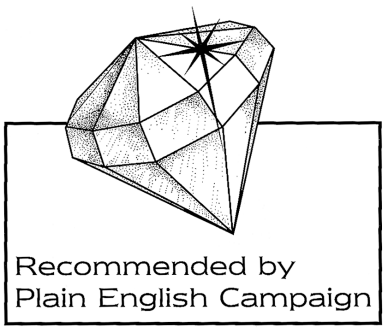
A Guide to *Excel 2000*

by

Adrian Beck

Mark Maynard

Richard Rodger



Software Made Simple
3 Glenbervie Drive, Beltinge, Herne Bay, Kent CT6 6QL
Telephone: 01227 361 263
Fax: 01227 371 054

Internet: http://www.s-m-s.co.uk
Email: guides@s-m-s.co.uk

OTHER GUIDES IN THIS SERIES

• Word 2000 • Access 2000 • PowerPoint 2000

• Word 97 • Excel 97 • Access 97 • PowerPoint 97

• Word 7 • Excel 7 • Access 2 • Word 6

Also Available on CD-ROM as a Site Licence

For further information please contact:

Software Made Simple
3 Glenbervie Drive, Beltinge, Herne Bay, Kent CT6 6QL

Telephone 01227 361 263
Fax 01227 371 054

Internet: http://www.s-m-s.co.uk
Email: guides@s-m-s.co.uk

The Guide assumes a basic understanding of how to use a PC and Windows.
If you are not confident that you have this basic understanding then read the companion Guide:
A Guide to Word 2000 which contains the necessary information.

Version 1

CONTENTS

CONTENTS

SECTION 1

STARTING EXCEL

Excel's prime function is as a Spreadsheet, a powerful program for handling data, mostly numerical data. A spreadsheet is rather like an electronic accounting ledger which provides a method by which data can be analysed and used in complex calculations. It is unlikely that you will use any more than 20% of its capabilities. Consequently, this guide concentrates on those aspects of the spreadsheet which you are likely to use most.

Also covered in this guide are how to create **Charts** using your data and how to use Excel as a simple flat file **Database**.

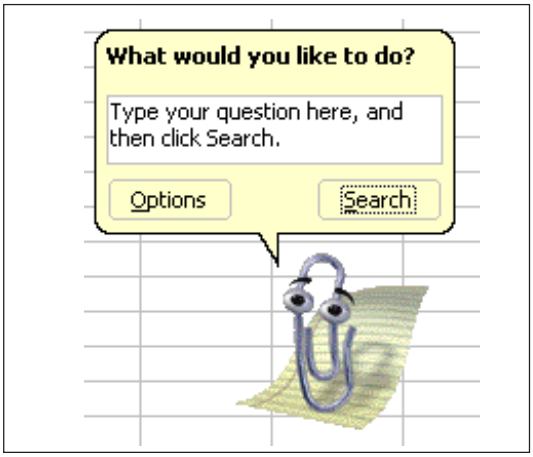
The guide assumes a basic understanding of how to use the PC and Windows. If you are not confident that you have this basic understanding then read our companion guide to Word 2000 which contains the necessary information.

1.1 Starting Excel

To start Excel either choose **Programs** from the **Start** menu and **Microsoft Excel** from the **Programs** sub-menu or click on the icon for Excel on the **Office Shortcut Bar**.

1.2 The Office Assistant – Help Using Excel

By default Excel will probably display the **Office Assistant**. The Office Assistant is shown as an animated character and clicking once on the character will display a speech bubble into which you can type a question relating to the workings of Excel. Click on the **Search** button and the Office Assistant will try to answer your question. Usually a selection of possible answers is returned, and for further details just click on the most appropriate answer. Hide the speech bubble by clicking anywhere on the Excel worksheet.



Note: If for any reason the Office Assistant is not displayed, choose **Show the Office Assistant** from the **Help** menu. Conversely, to hide the Office Assistant select **Hide the Office Assistant** from the Help menu. While you work the Office Assistant monitors the way you use Excel. If it has alternative suggestions a light bulb is displayed alongside the character and clicking on the light bulb displays the suggestion.

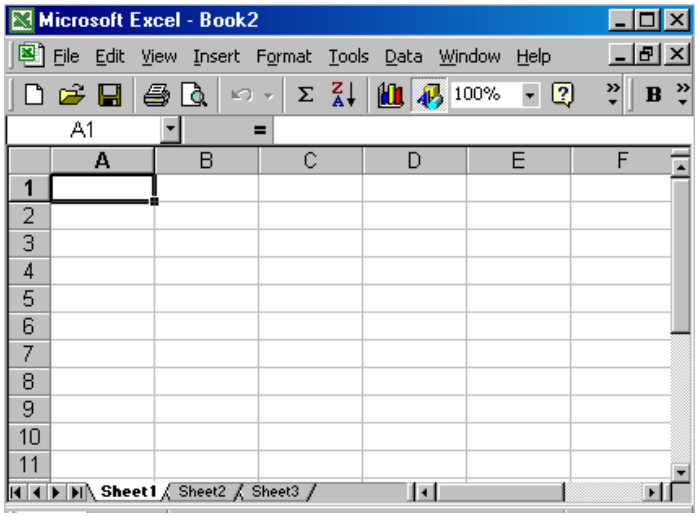
In addition to the Office Assistant, help with any object on the screen can be obtained by choosing **What's This** from the **Help** menu and clicking on the object. Also, many dialogue boxes contain a help button.

1.3

Workbooks and Worksheets

A workbook is the type of file that Excel uses to store your data.

In the illustration below you can see what a blank workbook will look like when you first open it.



The workbook consists of worksheets (for calculating), and chart sheets (for creating charts). There are other types of sheet but these are beyond the scope of this guide. A workbook may contain a single sheet or many sheets. By default Excel opens with a workbook of 16 sheets named Sheet 1 to Sheet 16. The sheet currently in use, known as the **Active Sheet**, is indicated by the tab in bold at the bottom of the worksheet. If you wish to make a different sheet active simply click on its tab.

When you choose to save your data all the worksheets sheets are saved together as a single workbook file.

For simplicity, this guide concentrates on the use of a single worksheet since this is sufficient for most needs. See Section 3.10 if you are interested in using several worksheets together.

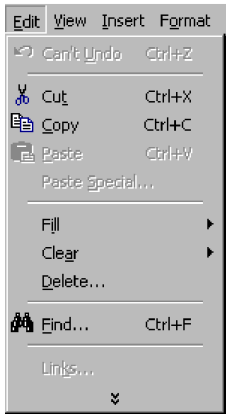
Changing Excel Settings

When open the Excel screen will usually show the Title Bar, Menu bar, Toolbars and Scroll bars (for use of scroll bars see Section 2.7). This guide assumes that the Standard and Formatting Toolbars are shown on screen. If these are not shown choose **Toolbars** from the **View** menu and the appropriate command from the sub-menu.

Toolbars and Menus in Excel 2000

All the time you are working Excel is keeping a record of the commands you use most often and those that you have used most recently. To help you to work efficiently Excel will place the commands you use most often on the Toolbar or the main menu so that you can access them quickly.

Sometimes you will want to use commands that you rarely use and therefore are not on the main menu or the Toolbar.



Accessing the Entire Menu

When you first choose a typical menu it will look like the one shown left.

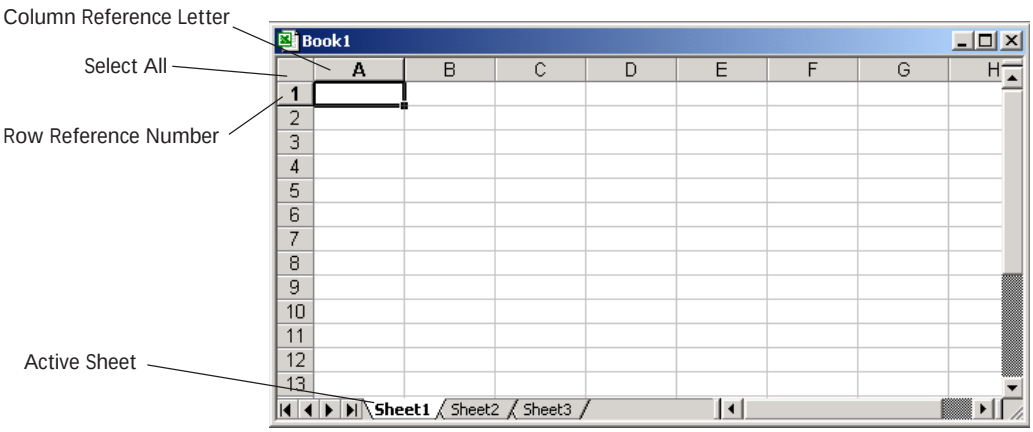
Placing the pointer over the symbol at the bottom of the menu will expand the menu and give you access to more commands.

Adding Buttons to Your Toolbar

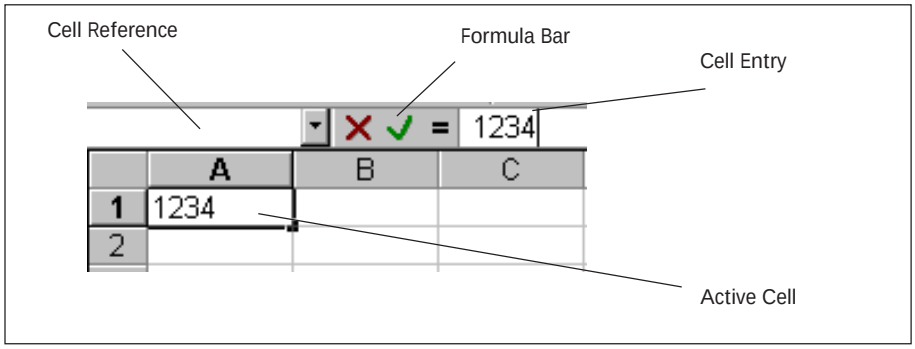
To add an additional button to your Toolbar you need to click on the button on the relevant Toolbar. This will reveal the **Add Buttons** menu. Double-click on the button you need to add it to your Toolbar.

1.4 Data Entry

When you start Excel a blank workbook is displayed entitled **Book1**.



Each worksheet of the workbook is divided horizontally into rows and vertically into columns, as in the figure above. The intersection of each row and column makes a box called a Cell and it is into the cells that you type your data. Each cell is referenced individually by a column letter and a row number which together create a **Cell Address** or **Reference** eg. A1.

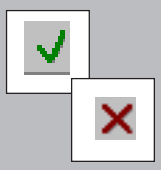


To enter data in a cell move the pointer to the preferred cell and then click on the mouse button. You can type any kind of data in a cell eg. text, numbers. When you begin to type the entry it will appear in two places:

- In the cell itself, called the **Active Cell**.
- On top of the window in an area called the **Formula Bar**.

Problem? The Formula Bar is not displayed.

Solution: Choose **Options** from the **Tools** menu, click on the **View** tab and click in the **Formula Bar** box.



When you have finished typing click on the ✓ in the formula bar to enter data into the worksheet. Clicking on the ✗ in the formula bar makes the active cell blank again.

Data can be entered into any cell on the worksheet. It is not necessary to start with the first cell. You can also leave cells blank if you wish.

Once data has been entered in a cell, amendments can be made by clicking on the cell and editing in the **Formula Bar**. You will find it easier to edit using the formula bar rather than editing in the cell itself.

Using the **Backspace** (←) key and clicking on the ✓ will remove the entire contents of a selected cell, or, if the pointer is in the formula bar, the **Backspace** (←) key enables you to amend the contents of the cell.

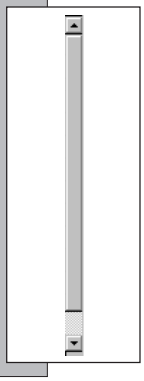
1.5 Spellchecking and AutoCorrect

To check the spelling of a worksheet click on the ABC button on the Toolbar. If the spell checker identifies a word as spelled incorrectly a dialogue box will then be displayed listing alternative spellings. You may choose to ignore the mis-spelling. The spell checker will ignore the spelling of functions.

Excel's AutoCorrect feature prevents some of the most common typing errors. For example, typing two capitals together eg. EXcel, failure to capitalise days of the week, and repeated mis-types such as teh instead of the can be corrected automatically as you type when the AutoCorrect is switched on.

1.6 Moving Around the Worksheet

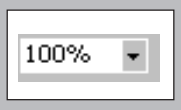
What you see on screen in the window is only a small part of the total worksheet. To see more of it use the scroll bars at the bottom and right hand side of the window in the same way you would for any other Windows program.



You have already seen how to move about the worksheet using the mouse. Another way is to use the **Arrow** keys which are often referred to as the **Cursor** keys. The Arrow keys enable you to move the active cell about the worksheet one cell at a time, up, down, left or right. When the active cell reaches the right side or the bottom row of the worksheet, pressing the arrow key again will bring an additional row or column into view.

The **Tab** (→/) key can be used to move the active cell to the right.

The **Enter** (↵) key can be used to move the active cell down.



1.7

Particularly useful in a large worksheet with multiple column and row entries is **Go To** from the **Edit** menu, since if you know the precise cell reference (column letter and row number), typing this will allow you to move directly to it.

The **Zoom** control box on the Toolbar can be used to take a closer look at any part of the worksheet. Just click on the arrow and drag down the required level of magnification.

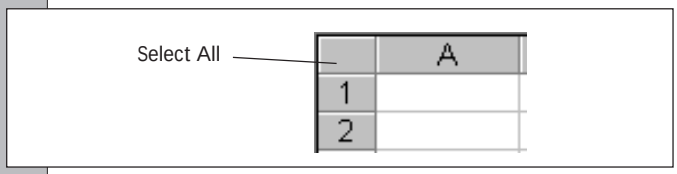
Selecting Data

Often you will want to select an entire column of cells for special treatment. To do this click on the column letter. To select adjacent columns follow the above procedure and, while holding down the mouse button, drag the pointer across the columns. Similarly, several rows can be selected by clicking on their row number(s).

For columns which are not contiguous (not touching one another), select one of the columns required and then select the other by holding down the **Ctrl** key while clicking and dragging. Use the same technique to select non-contiguous rows.

Blocks of cells can be selected by clicking on the top left cell of the range and dragging diagonally to the bottom right hand cell.

To select all cells in the worksheet click on the **Select All** box. To de-select just click anywhere in the window.



To select a range of cells that extends off the screen, either click and drag from the first cell of the range to the last cell dragging past the scroll bar (the cells displayed on screen will be adjusted automatically), or alternatively, click once on the first cell of the range use the scroll bar to move to the last cell of the range and, while holding down the **Shift** (⇧) key, click once.

SECTION 2

FORMATTING AND EDITING DATA

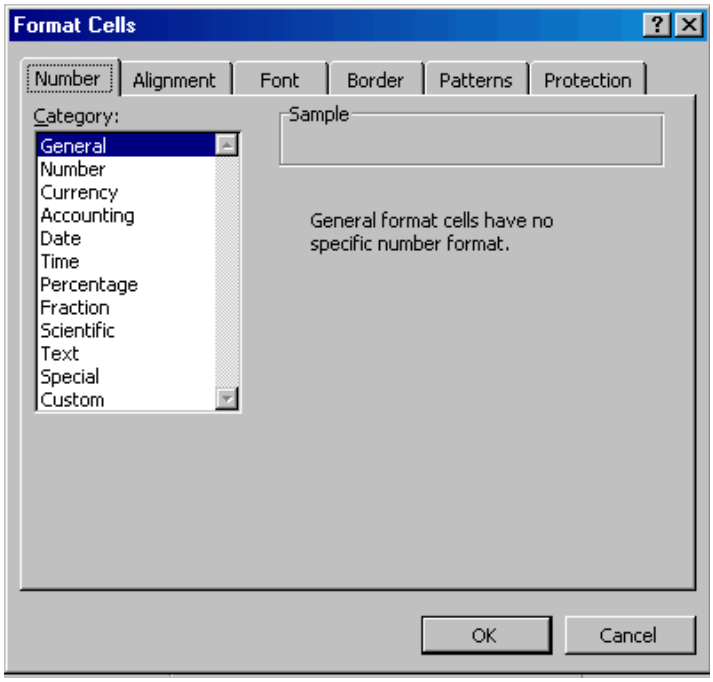
2.1

Types of Data

The data which you type into a worksheet is one of two types.

- Values: Raw data which forms the basis of the calculations.
- Labels: Normally text used as headings for rows and columns.

The type of data that is used for calculations is referred to as Values. Values can be in one of many different formats and it is important both for display and calculation purposes that the appropriate format is used. Formats are differentiated according to £ signs, number of decimal places, presence of commas dividing thousands, date formats and percentage formats.



It is good practice to set the format in which you wish your data to appear before you type it. However, it is possible to amend the format subsequently.

To format values, select the cells, columns or rows which share the particular format and choose **Cells** from the **Format** menu. You will be presented with the dialogue box above. Click on the **Number** tab.

The format is selected choosing the category and options which correspond to your requirements.

Some examples of common number formats are shown below.

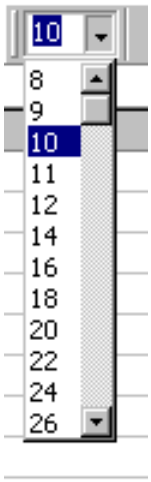
Category	Options
General	none
Number	number of decimal places, comma separator for thousands, special options for negative numbers
Currency	number of decimal places, use currency symbol (£), special options for negative numbers
Date	various date formats
Time	various time formats
Percentage	number of decimal places

If the format you want is not among the selection provided then use the Custom category, follow the syntax and type your preferred version in the Type box provided.

Hint: For the most common Number formats there are buttons on the Toolbar which provide a short cut to using the menu. The button changes the selection to Currency. The % button changes the selection to a Percentage. The , button changes the selection to display thousands delimited by a comma. The button increases the number of decimal places by one whilst the button decreases the number of decimal places by one.

2.2 Changing Font, Style and Alignment Font

One way of changing the appearance of your selection is to change its **Font** (Typeface). As you will see by clicking on the arrow to the right of the **Font box** on the Toolbar, fonts are given all sorts of peculiar names. Choose one of these fonts as you would a command from the menu bar.



To alter the size of a selection use the down arrow to the right of the Font box. Click and drag on the arrow to the required size or type a size into the box. Sizes are measured in points or pts; 10 or 12 pts is normal, the bigger the point size the bigger the character size.

For different font styles use the buttons on the Toolbar:

B produces bold text.

I produces italic text.

U produces Underlined text.

To de-select any of these font styles simply select the cells and click on the particular font style button again. Other font styles are available by choosing **Cells** from the **Format** menu and from the dialogue box presented click on the **Font** tab to alter the font, font style or size as required.

Alignment

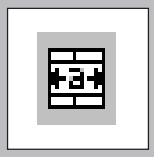
When you type in text it will be displayed on the left side of the cell (left aligned); values will be shown on the right side of the cells (right aligned). These alignments can be changed by selecting the cells to be altered, and clicking on the appropriate button on the Toolbar.

button changes the selection to **Left Aligned.**

button changes the selection to **Centre Aligned.**

button changes the selection to **Right Aligned.**

Other alignments, including the facility to rotate text in cells, are available by choosing **Cells** from the **Format** menu and then from the dialogue box presented, by clicking on the **Alignment** tab to alter the alignment as required.



To align the contents of a cell across several columns enter the data into the left hand cell, select the range of the cells across which your data is to be spread, and click on the button on the Toolbar. The gridlines between the range of selected cells will disappear indicating that a cell is centred across columns. To revert to the previous alignment select any cell in the range and click on the button again.

See Section 2.9 to see how to automatically format your data.

2.3 Copying Formats

If you have formatted a cell or range of cells and wish to copy this format, select the cells whose format you wish to copy and then click on the **Format Painter** button. Select the cell(s) you wish to copy the format to and when you release the mouse button the formats will be copied.

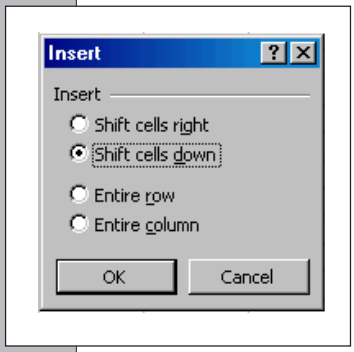
Note: More than one format can be copied at once using this method.

2.4 Inserting Rows, Columns and Cells

To insert a column between two existing ones, select the right hand column and choose **Columns** from the **Insert** menu. A column with the same format as that selected will be inserted. Several columns can be inserted simultaneously by selecting two, three or any number of columns and then choosing **Columns** as before. The method for inserting rows is the same.

Note: when columns and rows are inserted, all reference numbers are adjusted. Formulae references (see Section 3) are also adjusted except where cells are displaced into adjacent columns.

To insert a single cell, first select the cell where you wish it to appear, then choose Cells from the Insert menu. The dialogue box presented offers you the option of moving existing cells down or to the right. Several cells can be inserted at once by first selecting two, three or any number of cells and then choosing Cells as before.



Altering Column Widths and Row Heights

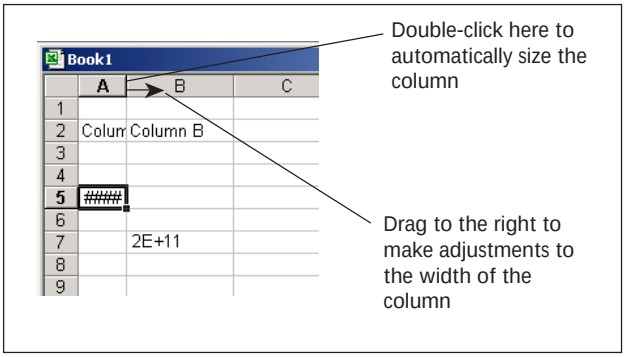
Occasionally hashes (####) or scientific notation (eg. 1E+07) appear when a column is too narrow for calculated data to be displayed in a cell. Another problem of display arises when text overflows to an adjacent cell.

To solve all these problems select the columns involved, and move the pointer to the border line that divides the column references. Notice that the pointer changes shape to ↔.

Double-clicking on the border between the column reference letters when the ↔ pointer is displayed will cause the column width to be adjusted automatically to display all the cell contents of the selected columns.

To make fine adjustments to the column width, click and drag the pointer ↔. By making columns narrower more can be displayed on the screen.

The method for making rows taller or shorter is the same. Alterations to widths and heights affect complete columns or rows.



2.5 Deleting and Moving Data

Deleting Data

Any deletion should be performed with care, especially if you are deleting entire rows or columns. You may choose to delete cells including their contents or just the contents itself.

To delete cells and their contents: select the cells you wish to remove and choose **Delete** from the **Edit** menu. From the dialogue box presented choose whether to move the remaining cells up or to the left.

To delete just the contents of cells: select the cells whose contents you want to remove. Next, choose **Clear** from the **Edit** menu, and **Contents** from the sub-menu.

Moving Data

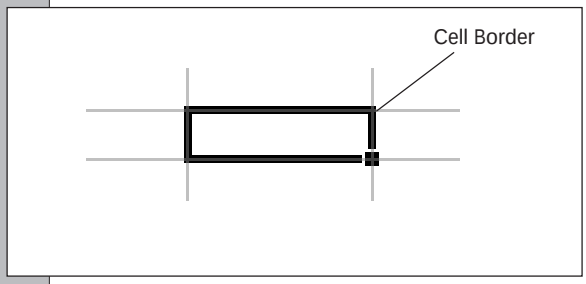
At some stage you will want to move a block of data from one place in the worksheet to another. Excel provides you with two techniques for doing this, so avoiding the trouble and errors involved in retyping:

- Drag and Drop
- Cut, Copy and Paste

Drag and Drop

Drag and Drop is most useful for moving a small number of cells for short distances about a worksheet.

- Select the cells that you wish to move and release the mouse button.
- Move the pointer to the border of the selection and when it changes shape from the cross to an arrow, click and drag the selection to its new position. If the new position of the text is currently not on screen, you can cause the text to scroll by moving the pointer to the top or bottom of the screen.



To copy a piece of text leaving the original intact hold down the **Ctrl** key while dragging. Note that a + sign is shown alongside the pointer.

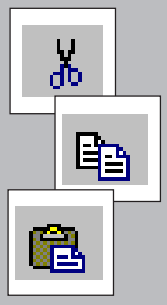
If you wish to insert the selection between other data hold down the **Shift** (⇧) key before releasing the mouse button. Note that for guidance the pointer is followed by a shaded rectangle.

Problem? Drag and Drop does not appear to work.

Solution: Choose **Options** from the **Tools** menu and from the dialogue box presented click on the **Edit** tab and click on the **Allow Cell Drag and Drop** box.

Note: that the reference of the cell or cells being dragged is indicated in a pop-up box alongside the selection.

Cut, Copy and Paste



It is best to use Cut, Copy and Paste when moving large numbers of cells of data and transferring data between programs.

To move cells of data deleting the original:

- Select the cells to be moved.
- Choose **Cut** from the **Edit** menu. Click on the cell at the top left hand corner of its new position and choose **Paste** from the **Edit** menu.

Hint: A short cut to using the cut, copy and paste commands is to use the buttons on the Toolbar: the button Cuts, the button Copies and the button Pastes.

To move a piece of data leaving the original in place, repeat the above using **Copy** from the **Edit** menu instead of **Cut**. Note that a dotted line appears around the copied data.

For information on copying and pasting formulae see Section 3.5. For information about copying and pasting data between programs see Appendix B.

2.6 Undo

One useful facility you will soon grow to love is **Undo**. This is available by clicking on the  button on the Toolbar. Clicking on the down arrow to the right of the button lists the last changes made and these can be undone by choosing the appropriate item on the list.

Conversely, using the **Redo** button  on the Toolbar reverses any changes you have made using the **Undo** button.

2.7 AutoComplete

Creating a Series Using AutoComplete

Two common requirements when entering data are the repetition of a particular number across a range of cells and the creation of a series. There are many different types of series, and some examples are shown below.

Date and Time related:

9:00,10:00,11:00,12:00

Mon, Tue, Wed, Thur

Monday, Tuesday, Wednesday, Thursday

Apr, Mar, Feb, Jan

1st Jan, 2nd Jan, 3rd Jan, 4th Jan

1986, 1988, 1990, 1992

1860, 1861, 1862, 1863

Linear related:

1, 2, 3, 4

1, 3, 5, 7

200, 150, 100, 50

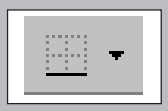
The technique used for creating a series is called **AutoComplete.**

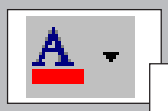
- At the start of the range of cells enter two examples of the series into two contiguous cells.
- Select the two cells and drag the handle which appears in the bottom right hand corner of the selection across the required range. When you release the mouse button the series will be displayed in the cells that you have dragged across. Note that as you drag across the required range a pop-up box indicates the last value in the range.

Repeating a Number Across a Range of Cells

- At the start of the range of cells enter the number you wish to repeat.
- Select the cell and drag the handle which appears in the bottom right hand corner across the required range. When you release the mouse button the contents of the cell will be repeated in the cells that you have dragged across.

2.8 Borders and Shading





You can highlight a selected cell or group of cells with a border by clicking on the arrow alongside the  button on the Toolbar and choosing the border you require from those displayed.

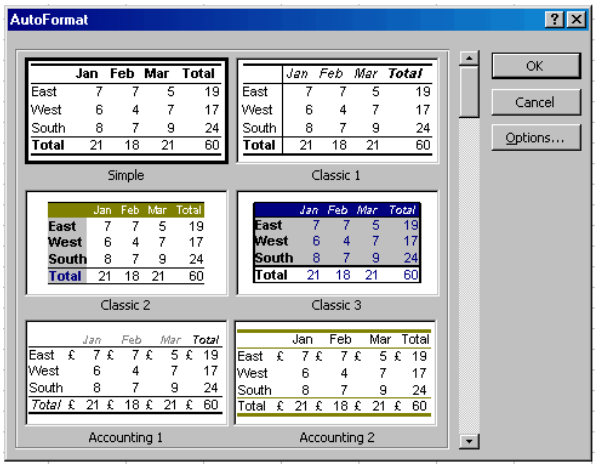
To alter the fill colour of a selection click on the arrow alongside the  button on the Toolbar and choose the required colour.

To alter the font colour of a selection click on the arrow alongside the  button on the Toolbar and choose the required colour.

Note: Unless you intend to print your worksheet on a colour printer remember to use contrasting colours.

2.9 AutoFormat

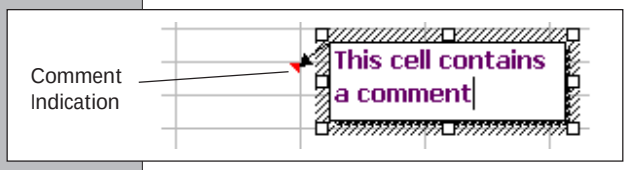
Excel has pre-set formats which you can apply to your data using the AutoFormat command. To use a pre-set format select the data you wish to format and choose **AutoFormat** from the Format menu. The following dialogue box will be presented:



Scroll down to see all the options available to you. Choose the format that most suits your work then click on **OK** to apply this to the selected range of cells.

2.10 Comments

It is sometimes useful to be able to attach some text to a cell eg. you might want to include the source of a particular piece of data. You can do this by using the **Comment** command. Select the cell to which your text relates, choose **Comment** from the **Insert** menu, and type your text into the box provided. Text will wrap on to the next line of the box, as with wordprocessing, so you do not need to press the **Enter** (↵) key at the end of each line. Click on any other cell when you have finished.



Notice that a small red triangle appears in the top right corner of the cell. When the pointer passes over a cell containing a Comment the text contained in the cell is displayed.

Text in a Comment can be edited by selecting the cell and choosing **Edit Comment** from the **Insert** menu. Edit as you would using a wordprocessor.

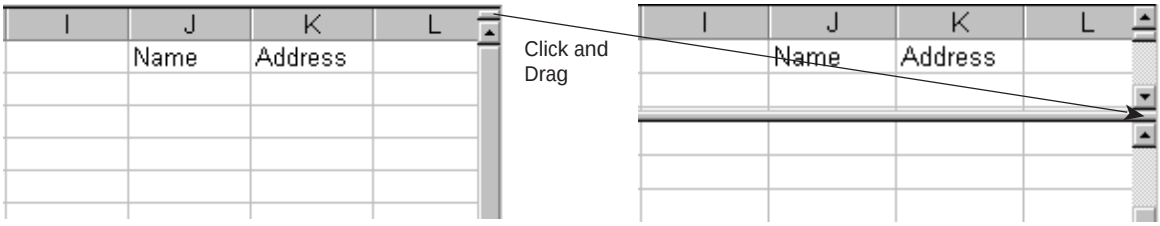
2.11 Display Options

You can choose to display gridlines, formulae, row and column headings (reference numbers and letters), page breaks etc. Choose **Options** from the **Tools** menu, and from the dialogue box presented click on the View tab and choose your display preferences.

Note: What is displayed on screen is not necessarily the same as what is printed. There are options here that can be confused with options in **Page Setup** dialogue box. Only the **Formulas** option will be printed.

Freezing Panes

Occasionally, you might have column or row headings which you would like to remain stationary while the remainder of the worksheet scrolled normally. First you need to split the window. Do this by clicking and dragging the small rectangle at the top (for a row) or right (for a column) of the scroll bar. Drag until it exposes the row or column that you want to freeze. You can now scroll either part of the split window independently. Choose **Freeze Panes** from the **Window** menu to freeze the upper or right pane.



Hiding Columns

Excel enables you to hide columns or rows should you need to. The purpose for this might be that they contain confidential information, for example wages, that you don't want other people to see. Alternatively you might want to hide these so that you can see information contained in columns or rows further along in the worksheet. First, you need to select the columns or rows that you want to hide. Next, you choose **Column** or **Row** from the **Format** menu and, depending on what it is you want to hide, then choose Hide. To reveal the hidden cells, select the columns (or rows) which came both before and after the hidden column (or row). Choose **Columns** or **Rows** from the **Format** menu and choose the sub-menu unhide.

SECTION 3

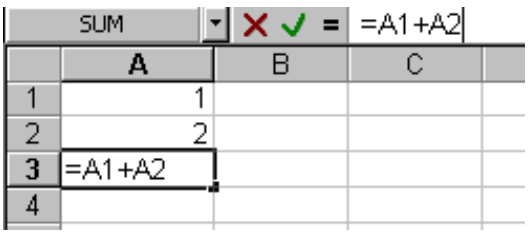
CALCULATING

Formulae are at the heart of a worksheet. They are what make a worksheet special since they enable rapid arithmetical or statistical calculations to be made. They can be written quickly and easily to perform calculations such as averages, percentages and totals on the entire range of data, or part of it, as well as many more complex routines.

3.1 Simple Formulae

It is essential to remember that the formula is written into a cell where the result of the calculation is required. The result is shown in the cell when the ✓ on the formula bar is clicked, or when the insertion point is moved to another cell.

The formula is a set of instructions to the computer. It has four elements:



- The = symbol that must be used to start a formula. This lets Excel know that what you type next is a calculation.
- The references of **cells** on which you wish to perform a calculation.
- **Mathematical operators**: +,-,*(multiply) and / (divide). You can also use brackets in your calculation.
- **Functions**: Use of functions in a formula is optional. Some functions have arguments, including cell references, associated with them. All these must be enclosed in brackets. For a list of the most useful functions see the **Office Assistant**.

The simplest of formulae do not use functions. Here are some examples:

=A1+A2	This adds cells A1 and A2 together.
=A1*B1	This multiplies cells A1 and B1.
=A1/A2+(A3+A4)	This divides A1 by A2 and adds A3 and A4 to the result.

3.2 Functions

If you have many cells you wish to add or multiply together, or on which you wish to perform some statistical operation, it would be laborious to have to type each cell reference in as in the simple formula:

=A2+B2+C2+D2+E2+F2...etc.

You might also introduce errors in the formula. Using **Functions** offers an important shortcut. Understanding functions will enable you to automate many procedures and manipulate your data to greater effect. Indeed without them, your use of Excel will be severely curtailed.

Here are some examples of Formulae that use functions:

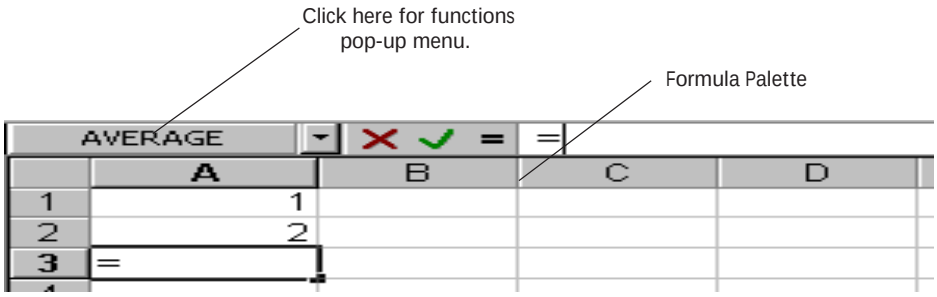
=SUM(A1:D1)	This sums the contents of cells A1, B1, C1 and D1. The presence of the colon indicates that all cells between those referenced are to be used by the formula.
=AVERAGE(A1:A4)	This averages, or provides the mean of, the contents of cells A1, A2, A3 and A4.
=STDEV(A1:A4)	This finds standard deviation of cells A1, A2, A3 and A4.

Cell references entered into the parenthesis are called arguments. For a list of the most useful functions see the **Office Assistant**.

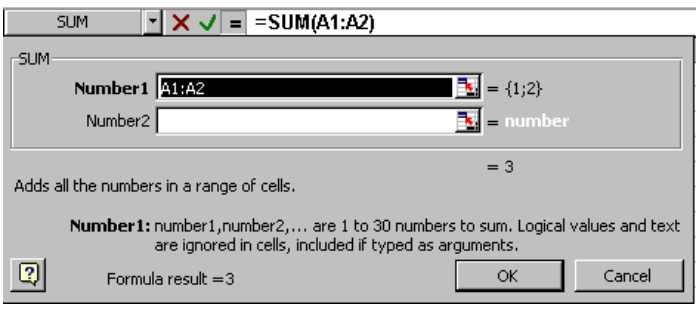
3.3

Using Formulae and Functions

- Select the cell in which you wish the result of the calculation to appear. Usually this is at the bottom of a column of cells or to the right of a row of cells which form the basis of the calculation. However, it could be anywhere on the worksheet except in a cell that will be referred to in the calculation.
- Click on the = in the Formula Bar and the **Formula Palette** will appear.



- If a **Function** is to be used choose the required function from the (functions) pop-up menu on the Formula Bar. The Formula Palette is then expanded to include a description of the function and allows arguments required by the function to be entered.



Arguments can consist of cell references and any relationships that apply to them. If required, you can use mathematical operators between the references. In many cases Excel will automatically enter the cell references for you. However, if you wish manually to specify a range of cells that are contiguous (touching one another) it is only necessary to type in the first and last cell references, separated by a colon. For quick entry in a cell range click on the first cell of the range and while holding down the mouse button drag to the last cell of the range. The cell references and colon will be entered automatically for you. If you wish to calculate using cells that are not contiguous, just type in their references separated by commas.

Note: To view cells beneath the Formula Palette click and drag it to a new location. Alternatively, hide the Formula Palette by clicking on the button on the Palette. To display it once again click on the button.

- Click on the OK button to perform the calculation and the result of the calculation will be shown in the cell where the formula was typed. If for any reason Excel interprets the formula to be incorrect you will be alerted (see Error Messages in Appendix A).

- To amend any formula just click in the cell containing the formula and edit in the Formula Bar. Checking the range of cells referenced by a function can be assisted by selecting the cell containing the function and moving the insertion point into the Formula Bar; the references are highlighted in blue.

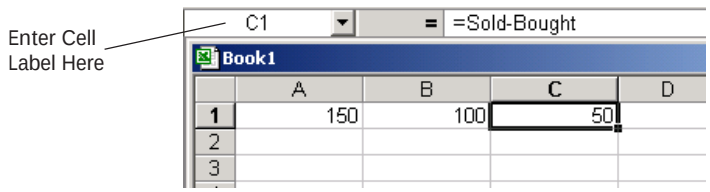
- You are not limited to using a single function within a formula, formulae can be as complex as required. To add further functions to a formula click in the cell containing the formula, and within the Formula Bar move the insertion point to where you wish to add the further function and add the function as above.

A short cut is to make use of the **SUM** function by clicking on the Σ button on the Toolbar. This will guess at the range of cell references that you wish to sum and insert them into the function for you. Edit the formula if this does not coincide exactly with the range of cells you do in fact want to use.

3.4 Calculating Using Text Labels

Lets face it, most people could relate better to the formula 'Profit = Price Sold - Price Bought' than they could 'C2=A2-B2'! This is where using text labels in formulae comes in. Text labels let you use words instead of cell references to describe what you wish calculated - for example, the Profit formula above would be perfectly valid.

To use text labels in a formula requires you to provide labels for the columns or rows you wish to use in your calculation – in our example the column labels would be *Sold* and Bought. To add text labels select the cell you wish to label and enter the label in the *box which* usually contains the cell number (next to the formula bar)



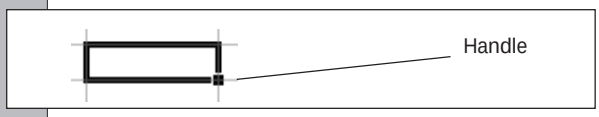
In the cell where you wish the calculation to appear simply enter these labels into the calculation and click on the ✓ as normal.

IMPORTANT: By default formulae which use labels reference their cells absolutely. This is in contrast to formulae using cell references that are by default relatively referenced. See Section 3.6 to learn about absolute and relative cell references.

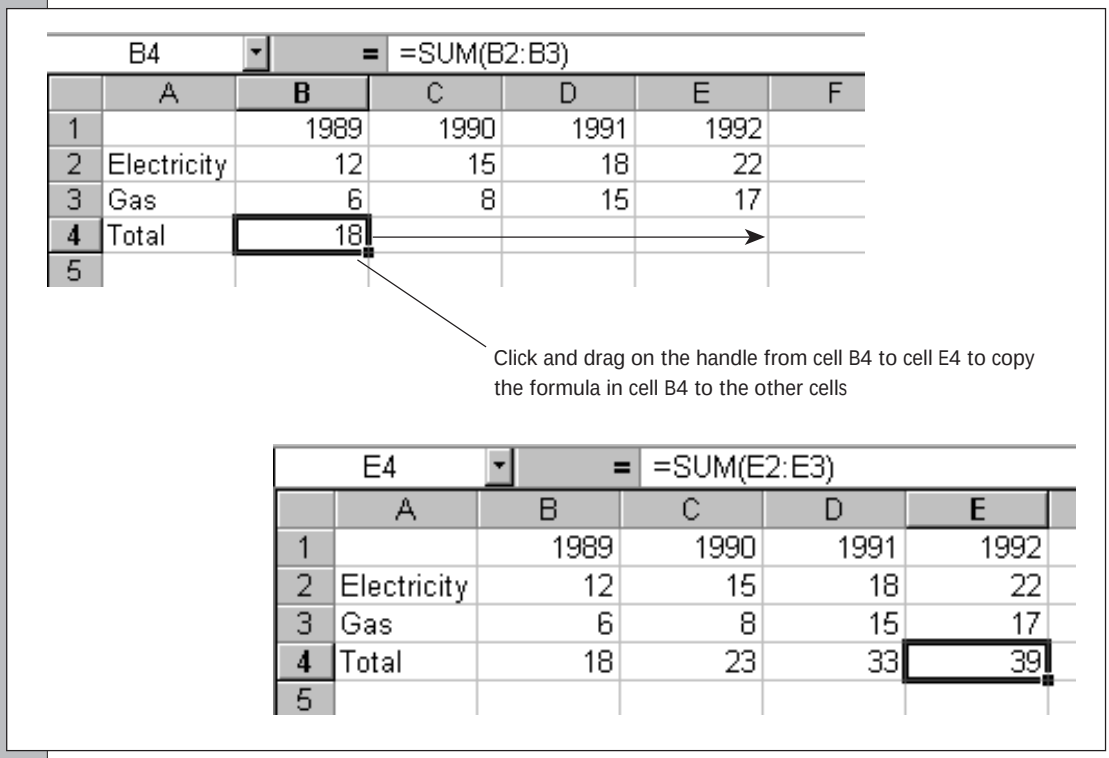
3.5

Copying Formulae using AutoComplete

Typing in the odd formula is all very well, but if you have a worksheet that performs the same calculation on column upon column of cells it can be tedious to type the same formula over and over again, the only difference being the range of cells referenced.



There is an easier way to apply an existing formula. Select the cell with the formula that you wish to apply to another group of cells. Click and drag the handle across the range of cells to which you wish the formula to apply and release the mouse button. This will copy the formula and apply it **relative** to the new range of cells on the worksheet. So the formula =SUM(B2:B3) typed into cell B4 and clicked and dragged into cell E4 will now look like =SUM(E2:E3).



To copy the formula into a range of cells which are not adjacent to the cell containing the formula, select the cell containing the formula and while holding down the **Ctrl** key, click and drag its border to copy the cell to the first cell of the range. As above click and drag the handle across the range of cells to which you want the formula to apply.

Although these examples of formulae have all applied to calculations involving columns of data, with results appearing below the data; you can also perform calculations on rows where the result appears to the right of the data. These formulae can be clicked and dragged in just the same way.

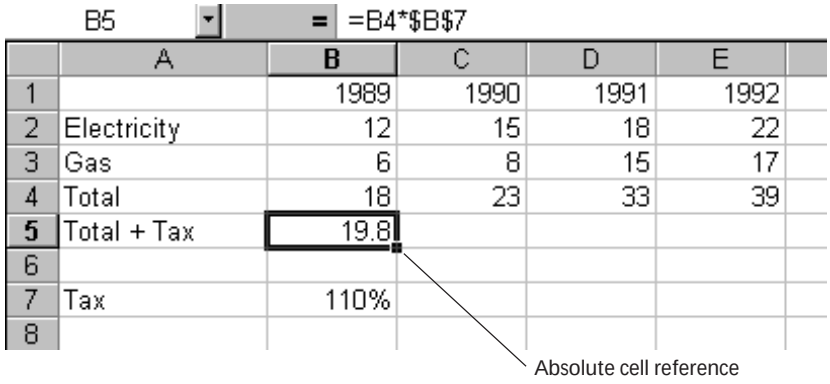
3.6

Absolute and Relative References

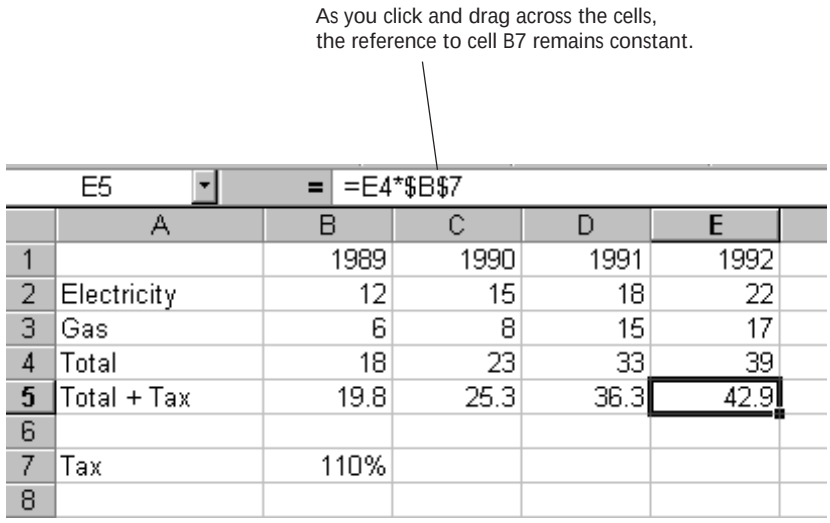
Up to this point all formulae references have been **Relative**. That is, if a formula is moved the cells to which it refers are changed according to its new position on the worksheet. We have seen how useful this can be when **Copying** and **Pasting** formulae.

Occasionally, it is useful to have a formula reference the same cells no matter where on the worksheet the formula is moved. For example, you might always want to refer to a constant value that you have typed into a particular cell on the worksheet. This is called an **Absolute** reference. Where some of the cells to which the formula refers are absolute, type a $ symbol before both the row number and column letter. So a relative cell reference of A1 becomes A1. Occasionally, you may wish the rows to be relative but the columns to be absolute. To do this put a $ symbol in front of the column reference only, eg. $A1.

The example below multiplies the total by the constant Tax in cell B7. Note that when the formula is clicked and dragged the cell reference B7 remains constant due to the presence of the $ symbols.



	A	B	C	D	E
1		1989	1990	1991	1992
2	Electricity	12	15	18	22
3	Gas	6	8	15	17
4	Total	18	23	33	39
5	Total + Tax	19.8			
6					
7	Tax	110%			
8					



	A	B	C	D	E
1		1989	1990	1991	1992
2	Electricity	12	15	18	22
3	Gas	6	8	15	17
4	Total	18	23	33	39
5	Total + Tax	19.8	25.3	36.3	42.9
6					
7	Tax	110%			
8					

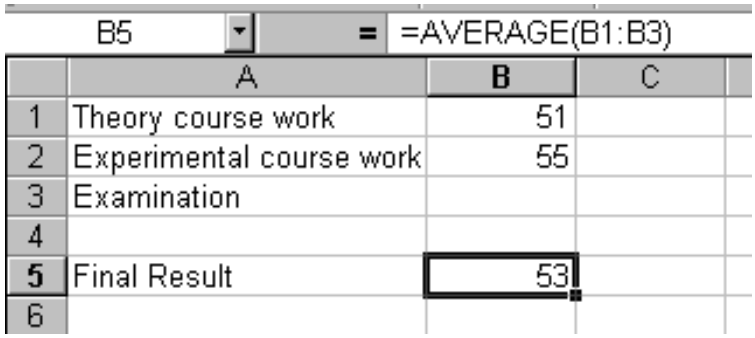
Note: a quick way to change a relative reference into an absolute reference in the formula bar is to select the cell references you wish to change and then press the **F4** key. The $ symbol is added to both the column and row references. Press the **F4** key again to make only the row references absolute, and again to make only the column references absolute.

3.7

Goal Seeking

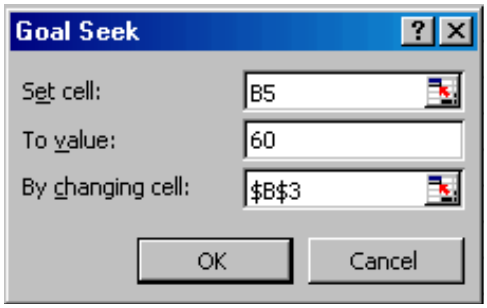
Goal-Seeking is useful if you know the result you want from a formula but you don't know a particular value the formula needs to achieve the result.

In the example below:



A student wishes to calculate the examination mark she needs to attain taking into account her course work marks. The pass mark for the course overall is an average of 60%.

To calculate the examination mark required, ensure that the cell displaying the **Final Result** contains the calculation to average the three marks and choose **Goal Seek** from the **Tools** menu.



In the dialogue box presented, first enter the cell reference of the **Final Result** into the **Set cell** box, and then enter the value you wish the result to goal seek in the box alongside **To value**. In our case this is 60. In the box alongside **By changing cell**, click on cell B3 to enter the reference of the cell you wish to change. Click on **OK** and the required value will be calculated.

3.8

Automatic and Manual Recalculation

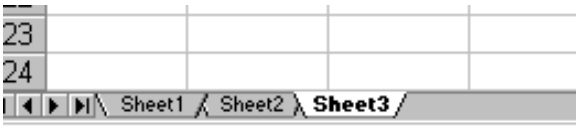
When you alter data in cells that are used in a calculation Excel normally updates calculations automatically. Indeed this is a powerful feature of a worksheet. However, if you have a very large worksheet with many inter-dependent calculations this updating can be slow. To circumvent this Excel allows you to turn off the default **Automatic** re-calculation and instead opt for **Manual**. To do this choose **Options** from the Tools menu and from the dialogue box presented click first on the **Calculation** tab and then on the **Manual** button.

Now a re-calculation is performed only when you press the **Ctrl** and = keys or **F9**.

Note: Ensure that the formula bar is not active when manually re-calculating.

3.9 Using and Linking Several Worksheets

An Excel workbook is made up of many sheets. So that different sets of data can be kept on separate worksheets in the same workbook. You can change between different worksheets by clicking on the tabs at the bottom of the workbook.



Note: While there is no technical reason why can not store completely unrelated data in the same workbook you will find that it is difficult to keep track of your work if you do so. Try and organise your worksheets in a logical fashion. For example you might have a workbook which contained information relating to a business's sales figures, on one worksheet you might have a regional breakdown of sales and on another you could store the bonus's paid to sales staff etc.

Inserting More Worksheets

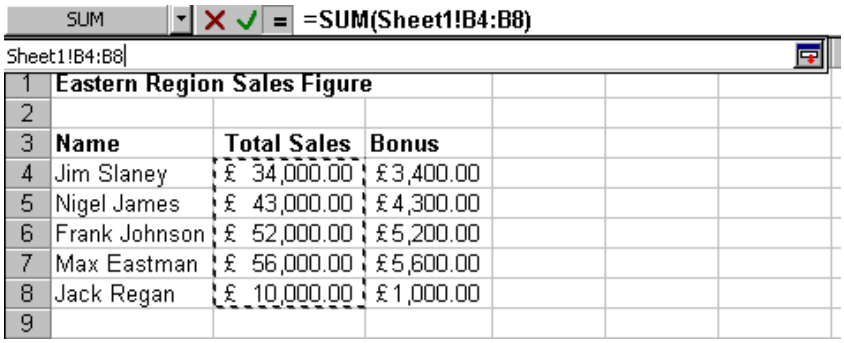
When you open a new Excel workbook it will contain three worksheets. If you need more worksheets choose **Worksheet** from the **Insert** menu.

Linking Worksheets

One of the main advantages of storing related information in the same workbook is that it is easy to do calculations and to create charts that draw from different sheets. For example you might store different regions sales figure on separate worksheets. If you then wanted to compare these and to produce national sales figures you might use a further worksheet.

To perform a calculation using data held on different worksheets is very similar to performing a normal calculation.

- Select the worksheet cell in which you wish the result of your calculation to appear.
- Click on the = to show that you are performing a calculation. Choose what type of calculation you are performing from the drop down menu on the formula bar. Click on the button and then choose the cells that you wish to calculate. In the example we are summing the sales figures of the entire Easter Region.



1	**Eastern Region Sales Figure**		
2			
3	**Name**	**Total Sales**	**Bonus**
4	Jim Slaney	£ 34,000.00	£3,400.00
5	Nigel James	£ 43,000.00	£4,300.00
6	Frank Johnson	£ 52,000.00	£5,200.00
7	Max Eastman	£ 56,000.00	£5,600.00
8	Jack Regan	£ 10,000.00	£1,000.00
9			

- Use the sheet tabs on the bottom of the page to move to the worksheet that you want to use as the basis of your calculation. Notice that in the formula bar "Sheet1!" has been added next to the calculation you entered.
- Click and drag over the area that you want to be part of the calculation. A dashed rectangle should appear around your selection.
- Click on **OK** to complete.
- Use the sheet tabs at the bottom to return to your original worksheet and see the result of the calculation.

Notes: Changes you make in one worksheet will affect all worksheets that you have linked that worksheet to.

It is possible to create charts from multiple spreadsheets using the same technique.

For information regarding linking data or charts to documents created by other programs see Appendix D.

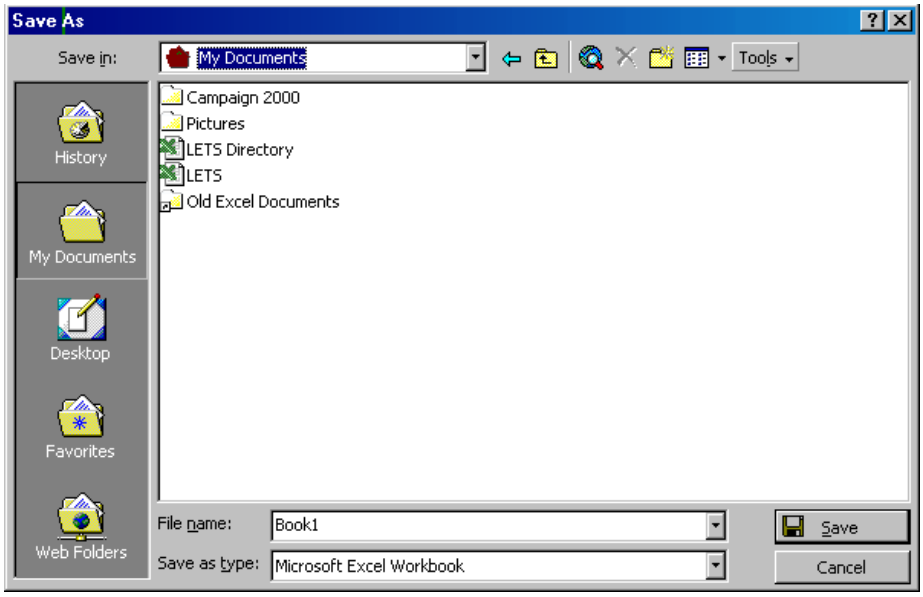
SECTION 4

SAVING, OPENING, CLOSING AND PRINTING

4.1

Saving a Workbook

When you decide that you wish to stop using Excel you should save your workbook so that you can continue another day. To save a newly created workbook, choose **Save As** from the **File** menu. A dialogue box appears like the one below.



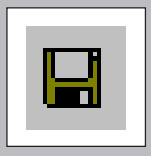
By default workbooks are usually saved to a folder called 'My Documents' on the hard disc or network disc. If you wish to save to a different disc click on the down arrow alongside the **Save In** box and choose the disc from those listed. If you wish to save to a different folder double-click on the folder from those listed in the dialogue box.

If you wish to create a folder into which to save your workbook click on the button from the **Save** dialogue box, enter a name for the folder and double-click on the newly created folder from the dialogue box. Clicking on **Save** will save your workbook into this folder.

Next replace the default file name '**Book1**' in the file name box with an appropriate file name for your workbook.

To save your workbook either click on the **Save** button or press the **Enter** (↵) key. The workbook has now been saved as a file on the disc you specified.

Note: When a Workbook is saved all sheets - Worksheets and Chart sheets are saved together.



A titled file (one that has been saved previously) can be updated and replaced by using the **Save** command from the **File** menu or by clicking on the **Save** button on the Toolbar.

4.2 Opening a Workbook

To open an existing workbook choose **Open** from the **File** menu or click on the button on the Toolbar. A dialogue box appears (similar to the Save dialogue box shown previously), and this lists all the files or workbooks which can be opened by Excel. If the file you wish to open is listed select it and click on the **Open** button, or double-click on its filename. To open a file in a different folder or disc choose the disc from those listed and click on the arrow alongside the **Look in** box. If the file was saved into a particular folder double-click on the folder from those listed in the dialogue box open the file as above.

Hint: A shortcut to opening one of four most recently used workbooks is to choose the name of the workbook from those listed at the bottom of the **File** menu.

If the Excel program itself is not yet open existing workbooks can also be opened by locating their icon in Windows and double-clicking.

To open a new workbook choose **New** from the **File** menu, or as a shortcut, click on the button on the Toolbar.

Excel allows you to open more than one workbook at a time. To change between workbooks use the **Window** menu or choose the workbook from the **Taskbar**.

4.3 Closing and Exiting

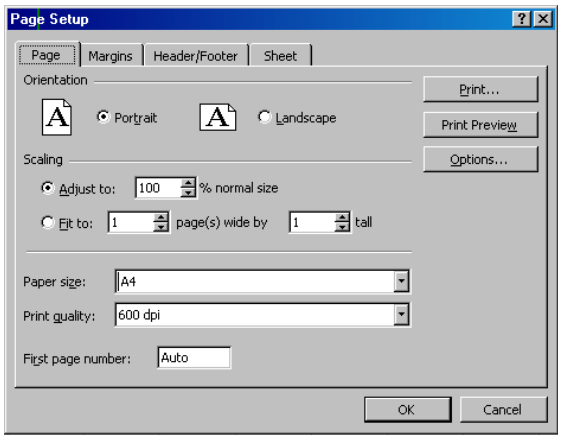
To stop working on your workbook choose **Close** from the **File** menu. If you have not saved or have made any changes you will be asked if you wish to save the workbook. Yes saves all changes before closing or exiting; No closes the file without saving any changes since the last save. The **Cancel** button cancels the **Close** or **Exit** command.

To conclude using Excel altogether simply choose **Exit** from the **File** menu.

4.4 Printing

The first step when printing from Excel is to use the Page Setup command.

Note: See Section 6.11 for information about printing charts



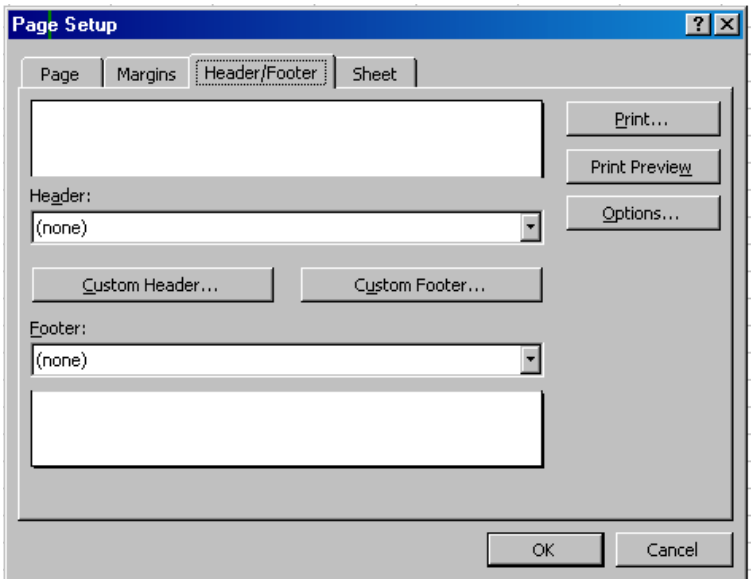
The Page Setup

Choose the command **Page Setup** from the **File** menu. This presents a dialogue box like the one below.

Along the top of the dialogue box is a series of Tabs. Clicking on one of these tabs displays options relating to the tab title. Click on the **Page** tab and check that the paper set up is for A4 and that the orientation is correct.

You can also adjust the position on the page where the worksheet is printed by changing the size of the margins. To print the worksheet in the centre of the page click on the **Margins** tab and on the **Centre Horizontally** and **Vertically** boxes.

By default Excel prints a header at the top of each printed page consisting of the name of the file. To remove this and insert your own header click on the **Header/Footer** tab and on the **Custom Header** button. The header is divided into three sections representing text inserted to the left, centre, and right of the top of the page. To insert text so that it appears at the top centre of each page of the workbook delete any characters in the centre section and insert your text.



Likewise, by clicking on the **Custom Footer** button the default footer consisting of the word '**Page**' and the page number can be deleted or amended if required.

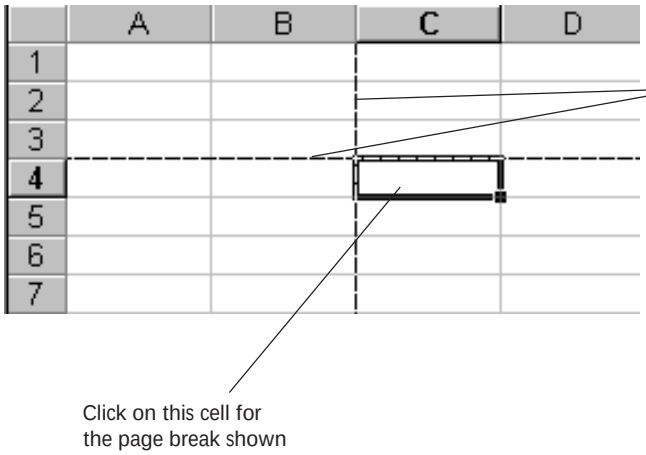
You may also wish to have a particular column or row printed out on every page – this can be particularly useful for headings. To do this click on the **Sheet** tab and enter the row number alongside **Rows to Repeat at Top**. Similarly, for columns enter the column letter alongside **Columns to Repeat at Left**.

Selecting What to Print

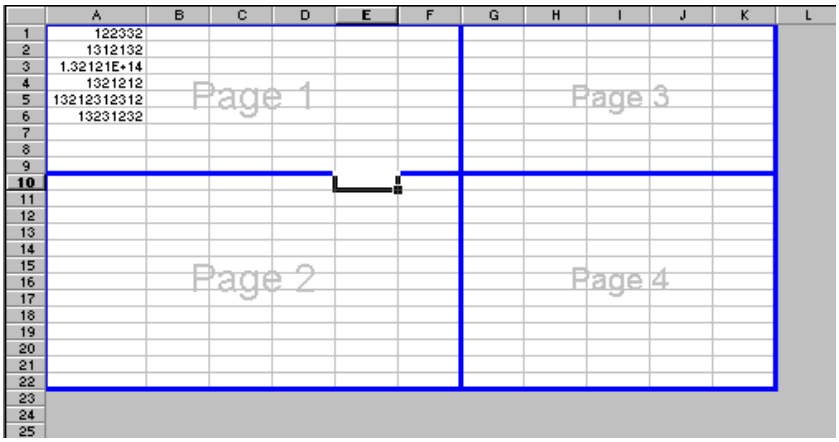
The next step is to specify exactly which cells are to be printed, and between which cells you wish the page breaks to occur. Of course, if you wish to print the whole of the worksheet and it does not occupy more than a page you can disregard this. Otherwise you need to follow the instructions below.

- First, to select the area of cells you wish to print, choose **Print Area** from the **File** menu and **Set Print Area** from the sub-menu. Omit this step if you wish to print the entire worksheet.

- Next, you must specify where on the worksheet the page breaks are to appear. Excel automatically fits as many cells as possible on to a page, and puts a dotted line on the cell border where a page break occurs. However, this may not be where you want the page break. Define your own page break by clicking on the cell above and to the left of where you wish the page break to appear (see opposite). Then choose **Page Break** from the **Insert** menu.



To check the position of page breaks choose **Page Break Preview** from the **View** menu. Page breaks and their respective page numbers are displayed in a magnified view. It is possible to move the position of the page breaks in Page Break Preview by clicking and dragging the page break borders



- Lastly, choose **Print Preview** from the **File** menu and you will be shown a 'bird's eye view' of how the worksheet will appear when printed. This is useful since you can check all your print settings. To take a closer look click on the **Zoom** button and use the scroll bars to move about the worksheet. The **Next** and **Previous** buttons show the adjacent pages of the worksheet. If what appears on screen is not exactly as you want to print, click on the **Close** button to return to the worksheet.

Note: If you are unable to fit all the data you wish to on to a page either adjust the width of the columns to accommodate more data on to a page (see Section 2.4), or adjust the scaling of the page from the **Page** tab on the **Page Setup** dialogue box.

Printing Your Data

Choose **Print** from the **File** menu.

If you wish to print only a selection of pages enter the page numbers into the appropriate boxes.

After you have made your final print choices click on the **OK** button.

Hint: As a short cut to printing, if you have chosen the printer set up you wish to use just click on the  button on the Toolbar.

Problem? Gridlines and/or row and column headings are printed even though these are not displayed on the worksheet.

Solution: Choose **Page Setup** from the **File** menu, click on the **Sheet** tab, click in the **Gridlines** and/or **Row and Column Headings** boxes as required and then on **OK.**

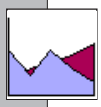
SECTION 5

CREATING CHARTS

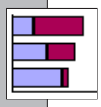
5.1

Chart Types

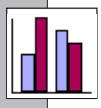
Excel uses data contained in the worksheet to draw charts. The general chart types that are available are shown below, as are definitions for the terms used.



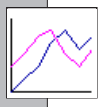
Area Displays the relative importance of values over time with emphasis on the amount of change.



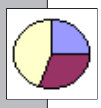
Bar Displays values at a particular time or comparisons between values. Bar charts place emphasis on comparison between values.



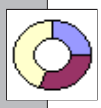
Column Displays values over time or comparisons between values. Column charts place emphasis on comparison between values.



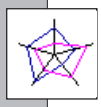
Line Displays trends in data over time at regular intervals with emphasis on time and rate of change. For data series sampled at irregular intervals an XY (Scatter) chart is more suitable.



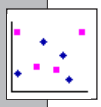
Pie Displays the relationship between the value and the whole as a proportion. Only suitable for displaying the relationships of one data set at a time.



Doughnut As Pie. chart but can display relationships between more than one data series at a time.



Radar Displays variations in data series relative to a central point and between one another.

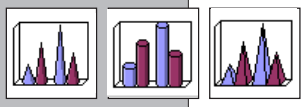


XY (Scatter) Displays the relationship between values of several data sets as points on the chart. Useful if data series over time are at irregular intervals. Points for particular data sets can be joined with lines if required.

Surface The best combinations between two sets of data.

Bubble A variation of the XY (scatter) chart where the size of the marker shows the value of a further variable.

Stock Sometimes termed a Hi-Lo chart it illustrates a band through which a variable moves.



Cone, Cylinder, Pyramid Alternative shapes to the standard 3D column and bar charts. Once created each type of chart can be refined to suit your needs.

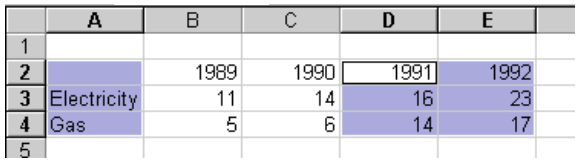
5.2

Selecting Chart Data

Be sure to first select the data that will form the basis of the chart. Data may be either in rows or columns and any number of each may be selected.

Contiguous columns/rows (columns/rows which are touching) can easily be selected by clicking and dragging across the range of cells. Select the cells NOT the row numbers or column letters.

To select columns that are not contiguous, select one of the columns as above, and then select other columns by holding down the **Ctrl** key while clicking and dragging. Use the same technique to select non-contiguous rows.



	A	B	C	D	E
1					
2		1989	1990	1991	1992
3	Electricity	11	14	16	23
4	Gas	5	6	14	17
5					

5.3

Creating the Chart

A chart can be created in two ways: embedded in the worksheet along with any data, or, on its own in a chart sheet as part of a workbook. Creating an embedded chart has the advantage that it can be easily viewed and printed along with data in the worksheet. Creating a chart sheet has the advantage that it can be viewed and printed independent of the worksheet from which it was derived. In both cases the chart and the data will be saved together in the workbook.

The easiest way to create a chart is to use the **Chart Wizard.**

To create a chart select the data to be used and click on the Chart Wizard button  on the Toolbar. A series of chart wizard dialogue boxes is displayed.

Follow the instructions in the four dialogue boxes displayed. Click on the **Next** button of each dialogue box to proceed.

1 This **Chart Type** dialogue box requires you to choose the standard chart type, eg. line, column etc. The chart type can be further refined by clicking on the **Custom Types** tab.

2 This **Chart Source Data** dialogue box merely asks for confirmation of the range of cells which contains the data from which you wish to create the chart. You can also choose whether the data should be displayed as columns or rows. A sample chart using your selected data is displayed in the dialogue box.

3 This **Chart Options** dialogue box provides tabbed options relating to chart titles, axes, gridlines, legend, data labels and the data table.

Note: Chart options are explained in detail in subsequent sections.

4 This **Chart Location** dialogue box allows you to choose whether to create the chart embedded on the worksheet or in a separate chart sheet.

The chart is drawn to your specifications when the **Finish** button is clicked in the fourth dialogue box.

Terms defined:

Throughout this guide and while using Excel several terms are used that require clarification. The terms are defined here where relevant with reference to the fictitious data below.

Data Series

	1989	1990	1991	1992
Electricity	12	15	18	22
Gas	6	8	15	17

Category

Values

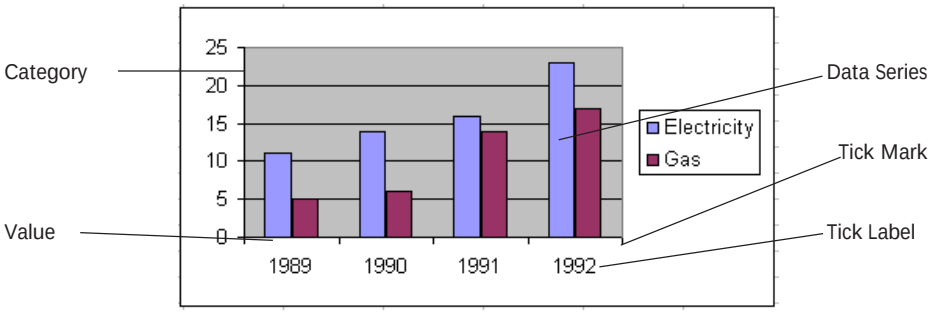
Category – Category data is usually plotted on the X (horizontal) axis of a chart. Exceptions 3D charts, XY (Scatter) charts, Bar charts.

Value – Values are usually plotted on the Y (vertical) axis of a chart. Exceptions 3D charts, XY (Scatter) charts, Bar charts.

Data series – A series of data plotted on the chart eg. the cost of Electricity for the years 1989,1990,1991,1992.

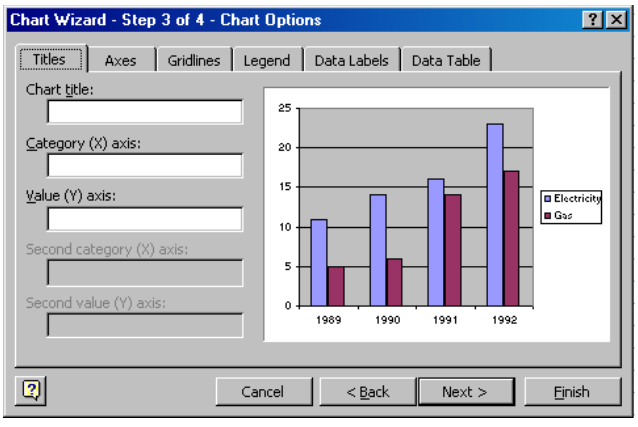
Tick marks – A small line on the axis that divides categories, the scale or a data series.

Tick labels – Text associated with tick marks.



5.4 Chart Data Options

The format of your data influences the way Excel creates charts. You may prefer a different appearance, and so the third dialogue box of the Chart Wizard provides options for a different

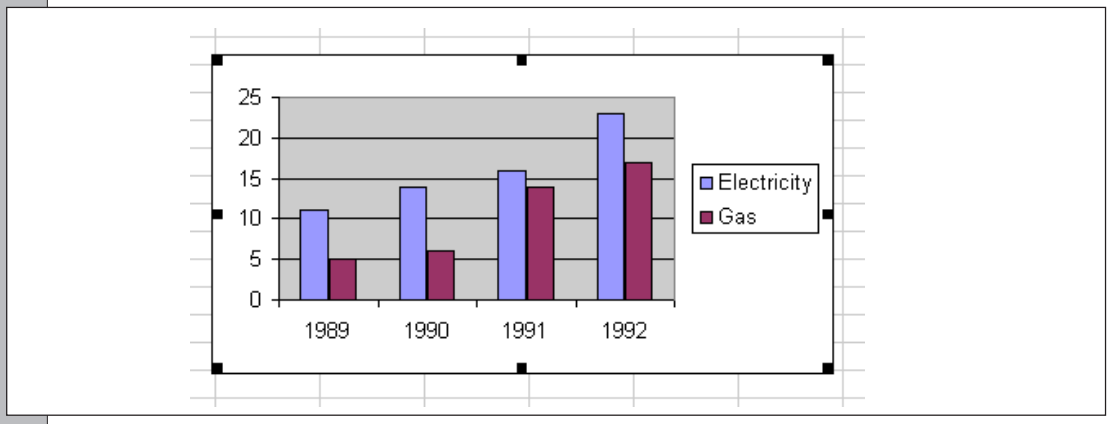


presentation of the chart. Not all the options are available for every type of chart. The most common options are listed here.

- Click on Rows or Columns depending on which you wish to be displayed as data series on the chart.
- The contents of the first rows/columns specified will be displayed as labels along the X axis.
- The contents of the first rows/columns specified will be displayed as the legend text.
- The contents of the first rows/columns specified will be displayed pie. slice labels.
- The contents of the first rows/columns specified will be displayed as the chart title.

5.5 Moving, Resizing and Deleting Charts

Charts can be moved around the worksheet by clicking and dragging the centre of the chart.



To resize a chart: click once on the chart – this will put handles in the corners and along each side of the chart.

The handles can then be clicked and dragged to make the chart bigger, smaller, taller or wider.

Deleting a Chart

To delete an embedded chart, first select it, then choose **Clear** from the **Edit** menu and **All** from the sub-menu.

To delete a chart sheet containing the chart, choose **Delete Sheet** from the **Edit** menu.

SECTION 6

FORMATTING AND PRINTING CHARTS

Though Excel will format your chart automatically, occasionally this format will not be acceptable and the chart will need customising.

6.1

Changing Chart Type

Select the chart and choose **Chart Type** from the **Chart** menu and then the preferred chart type from those displayed.

The chart type of a data series can be altered independently of other series in the chart. Just select the series and choose the chart type as above.

Problem? There is no **Chart** menu.

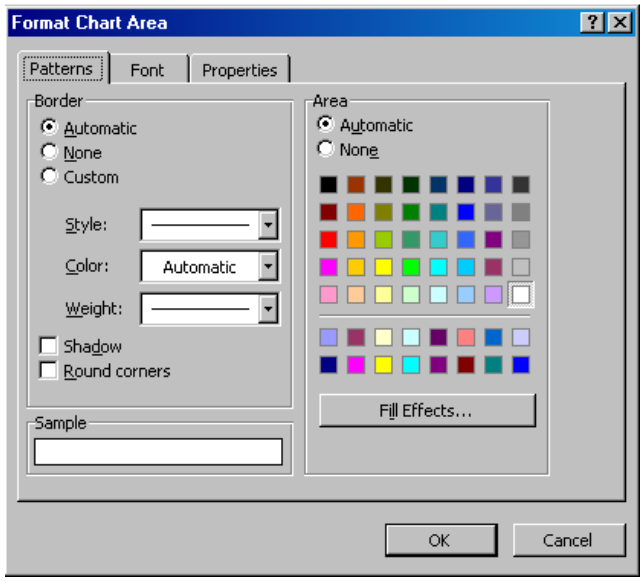
Solution: Select the chart and try again!

6.2

Changing Fill and Colour

The fill pattern and colour of areas in pie. slices, bars, columns, plot area, and their backgrounds can be altered.

To do so double-click on the area to be filled, eg. bar of a bar chart, plot area, chart area etc. This will display a dialogue box from which you can choose the required colours and patterns.



6.3

Adding a Legend

Adding a legend to a chart clearly differentiates one plotted variable from another. Using shaded areas or plot symbols emphasises the distinctions between the variables.

To add a legend to your chart choose **Chart Options** from the **Chart** menu and click on the **Legend** tab. Check the **Show Legend** box and choose the default placement of the legend. Click on **OK** to add the legend to the chart.

The legend can repositioned and resized by clicking and dragging.

To alter the font or border of the legend double-click on it and make the necessary changes from the dialogue box displayed.

6.4

Adding Text and Arrows

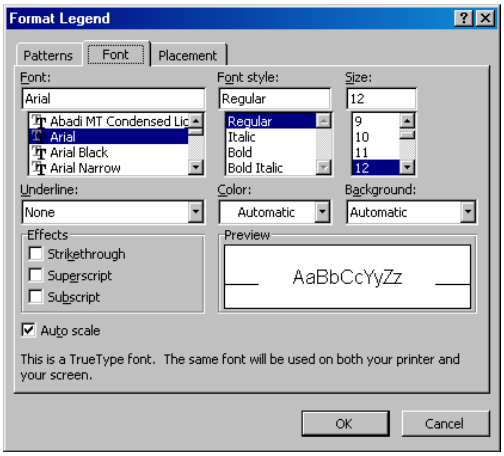
Adding Text

To add text to a chart enter the text into the formula bar and click on the ✓ mark. The text will be displayed on the chart surrounded by handles. Click and drag on the text to reposition it, and on the handles to resize it.

Formatting and Deleting Text

The appearance or format of any chart text can be altered in a variety of ways: font and font style can be changed, orientation of text changed to vertical or rotated, colour and pattern of text and text background changed.

To change the formatting of any chart text double-click on the text you wish to change. From the dialogue box displayed choose the tab appropriate to the formatting you wish to change, make the necessary changes, and click on the **OK** button.



It is also possible to edit some text directly using the formatting Toolbar. Text that you have inserted yourself will usually allow you to edit it in this way.

To delete text, select the border around the text and press the **Backspace** (←) key.

Using Arrows in a Chart

Sometimes it can be useful to highlight a particular aspect of your chart with an arrow. To add an arrow:

- Click on the button on the Toolbar and the Drawing Toolbar is displayed.
- Click on the button on this Toolbar.

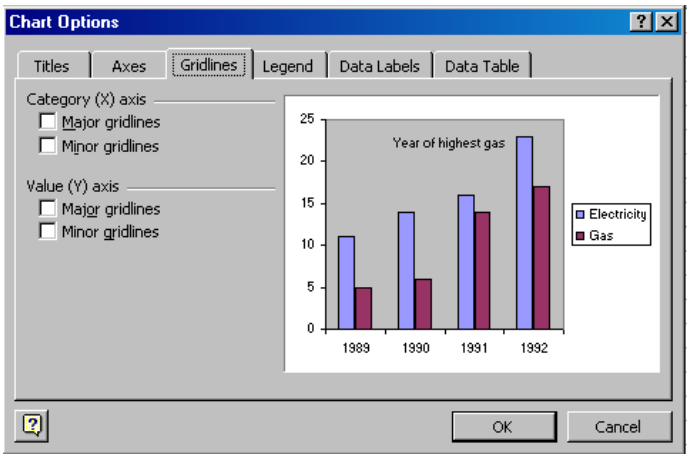
- To move the arrow click and drag its start and end points.
- To change the orientation, click and drag one of the handles at either end of the arrow.
- To add text to the arrow enter it into the formula bar, click on the ✓. The text will appear on the chart. Click and drag it into position.

To delete an arrow, select it, and press the **Backspace** (←) key.

To format an arrow double-click on it. A dialogue box will be presented which allows you to choose your preferred format from a range of options.

6.5 Gridlines

If you have a large chart it can be particularly useful to add gridlines to assist in comparing variables. To add either major or minor gridlines:



Choose **Chart Options** from the **Chart** menu.

From the dialogue box displayed choose the **Gridlines** tab, click on the check boxes of the gridlines you require and click on the **OK** button.

To alter the style and weight (thickness) of the gridlines double-click on the gridline, and from the dialogue box presented select the format you prefer.

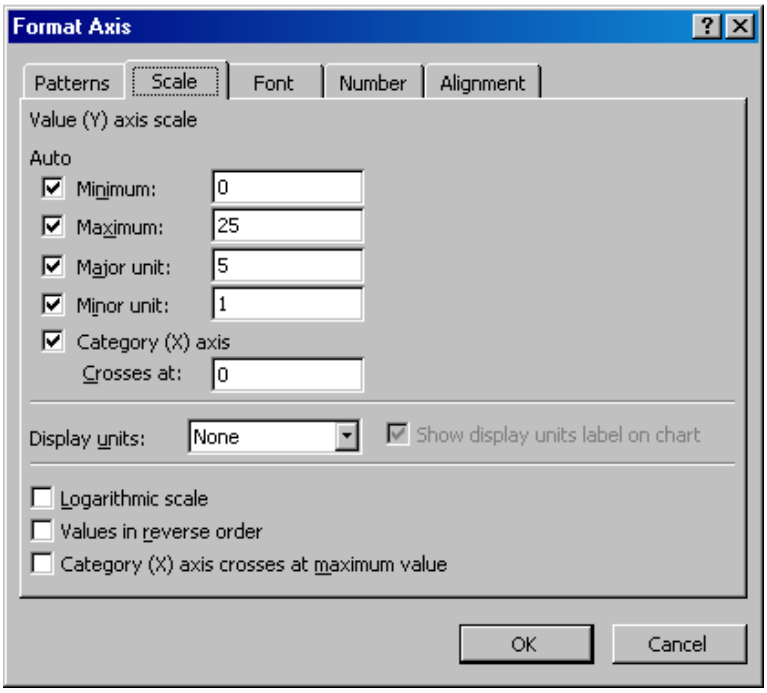
6.6 Axes

By default all axes are shown on the chart. If you do not want to display a particular axis choose **Chart Options** from the **Chart** menu, click on the **Axes** tab, and un-check the appropriate check box(es).

To alter the appearance of the axis, tick marks, axis labels and scale just double-click on the axis concerned. From the dialogue box presented click on the appropriate tab and make the required changes. Options available from the **Scale** tab require further explanation (see below).

Altering the Scale of an Axis

The following options are available from the **Scale** tab though not all are available with every chart or axis type:



Minimum/Maximum - Defines the smallest/largest data value to be displayed.

Major/Minor Unit - Defines the increment between major/minor tick marks.

Category (X) Axis Crosses At - Moves the position of the X axis to the value you specify. With Scatter charts this option changes to **Value (Y) Crosses At**. With 3D charts this option changes to **Floor (XY Plane) Crosses At**.

Values In Reverse Order - Inverts the chart scale eg. lowest scale at the top highest at the bottom.

Logarithmic Scale - Converts the linear scale into a logarithmic scale.

Category (X) Axis Crosses At Maximum Value - Moves the position of the X axis to after the highest value. This option overrides the **Category (X) Axis Crosses At** option. With a Scatter Chart this option changes to **Value (Y) axis Crosses At**. With a 3D chart this option changes to **Floor (XY) Plane Crosses At**.

Number Of Categories Between Tick Mark Labels - Defines how many categories that you wish to label, eg. 2 will label every other category.

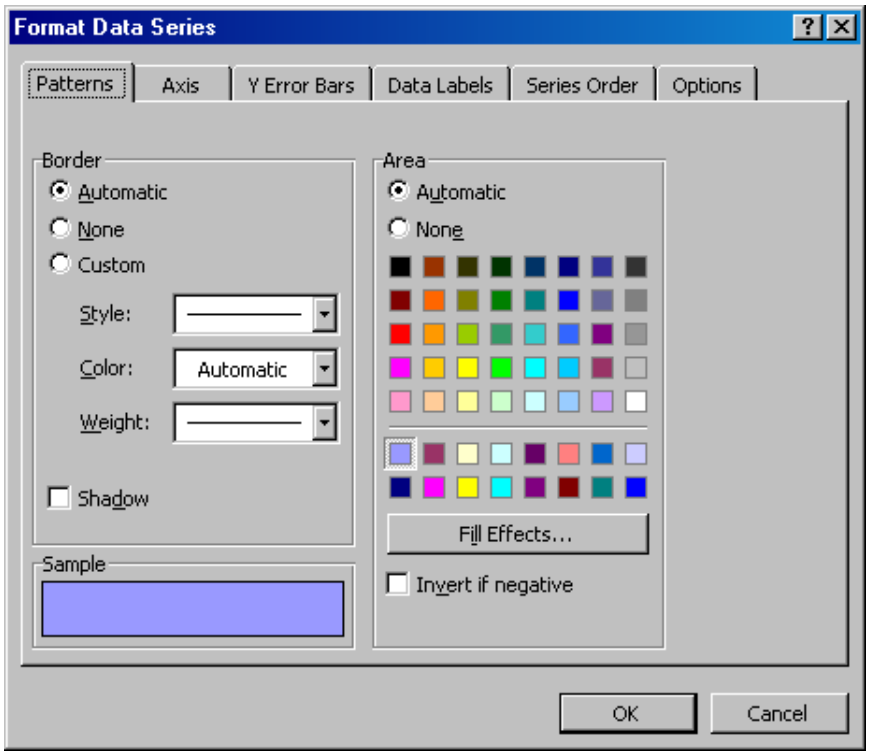
Number Of Categories Between Tick Marks - Defines where you wish to display tick marks, eg. 2 will put a tick mark between every other category.

6.7 Data Series

Formatting Data Series

The patterns, axis, name and values, Y error bars, X values and data labels can also be altered for each series. To make such changes double-click on one of the values in the series. The Format Data Series dialogue box will be displayed with various options appropriate to the type of chart concerned.

The chart type of a particular data series can be altered independently of other series in the chart. See Section 6.1.

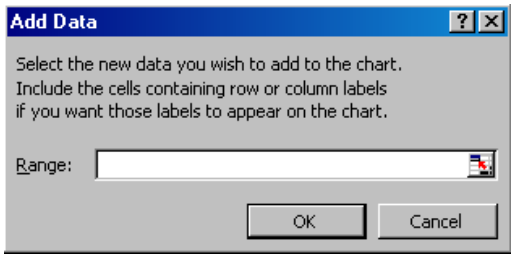


6.8 Adding New Data to a Chart

If data used to create the chart is changed then this is automatically reflected in the chart. Axes are altered accordingly.

If you wish to add a new data series:

- Ensure that the chart is selected.
- Choose **Add Data** from the **Chart** menu. This displays the **Add Data** dialogue box.
- With the dialogue box on screen select the range of cells containing the data you wish to add to your chart. If necessary you can move the dialogue box. The references for these cells will be displayed in the dialogue box.



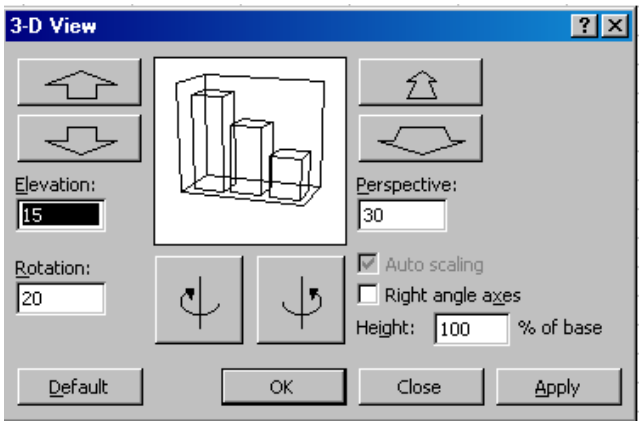
- Click on **OK** and the data will be added to the chart.

6.9

3D and Picture Charts

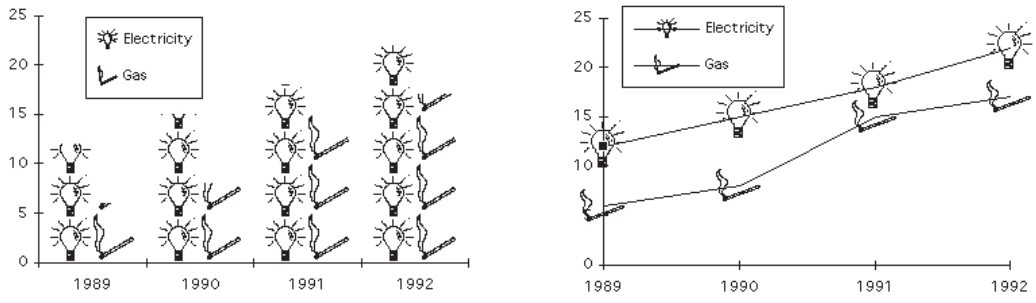
Special 3D Chart Options

Choose **3D View** from the **Chart** menu. The following dialogue box allows you to specify the angle of elevation, angle of rotation and perspective of the chart. A sample view of a 3D chart displays the effect of your actions.



Picture Charts

Bar, Column and Line charts can be modified to include pictures as data series markers as in the charts shown below:



To use pictures in this way you need first to have created the graphic. Graphics are best drawn by using a graphics program but the graphics facility in Excel can be used. Click on to get access to the graphics tools. Either way, for best results it is advisable to keep the graphic as simple as possible.

- Create your graphic.
- Select the graphic and choose **Copy** from the **Edit** menu.
- Open Excel, click on the chart and select the data series with the marker you wish to replace by the picture.
- Choose **Paste** from the **Edit** menu. The graphic will replace the chosen column or marker.
- If the graphic is pasted to a column you can specify whether the graphic is stretched or stacked to make up the length of the column and whether the graphic is scaled. To do this double-click on the data series, click on the **Patterns** tab and on the **Fill Effects** button.
- In the dialogue box displayed choose the required stretch and fill options. When finished click on **OK** in the dialogue box and apply the options by clicking **OK** in the **Format Data Series** dialogue box.
- To clear a graphic pasted on to a chart, select the column or data marker and choose Clear from the **Edit** menu and **Formats** from the sub-menu.

6.10 Regression Analysis

By establishing a trend, regression analysis enables you to forecast future values based on your existing data and display these on a chart. To create a trendline:

- Select the data series on which you wish to use a trendline.
- Choose **Add Trendline** from the **Chart** menu and a dialogue box will be presented. Choose the **Type** tab and the type of trendline you require.
- If you wish to display the equation which was used to create the trendline Choose the **Options** tab and click in the **Display Equation on Chart** box.
- Click on **OK** to display the trendline.

For more sophisticated uses of trendlines consult the Office Assistant.

6.11 Printing Charts

Excel can print charts either embedded in a worksheet or just on their own, ie. without the data.

To print a chart as part of a worksheet use the method of printing as in Section 4.4.

To print a chart only, ensure that it is either on a chart sheet or, if it is embedded, double-click on it to make it active. Print the chart using the same method as printing the worksheet.

By default charts printed on their own are printed in landscape orientation and to fill the page. To alter this choose **Page Setup** from the **File** menu.

The orientation can be altered from the **Page** tab. The area of the page that the chart fills can be altered from the **Chart** tab. If you wish to resize or position the chart in any other way click on the **Custom** button and on the **OK** button. The chart can then be resized by clicking and dragging the chart handles.

SECTION 7

EXCEL AS A DATABASE

7.1

Excel as a Database

A database is a store of information, systematically organised, which can be manipulated and retrieved by issuing instructions to the computer. For example, a database would allow you to sort a list into alphabetical order and search for the name of a particular item on the list. For most purposes like this that involve searching, sorting and extracting information from a simple list, Excel's database facility will prove adequate.

Terms defined:

There are some new terms used in connection with Excel's database which need to be understood:

Field – a column of the database.

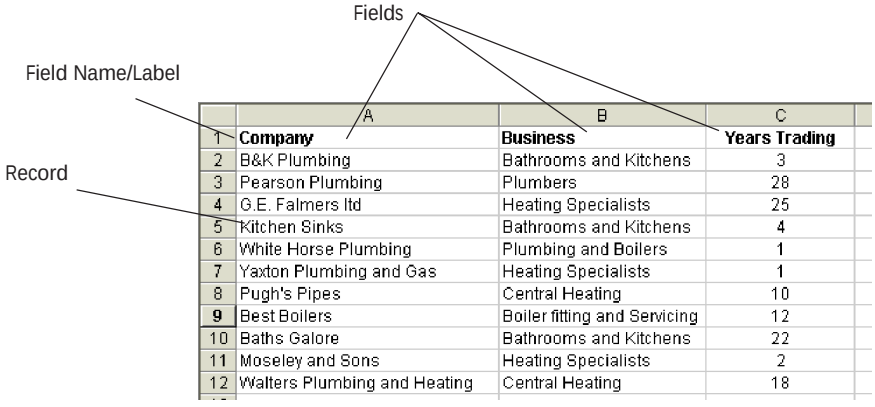
Field Name – the name of the field entered into the first cell of the column.

Record – a row of the database.

7.2

Entering Data

Before you can use Excel as a database you must type your data into the cells as in the sample below ensuring that the first cell in each column is a field name.



	A	B	C
1	**Company**	**Business**	**Years Trading**
2	B&K Plumbing	Bathrooms and Kitchens	3
3	Pearson Plumbing	Plumbers	28
4	G.E. Falmers ltd	Heating Specialists	25
5	Kitchen Sinks	Bathrooms and Kitchens	4
6	White Horse Plumbing	Plumbing and Boilers	1
7	Yaxton Plumbing and Gas	Heating Specialists	1
8	Pugh's Pipes	Central Heating	10
9	Best Boilers	Boiler fitting and Servicing	12
10	Baths Galore	Bathrooms and Kitchens	22
11	Moseley and Sons	Heating Specialists	2
12	Walters Plumbing and Heating	Central Heating	18

7.3

Sorting Data

One of the most common manipulations is to sort records in a database. The sort can be numerical or alphabetic, and can be in ascending or descending order.

To sort your data:

- Select a single cell of the data to be sorted.
- Choose **Sort** from the **Data** menu.

The dialogue box similar to that shown below will be presented.

If the first row of data contains column labels Excel uses these to sort the data. By default this starts with the first label of the row. Sorting our sample data in this way would result in the rows being re-ordered alphabetically based upon the name of the company. To sort the data using a different column label, for example, Years Trading, click on the arrow alongside the **Sort By** section of the dialogue box and choose Years Trading.

If you wish you may sort using more than one column label, eg. to sort our sample into Company and Years Trading. Set up **Sort By** as Company, and set up a **Then By** as Years Trading.

To change the order of the sort click on the **Ascending** or **Descending** buttons.

If you wish to sort only a portion of your data, select just this data and follow the procedure above.

Buttons on the Toolbar provide a short cut to sorting. Use the  button to sort a list into ascending order and the  button to sort into descending order.

7.4 Manipulating a Database

Excel allows you to filter your data so that only data conforming to certain criteria is displayed.

There are two main ways of using Excel to filter data:

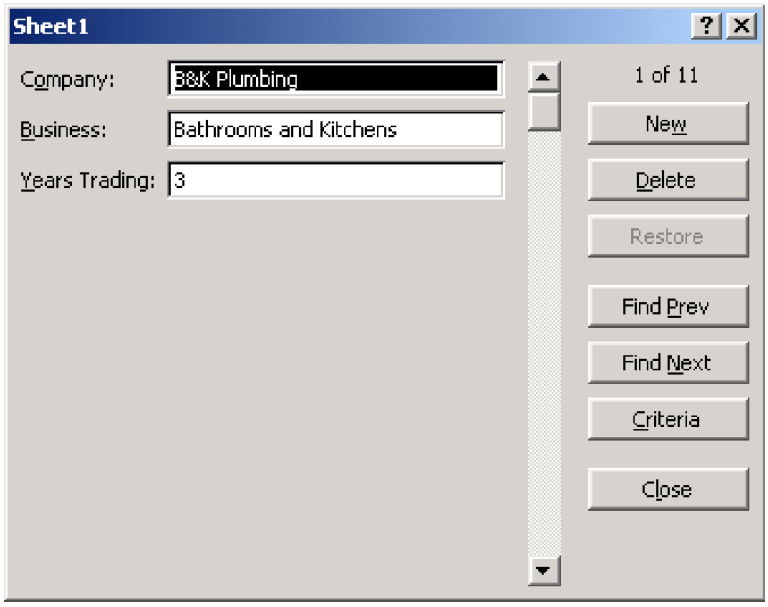
- Using a **Data Form**. See Section 12.1.
- Using **AutoFilter**. See Section 12.4.

Though Excel has a filtering method for complex criteria, it is beyond the scope of this guide and you should refer to the Office Assistant for more details.

7.5

Using a Data Form

A Data Form is the easiest method of searching a database for a particular record. It cannot, however, be used to examine several records simultaneously or extract data based upon a set of criteria. To use a Data Form select a single cell of the data to be filtered and choose **Form** from the **Data** menu. A dialogue box like the one opposite is presented though its exact appearance will vary according to the nature of your own data.



The dialogue box shows the details of a single record. Field names for each record are presented on the left of the dialogue box; alongside each field name is a box displaying data from each field. Initially this will contain the data from the first record, to move to other records use the scroll bar.

Adding, Deleting and Amending Records

To add a record, click on the **New** button and enter the data for your new record in the blank boxes alongside the field names.

To delete a record, use the scroll bar to display the record you wish to delete and click on the **Delete** button. A dialogue box will be displayed asking for confirmation and warning you that the record will be deleted permanently from the worksheet.

To amend a record, use the scroll bar to display the record you wish to change. Make the changes by altering the contents of the boxes alongside the field names. To revert to the original entry click on the **Restore** button.

Searching Using a Data Form

To search using a Data Form it is necessary to have some basis for your search the criteria. To input your search criteria click on the **Criteria** button. This will display a dialogue box listing the field names with boxes alongside for entry of the criteria.

The criteria entered in the boxes depends upon the purpose and nature of your search. To search for a record containing a particular field entry, type in the appropriate box alongside

the field name and click on the **Find Next** button. If a record containing the entry is present in the database it will be displayed in the data form; if more than one record conforms to the criteria by clicking again on the **Find Next** button other records will be displayed. If no record complies with the criteria a warning note is sounded.

The following operators can also be used if the field entry is numerical:

=	Equal to
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than of equal to
<>	Not equal to

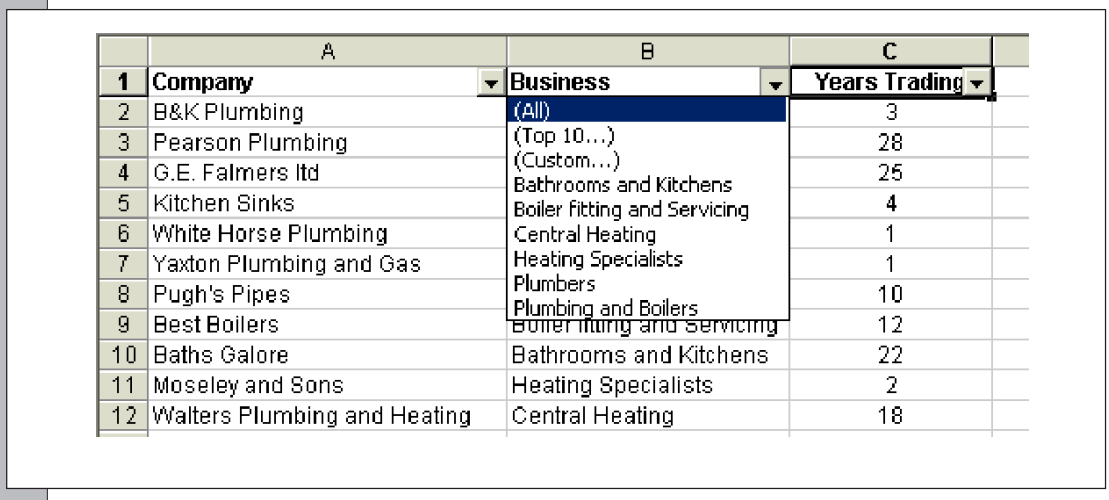
By entering one of the above operators followed by a number into the field entry box the criteria can be specified further. For example, to use our sample database to find companies trading for longer than 20 years >20 should be entered into the **Years Trading** field entry box.

More than one field entry box can be used to specify criteria for each search.

7.6 Using AutoFilter

Using the Data Form to search your database is often perfectly adequate but if you wish to examine several records simultaneously or extract data based on a set of criteria, then you need to use the AutoFilter method.

Select a single cell of the data to be filtered. Choose **Filter** from the **Data** menu and **AutoFilter** from the sub-menu. This will cause drop-down arrows to be displayed alongside the column (field) labels. Clicking on one of these arrows will display a list of all unique items in the column, choosing one of these will display only those records which conform to this criterion.



The list can be filtered further by choosing other criteria from different columns.

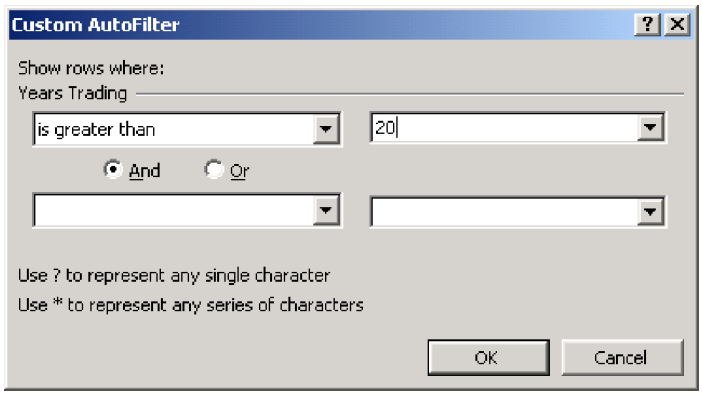
- To remove a filter from a column use the drop-down arrow to choose (**All**).

- To remove all filters choose **Filter** from the **Data** menu and **Show All** from the sub-menu.
- To turn off AutoFilter choose **Filter** from the **Data** menu and **AutoFilter** from the sub-menu.

Using Custom Criteria with AutoFilter

Often you will want to filter more complex criteria than those listed directly under the drop-down arrows. For example, using our sample data you might wish to find all companies that have been trading for more than 20 years.

To enter custom criteria choose **Custom** from the Years Trading column label, and the dialogue box below will be displayed.

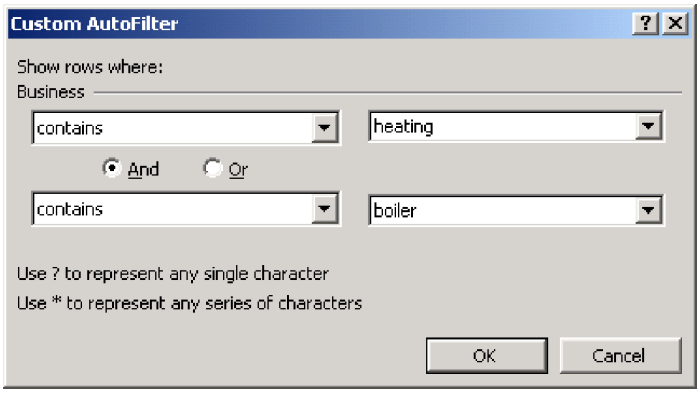


Enter the required criterion, if necessary, using the operators available from the pop-up menus in the dialogue box.

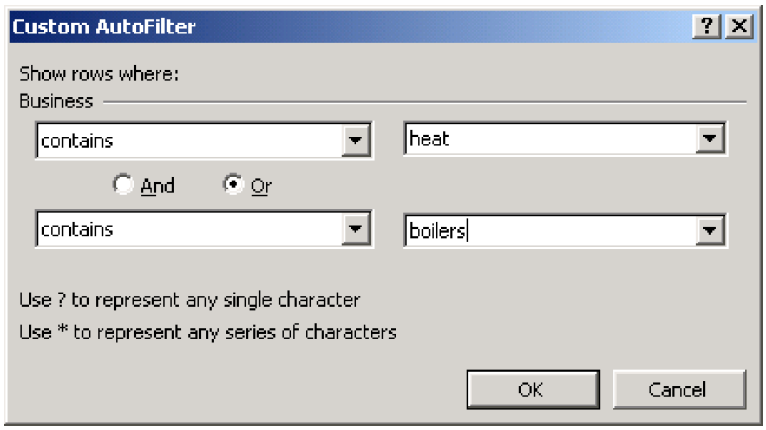
7.7 Using More Than One Criteria

Using AND Criteria

The above example uses only a single criterion. However, sometimes it is necessary to specify more than one criterion, eg. if you wish to filter only the data for companies specialising in heating AND boilers. This kind of filter is called an **AND** filter because the data is filtered only if it conforms to one criterion AND another.



To filter the sample data according to the criteria above using AND, for the Business column label choose **Custom** and from the dialogue box enter **contains** "heating" as custom criteria into the top boxes, ensure that the And button is selected and enter **contains** "boiler" in the bottom boxes.



Alternatively you might wish to filter for companies specialising in heating that have been trading more than 20 years. To do this enter the appropriate custom criteria separately under each column label.

Using OR Criteria

OR is useful if you wish to filter data based on one set of criteria OR another eg. if you wish to filter only the data for companies specialising in heating OR boilers.

To filter the sample data according to the criteria above using OR, choose **Custom** under the Business column label. Enter **contains** "heating" as custom criteria into the top boxes, ensure that the Or button is selected and enter **contains** "boiler" in the bottom boxes.

7.8 Extracting Filtered Data

Data which has been filtered using the AutoFilter method above can be extracted from the database by using copy and paste.

To do this, select the filtered data and choose **Copy** from the **Edit** menu. Move the insertion point to where you wish to copy the data and choose **Paste** from the **Edit** menu.

Note: You may paste filtered data to another part of the worksheet, another worksheet, another workbook, or even to a document created by a different program.

SECTION 8

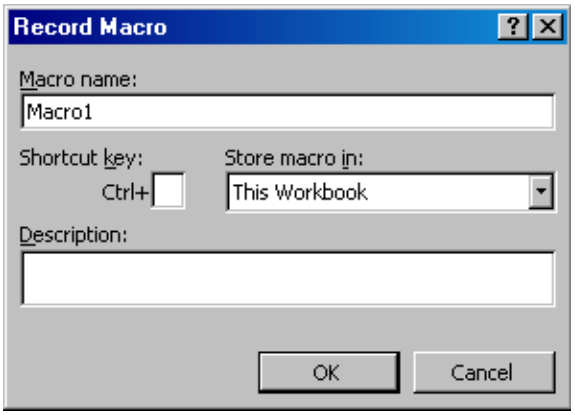
MACRO'S AND TEMPLATES

8.1

Macros

A macro is a file within Excel that contains the commands needed to carry out a frequently repeated function, for example inserting a particular formula or piece of text. A Macro will record a complete series of commands and keystrokes you make and save them as a single command under a shortcut key allocated to it from the keyboard, or as a Toolbar button, whichever you specify.

To create a macro choose **Macro** from the **Tools** menu, and **Record New Macro** from the sub-menu. This will open the dialogue following box.



Enter a name for your macro into the **Macro Name** box and in the **Store Macro in** box confirm the template or workbook into which the macro is to be stored. Enter in a brief description of the macro and then enter the shortcut key into the box, ie. **Ctrl S**. Notice that when using the macro you should hold down **Ctrl** on the keyboard whilst pressing the chosen keyboard key, ie. **Ctrl S**. Finally, click on **OK**.

Note: If the key sequence you enter is already assigned to another command it will be indicated. You should then either delete the key sequence and enter a different one or continue with the original. If you choose the latter option remember that the macro you create will override the existing command allocated to that keyboard sequence.

Having given your macro a keyboard sequence you are now ready to record it. Enter exactly what the macro should contain, whether it is a series of instructions to create a formula, or text that you would usually use a reference, your company name and so on.

Once you have completed this process choose **Macros** from the **Tools** menu and then **Stop Recording** from the sub-menu.

Now try using it! Press the keyboard sequence for the macro to run.

Note: When recording a Macro Excel mouse actions will not be recognised so you must use the keyboard when recording actions such as moving the insertion point, selecting, opening menus etc.

8.2 Templates

Templates are pre-designed layouts for certain commonly used types of workbooks. They consist of a workbook with several pre-defined styles along with text indicating the purpose and positioning of the style.

If you know which template to use choose **New** from the **File** menu. From the dialogue box presented choose the appropriate tab, and from this the required template. Click on **OK**. Replace the bracketed text of the template with your own text.

Note: Although creating workbooks in this way does take out some of the hard work, if, as is likely, you wish to modify the formatting of the resulting workbook it will be necessary for you to have understood most of this guide. Templates are not a short-cut to learning how to use Excel.

Creating Your Own Templates

If you find that the pre-designed templates don't quite offer layout and styles that you need you can create your own. Alternatively, the pre-designed ones can be adjusted to be more specific to your needs so that every time a new worksheet is created the template can be used and will be already set up with a standard colour scheme, containing contact names, laid out appropriately for an invoicing system etc.

Create a new workbook and set it up as you require. For example, create a header and footer, enter the information you want at the top of the page (such as name and address, invoice details, ie. reference/order no, date etc. in the header, this will give you more space for the contents of your workbook. When you've set the workbook up as you want it choose **Save As** from the **File** menu and title the file, ie. own invoice. Click on the arrow alongside the **Save As Type** box and choose **Excel Template**. Notice that the destination folder shown in the **Save In** box has changed to **Templates** Folder. Now click on **Save**.

To use this template choose **New** from the **File** menu within **Excel** and choose the file name for the template you've created, ie. own invoice.

APPENDIX A

Error Messages

If a formula is incorrect in any way Excel will display an error message in the cell into which the formula is typed. The error messages and their meanings are as follows:

######	This means that the column containing the number is not wide enough to display its contents. See Section 2.12 on how to increase the width of a column.
#DIV/0!	This means that the formula is trying to divide by zero. The most likely cause is that you have referenced a blank cell or a cell containing zero.
#N/A	This means that no value is available for one of the cells that you have referenced.
#NAME?	This means you have used a formula name that Excel does not recognise. Maybe you mis-spelled it or forgot to put a colon in between cell references.
#NUM!	This means there is a problem with a number. Maybe you have used an unacceptable argument with a formula or you have produced a number using a formula which is too large or small to be represented by Excel.
#REF!	This means that you have referred to a cell that is not valid. Maybe you have deleted a cell to which a formula refers.
#VALUE!	This means you have used the wrong type of argument. Maybe you have not put the = sign before the formula or you have typed text into a formula where numbers were expected.

APPENDIX B

Importing and Exporting Data

Moving data to and from other programs is extremely useful since it allows you to mix the capabilities of Excel with the specialist features of other programs such as graphics or wordprocessing programs. It also avoids both the labour of re-typing and the possibility of introducing errors.

Importing Data

There are two ways of importing data from other programs into Excel.

- By cutting and pasting data into Excel.
- By saving the data in a format that can be opened by Excel.

Cutting and Pasting Data into Excel from other programs

The way that you Cut, Copy and Paste between programs is more or less the same. Here is an example of how to copy data from almost any program into Excel.

Select the data in the program from which you wish to copy. Choose **Copy** from the **Edit** menu. Open **Excel**. Select the place where you wish the data to appear, and choose **Paste** from the **Edit** menu.

Hint: You can switch between programs you have open by using the Taskbar.

Note: Many programs, eg. Word and Access, allow pasted data to be edited within Excel. Double-clicking on the pasted data changes the menu bar to that of the originating program allowing the data to be edited. Click outside the area of the data to revert to Excel's menu bar.

Importing Saved Data

Importing data already saved has the advantage that you have a stored copy should anything go wrong. It is also sometimes the easiest way to transfer data between different types of program.

Data from another program needs to have been saved in a file format that Excel can understand. However in many cases you will find that Excel can open files without any need to resort to saving in a different file format.

Note: Importing and exporting can result in the loss of some of the chararacteristics of your data. Import and export from another spreadsheet using text only as a last resort.

The way that you import any kind of saved data is into Excel is more or less the same.

- Open Excel.
- Choose **Open** from the **File** menu. This will present a dialogue box. Click on the arrow to **List Files of Type** and choose **All Files**. Select the file you wish to import and click on **Open**. The file will be converted into Excel format.

Note: When opening files containing formulae from other Spreadsheet programs Excel will attempt to convert formulae, but in some cases this will not be possible and an error message will result.

Exporting Data

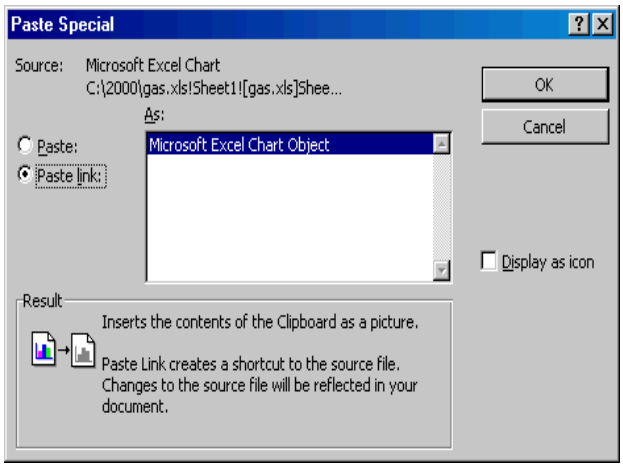
There are two ways of exporting data to another program from Excel.

- By copying and pasting data.
- By using saved data.

Using Copy and Paste

Select the data you wish to export and Copy it. Open the program to which you wish to export the data. Move the insertion point to where you wish the data to appear and choose **Paste** from the **Edit** menu.

When pasting from Excel into another program you have the option to Link the pasted chart or data dynamically to your Excel data. For example if you want a Chart in Word or in a PowerPoint presentation to be updated every time you change the data on your Excel worksheet. To do this choose **Paste Special** from the **File** menu and click on the **Paste link** button.



Note: Unless pasting within an open worksheet only the results or values of any calculations are pasted from Excel, not the formulae that went to create them. To paste the formulae as well as values into any other worksheet, Excel workbook, or program you should use Paste Link instead of Paste.

If copying from Word ensure that the data for each column is separated (delimited) by tabs or in table format before selecting.

Using Saved Data

This is the only way to export data to some programs.

Open the data you wish to export. Choose **Save As** from the **File** menu. Click on the arrow alongside the **Save File As Type** box and choose the file type that you know can be imported by your program. Open the file as normal.

Remember: not all formats save all the information contained in an Excel file. For example, Text or CSV will not save any formatting. So make sure that you keep a copy of the workbook in normal Excel format.