

# MICROSOFT EXCEL 2013 INTRODUCTION LEVEL 1

## Contents

Introduction .....	1
Starting Excel .....	1
The Excel Screen .....	1
Getting Help .....	2
Moving Around the Worksheet .....	2
Saving your Work .....	3
Data Entry .....	3
Examining the Cell Contents .....	4
Naming a Cell .....	5
Commands .....	5
Changing Column Width .....	5
Changing the Format .....	6
Clearing a Format .....	7
Inserting Blank Rows and Columns .....	8
Changing the Style of Text .....	8
Storing Numbers as Text .....	9
The Copy Command .....	9
Realigning Titles .....	11
Functions .....	12
Calculating Totals - the SUM Function .....	12
The IF Function .....	13
Graphs and Charts .....	14
Moving a Chart .....	14
Altering the Chart Type .....	15
3-D Rotation .....	15
Borders and Gridlines .....	16
Printing your Work .....	16
Print Preview .....	16
Page Setup .....	17
Leaving Excel .....	18
Appendix .....	18

## 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 specialized 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, database software such as Microsoft 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:

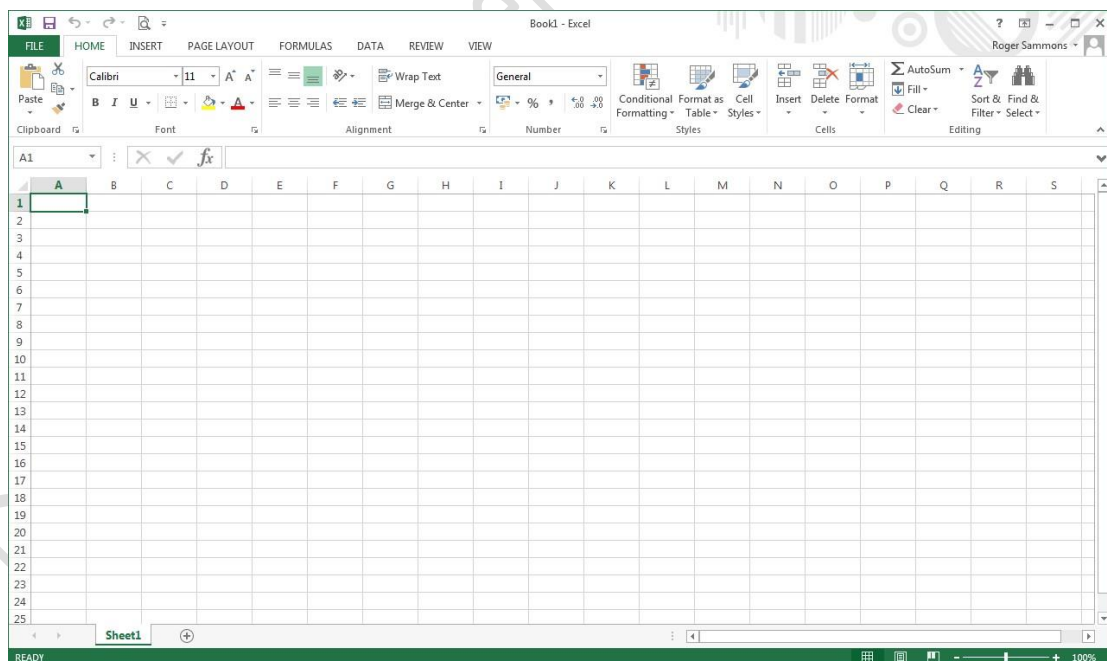
1. Click on the Windows **Start** button
2. Choose **All Programs** then **Microsoft Office 2013** followed by **Excel 2013**

**Tip:** To create a *shortcut* on the *Desktop*, right click on **Excel 2013** then choose **Send To** followed by **Desktop (create shortcut)**. You'll then be able to load Excel using the icon on the Desktop.

3. Press **<Enter>** for **Blank workbook** to start up a new session

## THE EXCEL SCREEN

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 *Quick Access Toolbar* is shown. This has three buttons showing by default – **Save**, **Undo** and **Redo**. To add extra buttons:

1. Click on the down arrow on the right for **Customize Quick Access Toolbar**

## 2. Add **Print Preview** and **Print** and any other buttons you might require

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 **Help**, **Ribbon Display Options**, **Minimize**, **Maximize/Restore** and **Close** buttons.

The next section down the screen is called the *Ribbon*. This replaces the menu and toolbar system in earlier 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. From Excel 2010, a **FILE** tab has replaced the *Office Button*.

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 a grey 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



As with all the other Microsoft Office software, a quick link to the help system is provided by the **[Microsoft Excel Help]** button on the right, above the *Ribbon* tabs. The **<F1>** key also loads the help system.

## 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 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 grey 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 how they move the active cell around
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, as you will see later.

## 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 **FILE** tab on the *Ribbon*)

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

2. Choose **My Documents** then type **test** into the *File name:* box

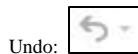
Note that the default drive is set to **My Documents** (on drive **N:** - your *home directory* on University Lab PCs). Avoid working directly from a USB memory stick or similar device; always copy your files to *My Documents*, work on them there and then copy back to the stick, when you have finished.

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

Note that once the file has been saved, the new name (*test*) 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 recognizes 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 recognized 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 color-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 can also use the *arrow keys* to select a cell reference – this is the easiest way to pick up a neighboring cell.

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>** three times) 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 - press **<Enter>** **Tip:** If you move to the cell and then press function key **<F2>**, you only need type the extra words.

You will find the text appears 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, make sure **<Num Lock>** is turned 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 – e.g. 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* and typing *After* instead – press **<Tab>** to move to cell B5).

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 (follow the links or look at the [Appendix](#) 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 Bef	10000				
4	Tax	3000				
5	Profit Afte	7000				
6						
7						

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.

You may be wondering why a small green triangle has appeared in the top left corner of cell *B4*. This is a warning indicator and implies there may be an error in a cell formula. The error here is *Inconsistent Formula*. This is because the formulae in *B3* and *B5* are essentially the same while that in *B4* is intentionally different. To view all the formulae:

1. Hold down the **<Ctrl>** key and type a **<'>** - the key in the top left corner, to the left of **<1>**
2. Once you have seen why Excel gave you the warning, press **<Ctrl>** **'>** again to return to normal working

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* (i.e. 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 allowed in cell names) 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>**

The result doesn't change but you can now use *taxrate* whenever you want to calculate the tax. Incidentally, you can still also use *A10* to reference this cell, though this defeats the reason for giving a cell a special name.

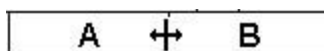
**Tip:** It's easier to edit a formula rather than retype it in the cell. Press function key **<F2>** to enter edit mode then use **<Backspace>** to delete the 30%. Type in **taxrate** then press **<Enter>**. The *arrow keys* can be used to move the typing position along the formula, then press **<Enter>** or **<Tab>** to finish editing.

## 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 used 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 as 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 Before 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 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. When using *autofit*, the column must first be selected or the width of the current cell is used instead.

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. Press <Ctrl z> or use the **[Undo]** button to restore the column to its original width

## CHANGING THE FORMAT



The way data in a cell is displayed can be set using a *format*. For example, a date could be shown as 25-12-14 or 25 Dec 14 or 25th December 2014 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 - it is highlighted in grey (cell *B1* remains white)

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 on the right

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.

**IMPORTANT:** When using Excel you should always think about how many decimal places should be shown. Here, it looks as though the *Income* and *Costs* figures are to the nearest thousand pounds so calculations showing pence are completely meaningless.



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 **[Number Format]** button (the small arrow in the bottom right 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:* (e.g. 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



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 block of cells have a moving boundary while the mouse cursor now has a little brush attached.

14. Click on each of the other column headings (i.e. **C** to **F**) in turn, or drag across them
15. Click on the **[Format Painter]** button again to turn it off (the brush and moving border disappear)

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

16. Finally, using **<left arrow>**, move to *B1* and retype the original value of **25000** (press **<Enter>**)

## 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 press **<up-arrow>** or click on cell A7 (the format clears and the number is properly displayed)

Note that if you click on the **[Format Painter]** *once*, after you have copied the format to a single cell or range, the painter is automatically turned off. If you *double click* on it then the format painter remains active until you turn it off again. 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 **Tip:** If you select several rows/columns you can insert/delete more than one at a time.

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. Use **<Ctrl `>** if you want to inspect the formulae,

5. Finally, press **<up\_arrow>** to release the selection and enter the title **Profit and Loss** in cell A1 then 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



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** (or use **[Increase Font Size]**)
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

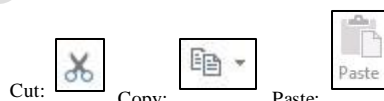
Next, extend the calculations over time. Imagine you want to project the profit and loss figures over a four year period, based on some simple assumptions about what is going to happen to income and costs. Firstly, you need some labels to show which year is which:

1. Move to cell B2 and type '2011' then move to C2 (press <right arrow>)

Don't miss out the single quote (same key as @) at the beginning - this tells Excel that although 2011 looks like a number, it should be treated as text. This will prevent the year 2011 being displayed as €2,011, 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 '2012', '2013' and '2014' into cells C2, D2 and E2

## THE COPY COMMAND



Assume that both income and costs will grow by 20% in 2012 from their 2011 figure.

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

Where one formula is essentially the same as another (except the calculation is being made in a different row or column), when you copy and paste it, Excel automatically adjusts it to account for its new position. Assuming costs also rise by 20%, the formula for C4 can be copied across from C3:

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 cell 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 the 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 paste – if you forget, press **<Esc>** to turn off the moving border).

You can copy a range of cells in the same way. Here, the *Profit Before Tax*, *Tax* and *Profit After Tax* formulae for 2012 are essentially the same as those for 2011:

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. Press **<Ctrl c>** or 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 square at the bottom right corner of the active cell (or range). Try using this for the 2013 and 2014 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	<b>Profit and Loss</b>					
2		2011	2012	2013	2014	
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 2013 and 2014 because, although the formulae are there, there are no income or costs figures in D3, D4, E3 or E4 to work on.

10. Press **<Ctrl `>** to view the formulae which underlie the figures

Notice how the Profit Before Tax formula (which was  $=C3-C4$  in 2012) has changed to  $=D3-D4$  in 2013, and  $=E3-E4$  in 2014. Note that the *tax rate* cell reference does not change as the formula is copied across row 6. Had you used A10 instead, this would have been amended to B10, C10 and D10 which, being empty, would have multiplied the profit by zero!

Next provide the model with some Income and Costs figures for 2013 and 2014. Sometimes, when typing in formulae, it's better to work in *formula view* – you can then check that what you've typed is correct. When you work in normal view, the results appear as soon as you move to the next cell and you can't check you typed it correctly.

11. Work out formulae for D3, D4, E3 and E4 yourself, given the following assumptions:

- in 2013, Income and Costs will increase by 10% over the 2012 values
- in 2014, Income and Costs will increase by 5% over the 2013 values

**Hint:** Copy the formula from C3 to D3 and E3, amend the percentage values then copy down to D4 and E4.

12. Press <Ctrl 1> again to return to normal working – the formulae results will now be shown

The screen should appear as below (see the [Appendix](#) or use the links above to check the formulae) but make sure you type in formulae (and not just the answers to the calculations):

	A	B	C	D	E	F
1	<b>Profit and Loss</b>					
2		2011	2012	2013	2014	
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



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 (2011, 2012 etc.) were in bold text in the center of the columns while the main title (*Profit and Loss*) could be centered across the figures below.

1. Select row 2 (by clicking on the number 2 on the left hand side)
2. Press <Ctrl b> or click on the **[Bold]** button to make the text bold
3. With the cells still highlighted, click on the **[Center]** button in the **Alignment** group on the *Ribbon*

Using the buttons along the top row of the *Alignment* group, you can justify cell contents vertically as well as horizontally. Another button, *Wrap text*, allows text to flow onto several lines.

**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 center text across several columns - try this for your main title:

4. Select cells A1 to E1
5. Click on the **[Merge and Center]** button (on the right in the *Alignment* group)

The title will now appear in the center of the selected range, even though it is still stored in cell A1. Incidentally, cells B1 to E1 no longer exist. To undo the merge and center:

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 then release the mouse button

## FUNCTIONS

Insert Function:  AutoSum:  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. Reset the *category* to *Most Recently Used* then 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	G
1	<b>Profit and Loss</b>						
2		<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Totals</b>	
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							
9							

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 do the calculation (widen the column, if necessary)

The **SUM()** function (and other commonly-used ones) is also available from the **[AutoSum]** button (the Greek sigma  $\Sigma$  on the right of the *Ribbon*). Using this, you can calculate the missing total figures in one go:

3. Select F4 to F7
4. Click on the **[AutoSum]** button (or press **<Alt =>**) - 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 (or press **<Alt =>**) - 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

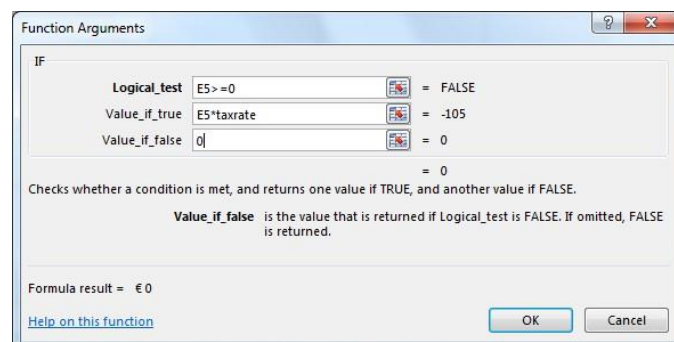
Another, slightly different, function is **IF**, which lets you test whether something is true or not and take different actions as appropriate. This next example shows you how it works.

What would happen if, in 2014, 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 2014 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 ( $\geq$ ) 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 – here, cells A2 to E7 (i.e. missing out the *Totals* and main heading)

A new feature in Excel 2013 is the *Quick Analysis* tool. This appears whenever you select some data. To use it:

2. Click on the [Quick Analysis] button, which has appeared to the bottom right of the selection
3. Move to the **Charts** tab then select the first **Clustered** chart

**Alternatively:**

4. Move to the **INSERT** tab on the *Ribbon* then click on the [Insert Column Chart] button in the *Charts* group and choose the first (2-D Column) chart type for a *Clustered Column*

A chart (with 3 buttons attached) appears on the spreadsheet and two 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 chart would immediately be updated. Further, you can copy additional values directly from the worksheet and paste the data straight onto the chart.

## MOVING A CHART

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

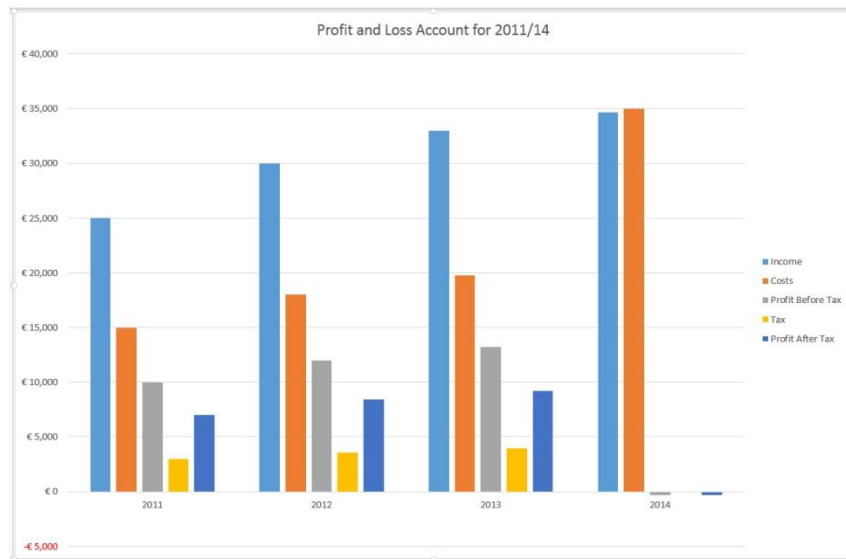
1. Click on the [Move Chart] button on the far right of the *Ribbon* (or *right click* on the chart and choose **Move Chart...**) then choose *New sheet*: – press <Enter> for [OK]

Note how much less space is taken up by the axes and legend. Next change the title of your chart

2. Click on the [Chart Title] at the top of the chart then type **Profit and Loss Account for 2011/14**

Note that you could also add *Axis Titles* via the [Add Chart Element] button, but these are not needed as the year is obvious and the vertical axis already has a currency symbol. Instead, try moving the *Legend*:

3. Click on the [Add Chart Element] button and choose **Legend** then **Right** Your chart should now appear as below:



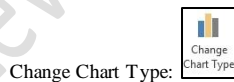
Note: The **[Switch Row/Column]** button in the *Data* group on the right of the *Chart Tools DESIGN* tab can be used to switch the axis labels and legend labels, should you want to have the years as the legend

If you want to change any of the other settings (e.g. one of the colors used for the columns or the background color):

4. Move to the *Chart Tools FORMAT* tab on the *Ribbon* and, using the **[Chart Elements]** button on the far left, choose the element required – you can also select it by clicking on it on the chart
5. Next, click on the **[Shape Fill]** button and choose the required color

Note: Excel also provides you with pre-defined color palettes via the **[Change Colors]** button on the *Chart Tools DESIGN* tab. There are also a range of pre-defined styles here.

## ALTERING THE 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 background and choose **Change Chart Type...** (or click on the **[Change Chart Type]** button on the right 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 background and choose **Change Chart Type...**
2. In the *Column* category choose **3-D Column** (on the far right) – press **<Enter>** for **[OK]**

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

3. *Right click* on the chart background again and choose **3-D Rotation** – a *Task Bar* appears on the right

4. Increase the **X: Rotation** angle to **130°** using the *spin button* control (up/down arrows) provided
5. Experiment changing the **Y: Rotation** angle and **Perspective:** (reset both to the default **15°** afterwards)

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

6. First, click on **[Default Rotation]** then **[Close]** the *Format Chart Area Task Bar*
7. Next right click on the *Income/Costs Axis* and choose **Format Axis** – the *Format Axis Task Bar* appears
8. Here, under *Axis Options*, turn on the **Series in reverse order** option

## BORDERS AND GRIDLINES



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	G
1	<b>Profit and Loss</b>						
2		<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>Totals</b>	
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 at the foot of the screen
2. Select cells *B3* to *F7* (include the *Totals* this time)
3. On the **HOME** tab of the *Ribbon*, click on arrow on the right of the **[Borders]** button in the *Font* group 4. Choose a **Thick Box Border**
5. Next select *F3* to *F7* and add a **Left Border** in a similar way

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

1. Move to the **PAGE LAYOUT** tab on the *Ribbon*
2. In the *Sheet Options* group uncheck/check the **View** option in the **Gridline** sheet options

Note that 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

### 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 **[Print Preview and Print]** button on the *Quick Access Toolbar* or move to the **FILE** tab on the *Ribbon* and choose **Print**

Ideally, it would look better to have the paper sideways and the *taxrate* cell, for example, shouldn't appear.

**Tip:** You can easily hide the *taxrate* by changing the font color to match the background – here white.

## 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).

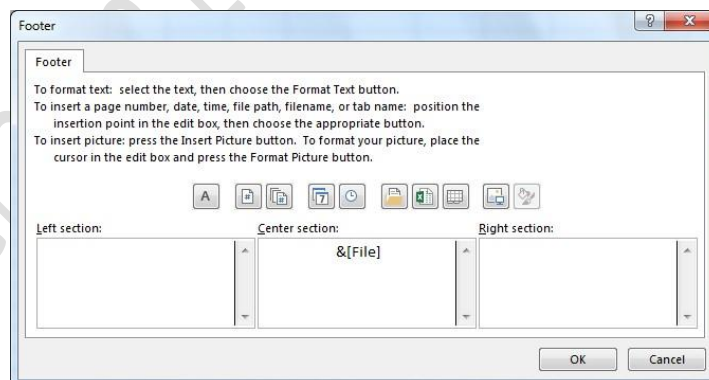
1. Press **<Esc>** (or click on the back arrow in the top left corner) to move back to your work
2. Move to the **PAGE LAYOUT** tab on the *Ribbon* then click on the **[Page Setup]** button (the arrow to the far right of the *Page Setup* group heading)

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:

3. Check you are viewing the **Page** tab
4. Under *Orientation* choose **[Landscape]** – i.e. sideways
5. 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 a University Lab PC.

6. Move to the **Margins** tab and click on both **[Horizontally]** and **[Vertically]** under *Center on page*
7. Move to the **Header/Footer** tab then click on the *list arrow* attached to *Footer:* and choose **test** (to add the filename) – you could have put this in the header, instead, if you wanted to 8. 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 the date field on the right:

9. Click inside the *Right section* then on the date icon (the fourth) - **&[Date]** is added
10. Click on **[OK]** and note today's date 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). It also controls whether **[Row and column headings]** are printed

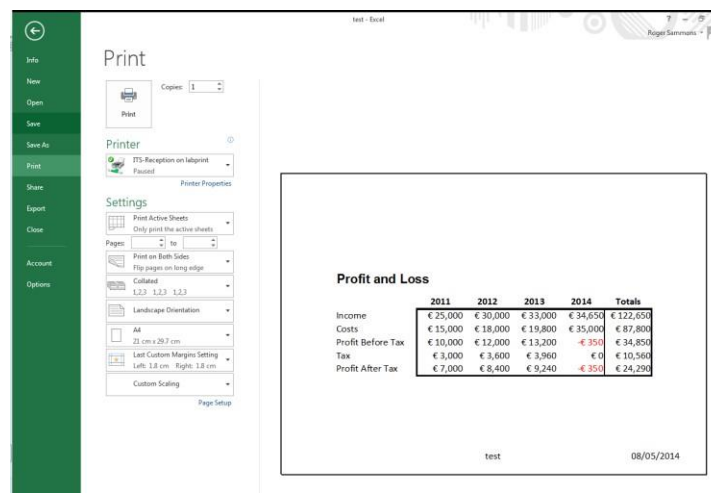
11. Move to the **Sheet** tab

12. In the *Print area:* box type **A1:F7** (or drag through the required cells using the mouse)

**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*.

13. Click on **[Print Preview]** to view the modifications – the screen should be similar to that below:



## LEAVING EXCEL

To quit from Excel:

1. Move to the **FILE** tab if necessary (you are already there) and choose **Close** (or press **<Ctrl F4>**)
2. Press **<Enter>** for **[Save]** when asked whether you want to save the changes to *test.xlsx*
3. Finally **[Close]** Excel by clicking on the cross in the top right corner of the window (or press **<Alt F4>**)

**Note:** This document is an introduction to Microsoft Excel 2013. More advanced notes ([Microsoft Excel 2013: An Intermediate Guide](#) and [Advanced Spreadsheet Topics Using Microsoft Excel 2013](#)) are also available.

## APPENDIX

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%

MS Excel 2013 Level 1 Instructor: Mr. Libutsi