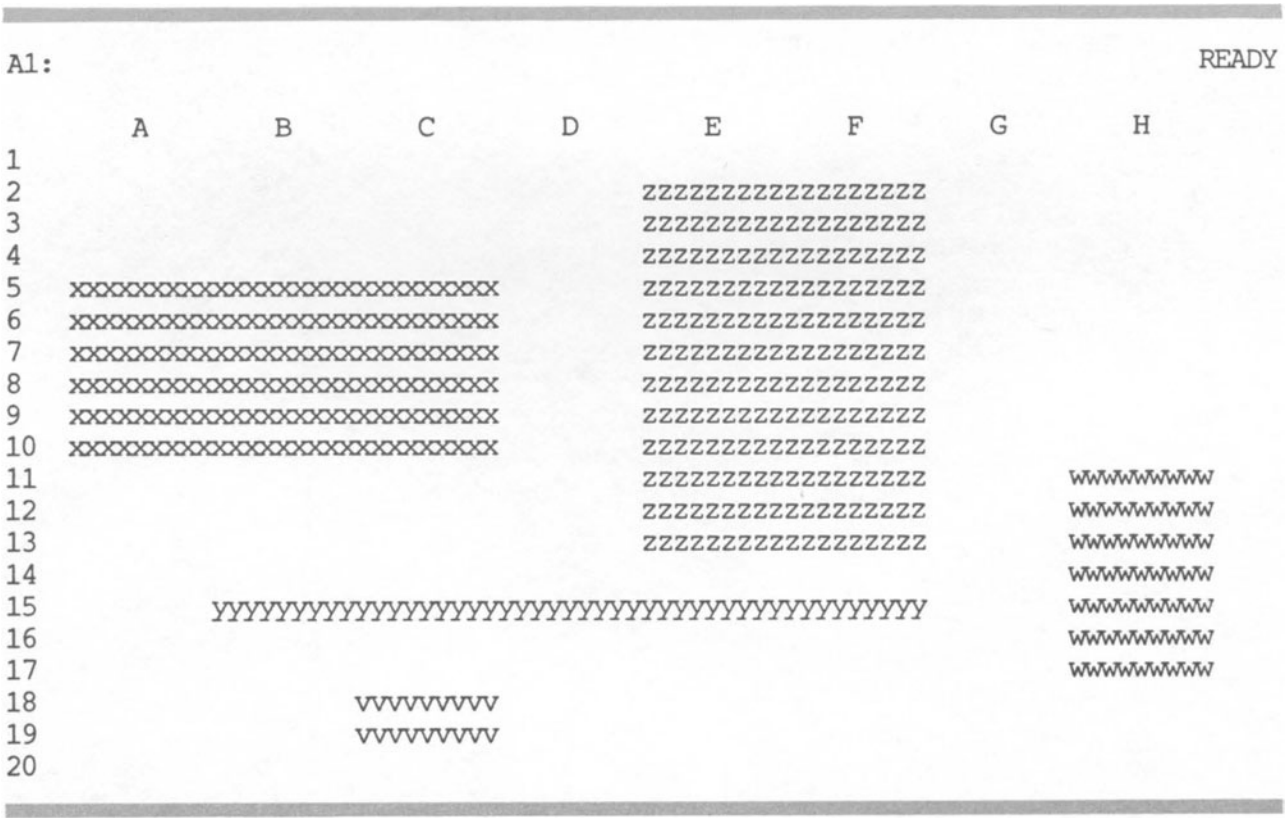
In this Session you will:

- Discover what is meant by a 'Cell Range'
- Point to a Range
- Change the Format of a Range
- Erase a Range of Cells

Up to this point, we have considered cells as individual units within a spreadsheet. However there is a more convenient way in which to manipulate data – in '**Cell Ranges**'. A range of cells is defined as any rectangular area of the spreadsheet, and is identified by the address of the top-left and the bottom-right of the rectangle.

Such an area on the spreadsheet can be moved, copied, or erased with a single command, rather than you having to perform those actions on the several cells within the range. Once mastered, cell ranges make working with Lotus 1–2–3 a great deal easier and quicker.

The key matter is that the range *must* be a rectangular area – other irregular collections of cells cannot be grouped into a range. Look at the following screen which shows some 'ranges'.



All of the above groups of cells which are highlighted are **Cell Ranges** and can be moved, copied, erased, or formatted without having to carry out the process for each individual cell. Each range can be identified by the top-left and bottom-right cell addresses. For example, in this case A5–C10 forms a range. Although B15–F15 is simply a row of cells it is also a true range and can be manipulated by all of the range commands.

The most usual way to describe a range in 1–2–3 is not as A5–C10, but as (A5. . .C10). This is the structure used for calculations within formulae which use cell ranges. This will be dealt with in Session Seven in more detail, but in this book, we shall continue to use the latter structure from here on.

RANGES AND RANGE COMMANDS

Start your computer and Lotus 1–2–3. Check that the current directory is set for the drive containing the Training Disk. Retrieve the spreadsheet file 'FLEET'. Cell ranges can be used here to make the data more presentable.

```
A1:                                                                    READY

   A    B            C               D       E        F          G        H    I
1                                    COMPANY VEHICLE SUMMARY
2   ----------------------------------------------------------------------------
3  |    Make          Model          Reg.No.    Cost  Current  Expected  Actual |
4  |                                            New   Value         mpg    mpg  |
5  |---------------------------------------------------------------------------
6  |Austin        Montego          A231 XZY    6950   4518           32      33 |
7  |Vauxhall      Cavalier         A123 XYZ    7100   4615           32      34 |
8  |Ford          Sierra           A322 ZYX    7200   4680           31      33 |
9  |Ford          Sierra           A321 ZYX    7250   4713           34      35 |
10 |Vauxhall      Cavalier         A124 XYZ    7425   4826           34      36 |
11 |Austin        Montego          A232 XZY    7450   4843           34      36 |
12 |                                                                            |
13 |                                                                            |
14 |                                                                            |
15 |                                                                            |
16 |                                                                            |
17  ----------------------------------------------------------------------------
18                                 Current Value      28194
19                                 ========================
20
```

This is what you do

Go to cell **G6** which is the first '**Expected mpg**' value. Consider that perhaps you want to record the mpg figures to include a single figure after the decimal point. Start by keying-in the following command:

/ RANGE FORMAT FIXED

This is what will happen

1–2–3 will offer to place 2 figures after the decimal, but you need only 1.

This is what you do	*This is what will happen*
Key-in **1** and tap **RETURN**.	1–2–3 now wants to know the range to be formatted in this way. It presents you with **G6. . .G6**, suggesting a 'range' which only includes the current cell. You need to point the program to **G17** which is the bottom cell available for such data entry.
Using the **Down Arrow** key, point to **G17**.	1–2–3 highlights the range you are pointing to, and the command reflects the change as **G6. . .G17**.
Tap **RETURN** to confirm the range.	Immediately the range will be converted to show 1 decimal place. Note that the cell address in the top left of the screen now contains an additional piece of information – the cell format (**F1**), that is, fixed at 1 decimal place.

If you had decided to have both **columns G** and **H** in this cell format, you need only have used the **Right Arrow** to complete the range with both columns. Try this now. As well as **FORMAT** for numeric fields, **LABEL-PREFIX** exists for fields with letters only (alphabetic) or letters and numbers (alphanumeric).

This is what you do	*This is what will happen*
Go to **B6**. Use the command: **/ RANGE LABEL-PREFIX RIGHT**	
And complete the range by pointing to **B17**. Tap **RETURN**.	1–2–3 responds by **right aligning** the labels within the column.
Similarly, use the command: **/RANGE LABEL-PREFIX CENTRE**	1–2–3 responds by **centring** the labels.

Finally, we need to know how to remove the contents of a cell or range of cells.

It is important to realise that keying-in a cell with **BLANKS** is *not* the same as an **EMPTY** cell. In computing, blank spaces have a value quite different from empty spaces. And while the reasons need not trouble us here, it is a good principle to follow that cells which need to be removed are **ERASED**, not merely overwritten with blanks.

This is what you do	*This is what will happen*
Assume that you want to remove the '**Actual mpg**' figures in readiness for a new set of figures being keyed. Go to cell **H6**. Use the command: **/ RANGE ERASE**	1–2–3 will ask you to indicate the range to erase.
Point to **H17** to erase completely the column data. Tap **RETURN**.	The data in the range indicated is lost, and the cells cleared completely.

While you would normally **SAVE** the spreadsheet file now, there is no need to do so in this Session.

Session Check

In this Session you have:

- Discovered what is meant by a 'Cell Range'
- Pointed to a Range within a Formula
- Changed the Format of a Range
- Erased a Range of Cells

If you feel that you understand all of the above topics, take a break before moving on to Session Five, otherwise spend a little time reviewing what has been done.

5 SESSION FIVE

In this Session you will:

- Copy the contents of one cell to another
- Copy one cell to several others
- Copy several cells in one command
- Move a range of cells within a spreadsheet

This Session shows some of the most useful features of 1–2–3, in the ability to copy or move cells (alphabetics, alphanumerics *and* formulae) within a spreadsheet. This allows work to be duplicated or repositioned without having to re-key any of the information.

To begin this Session, start your computer and Lotus 1–2–3. Check that the current directory is set for the drive containing the Training Disk. Retrieve the file you saved earlier, 'BUDGET1'. The formula entered in Session Two was only entered up to February. In practice, of course, it would be required for all the months through to December. It would, of course, be possible to key-in the formula for each month. However, 1–2–3 is here to save you precisely that kind of labour! Here is the spreadsheet again. Compare what you see here with the contents of your screen, particularly cell **C19**.

C19: +C18+B19 READY

	A	B	C	D	E	F	G	H	I	J	K	L	M
1				HOUSEHOLD BUDGET 1987									
2													
3	Item	J	F	M	A	M	J	J	A	S	O	N	D
4	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
5	Mortgage	120	120	120	120	120	120	120	120	120	120	120	120
6	Rates				275						275		
7	Gas			120			70			50			90
8	Electricity		70			50			30			45	
9	Telephone	45			45			45			45		
10	Water Rate				55						55		
11	--->												
12	--->												
13	--->												
14	--->												
15	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------
16	Total	165	190	240	495	170	190	165	150	170	495	165	210
17	Income	650	650	650	650	650	650	650	650	650	650	650	650
18	M/Bal	485	460	410	155	480	460	485	500	480	155	485	440
19		485	945										
20	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------	--------

Go to cell **C19**. This contains the formula for adding the previous month's balance to this month's balance. In terms of the cell positions, the formula says 'add together the cell one to the left with the one above'. If this seems over simple, that is just how 1–2–3 interprets your formula – and why it is so easy to copy to all the following months.

This is what you do	*This is what will happen*
To make the copy you *must* be in the cell to copy **FROM**. In this case that is **C19**. Use the **COPY** command as follows: **/ COPY**	1–2–3 responds by offering a **RANGE** of cells to be copied **FROM**. In the first instance it offers the single current cell address as the full **RANGE (C19. . .C19)**.
As you only want to copy **FROM C19**, this suggestion by 1–2–3 can be accepted without change. Tap **RETURN**.	You are now asked where the cell(s) are to be copied to and the current cell — the one you want to copy from — seems to be suggested. Note that the 'copy **TO**' prompt changes accordingly.
This is the tricky bit! 1–2–3 is really only giving you a starting address from which it expects you to move. Using the **Right Arrow** move to cell **D19**. To accept the copy **FROM (C19. . .C19)** to **D19** tap **RETURN**.	A copy is made from the original cell to the new one. It is *not* a literal copy as you will see from the resultant calculation. 1–2–3 has copied the meaning or sense of the formula, that is, **added one cell to the left to the one above and placed the result here.**
If it doesn't seem worth the trouble for just one more cell completed, simply extend what you have already done to copy **FROM** one cell **TO** a **RANGE**. Go to **C19**. Use the **COPY** command: **/ COPY** And tap **RETURN** to accept the **FROM** range **C19. . .C19.** Remember this simply means that one cell, **C19**, will be copied.	Again, 1–2–3 will prompt for a 'copy **TO**' range.

This is what you do	*This is what will happen*
Move to the first cell you want to copy into – **E19**.	1–2–3 changes the 'copy **TO**' address to **E19**.
Now, to tell 1–2–3 that you want to **EXTEND** the range, tap the **FULL STOP**.	The range is extended to show **E19. . .E19**.
To extend the copy through to December, use the **Right Arrow** to point to **M19**.	1–2–3 highlights the identified range on the spreadsheet itself, and the cell address on the command line is altered to show **E19. . .M19**.
Tap **RETURN** to accept the nominated range.	Immediately, the formula is copied across the spreadsheet, calculating the **RELATIVE** values.

Copying cells containing numbers or labels rather than formulae is performed in exactly the same way as shown here for formulae. Formula cells have been used in this example to show the nature of the copying process with such cells.

A copying process where formulae have their 'sense' copied rather than being copied literally can be thought of as **RELATIVE** copies. 1–2–3 is also quite able to produce a literal or **ABSOLUTE** copy of a formula.

For the moment, **SAVE** (with **/FILE SAVE**) this spreadsheet using BUDGET 1, the same name that you used earlier. Note that this time, and whenever you are replacing an existing file, 1–2–3 asks for confirmation of the replacement.

Retrieve the spreadsheet called '**FLEET**'. This spreadsheet can be used to try another type of **COPY**: many cells to a second range.

A1: READY

	A	B	C	D	E	F	G	H	I
1				COMPANY VEHICLE SUMMARY					
2									
3		Make	Model	Reg.No.	Cost New	Current Value	Expected mpg	Actual mpg	
4									
5									
6		Austin	Montego	A231 XZY	6950	4518	32	33	
7		Vauxhall	Cavalier	A123 XYZ	7100	4615	32	34	
8		Ford	Sierra	A322 ZYX	7200	4680	31	33	
9		Ford	Sierra	A321 ZYX	7250	4713	34	35	
10		Vauxhall	Cavalier	A124 XYZ	7425	4826	34	36	
11		Austin	Montego	A232 XZY	7450	4843	34	36	
12									
13									
14									
15									
16									
17									
18				Current Value		28194			
19				==========		==========			
20									

Imagine that several new cars have been added to the fleet. Rather than re-key the details of them all, it might be useful to be able to copy most of the information from existing records.

If three cars had arrived – a Montego, a Sierra, and a Cavalier – then it would be possible to take the first three lines of the spreadsheet and copy them to rows 15 to 17. Changes such as Registration number can be made later.

This is what you do

Go to cell **B6**. This is the top-left of the **RANGE** to be copied. Use the command:

/ COPY

This time, to copy the entire 3 lines, point to **H8**.

This is what will happen

1–2–3 responds by offering a a **RANGE** of cells to be copied **FROM**. In the first instance it offers the single current cell address as the full **RANGE** (**B6. . .B6**)

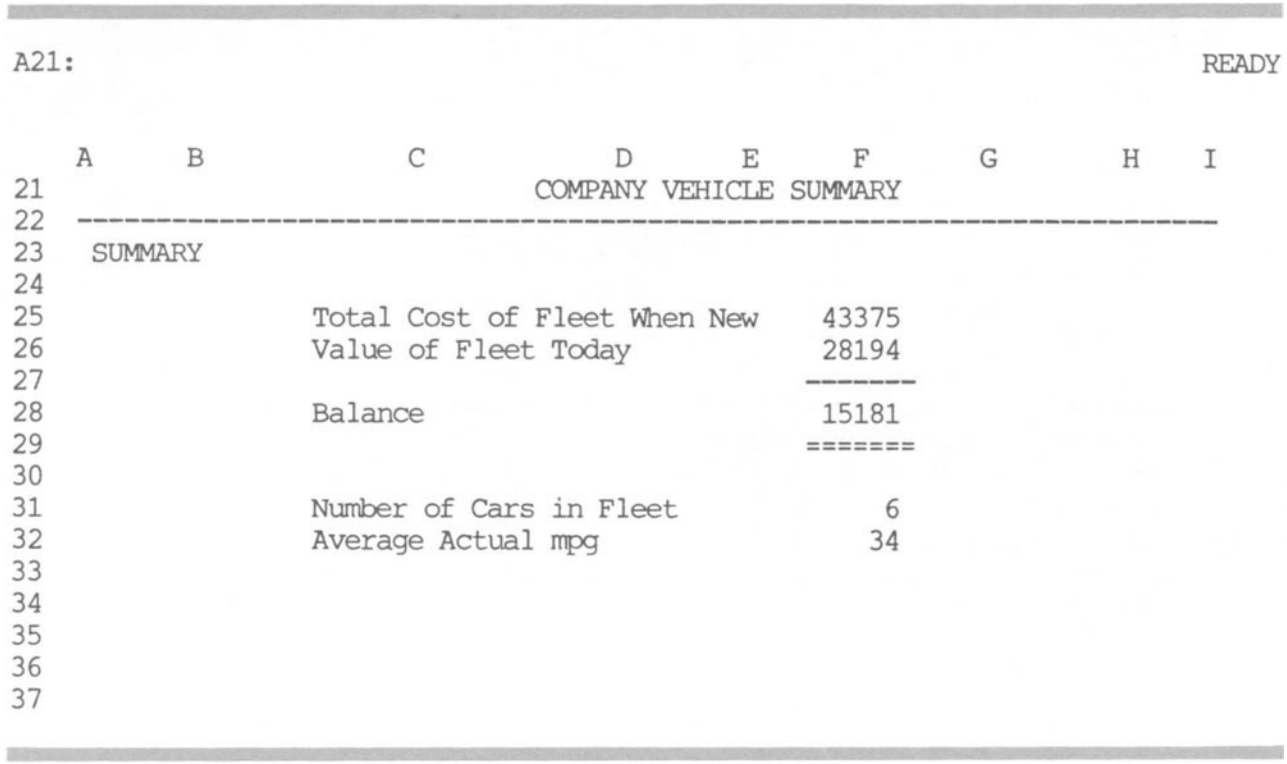
The entire 3 lines are highlighted on the spreadsheet and the copy **FROM** range is given as **B6. . .H8**.

This is what you do	*This is what will happen*
Tap **RETURN** to accept this range.	You will now be asked for the 'copy **To**' range, again initially given as the current cell.
Move to **B12** which should be the first free row. This location is all 1–2–3 needs to be able to copy the three records successfully. In fact, all you are giving 1–2–3 is the **STARTING** position for the range copy.	
Tap **RETURN** to accept the 'copy **TO**'.	Immediately, 1–2–3 will copy the 3 rows to the new position without making any changes to the originals. Note that the **Current Fleet Value** is automatically increased.

You can now alter the value of these cars.

MOVING a cell or range of cells is yet another possibility. In this case, the cells are erased from their original position and placed elsewhere.

This is what you do	*This is what will happen*
Go to **Page 2** of the **FLEET** spreadsheet using the **PgDn** key	
(Page 2 of the Fleet spreadsheet appears on next page.)	
To move the range (**C25. . .F29**) across by one column, you must first go to the top-left of the range, **C25**. Use the command: **/ MOVE**	1–2–3 responds by offering a **RANGE** of cells to be **MOVED FROM**. In the first instance if offers the single current cell address as the full **RANGE** (C25. . .C25)



This is what you do

As you want to **MOVE** a full range, point to the bottom right (**F29**). Accept this range by tapping **RETURN**.

As with **COPY**, move to the **TOP LEFT** cell of the range to be used to move **TO**. In this case, move to cell C23. Tap **RETURN** to accept the new position.

This is what will happen

You are now asked to state where the range is to be 'moved **TO**'.

Immediately, 1–2–3 moves the range to its new position on the spreadsheet.

Notice that although the calculations have been moved, their value remains the same. 1–2–3 is clever enough to transfer the real sense of the original formula into whatever is appropriate from the new position.

Session Check

In this Session you have:

- Copied the contents of one cell to another
- Copied one cell to several others
- Copied several cells in one command
- Moved a range of cells within a spreadsheet

6 SESSION SIX

In this Session you will:

- Use /WORKSHEET commands to insert rows and columns
- Use /WORKSHEET commands to delete rows and columns

To begin this Session, start your computer and Lotus 1–2–3. Check that the current directory is set for the drive containing the Training Disk. Retrieve the spreadsheet file called 'STAFF'.

This spreadsheet lists some basic personnel information: name, date of birth, date started, grade, salary, job title. There are six people in the list at the moment. The problem is what to do when new members of staff join and how to change the spreadsheet to include a new item of information: clock number.

A1: READY

	A	B	C	D	E	F	G
1		DEPARTMENTAL STAFF INFORMATION				01-Jan-80	
2		CONFIDENTIAL					
3							
4	---	---	---	---	---	---	---
5		Job			Date of	Date	
6	Name	Title	Grade	Salary	Birth	Started	
7	---	---	---	---	---	---	---
8	Albinoni	Operator	5	5800	23-Oct-36	26-Jun-74	
9	Bach	Head of Dept.	1	15250	23-Apr-48	18-Nov-77	
10	Byrd	Secretary	4	6500	20-Jul-63	24-Jul-86	
11	Corelli	Supervisor	3	8500	12-Nov-32	19-Aug-58	
12	Mozart	Assistant Manager	2	9250	10-Feb-60	15-Jun-78	
13	Rossini	Operator	5	4800	03-Apr-65	05-Jan-86	
14	---	---	---	---	---	---	---
15							
16							
17							
18							
19							
20							

INSERTING AN EXTRA COLUMN

Clock number is to be inserted between 'Name' and 'Job Title'. This could be done by **MOVING** everything to the right of Name by one column. However 1–2–3 allows us to **INSERT** one or many columns. In this case we need only one.

This is what you do	***This is what will happen***
To **INSERT** a new column, move the cursor into the column on the right of where the new column will be placed. In this case, for a new column between A and B, move to cell **B1**. Use the command: **/ WORKSHEET INSERT COLUMN**	1–2–3 will prompt for a **RANGE** of columns to be entered, using the current to start the range, in this case **B1. . .B1**.
As only one new column is required, accept this 'range' of one by tapping **RETURN**.	Immediately all the columns from B onwards are shifted by one column to the right, and **a 'new' and empty column B appears.**

Now that the new column is in place, go down the column and key-in the cell entries required to make the modified spreadsheet look like this:

```
B8: 10050                                                              READY

        A         B          C           D     E       F         G
1                          DEPARTMENTAL STAFF INFORMATION        01-Jan-80
2                                 CONFIDENTIAL
3
4   ----------------------------------------------------------------------
5               Clock          Job                        Date of     Date
6      Name     Number         Title       Grade Salary   Birth      Started
7   ----------------------------------------------------------------------
8   Albinoni       10050 Operator              5   5800 23-Oct-36 26-Jun-74
9   Bach           10125 Head of Dept.         1  15250 23-Apr-48 18-Nov-77
10  Byrd           10200 Secretary             4   6500 20-Jul-63 24-Jul-86
11  Corelli        10275 Supervisor            3   8500 12-Nov-32 19-Aug-58
12  Mozart         10350 Assistant Manager     2   9250 10-Feb-60 15-Jun-78
13  Rossini        10425 Operator              5   4800 03-Apr-65 05-Jan-86
14  ----------------------------------------------------------------------
15
16
17
18
19
20
```

There is now the problem of introducing new members of staff to the spreadsheet. It would be possible to overwrite row 14 with a new record. But if the list is to be kept in alphabetical order of name, it might be more difficult.

Here are the new members of staff:

Purcell	Clerical Assistant/Grade 5
Wagner	Group Leader/Grade 3

So in order to retain the sequence we will want to insert a new row between rows 12 and 13 for Purcell. And for Wagner we need a row between rows 13 and 14.

This is what you do	*This is what will happen*
To introduce a new row 13, move the cursor to the first row which is to be moved down – row 13. Use the command: **/ WORKSHEET INSERT ROW**	1–2–3 will prompt for a **RANGE** of rows to be entered, using the current cell to start the range, in this case **A13. . .A13.**
As only one new row is required, accept this 'range' of one by tapping **RETURN**.	Immediately all the rows from 13 down are shiften one row lower and a new and 'empty' tow 13 appears.

Now that the new row is available, key-in the given details for the new employee, Mr. Purcell.

Using the same method described above, insert a new row between 'Rossini' and the end of the list, and key-in the details for Mr. Wagner.

A very similar process would occur should you choose to **DELETE** a row or column. If the departmental Secretary chooses to leave, it is possible to delete the row as follows:

This is what you do	*This is what will happen*
Position the cursor somewhere in the row to be **DELETED**. Use the command: **/ WORKSHEET DELETE ROW**	1–2–3 will prompt for a **RANGE** of rows to be **DELETED** using the current cell to start the range.
As only one row is required to be **DELETED**, tap **RETURN** to accept this range.	Immediately all the rows from 14 down are shifted one row higher. Row 13 and the details of the employee are removed.

The process to **DELETE** column is very similar to **INSERT**. Using commands from earlier in this Session, insert a new column between B and C, then, with the command '**/WORKSHEET DELETE COLUMN**', remove the empty column again.

It is important to notice that 1–2–3 is clever enough to recreate the formulae in each cell with **RELATIVE ADDRESSING** so that the calculations on the spreadsheet remain correct even though columns or rows have been inserted or deleted.

Session Check

In this Session you have:

- Used / WORKSHEET commands to insert rows and columns
- Used / WORKSHEET commands to delete rows and columns

7 SESSION SEVEN

In this Session you will:

- Discover a better way of entering complex formulae using the '@' functions including:

  @ sum
  @ avg
  @ max
  @ min
  @ count

- Use the '@ date' function to enter dates and perform date arithmetic

In Session Two you added a simple calculation to a spreadsheet as a cell formula '+B19+C18'. This is the very simplest way of entering calculations. Clearly it would be a very unsatisfactory method where large numbers of cells were involved in the calculation, or the calculation was more complex than simple arithmetic. As always, 1–2–3 provides a sophisticated yet straightforward solution which allows you to carry out complex calculations with the minimum of effort. The solution depends on **EMBEDDED FUNCTIONS**. These are functions which 1–2–3 is able to perform for you without explicit details of the calculation itself. For example, one embedded function calculates the average of a series of numbers without having to be told *how* to calculate an average; another reports the maximum value within a range; yet another, the minimum value; the number of items within a list; log; sine; cosine; standard deviation – the list is considerable. In order to use these functions there is one simple construction to be understood. Most of these functions are written in the form:

@ 'function' (cell-range)

for example: **@ sum (a1. . .c5)**

This example will add all of the values within the range **A1. . .C5.**
' @ sum' is the embedded function for any arithmetic.

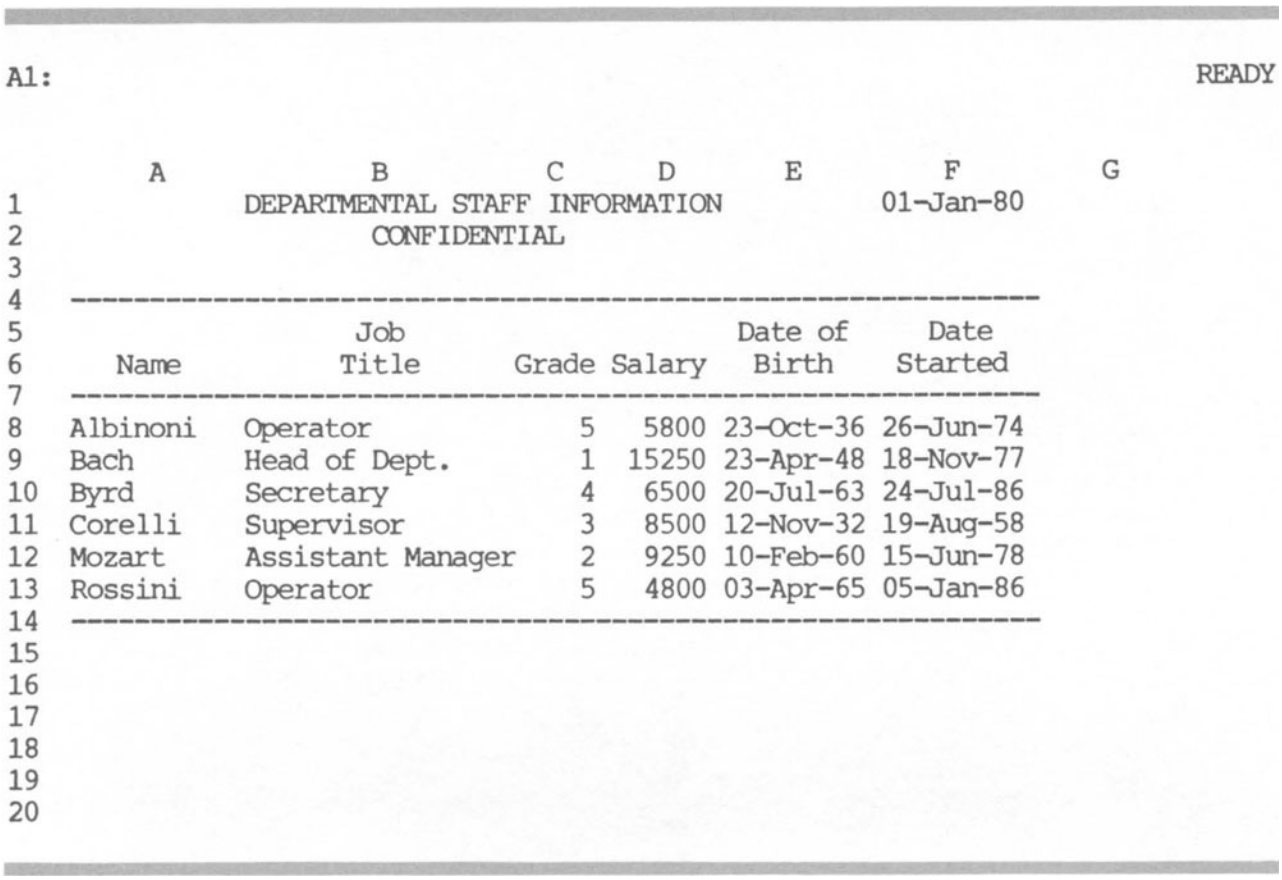
The only thing to remember is that computers use slightly different symbols for divide and multiply:

Add	+
Subtract	–
Multiply	*
Divide	/

The following are valid cell formulae:

@ sum (a1. . .c5) * 1.15
@ sum (d9+b5–e2)
@ sum (d5+d8) * 2
@ sum (f6/3)

To begin this Session, start your computer and Lotus 1–2–3. Check that the current directory is set for the drive containing the Training Disk. Retrieve spreadsheet file called 'STAFF'.



This is what you do

Go to cell **B15**. This should be the first line below the data.

This row will be used to calculate the average Salary of the department.

Key into B15 the label:

Average

and move to **D15**.

You now want to key-in a function which calculates the average of cells **D8. . .D13**. Key this formula and tap **RETURN**.

@ avg (D8. . .D13)

Move down to B16 and key-in the label:

Maximum

and move to **D16**.

This is what will happen

1–2–3 immediately calculates and displays the average value within the given range.

This is what you do	*This is what will happen*
You now want to key-in a function which calculates the maximum value within cells **D8. . .D13**. Key this formula and tap **RETURN**. **@ max (D8. . .D13)**	1–2–3 immediately calculates and displays the maximum value within the given range.
Move down to **B17** and key-in the label: **Minimum** and move to **D17**.	
You now want to key-in a function which calculates the minimum value within cells **D8. . .D13**. Key this formula and tap **RETURN**. **@ min (D8. . .D13)**	1–2–3 immediately calculates and displays the minimum value within the given range.
Move down to **B18** and key-in the label: **Number of Staff** and move to **D18**.	
You now want to key-in a function which calculates the number of values within cells **D8. . .D13**. Key this formula and tap **RETURN**. **@ count (D8. . .D13)**	1–2–3 immediately calculates and displays the number of values within the given range. This, of course, is equal to the number of staff!

THE @ DATE FUNCTION

If you were asked to state what the date would be 125 days from today, the chances are you would need to consult a diary. If you had to calculate 30 days from receipt of a hundred individual invoices, the chances are you would use a computer program. Our calendar is so untidy, with 30, 31, and 28 day months (not to mention 29 every fourth year!), even a capable computer programmer is hard pressed to code a competent and accurate method of doing such arithmetic. Lotus 1–2–3 makes it easy.

The rules are simple. First, whenever you enter a date onto a spreadsheet *do not* enter the date as a label or a set of numbers, that is, as 23rd July, 1987, or 23/7/87. Instead enter each date using the **@ date function**.

This means the date must always be entered in the following format:

@ date (YY, MM, DD)

For example **@ date (87, 07, 23)**

1–2–3 converts this structure into a rather strange format – the number of days since the turn of the century! Looked at on a screen, a number like 32552 doesn't mean much to humans, but it does mean that the computer can add 30 or 300 or 3000 days to the number and come up with an accurate date. So how can we make use of this? Remember the /**RANGE FORMAT** command? One **FORMAT** is **DATE**. We can 'mask' the cells in this way so that they can look like 'real', 'human' dates.

The next exercise includes setting up date cells, masking those cells, and performing some otherwise difficult date arithmetic.

Have a look at the dates on the spreadsheet 'STAFF'. You can see how they conform to the above structure '@ date (YY, MM, DD)'. Now retrieve the spreadsheet file 'DATES' from the Training Disk, and try the following exercise.

This is what you do

Go to cell **B4**. This is the first of the **Dates of Receipt of the Invoices** listed here. Notice in the top-left of the screen the cell format has been set to (**D1**) and how this area shows the content of the cell without any formatting.

Move into **C4**. This is an unformatted cell. If we assume that registration occurs two days after receipt, we can enter a formula to calculate the date of registration. This is:

+B4+2

Key-in this formula and tap **RETURN**.

To present the figures properly, change the format of the range **C4. . .D11** as follows:

/ RANGE FORMAT DATE 1

Now point to the end of the range, **D11**, and tap **RETURN**.

COPY the formula in **C4** to **C5. . .C11**.

Using what you have already learned, add a formula in column D to calculate each cell in column C as, say, **+30 days**.

This is what will happen

While 1–2–3 calculates the result, in an unformatted cell it results in a date shown in days since the turn of the century.

There are 3 date formats, number 1 is the choice here.

Session Check

In this Session you have:

- Discovered a better way of entering complex formulae using the '@' functions including:
  @ sum
  @ avg
  @ max
  @ min
  @ count
- Used the '@ date' function to enter dates and perform date arithmetic

8 SESSION EIGHT

In this Session you will:

- Prepare and print a spreadsheet using
  the Print Range Command;
  the Printer Control Commands;
  printing Options.
- Discover how to store a 'print' from a spreadsheet on disk.

For this Session you will need to have a printer attached to your computer. Printers, like all computer equipment, can vary too much for us to be able to allow for all possibilities within this text. However, the following Session reflects what will work with by far the highest proportion of printers. If you have any difficulty then contact the person responsible for the printer or your supplier. In general the following rules will apply in preparation for this Session:

1 Switch on the printer.

2 Load the paper, whether sheet or continuous, until the top of the sheet is just past the print head.

3 Press your **Top of Form** (TOF) switch to instruct the printer that it is set to the top of the sheet.

4 Start your computer and Lotus 1–2–3. Check that the current directory is set for the drive containing the Training Disk. Retrieve the spreadsheet file called 'STAFF'.

```
A1:                                                                    READY

        A          B          C     D       E         F         G
1              DEPARTMENTAL STAFF INFORMATION       01-Jan-80
2                     CONFIDENTIAL
3
4    ------------------------------------------------------------
5                     Job                     Date of    Date
6       Name         Title       Grade Salary  Birth    Started
7    ------------------------------------------------------------
8    Albinoni   Operator              5   5800 23-Oct-36 26-Jun-74
9    Bach       Head of Dept.         1  15250 23-Apr-48 18-Nov-77
10   Byrd       Secretary             4   6500 20-Jul-63 24-Jul-86
11   Corelli    Supervisor            3   8500 12-Nov-32 19-Aug-58
12   Mozart     Assistant Manager     2   9250 10-Feb-60 15-Jun-78
13   Rossini    Operator              5   4800 03-Apr-65 05-Jan-86
14   ------------------------------------------------------------
15
16
17
18
```

This first exercise shows how it is possible to print a copy of the entire spreadsheet with very few commands.

This is what you do	*This is what will happen*
To produce any print you should first of all position the Spreadsheet Cursor in the **TOP LEFT** cell of the range to be printed. To print an entire spreadsheet, this will probably mean cell **A1**. Check that you are in cell **A1** now.	
To set up the print use the command: **/ PRINT PRINTER RANGE**	1–2–3 will respond by **asking for a print range** and offering the current cell **A1**.
To select more of the spreadsheet for printing, tap **FULL STOP**.	A range is now offered, **A1. . .A1.**
Use the cursor movement keys to 'fill' the range down to **F14**.	The range is now **A1. . .F14**
Tap **RETURN** to accept this range.	You are returned to the Print menu.
To be sure that 1–2–3 knows you are at the top of a sheet, move to **ALIGN** and tap **RETURN**.	There is no obvious response, but 1–2–3 now recognises that you are at the top of a new sheet of paper. **This should always be done before printing at the top of a sheet.**
To start the print, move to **GO** and tap **RETURN**.	The printer should instantly respond by printing the spreadsheet data.
There are several printer control commands other than **ALIGN** and **GO**. When the printer has completed the print, request the printer to move down a line. Move to the **LINE** command and tap **RETURN**.	The printer will move down one line.

This is what you do	*This is what will happen*
To move to the next sheet of paper, or for single sheet printers to feed the paper out, move to **PAGE** and tap **RETURN**. To leave the Print Menu, move to **QUIT** and tap **RETURN**.	The printer feeds until it reaches the end of a page. See note below.

Note: It is important to realise that 1–2–3 does *not* have any way of knowing how long or how wide your sheet of paper actually is. All that can be done is to set those values within 1–2–3 itself. If the paper then changes, or the printer skips forward a few lines, then 1–2–3 may become out of step with your printer. Always make sure that you set *both* the printer and 1–2–3 to the **Top of Form** state before printing. (In the printer this will be done by the 'Top of Form' switch, in 1–2–3 it is achieved by moving to **ALIGN** and tapping **RETURN**.)

1–2–3 allows for several optional settings to be changed to improve printing flexibility, match with unusual paper or special printer conditions. Headers, Footer, Margins and Page-length are among the most important.

This is what you do	*This is what will happen*
A Header within 1–2–3 is a line typed by you which is not on the spreadsheet itself, but is printed at the top of every page. To set a Header from the / **PRINT PRINTER** Menu, use the command: **/ PRINT PRINTER OPTIONS HEADER** Key-in the Header: **REPORT ON SALARIES** then tap **RETURN**. To set up a Footer move to **FOOTER** and **RETURN**. Now move to **QUIT** and tap **RETURN** to come back out from the **PRINTER OPTIONS** Menu to the main **PRINTER** Menu.	1–2–3 will ask for the **Header Line**. 1–2–3 will ask for the Footer Line. Tap **RETURN** when you have completed the required **FOOTER** text.

This is what you do	*This is what will happen*
Set up a new sheet of paper on your printer.	
To see the results of the Header and Footer go to **ALIGN** and tap **RETURN**, then move to **GO** and tap **RETURN**.	1–2–3 will now print the same range of the spreadsheet as before, but with Header and Footer lines.

Note that the **FOOTER** in the above exercise will only occur at the bottom of a page. It may be necessary to move to **PAGE** on the **PRINTER** Menu and tap **RETURN** before the **FOOTER** is printed.

The margin settings for printing are important to allow tidier printing, and to ensure that the full width of the spreadsheet is printed on one line of paper.

Here is how you can check each of the left, right, top and bottom margins.

This is what you do	*This is what will happen*
From within the **PRINTER** Menu select **OPTIONS**. Within the **OPTIONS** Menu, select **MARGINS**.	
You will now be offered the choice of: **Left** **Right** **Top** **Bottom**	
Select any of these and tap **RETURN**.	1–2–3 will ask you to enter a margin setting, prompting with the current value and the lower and upper limits.
Key-in your required margin setting and tap **RETURN**.	The setting of that margin will now be stored, but only for the duration of the current Session.
Go to **QUIT** and tap **RETURN**.	To come out of **OPTIONS** Menu.
Go to **QUIT** and tap **RETURN**.	To come out of **PRINTER** Menu.

STORING A 'PRINT' FROM A SPREADSHEET ON DISK

It might seem to be a strange notion at first, but the ability to 'print' a report to disk is often very useful. In particular, a 1–2–3 'spooled' print, as it is known, is able to be read by many other software packages. It might be possible then for you to pass spreadsheet information to your word-processing package without having to re-key any of the information. A report might include financial information derived from a spreadsheet, and modified as appropriate by the word-processor.

What happens is that an exact copy of what would have been sent to the printer is sent instead to the disk you use for saving spreadsheet files. All of the options and settings which you have used for the printer still apply to the disk copy. In fact, there is only one difference, and that is in the command itself. Where a printed copy is produced using / **PRINT PRINTER**, the spooled copy is produced using / **PRINT FILE**. Try the exercise above which printed the spreadsheet, but instead of starting with / **PRINT PRINTER**, use / **PRINT FILE**. The result will be that a file is written to disk when you use the **GO** command.

Session Check

In this Session you have:

- Prepared and printed a spreadsheet using
  the Print Range command;
  the Printer Control commands;
  printing Options
- Discovered how to store a 'print' from a spreadsheet on disk

9 SESSION NINE

In this Session you will:

- Learn to use a simple 1–2–3 database facility for
  SORTING records using:
  / DATA QUERY SORT
  Data-Range
  primary key
  secondary key

One of the most common requirements in computing is that data should be sorted. Within a 1–2–3 spreadsheet it is possible to sort on a row-by-row basis. You determine the rows to be sorted and choose the column which is to be used to decide the sorted position of each row. This column upon which the sort depends is called the **SORT KEY** and you can choose two such keys in each sort. So it is possible, for example, to perform a single **SORT** which arranges the chosen rows into the sequence of column A and within that sequence, also to sort within the sequence of column B.

Sorting normally is carried out according to a standard computer sequence for all numbers and letters called **ASCII**. In 1–2–3 this convention is followed, and all you have to add is your requirement for the sort to be in **ASCENDING** or **DESCENDING** order.

Start your computer and Lotus 1–2–3. Check that the current directory is set for the drive containing the Training Disk. Retrieve the spreadsheet file called 'STAFF'.

A1: READY

	A	B	C	D	E	F	G
1		DEPARTMENTAL STAFF INFORMATION				01-Jan-80	
2		CONFIDENTIAL					
3							
4	---	---	---	---	---	---	---
5		Job			Date of	Date	
6	Name	Title	Grade	Salary	Birth	Started	
7	---	---	---	---	---	---	---
8	Albinoni	Operator	5	5800	23-Oct-36	26-Jun-74	
9	Bach	Head of Dept.	1	15250	23-Apr-48	18-Nov-77	
10	Byrd	Secretary	4	6500	20-Jul-63	24-Jul-86	
11	Corelli	Supervisor	3	8500	12-Nov-32	19-Aug-58	
12	Mozart	Assistant Manager	2	9250	10-Feb-60	15-Jun-78	
13	Rossini	Operator	5	4800	03-Apr-65	05-Jan-86	
14	---	---	---	---	---	---	---
15							
16							
17							
18							

This spreadsheet is, perhaps, stored in alphabetical order of name. By using the **SORT** facility, it can be changed to ascending order of **GRADE**.

This is what you do	*This is what will happen*
The first step in **SORTING** data is to position the spreadsheet cursor over the leftmost cell of the **FIRST ROW** to be included in the **SORT**. It is extremely important *not* to include any rows which are not part of the data. If you were to include a heading line, say, then 1–2–3 would sort that line too!	
In this case, go to cell **A8**. Use the command: **/ DATA SORT**	You will then be presented with a SORT Menu offering **Data-Range** **Primary Key** **Secondary Key** **Reset** **Go** **Quit**
You *must* set a range. In this case the entire group of records is **A8. . .F13**.	
While the cursor is over **DATA-RANGE**, tap **RETURN**.	You will be offered a **SORT RANGE** in the first instance starting with the cell **A8**.
To select a full range, tap the **FULL STOP** and then, using the Arrow keys, point to the bottom right cell of the data, **F13**. Tap **RETURN**.	You will return to the **SORT** Menu.
Now you must choose the **PRIMARY KEY**. Remember this is the column which decides the sequence. So choosing Column **C** will provide a **SORT** to Grade sequence. Move to **PRIMARY KEY** and tap **RETURN**.	1–2–3 will ask for the **Primary Sort Key Address** – in other words, which column to sort on!

This is what you do	*This is what will happen*
Go to cell **C8** and tap **RETURN**.	You will be asked whether you want this **SORT** in ascending or descending sequence by the prompt: **Enter Sort Order (A or D)**
Choose **Ascending** by tapping the letter **A** and then **RETURN**.	You will return to the **SORT** Menu.
There is now the option to **SORT** within a **SECONDARY KEY**. That is, having sorted in **GRADE SEQUENCE** perhaps we want to sort by **AGE** within **GRADE**. Therefore by selecting Date of Birth as a Secondary key, we can achieve this.	
Move to **SECONDARY KEY** and tap **RETURN**.	1–2–3 will ask for the **Secondary Sort Key Address** – in other words, which column to sort on next!
Go to cell **E8** and tap **RETURN**.	You will be asked whether you want this **SORT** in ascending or descending sequence.
Choose **Descending** by tapping the letter **D** and the **RETURN**.	You will return to the **SORT** Menu.
The **SORT** ready, move to **GO** and tap **RETURN**.	1–2–3 will instantly **SORT** your data.

Note that now you have the grades in proper order, and within Grade 5, the youngest employee is first. This is because you chose, as the **SECONDARY KEY,** Descending order (more recent dates are higher numbers) within Date of Birth.

Session Check

In this Session you have:

- Learned to use a simple 1–2–3 database facility for
  SORTING records using:
  /DATA QUERY SORT
  Data-Range
  primary key
  secondary key

10 SESSION TEN

In this Session you will:

- Name ranges within three separate spreadsheets
- Consolidate the three named ranges into a single file

The ability to set ranges within spreadsheets provides one of the most useful facilities for the Lotus 1–2–3 user who wishes to bring together data from a number of spreadsheets and combine them for comparison or accumulation. The example used here is a common one. Three branches of a retail outlet provide details of the number of each of ten items sold within a time period. The three branches then pass their spreadsheet file containing that data to the head office. At head office the manager may well be interested in the individual performance of each branch, but he is as likely to be interested in the combined performance as well.

Start your computer and Lotus 1–2–3. Check that the current Directory is set for the drive containing the Training Disk. Retrieve the spreadsheet file called 'EXETER'. If you see that the spreadsheet does not appear on the initial selection list, move the Command Line Cursor right to extend the selection. The first thing to be done is to name the 'range' of cells which will be consolidated.

A1: READY

	A	B	C	D	E	F	G	H	I
1			PRODUCT SALES FIRST HALF-YEAR 1987						
2									
3			EXETER BRANCH						
4									
5									
6		Item	Jan	Feb	Mar	Apr	May	June	TOTAL
7		---	---	---	---	---	---	---	---
8		Classical LPs	212	229	205	221	200	195	1262
9		Classical CDs	45	49	52	57	61	66	330
10		Classical Tapes	31	29	32	30	29	27	178
11		Popular LPs	475	513	465	502	501	532	2988
12		Popular CDs	42	45	49	53	57	62	308
13		Popular Tapes	76	68	70	82	59	64	419
14		Popular Singles	785	890	754	814	879	780	4902
15		Jazz LPs	125	135	146	125	110	119	760
16		Jazz CDs	28	30	33	35	38	41	205
17		Jazz Tapes	21	18	20	15	16	17	107
18		---	---	---	---	---	---	---	---
19			1840	2006	1826	1934	1950	1903	11459
20		===	===	===	===	===	===	===	===

This is what to do	*This is what will happen*
Have a look at the spreadsheet. You will see that there are ten products categories, each with the number of units sold per month over six months.	
To allow you to bring several such sets of numbers together, you will have to **NAME** the **RANGE** to be used later for consolidation.	
To do this, go to the top-left cell of the numbers – in this case **C8**.	
To **NAME** the **RANGE** use the command: **/ RANGE NAME CREATE**	1–2–3 will then ask for the **NAME** of the **RANGE**.
Give the **RANGE** a suitable **NAME**: in this case, **SALES** will do. Tap **RETURN**.	You will then be asked to supply the **RANGE** itself, starting with the current cell.
Using the arrow keys, move to the bottom right cell of the numeric data – in this case, **J14.** Tap **RETURN**	1–2–3 will accept this **NAMED RANGE**.
Now the file must be **SAVED** so that the **NAMED RANGE** is stored. Use the command: **/ FILE SAVE**	You will be asked to name the file, but with the current name **EXETER** offered.
Tap **RETURN** to accept this name.	You are then given the chance to cancel the command, which would otherwise overwrite the original file. 1–2–3 will prompt you with **Cancel** or **Replace**. Cancel in this case means to cancel the **SAVE** command.
Accept the '**REPLACE**' option by moving to **REPLACE** and tap **RETURN**.	The disk file will now be overwritten by the new version with a **NAMED RANGE**.

The same process should now be performed on the two other 'branch' files **BRISTOL** and **SWINDON**. In exactly the same way, retrieve the file, name the range, and save the file under its original name.

You now should have three files with named ranges that correspond to the values within the grid. These values, remember, reflect the sales of each item over six months.

You are now in a position to bring the three together and consolidate the figures.

Retrieve the file 'MASTER'. This is the master layout into which you will bring all three sets of data. Notice that the layout is identical to the three branch spreadsheets, but that it contains no values.

A1: READY

	A	B	C	D	E	F	G	H	I
1			PRODUCT SALES FIRST HALF-YEAR 1987						
2									
3			CONSOLIDATED FIGURES						
4									
5									
6		Item	Jan	Feb	Mar	Apr	May	June	TOTAL
7		---	---	---	---	---	---	---	---
8		Classical LPs							0
9		Classical CDs							0
10		Classical Tapes							0
11		Popular LPs							0
12		Popular CDs							0
13		Popular Tapes							0
14		Popular Singles							0
15		Jazz LPs							0
16		Jazz CDs							0
17		Jazz Tapes							0
18		---	---	---	---	---	---	---	---
19			0	0	0	0	0	0	0
20		===	===	===	===	===	===	===	===

This is what you do

To consolidate the values from the other spreadsheets, position the cursor in the top-left cell for the incoming values, in this case **C8**.

Now use the command:

/ FILE COMBINE ADD NAMED-RANGE

This is what will happen

This command has told 1-2-3 that you want to **ADD** the values within a **NAMED RANGE** of another file, to the cursor position of the current file. It will then ask you to name the **RANGE**.

This is what you do	*This is what will happen*
Key-in the name '**SALES**' and tap **RETURN**.	You will now be asked to give the FILE NAME in which that RANGE can be found.
Key-in the name '**EXETER**' and tap **RETURN**.	Immediately, 1–2–3 will bring into the current spreadsheet the values recorded in the SALES range of EXETER

Now perform the same actions, twice more, but in each further case changing the **FILE NAME** being combined to '**SWINDON**' and then '**BRISTOL**'.

As you will see, for each further **RANGE COMBINED** the values on the **MASTER** spreadsheet are increased until after three operations, you have created a full consolidated file.

Session Check

In this Session you have:

- Named ranges within three separate spreadsheets
- Consolidated three named ranges into a single file

GLOSSARY

/ The command 'slash' key. When keyed this displays the first level of the 1–2–3 command hierarchy.

\ The 'label fill' key. When keyed with one or more following characters the current cell will be filled with the repeated character(s).

@ **Functions** Those calculations or functions which are prewritten into 1–2–3, such as @ sum, @ avg.

A> The PC-DOS or MS-DOS operating system prompt, showing the letter identification of the current disk drive.

Address The row and column co-ordinates of a cell, for example, A6 or BC1054.

Align Labels: the justification of the label within the cell, see **Label-prefix**. Printers: a command to instruct 1–2–3 that the printer is set to the top of form.

Alphabetics Characters from A to Z.

Alphanumerics Characters from A to Z and 0 to 9 plus special characters (for example '£', '+'), where any numbers are *not* used for calculation.

Arrow keys Those keys marked with arrows on the numeric pad of the keyboard. They are used to move the spreadsheet cursor over the spreadsheet.

Backspace The '←' key on the top row of the keyboard for 'destructive backspace', or the left arrow cursor movement key for 'non-destructive' backspace.

Backup The copy of a spreadsheet or other file made to ensure that the loss of the original does not mean recreating the file.

Byte In computing 1 byte = 1 character. See **Kilobyte, Megabyte**.

Carriage Return The typing term for the computing 'RETURN' or 'ENTER' key. The difference is that RETURN and ENTER submit any command to the computer rather than simply returning to the leftmost position on a new line.

Cell The basic storage unit within 1–2–3. Each cell is of variable width and format, and constitutes the minimum area of the spreadsheet which can be moved or copied. See **Address**.

Column Lotus 1–2–3 Version 1A allows for 256 columns of variable width. Each is identified by a letter from A to Z, then two letters from BA to IV.

Command An instruction to 1–2–3 to perform some function, preceded by the '/' key which prompts the user with the command menus.

Command lines These are just above the spreadsheet and are where all input data is shown before entry to the spreadsheet, and where the command menus appear.

Computer System The combined hardware and software which is required to perform the task for which the computer is to be used.

Consolidate In 1–2–3, the ability to overlay several spreadsheets to form a combined and new spreadsheet. Includes the ability to add and subtract the combined values.

Cursor An indicator, or pointer, of position on a computer screen. Lotus has two cursors, the spreadsheet cursor, a highlighted rectangle, and the command cursor, a flashing line of light.

Data The raw labels and numbers which you use in a computer system to generate information.

Database A computerised filing system allowing individual records to be recalled using selective criteria.

Destructive Backspace The '←' on the top row of the keyboard. In moving back, this key erases all characters it passes over.

Directory Generally, the part of every disk used to hold a list of files on that disk and details of their physical location. In 1–2–3 the directory command points to a particular disk drive in order to find the directory of the disk on that drive.

Disk drive The device most commonly used as a permanent storage medium, using either floppy or fixed magnetic disks to record programs and data.

Embedded functions See **@ Functions**.

Enter See **Return**.

Escape A special key which attempts to come back from, or get out of, the latest command entered. Useful when a program does not otherwise offer a way out from a difficult situation.

File A stored collection of data and, possibly, processes identified by a unique name. A spreadsheet when stored on disk becomes a spreadsheet file.

Fixed disk An enclosed unit capable of much higher access speeds and data capacities than the standard floppy disk. It is never removed from the computer and will commonly be called a 'Winchester' or 'Hard' disk, and hold 10 – 40Mb.

Floppy disk A most common means of sorting data on a flexible 5.25 inch magnetic disk. Easily damaged, the floppy disk is nevertheless a standard for storage and for the supply of software from manufacturers.

Footer A line of text across the bottom of every printed page.

Formula A calculation based upon the standard Lotus 1–2–3 embedded functions, or simple cell address arithmetic, for example +A1+C5 or @ sum (A1+C5).

Full stop Used specially in 1–2–3 to indicate the extension of a range. See **Range**.

Function keys The ten keys to the left of the main block of keys, labelled as F1 – F10. Each performs a specific function within 1–2–3.

Global Commands or settings which apply across the entire spreadsheet.

Hard disk See **Fixed disk**.

Hardware The physical components of a computer system.

Header A line of text across the top of each printed page.

Help A context-sensitive series of screens available to assist without you having to exit from 1–2–3. The function key F1 calls up the Help facility.

Home The top-left cell of a spreadsheet and the key on the numeric pad which instantly moves the spreadsheet cursor to that position.

Kilobyte Where 1 byte = 1 character, 1024 bytes = 1 kilobyte = 1K.

Label In 1–2–3 an alphabetic or alphanumeric cell entry. See **Alphabetics** and **Alphanumerics**.

Label-prefix Alphabetic and alphanumeric cells may be aligned to the left or right or centred within a cell. The position is marked on a cell by the entry having a prefix of ' for left, " for right, and ^ for centre.

Lotus Access Menu When Lotus is started, before entering 1–2–3, this is the menu which allows a choice of the spreadsheet, utility, or printgraph functions. Only the 1–2–3 option is considered in this book.

Margins Top, bottom, left and right margins can be set within the options of the commands for printing the spreadsheet.

Megabyte Where 1 byte = 1 character, 1 Megabyte is approximately 1 million characters. See **Kilobyte** and **Byte**.

Menu A series of options presented together which allow for a single choice, and which will typically lead to further sub-choices.

Monitor The screen, or Visual Display Unit of a computer system.

Non-destructive Backspace The left Arrow key on the numeric pad, which passes over characters without erasing them. See **Destructive Backspace**.

Num lock A special key that switches the numeric pad between numerics and cursor movement functions.

Numeric pad The block of keys to the right of the main key bock, which shares numbers and cursor movement functions on one set of keys which can be switched between these two functions by using 'Num Lock'. In 1–2–3 these keys are used for cursor movement and set automatically to this function by 1–2–3.

Numerics In 1–2–3 a numeric entry is one which may be used for performing calculations and cannot contain any alphabetics or special characters.

Operating System The program that controls the most basic operation of the computer. In the case of Lotus 1–2–3 software the operating system will be Microsoft MS-DOS or IBM PC-DOS.

Personal Computer A name given generally to business microcomputers, but used by IBM to name their first such model, the IBM PC.

PgDn A key on the numeric pad that moves the displayed range of cells down by 20 rows. Normally 'Page Down' in word processing.

PgUp A key on the numeric pad that moves the displayed range of cells up by 20 rows. Normally 'Page Up' in word processing.

Primary key In sorting data in 1–2–3, this is the column chosen to decide the sorted order of the resulting spreadsheet.

Printer The device attached in a computer system for making paper copy of a spreadsheet, document or file.

Random Access Usually called 'RAM', this is the 'working storage' of the Personal Computer. Today, costing less than £10 for 64K, this 'memory' determines the maximum size of spreadsheet which can be produced within 1–2–3. (Version 1A.)

Range A rectangular group of cells defined by the top-left and bottom-right cell addresses. A range may be moved, copied, named, or combined from an external file, without ever referring to the full list of cell addresses held within the boundaries.

Relative address This is used to describe the way in which 1–2–3 is able to copy complex formulae in a spreadsheet by recognising the 'sense' of the calculation, rather than simply copying the contents of a cell.

Return The key which submits a command or instruction to the computer, or confirms the acceptance of data to move it into a cell. Sometimes described as 'Enter' or 'Carriage Return', it is recognised on the keyboard by '↵'.

Save The process of copying a working spreadsheet onto a disk for storage when the computer is switched off.

Secondary key In sorting data in 1–2–3, this is the column chosen to decide the sorted order of the resulting spreadsheet.

Software The programs which are run on the hardware.

Spooled print Instead of sending a print to the printer, it can also be written to disk where it is known as a 'spooled print'. It is particularly useful for storing prints for later printing, and for passing 1–2–3 data to other programs. The file which is produced has '.PRN' suffix when written to the disk. It differs from a spreadsheet file in that it contains only alphanumeric and numeric fields and cannot readily be used for recalculation or read as a true spreadsheet.

Spreadsheet The contents of the RAM or working storage while Lotus 1–2–3 is active. When saved to disk, the spreadsheet becomes a spreadsheet file with a suffix of '.WKS'.

Spreadsheet cursor A highlight area of one whole cell which shows the current position on the spreadsheet matrix.

Sub-directory On fixed disks, areas of the disk may be allocated into sub-directories which make organisation of data more easy. For example, all of your spreadsheets might be held in a sub-directory called 'Data123', and will be more easily found than searching across a randomly organised 10 or 20Mb disk.

Systems unit That part of a Personal Computer system which holds the main electronic circuits including the processor itself and the RAM, and the disk drives.

Top of Form A setting, and usually a switch, to indicate that the top of the current sheet of paper has been aligned at the print head on the printer.

VDU Visual Display Unit on the computer system.

Winchester disk See **Fixed disk**.

Working Storage The Random Access Memory of the Personal Computer. The 'memory' where all your working data is stored while 1–2–3 is active. All of this data is lost unless saved to a file on a disk before switching the machine off.

Worksheet A current, active spreadsheet. The set of commands used in 1–2–3 to set the format and defaults for the current spreadsheet.

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