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DIRECTORATE OF INFORMATION AND COMMUNICATION TECHNOLOGY

Microsoft Excel 2007™
An Essential User Guide

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Introduction

Spreadsheets were originally developed for book keeping; however, they are also used for scientific calculations, data manipulation and for producing graphs. Excel includes some statistical functions, but for serious research work a specialised package such as SAS or SPSS should be used. Excel can also sort and select data subsets. For storing large amounts of data or more complex tasks, Access should be used. These notes cover the fundamental usage of Excel but also include many hints and tips.

Starting Excel

To start up the program:

1. Open the Windows **Start** menu

2. Choose **All Programs** then **Microsoft Office** followed by **Microsoft Office Excel 2007**

Tip: To create a *shortcut* to this software on the *Desktop*, right click on **Microsoft Office Excel 2007** then choose **Send To** followed by **Desktop (create shortcut)**. You'll then be able to load Excel using the icon on the Desktop.

The Excel Screen

A spreadsheet is similar to a giant table with the borders extending practically to infinity. The spreadsheet that appears on your screen will be similar to that below

You will then be presented with an empty worksheet, as below, ready to enter your data:
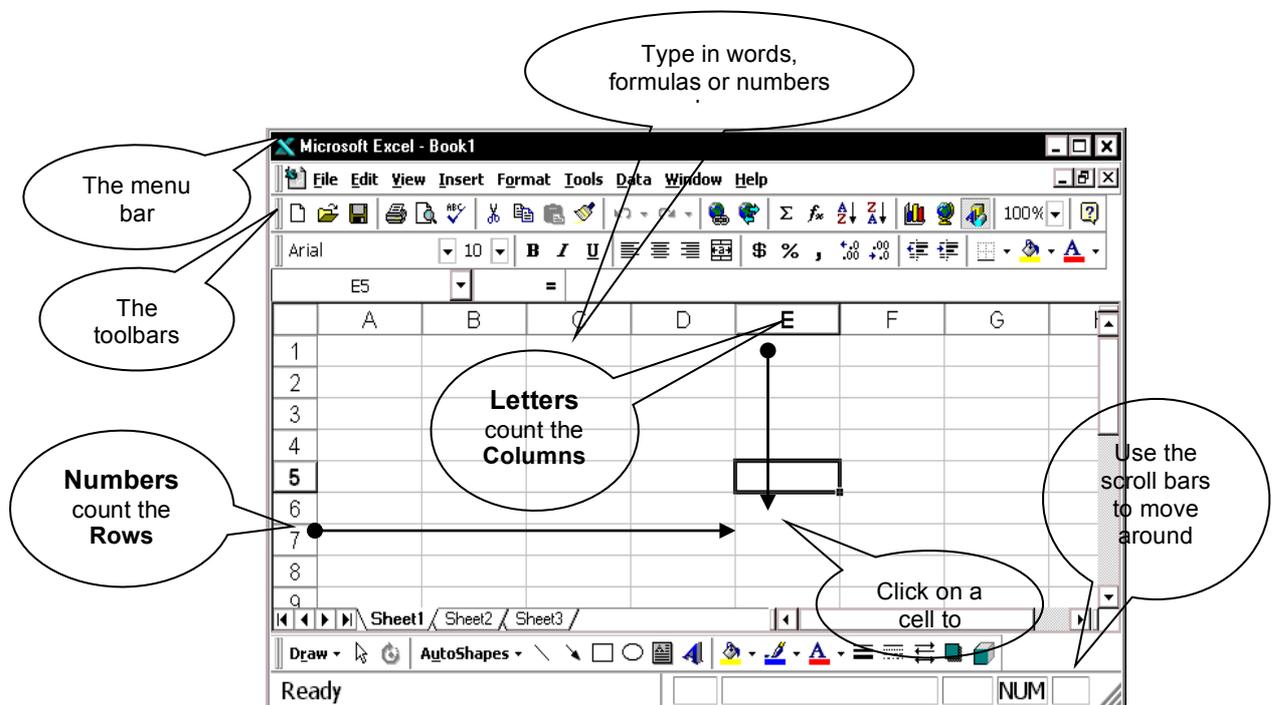
In the top left corner of the screen, the *Office Button* appears. Use this to **Open** or **Print** your files. To the right of this is the *Quick Access Toolbar*, which only has three buttons on it by default – **Save**, **Undo** and **Redo**. To add extra buttons, click on the down arrow on the right and choose **Customize Quick Access Toolbar**.

Moving right, Excel has given your work a name, **Book1**, which can comprise a set of related data and chart sheets. This name will change when you save your work in a file, at which time you will be asked to supply a real name. On the far right are the usual **Minimize**, **Maximize** and **Close** buttons..

The next section down the screen is called the *Ribbon*. This replaces the menu and toolbar system in previous versions of Excel. All the commands now appear as *buttons* (pictures) on this *Ribbon*, which has a series of tabs under which different commands are grouped. When you point to a button, a *tool-tip* appears, telling you what that button does.
Below the *Ribbon* is the *command line*. The area on the left (showing the characters **A1**) is the *Name Box*. To its right is the *Formula Bar*, which shows you what information is stored in a cell.

The main body of the screen contains the worksheet. You are currently using **Sheet1** of *Book1*, as denoted by the *sheet tab* at the bottom. The worksheet has numbers down the side, denoting *rows*, and letters across the top denoting *columns*. Each intersection of a row and column is known as a *cell* and has a unique name. The cell in the top left corner is *A1* (the intersection of column *A* and row *1*) and is currently the *active cell*. This is denoted by a darker border, with its identity shown in the *Name Box*, while the column letter and row number are shown with an orange-brown background. Any information you type is stored in the active cell.

Down the right of the screen is the *scroll bar*, which is used for moving up and down your work. A *horizontal scroll bar*, for moving left and right, appears to the right of the *sheet tabs*. The mouse cursor should also be visible. This can have several different shapes, some of which you will be meeting later in the course. Within the cells it appears as an outlined cross.

Getting Help

Help:

As with all the other Microsoft Office software, a quick link to the help system is provided by the **[Microsoft Office Excel Help]** button to the right of the *Ribbon* tabs. The **<F1>** key also loads the help system. If you already know Excel 2003, this shows you how to get to the equivalent command in Excel 2007.

Moving Around the Worksheet

Various keys or key combinations can be used to move the *active cell* around the worksheet. These include **<Enter>**, **<Tab>**, **<Home>** and the **<arrow>** keys (take care that **<Scroll Lock>** is *not* turned on as this affects the arrow keys). You can also move directly to a cell using the mouse:
1. Using the mouse, point to any cell other than *A1*

2. Click on the left mouse button to make this the active cell - note that the name of the cell in the *Name Box* has changed, as have the orange-brown row/column indicators

3. Move the active cell around the screen - try pressing the **<arrow>** keys, **<Tab>** (and **<Shift Tab>**) and **<Enter>** (and **<Shift Enter>**), noting the names of the cells in the *Name Box*

4. End by making *A1* the active cell

Tip: Pressing **<Ctrl Home>** moves the active cell to cell *A1*. To move to the left edge of a block of data, hold down **<Ctrl>** and press an **<arrow>** key in the direction you wish to move. **<Ctrl Enter>** keeps the current cell the active cell – useful when entering data or editing a formula.

Saving your Work

Save:

It is important to save your work frequently - you never know when the computer might fail!

1. Click on **[Save]** on the *Quick Access Toolbar* or use **Save** from the **[Office]** button

Up until now your work has been known as *Book1*; you are now asked to give it a proper name.

2. Type **test** into the *File name:* box

Note that the default drive is set to **My Documents** (on drive **N:** - your *home directory* on IT Services PCs). Avoid working directly from/to floppy disks or a USB memory stick; always copy your files to *My Documents*, work on them there and then copy back to the floppy/stick, if required.

3. Press **<Enter>** or click on **[Save]** to carry out the save

Note that once the file has been saved, the new name (*test.xlsx*) appears at the top of the screen.

Tip: Press **<Ctrl s>** every so often to save your file as you are working on it, thereby insuring you don't lose any changes you have made. **<Ctrl s>** is a shortcut key for the **Save** command.

Data Entry

Undo:

Information can be entered into the active cell, either in the form of raw data or calculations. Excel recognises various sorts of data - text, numbers, dates and times - which can then be used in formulae. Before you begin typing, make sure you are at the top left corner, in cell *A1* (when following this course it is vital that you use the same cells as in the document).

1. In *A1*, type the word **Income** then press **<right arrow>** to move to *B1*

Income is recognised as text and is stored as such in *A1*. By default, text is shown on the left of a cell. Pressing **<right arrow>** completes the data entry and moves the active cell ready for the next item of data. If you need to correct a typing error, click on **[Undo]** on the *Quick Access Toolbar* or simply move back to the cell in question and retype the information.

2. In *B1*, enter **22000** then press **<down arrow>** to move down to *B2*

22000 is stored as an ordinary *number* - on which the spreadsheet can perform calculations. By default, numbers appear on the right of a cell.

3. Move back to *A2* (**<left arrow>**) and type **Costs** then move to *B2* (**<right arrow>**)
4. In *B2*, type **15000** then move to *A3* (**<down arrow>** then **<left arrow>**)
5. In *A3*, type **Profit** then move to *B3* (**<right arrow>**)

In cell *B3* you are going to store a *formula* to subtract costs from income. Note that formulas in Excel start with an equals (**=**) sign. As you type in a formula, any cell references are colour-coded to help you verify the correct cells are being used.

6. In *B3*, type **=B1-B2** (or **=b1-b2** - case doesn't matter) and press **<Enter>**

Tip: When entering a formula into a cell you can pick up the cell references by clicking on the cells required with the mouse. Here in *B3*, for example, you would type **=** then click on *B1* then type **-** before clicking on *B2* and pressing **<Enter>**. This is particularly useful when picking up cell references from other sheets.

You are now presented with the result of the calculation rather than the formula itself, namely 7000. Note, however, that though Excel displays the answer, it is the formula which is stored in the cell. Spreadsheets are designed to recalculate as they go along, so see what happens when you change one of the original numbers.

7. Move up to *B1* (press **<up arrow>**) and type **25000**
8. Watch as you press **<Enter>** and note that the *Profit* (in *B3*) is recalculated as 10000

The formula =B1-B2 knows that *B1* has changed and the display in *B3* adjusts accordingly.
Next extend the example to bring tax into the calculations.
9. Change the text in *A3* - move to the cell and enter **Profit Before Tax** instead

On pressing **<Enter>** you will find the text is truncated (letters on the right are missing). Don't worry about this, the column will be widened later to show all the letters.

10. In cell *A4*, type **Tax** then move to *B4* (press **<right arrow>**)
Assume that tax is levied at 30% of Profit Before Tax; enter the following formula for this cell:
11. In *B4*, type **=B3*30%** (*don't forget the leading = sign*)

Note that Excel, in common with other computer software, uses an asterisk (*****) for multiplication and a slash (**/**) for division. Use the *numeric keypad* for convenient access to these characters (if you want to use the numbers too, turn **<Num Lock>** on).

12. Press **<Enter>** and the tax figure (3000) will be worked out for you
13. Work out a label and a formula to put in cells A5 and B5 to show the *Profit After Tax*, assuming that this is *Profit Before Tax* minus *Tax*

Tip: As you begin to type the word *Profit* in A5, Excel picks up *Profit Before Tax* from the list of entries above. This is very useful when you are typing the same information again and again – eg Travel, Accommodation, Food … on an expenses sheet. You don't need this information this time, but you could edit it (by *double clicking* on the word *Before* on the *Formula Bar* and typing *After* instead). Note how the words in *A5* initially appear in full (they are only truncated when *B5* is filled). If you have got the formula right (look at the Appendix A to check your answers), the screen should look like this (**don't be tempted to cheat by typing in the value of 7000**):

	A	B	C	D	E	F
1	Income	25000				
2	Costs	15000				
3	Profit Befc	10000				
4	Tax	3000				
5	Profit Afte	7000				
6						
7						

Try altering the *Income* or *Costs* figures in *B1* or *B2* and notice how the *Profit Before Tax*, *Tax* and *Profit After Tax* figures are updated automatically. Use the **[Undo]** button (or retype the data) to reset the values to **25000** and **15000** respectively.

Naming a Cell

Sometimes it is useful to reference a cell by name rather than by column and row. For example, the tax rate (of 30%) could be held in a cell named *taxrate* and then referred to as such in any formulae.
1. Move down to cell *A10* (ie well away from the rest of your work)
2. Click on the active cell name (A10) in the *Name Box* (just above the heading to column *A*) - the name will be highlighted
3. Type in the new name of **taxrate** (spaces aren't valid) then press **<Enter>**
4. Now, in cell *A10*, type in **30%** and press **<Enter>**
5. Finally, amend the formula in cell *B4* to read **=B3*taxrate** then press **<Enter>**

Tip: It's easier to edit a formula rather than retype it in the cell. Click at the end of the *Formula Bar* then use **<Backspace>** to delete the *30%*. Type in **taxrate** then press **<Enter>**. Note also that function key **<F2>** puts you in edit mode in the cell, with the typing position at the end of the contents. Use the *arrow keys* to move the typing position along the formula and press **<Enter>** or **<Tab>** to finish editing.

Examining the Cell Contents

Often you want to view a formula rather than its result. You can examine an individual formula by making its cell the active cell. Move to cell *B5* and you will see =B3-B4 showing in the *Formula Bar*. This means that the content of the cell *B5* is the formula *B3-B4* and not *7000*, as displayed.

Move the active cell around and see what has been stored in each cell. Take this opportunity to make sure you understand what is happening.

Note: You can display all the formulae (rather than the results) by pressing **<Ctrl `>** (the key in the top left corner of the keyboard, above **<Tab>**). Press it again to return to normal.

Commands

Sometimes it is necessary to issue a *command* to tell the program to do something to the worksheet, such as altering its layout or saving it. The commands are found on the *Ribbon*. This has several tabs, covering different aspects of use. Most of the commands in this course are on the *Home* tab.

Some commands are also available by clicking the *right button* on the mouse or through **<Ctrl>** key combinations, as shown by the tool tips which appear when you select a button on the *Ribbon*.

Changing Column Width

Before proceeding further, change the layout so there is enough room to fit the whole of *Profit After Tax* into its column.

1. Move the mouse pointer onto the line between the letter *A* at the top of column A and *B* at the top of column B - the cursor changes becomes a double-headed arrow, as shown above
2. Hold down the mouse button and drag the column divider to the right - note that the current width is displayed as you move the divider (set the width to about 20.0 - 145 pixels)
3. Release the mouse button and the column is resized

Getting the column width right using this method can be very time consuming. To fit the column exactly to the data:

4. Move the mouse pointer to the dividing line between the column headings as before
5. *Double click* on the mouse button

Note: Column width can also be set via the **[Format]** button under *Cells* on the *Home* tab of the *Ribbon*. Here, **Column Width...** lets you type in a fixed width while **AutoFit Column Width** is equivalent to *double-clicking* on the column border.

If cells contain numeric data and the column width becomes too narrow to display the numbers properly then Excel displays ####### instead. The first time you see this you will probably think an error has occurred, so it's useful to demonstrate it here:

6. Move the mouse pointer to the dividing line separating the column *B* and *C* headings
7. Hold down the mouse button and drag the divider to the left - set the width to less than 5.0
8. Release the mouse button and ####### should appear in some or all the cells
9. Use the **[Undo]** button to restore the column to its original width

Changing the Format

Accounting: Percent: Comma: Increase Decimal: Decrease Decimal:

The way data in a cell is displayed can be set using a *format*. For example, a date could be shown as *25-12-09* or *25 Dec 09* or *25th December 2009* or in various other similar ways. The basic information held in the cell is identical, however; it's up to you how you want it displayed. In this next exercise, you will add a currency format to your data.

1. Change the Income figure in *B1* to **24444** then press **<Enter>**

The resulting Tax and Profit After Tax figures are now displayed with a single decimal place. This looks a bit untidy as the other figures have no decimal places. It would be neater if all the numbers were shown as a currency, either with two decimal places (pounds and pence) or as whole numbers (pounds only). To do this, you first have to select the cells (here, format the whole column).

2. Click once on the letter **B** at the top of the column - the column should be highlighted (except for cell *B1*)

Five commonly-used formats are provided in the *Number* group on the *Home* tab of the *Ribbon*.

3. Click on the first formatting button for an **[Accounting]** style

What was 24444 should now be shown as £24,444.00. If ####### is displayed, widen the column.

4. To remove the decimal point and pence, click *twice* on the **[Decrease Decimal]** button

The figures should now be displayed as whole numbers. Note that you have only changed the *display* format; formats don't affect the stored data or accuracy to which calculations are made.
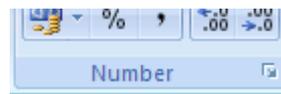
A wider range of cell formats is available via the **[Format Cells: Number]** button. This is shown as a small arrow to the right of the word *Number* (below **[Decrease Decimal]**). Try using this next:

5. Make sure column *B* is still selected
6. Click on the **[Format Cells: Number]** button (the small arrow in the corner of the group)
7. In the *Format Cells* window, change the *Category:* from **Custom** to **Currency**
8. Set the number of *Decimal places:* to **0** and choose a currency *Symbol:* (eg a Euro **€**)
9. Choose the last format for *Negative numbers:* **-€1234** in red
10. Press **<Enter>** or click on **[OK]** to apply the format

This produces much the same result as before except that the currency symbol is next to the figures while any negative values will appear in red (you'll see this later). Note that you can also display the *Format Cells* window by *right clicking* on a cell or selected range and choosing **Format Cells...**

11. Reduce the column width by *double clicking* on the dividing line between the column *B* and *C* headings

Format Painter:

Columns *C*, *D*, *E* and *F* (which you will be using later) also need to be formatted similarly. The simplest way to do this is to copy the format from column *B* to the other columns.

12. Make sure column *B* is still selected
13. *Double click* on the **[Format Painter]** button on the far left of the **Home** tab of the *Ribbon*

You will find that the blocked cells have a moving boundary while the mouse cursor now has a little brush attached.

14. Click on each of the other column headings (ie **C** to **F**) in turn or drag across them
15. Click on the **[Format Painter]** button again to turn it off (the brush disappears)

Only when you enter data into these cells will the new format become apparent.

`16.` Finally, move to *B1* and retype the original value of `25000`

Clearing a Format

Cell formats can sometimes cause confusion to the new Excel user. As an example:

1. Move to cell *A7* and type in **25/12** then press **<Enter>**

Because you forgot the equals sign denoting a calculation, Excel interprets this as a date.

2. Move back to *A7* and correct your mistake (type **=25/12** and press **<Enter>**)

You will find that the result is still translated into a date (Excel has assigned a date format to the cell). To display the information as a number you have to clear the format. To do this:

3. Click once on the **[Format Painter]** to pick up the format of cell *A8*
4. Now click on cell *A7* (the format clears and the number should be properly displayed)

Note that if you click on the **[Format Painter]** *once*, you can copy the format to a single cell or range and then the painter is automatically turned off. You can also clear a format via the **[Clear]** button in the *Editing* group on the right of the **Home** tab of the *Ribbon*.

5. Finally, press **<Delete>** to empty the cell - the data isn't needed

Inserting Blank Rows and Columns

Next add a title to your work. Unfortunately, there is insufficient room at the top of the sheet for this so you will first have to insert some blank lines.

1. *Right click* on the row number **1** and choose **Insert** from the menu which appears
2. Repeat step **1** for a second blank row

Note: If you *right click* inside a cell, you can insert (or delete) either a single cell or the whole column/row.

You can also insert (or delete) a column by clicking on a column letter. Try this next:

3. *Right click* on the column letter **A** and choose **Insert** from the menu - a blank column *A* will be added

You don't actually need this column, so delete it:

4. *Right click* on the column letter **A** again but, this time, choose **Delete** from the popup menu

Inserting rows and columns may seem trivial, but Excel has to adjust any formulae to take account of the changes. For example, the *Profit Before Tax* formula in *B5* now says =B3-B4 instead of =B1-B2. Had it not been changed it would of course be invalid, as B1 and B2 are now empty cells. Note also that though the *taxrate* has moved (to A12), it is still held in a cell named *taxrate*. This is one good reason for naming certain cells - you do not have to keep a list (that has to be updated each time you insert a row or column) of which cells hold which fixed values.

5. Finally, enter the title **Profit and Loss** in cell *A1*- press **<Ctrl Enter>** (this will keep the current cell as *A1*, ready for the next command)

Note that you can also insert and delete rows/columns using the **[Insert]** and **[Delete]** buttons in the *Cells* group on the right of the *Home* tab on the *Ribbon*.

Changing the Style of Text

Font: `Arial` Font Size: `10` Bold: **B** Italic: *I* Underline: <u>U</u>
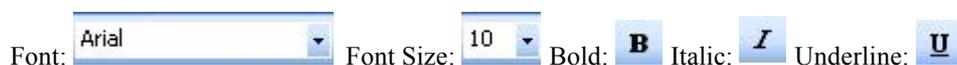
As in Microsoft Word, you can alter the font, font size and style of your data. For example, the title would look better if it was bigger and bolder.

1. Check that the current cell is still *A1*
2. Click on the **[Bold]** button (or press **<Ctrl b>**) - the text will become bold

Tip: If you want just part of the text in a cell to be bold/italic etc or a different font, then select the text on the *Formula Bar* and apply the format to that selection. You can also apply formatting as you type in any text.

Now make the text larger and change the font.

3. Click on the *list arrow* to the right of the **[Font Size]** box and choose **14**
4. Click on the *list arrow* to the right of the **[Font]** box and choose **Arial**

Note how the text changes automatically as you move up and down the list of font sizes and fonts. You can also *right click* on a cell for a floating copy of these buttons (instead of using the *Ribbon*)

Storing Numbers as Text

Next, extend the model over time. Imagine you want to project the profit and loss figures over a four year period, based on some simple assumptions about what is going to happen to income and costs. Firstly, you need some labels to show which year is which.

1. Move to cell *B2* and type **'2008** then move to *C2* (press ***<right arrow>***)

Don't miss out the single quote (at the beginning) - this tells Excel that although *2008* looks like a number, it should be treated as text. This will prevent the year *2008* being displayed as *€2,008*, for example, as the display format for this cell is set to a currency. Another reason for entering numbers as text is that they aren't then included in calculations (for example, if you summed a column of figures).

2. Next type **'2009**, **'2010** and **'2011** into cells *C2*, *D2* and *E2*

The Copy Command

Cut: ✂ Copy: 📋 Paste: 📋

Assume that both income and costs will grow by 20% in *2009* from their *2008* figure.

1. In *C3*, enter **=B3*120%** - press **<Ctrl Enter>** to carry out the calculation but stay in the cell

Where one formula is essentially exactly the same as another (except that the calculations are being made in a different row or column, on different cells), you can copy it and Excel will automatically adjust it to account for its new position. Assuming costs also rise by 20%, the formula for *C4* is almost identical to that for *C3*, and can be copied across:

2. Check you are in cell *C3* then click on the **[Copy]** button (or press **<Ctrl c>** or *right click* and choose **Copy** from the popup menu) - the cells will be surrounded by a moving border
3. Move down to *C4* (press ***<down arrow>***) then press **<Enter>** - note how the formula which was =B3*120% in *C3* has been modified to =B4*120% in *C4*

IMPORTANT: When pasting formulae in Excel, you don't have to use **Paste** at all. Instead, you move to destination cell and press **<Enter>**. This completes the copy/paste process, turning off the moving border and removing the data from the *Clipboard*. If you use **Paste** then the moving border remains, indicating that you can **Paste** again (should you need to). Get used to using **<Enter>** for a single copy/paste and **Paste** for multiple ones (use **<Enter>** for the final one in the sequence).

You can copy a range of cells in the same way. Here, the Profit Before Tax, Tax and Profit After Tax formulae for 2009 are essentially the same as those for 2008:

4. Drag through the cells required (here from *B5* to *B7*)

The three cells should now be *blocked* (with a single darker border around them).

5. Click on the **[Copy]** button - the cells will be surrounded by a moving border

6. Press **<right arrow>** to move to *C5* and press **<Enter>**

Appropriately modified formulae appear in the cells with the results displayed. Note that you do *not* have to select a block of cells to paste a range; just paste in the top left cell of the destination area. Copying formulae (or values) between cells is such a common requirement that Excel provides a special facility (called *autofill*) for doing this. The key is the *cell handle* - the small black square at the bottom right corner of the active cell (or range). Try using this for the 2010 and 2011 formulae:

7. The cells to be copied (*C5* to *C7*) should still be selected - if not, drag through them
8. Move the mouse cursor over the small black *handle* at the bottom right of the selection (in cell *C7*) - the cursor will change shape to a simple black cross
9. Hold down the left mouse button and drag the handle over the area you wish to fill (across to *E7*) - release the mouse button and the formulae are copied across

Take great care when using the cell handle to copy formulae. If the mouse cursor is pointing to the edge of the selection rather than the handle, the cells are moved and not copied.

Your screen should now look like this:

	A	B	C	D	E	F
1	**Profit and Loss**					
2		2008	2009	2010	2011	
3	Income	€ 25,000	€ 30,000			
4	Costs	€ 15,000	€ 18,000			
5	Profit Before Tax	€ 10,000	€ 12,000	€ 0	€ 0	
6	Tax	€ 3,000	€ 3,600	€ 0	€ 0	
7	Profit After Tax	€ 7,000	€ 8,400	€ 0	€ 0	
8						
9						

Don't worry about the £0's for 2010 and 2011 because, although the formulae are there, there are no income or costs figures in *D3*, *D4*, *E3* or *E4* to work on.

Examine the formulae which underlie the figures by moving the active cell around and looking at the *Formula Bar*. Notice how the Profit Before Tax formula (which was =C3-C4 in 2009) has changed to =D3-D4 in 2010, and =E3-E4 in 2011. Very occasionally you might want to copy the values themselves rather than the formulae. This you can do via the **[Paste Special]** button.
Next provide the model with some Income and Costs figures for 2010 and 2011.

10. Work out formulae for D3, D4, E3 and E4 yourself, given the following assumptions:
   - in 2010, Income and Costs will increase by 10% over the 2009 values
   - in 2011, Income and Costs will increase by 5% over the 2010 values

Hint: Copy the formula from *C3* to *D3* and *E3*, amend these then copy down to *D4* and *E4*.
The screen should look like this (see the Appendix or use the links above to check the formulae):

	A	B	C	D	E	F
1	**Profit and Loss**					
2		2008	2009	2010	2011	
3	Income	€ 25,000	€ 30,000	€ 33,000	€ 34,650	
4	Costs	€ 15,000	€ 18,000	€ 19,800	€ 20,790	
5	Profit Before Tax	€ 10,000	€ 12,000	€ 13,200	€ 13,860	
6	Tax	€ 3,000	€ 3,600	€ 3,960	€ 4,158	
7	Profit After Tax	€ 7,000	€ 8,400	€ 9,240	€ 9,702	
8						

Realigning Titles

Align Left: Center: Align Right: Merge and Center:

By default, text is displayed on the left of a cell, numbers (including dates and times) on the right. Your model would look much neater if the year headings (2008, 2009 etc) were in bold text in the centre of the columns and the main title (*Profit and Loss*) was centred across the figures below.
1. Select row *2* (by clicking on the number **2** on the left hand side)
2. Click on the **[Bold]** button to make the text bold
3. With the cells still highlighted, click on the **[Center]** button on the **Home** tab of the *Ribbon*

The justification commands are also available via the **[Format Cells: Alignment]** button – the little arrow on the right of the *Alignment* group heading on the *Home* tab. Here you can justify cell contents vertically as well as horizontally. Another option, *Wrap text*, allows text to flow onto several lines (the row height increases to accommodate it).
Tip: If you want to force text onto more than one line in a cell, hold down the **<Alt>** key and press **<Enter>** where you want each new line to begin.

[Merge and Center] is used to centre text across several columns - try this for your main title:
4. Select cells *A1* to *F1* (column F will be used shortly)
5. Click on the **[Merge and Center]** button (on the right in the *Alignment* group)

The title will now appear in the centre of the selected range, even though it is still stored in cell *A1*. Incidentally, cells *B1* to *F1* no longer exist. To undo a merge and centre:
6. Check the merged cell is the active cell then click on the **[Merge and Center]** button again

Finally, the year headings would look better if they were separated from the main heading. Most users would add extra rows to achieve this but a better answer is to increase the row height:
7. Position the mouse cursor over the division between the Row **2** and Row **3** headings on the left (just like you did when changing the width of the columns)
8. Hold down the mouse button and drag the division down a row
9. Release the mouse button and the row height will be increased

Functions

Insert Function: AutoSum:

Excel has hundreds of built-in functions which, as in mathematics, are denoted by using brackets after the function name. These can be seen via the **[Insert Function]** button on the *Formula Bar*.

1. Move to an empty cell and click on the **[Insert Function]** button
2. From *Or select a category:* choose **All**

3. Scroll down the *Select a function:* list to get an idea of what's provided

Note that information about any function selected is given at the foot of the *Insert Function* Window, while additional help is available via the **Help on this function** link. Don't try inserting any of the functions into your empty cell, just note what's available.
4. Press **<Esc>** or click on **[Cancel]** to close the window

Calculating Totals -the SUM Function

Imagine you want to work out four-year totals, so that your model looks like this:

	A	B	C	D	E	F
1	**Profit and Loss**					
2		**2008**	**2009**	**2010**	**2011**	**Totals**
3	Income	€ 25,000	€ 30,000	€ 33,000	€ 34,650	€ 122,650
4	Costs	€ 15,000	€ 18,000	€ 19,800	€ 20,790	€ 73,590
5	Profit Before Tax	€ 10,000	€ 12,000	€ 13,200	€ 13,860	€ 49,060
6	Tax	€ 3,000	€ 3,600	€ 3,960	€ 4,158	€ 14,718
7	Profit After Tax	€ 7,000	€ 8,400	€ 9,240	€ 9,702	€ 34,342
8						

1. Type the heading **Totals** into cell *F2* and press **<Enter>**

Next you need to add up the figures across each row. One way of calculating this for row *3* would be to use the formula =B3+C3+D3+E3. This works - but imagine you had twenty items to add up, or a thousand! Instead, you can use a *function* to work out the value. To specify a function you type its name then, in brackets, the cell or range of cells to which it is to be applied. To signify a cell range, a colon is used to separate the starting cell from the end cell.
2. In cell *F3* type **=SUM(B3:E3)** - press **<Enter>** to carry out the calculation

The *SUM()* function (and other commonly-used ones) is also available from the **[AutoSum]** button. Using this, you can calculate the missing total figures in one go:
3. Select *F4* to *F7*
4. Click on the **[AutoSum]** button on the right of the *Ribbon* - the remaining totals are filled in

Sometimes Excel guesses the range of cells to be summed incorrectly. The default is to total down a column rather than across a row. See what happens by recalculating the total in *F7*.
5. Move to *F7* and press **<Delete>** to clear the cell
6. Click on the **[AutoSum]** button - note the range is incorrect
7. Drag through the correct cells (*B7* to *E7*) to amend the range then press **<Enter>** to complete the calculation

The IF Function

Another, slightly different, function is *IF*, which lets you test whether something is true or not and take different action as appropriate. This next example shows you how it works.

What would happen if, in 2011, there was an exceptional Costs bill of £35,000 (for new equipment or premises, for example). Income is only £34,650 so the business would make a small loss.
1. Type a new *Costs* figure of **35000** into cell *E4* and press **<Enter>**

Note that the Profit Before Tax is correctly shown as negative. However, the Tax figure is also negative - as if the tax collector was giving you money for making a loss. This doesn't usually happen! To make the model behave correctly you need to alter the formula in the 2011 Tax cell *E6*:

  2. Move to *E6* and press **<Delete>** to clear the cell
  3. Click on the **[Insert Function]** button on the *Formula Bar* and choose **IF** (reset *Or select a category:* to *Most Recently Used* to get to this most easily) then press **<Enter>** for **[OK]**
  4. In the dialog box which appears set *Logical Test* to **E5>=0** (and press **<Tab>**)
  5. Set *Value_if_true* to **E5*taxrate** (press **<Tab>**)
  6. Finally set *Value_if_false* to **0** – the screen should appear as below:
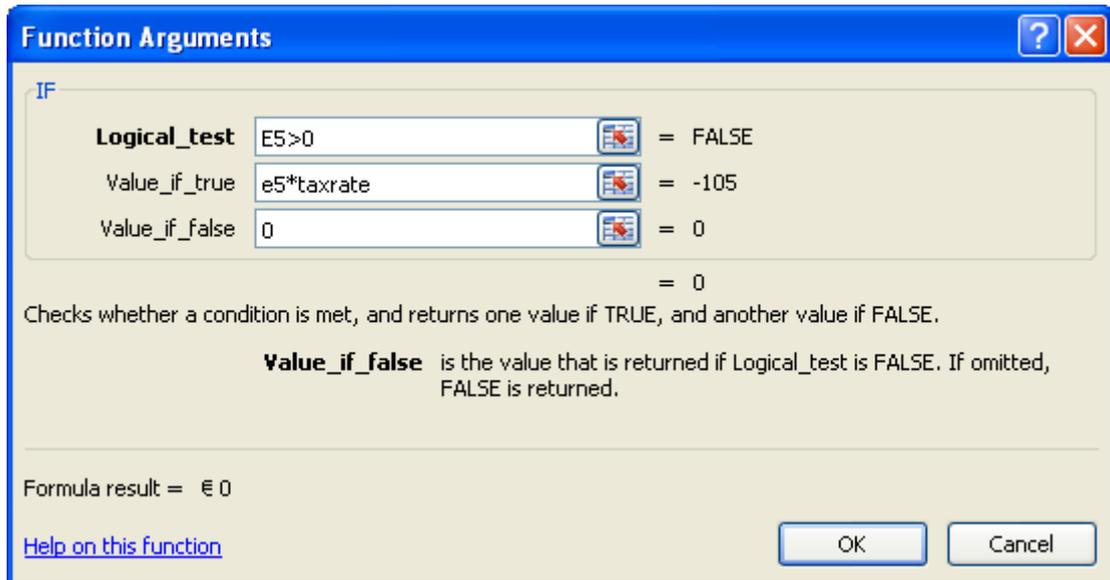
  7. Finally, press **<Enter>** for **[OK]**

This means that *if the contents of E5 (Profit Before Tax) are more than or equal to (>=) 0, the tax paid is equal to 30% of Profit Before Tax, otherwise, the tax is zero*. This produces a zero tax figure when the Profit Before Tax is in fact a loss. This example should teach you that spreadsheet models, even if they behave correctly in most circumstances, may break down under special conditions.

  8. Copy the new formula from *E6* into *D6* to *B6* by dragging the *cell handle* backwards

Graphs and Charts

When plotting a graph, it's easiest to first select the data to be plotted. Include the column and row headings (if there are any) as these are used for the *category* (x) and *value* (y) names.

Tip: To select non-adjacent areas, you first drag through one area and then use *control select* (hold down **<Ctrl>** as you drag through further areas).

  1. Select the required data area - cells *A2* to *E7* (ie missing out the *Totals* and main heading)
  2. Click on the **Insert** tab on the *Ribbon* then on the **[Column]** button and choose the first (*2-D Column*) chart type for a *Clustered Column*

A chart appears on the spreadsheet and three new *Chart Tools* tabs are added to the *Ribbon*. Don't worry if the chart partly covers the data, that is still all there; indeed the two are intricately linked. If you were to alter any of the original data, the graph would immediately be updated. Further, you can copy additional values directly from the worksheet and paste the data straight onto the graph.

Moving a Chart

This default chart isn't quite right and charts are better placed on separate sheets. To change this:

  1. On the *Chart Tools* **Design** tab on the *Ribbon*, click on the **[Switch Row/Column]** button on the left – the year is now used for the x axis

2. Click on the **[Move Chart]** button on the far right of the *Ribbon* (or *right click* on the chart and choose **Move Chart...**) then choose *New sheet:* – press **<Enter>** for **[OK]**

Next add a title to your chart
3. Move to the *Chart Tools* **Layout** tab on the *Ribbon*
4. Click on the **[Chart Title]** button and choose **Above Chart**
5. Type **Financial Statistics 2008/11** then press **<Enter>**

Note that you could also add *Axis Titles* here, but these are not needed as the year is obvious and the vertical axis already has a currency symbol.

Your chart should now appear as below:
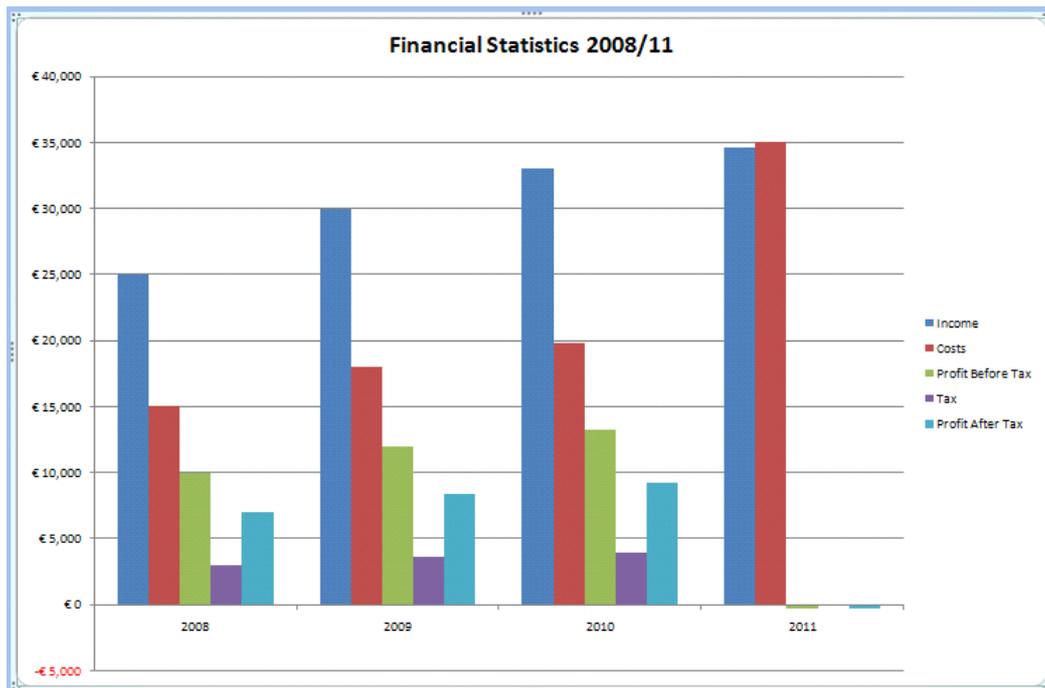
If you want to change any of the other settings (eg one of the colours used for the columns or the background colour):
6. *Right click* on the area of the chart to be changed (eg a column or the background) and choose **Format Data Series...** (or **Format Chart/Plot Area...**)
7. Move to the *Fill* options, turn on **Solid Fill** and choose a **Color** – click on **[Close]**

Note that you can also get to these commands using the **[Format Selection]** button on the far left of the *Chart Tools* **Format** tab on the *Ribbon*. Another button on this tab is **[Shape Fill]** which takes you directly to fill colours.

Altering the Chart Type

Change Chart Type:
There are over a hundred different styles of graph which Excel can produce. To change the type:
1. *Right click* on the chart and choose **Change Chart Type...** (or click on the **[Change Chart Type]** button on the far left of the *Chart Tools* **Design** tab on the *Ribbon*)
2. Using the mouse, select some of the different chart types shown, to see what is available

3-D Rotation

Excel allows you to rotate a 3-D graph to whatever angle and pitch you require, which can be very useful when some data values are hidden behind others. The procedure is as follows:

1. *Right click* on the chart and choose **Change Chart Type...**
2. In the *Column* category choose **3-D Column** (the seventh in the top row) – click on [OK]

Sadly, the *Profit* figures are hidden by the *Income* and *Costs*. To rectify this:

3. Move to the *Chart Tools* **Layout** tab on the *Ribbon* and click on the **[3-D Rotation]** button

4. Change the **X:** *Rotation* angle using the *spin button* control (up/down arrows) provided

5. Experiment changing the **Y:** *Rotation* angle and **Perspective:**

Another way to display the profit figures would be to reverse the axis values:

5. First, click on **[Default Rotation]** then press **<Esc>** for **[Close]** to reset the rotation
6. Next click on the **[Axes]** button on the *Chart Tools* **Layout** tab on the *Ribbon* and choose **Depth Axis** followed by **Show Reverse Axis**

You should now be able to see the hidden values.

Borders and Gridlines

Borders:

Another format you can apply to a range of cells (or single cell) is to put a border round them. For example, you might want your screen to look like this:

	A	B	C	D	E	F
1	**Profit and Loss**					
2		**2008**	**2009**	**2010**	**2011**	**Totals**
3	Income	€ 25,000	€ 30,000	€ 33,000	€ 34,650	€ 122,650
4	Costs	€ 15,000	€ 18,000	€ 19,800	€ 35,000	€ 87,800
5	Profit Before Tax	€ 10,000	€ 12,000	€ 13,200	-€ 350	€ 34,850
6	Tax	€ 3,000	€ 3,600	€ 3,960	€ 0	€ 10,560
7	Profit After Tax	€ 7,000	€ 8,400	€ 9,240	-€ 350	€ 24,290
8						

1. Move back to *Sheet1* by clicking on its tab on the left at the foot of the screen
2. Select cells *B3* to *F7* (include the *Totals* this time)
3. On the **Home** tab on the *Ribbon*, click on *arrow* on the right of the **[Borders]** button
4. Choose a **Thick Box Border**
5. Next select *F3* to *F7* and add a **Left Border** in a similar way

Removing the Gridlines

The *gridlines* are the grey lines separating the rows and the columns. Excel gives you the choice as to whether you want them displayed or not. To turn them off:

1. Move to the **Page Layout** tab on the *Ribbon*
2. In the *Sheet Options* group uncheck the **View** option in the **[Gridlines]** button
3. To turn them back on, repeat step **2** as above

Note: this only affects whether they are displayed *on the screen*. If you want them to be turned on/off *when printed,* turn on the **Print** option below **View**. The default is that they aren't printed.

Printing your Work

In Excel, you should also be familiar with the options available in *Page Setup*.

Print Preview

Before printing your work, you should preview it. This is particularly important in Excel if you want it to fit neatly onto the page. In a minute you will look at the *Page Setup* but first:

1. Click on the **[Office]** button and choose **Print** followed by **Print Preview**

Ideally, it would look better to have the paper sideways and you wouldn't want all of the data shown (the *taxrate* cell, for example, shouldn't appear).

2. Click on **[Close Print Preview]** to quit *Print Preview*

Page Setup

In *Page Setup* you can control how your results will appear on a printed page, including whether any column headings are repeated on each page (as a header row).

1. On the **Page Layout** tab on the *Ribbon*, click on the **[Page Setup]** button (the arrow to the right of the *Page Setup* group heading)

You will see various options grouped under four tab headings. Several settings are exclusive to Excel. The following exercise modifies some of these to show you how they work:

2. Check you are viewing the ***Page*** tab
3. Under *Orientation* choose **[Landscape]** – ie sideways
4. Under *Scaling* set **Adjust to:** to **180** - this will magnify your data to fill the page

Note that you can always force your work to fit on a single page (or more than one, if you require it) Note also that the *Paper size:* should be A4 if you are printing from an IT Services machine.

5. Move to the ***Margins*** tab
6. Click on both **[Horizontally]** and **[Vertically]** under *Center on page*
7. Move to the ***Header/Footer*** tab
8. Click on the *list arrow* attached to *Footer:* and choose **Test** (to add the file name)
9. Next, click on **[Custom Footer...]** – the following dialog box appears:
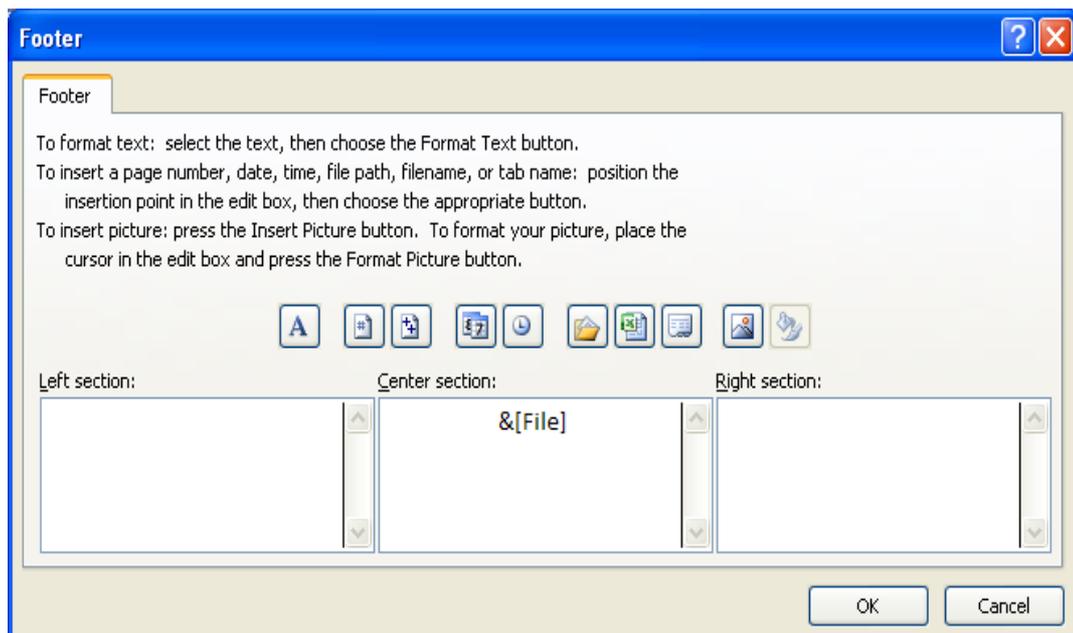
Note that Excel has coded the file name as *&[File]*. This is called a *Field Code* and will display the current name of the file if you save it with a different name. Other codes are available via the icons provided (read the text above to work out which is which). Try adding a page number on the right:

10. Click inside the *Right section* then on the second icon (the **#** sign) - *&[Page]* is added
11. Click on **[OK]** and note the page number now shows in the preview of the footer

The **Sheet** tab lets you define the area to be printed, letting you omit cells you don't want (here, you don't want the *taxrate* displayed – one way to do this would be to make the font colour white but setting the print area is better). It also controls whether **[Row and column headings]** are printed

12. Move to the **Sheet** tab
13. In the *Print area:* box type **A1:F7**

Tip: *Sheet* also lets you set *Print titles* - rows and/or columns which are automatically repeated on each page for data which extends over several pages. To set this to the first row, for example, use **1:1**; for the first two columns use **A:B** – type the range or select the rows/columns to fill these in. Within *Page Setup* you have links to *Print* and *Print Preview*.

14. Click on **[Print Preview]** to view the modifications
15. Click on **[Close Print Preview]** to return to the worksheet

Leaving Excel

To quit from Excel:

1. Choose **Exit Excel** from the **[Office]** button
2. Press **<Enter>** for **[Yes]** when asked whether you want to save the changes to *test.xlsx*.

Appendices

Appendix A   Test Example

The formulae required to complete the **test** example are:

In *A5* type **Profit After Tax**
B5 **=B3-B4**
D3 **=C3*110%**
D4 **=C4*110%**
E3 **=D3*105%**
E4 **=D4*105%**

Appendix B: Microsoft Excel 2007 Quick reference Guide