

# Excel 2010 Advanced

Stephen Moffat



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# Introduction

Excel 2010 is a powerful spreadsheet application that allows users to produce tables containing calculations and graphs. These can range from simple formulae through to complex functions and mathematical models.

## How To Use This Guide

This manual should be used as a point of reference after following attendance of the advanced level Excel 2010 training course. It covers all the topics taught and aims to act as a support aid for any tasks carried out by the user after the course.

The manual is divided into sections, each section covering an aspect of the advanced course. The table of contents lists the page numbers of each section and the table of figures indicates the pages containing tables and diagrams.

## Objectives

Sections begin with a list of objectives each with its own check box so that you can mark off those topics that you are familiar with following the training.

## Instructions

Those who have already used a spreadsheet before may not need to read explanations on what each command does, but would rather skip straight to the instructions to find out how to do it. Look out for the arrow icon which precedes a list of instructions.

## Appendices

The Appendices list the Ribbons mentioned within the manual with a breakdown of their functions and tables of shortcut keys.

## Keyboard

Keys are referred to throughout the manual in the following way:

[ENTER] – Denotes the return or enter key, [DELETE] – denotes the Delete key and so on.

Where a command requires two keys to be pressed, the manual displays this as follows:

[CTRL] + [P] – this means press the letter “p” while holding down the Control key.

## Commands

When a command is referred to in the manual, the following distinctions have been made:

When Ribbon commands are referred to, the manual will refer you to the Ribbon – E.g. “Choose **home** from the Ribbons the group name – **FONT** group and then **B** for bold”.

When dialog box options are referred to, the following style has been used for the text – “In the **PAGE RANGE** section of the **PRINT** dialog, click the **CURRENT PAGE** option”

Dialog box buttons are shaded and boxed – “Click **OK** to close the **PRINT** dialog and launch the print.”

### Notes

Within each section, any items that need further explanation or extra attention devoted to them are denoted by shading. For example:

*“Excel will not let you close a file that you have not already saved changes to without prompting you to save.”*

### Tips

At the end of each section there is a page for you to make notes on and a “Useful Information” heading where you will find tips and tricks relating to the topics described within the section.

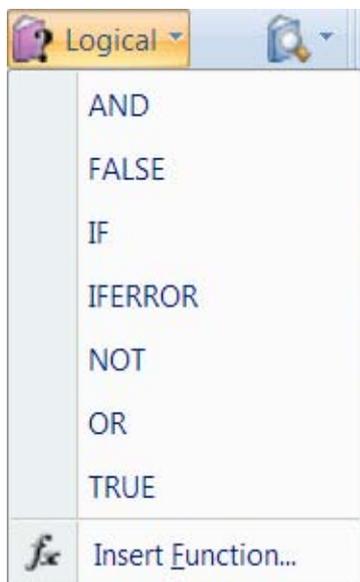
# 1 Advanced worksheet functions

By the end of this section you will be able to:

- Understand and use conditional formulae
- Set up **LOOKUP** tables and use **LOOKUP** functions
- Use the **GOAL SEEK**
- Use the **SOLVER**

## Conditional & Logical Functions

Excel has a number of logical functions which allow you to set various “conditions” and have data respond to them. For example, you may only want a certain calculation performed or piece of text displayed if certain conditions are met. The functions used to produce this type of analysis are found in the Insert, Function menu, under the heading LOGICAL.



### If Statements

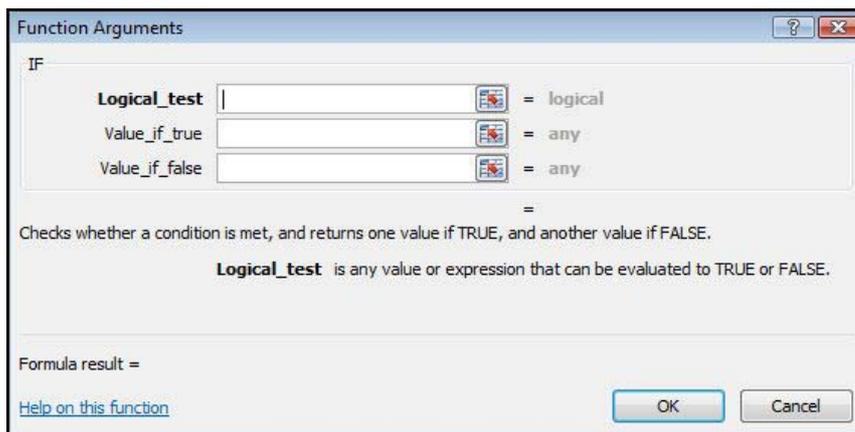
The IF function is used to analyse data, test whether or not it meets certain conditions and then act upon its decision. The formula can be entered either by typing it or by using the Function Library on the formula's ribbon, the section that deals with logical functions. Typically, the IF statement is accompanied by three arguments enclosed in one set of parentheses; the condition to be met (logical\_test); the action to be performed if that condition is true (value\_if\_true); the action to be performed if false (value\_if\_false). Each of these is separated by a comma, as shown;

`=IF ( logical_test, value_if_true, value_if_false)`

#### To view IF function syntax:

##### Mouse

1. Click the drop down arrow next to the **LOGICAL** button in the **FUNCTION LIBRARY** Group on the **FORMULAS** Ribbon;
2. A dialog box will appear
3. The three arguments can be seen within the box



### Logical Test

This part of the IF statement is the “condition”, or test. You may want to test to see if a cell is a certain value, or to compare two cells. In these cases, symbols called **LOGICAL OPERATORS** are useful;

>	<b>Greater than</b>
<	<b>Less than</b>
> =	<b>Greater than or equal to</b>
< =	<b>Less than or equal to</b>
=	<b>Equal to</b>
<>	<b>Not equal to</b>

Therefore, a typical logical test might be **B1>B2**, testing whether or not the value contained in cell **B1** of the spreadsheet is greater than the value in cell **B2**. Names can also be included in the logical test, so if cells **B1** and **B2** were respectively named **SALES** and **TARGET**, the logical test would read **SALES>TARGET**. Another type of logical test could include text strings. If you want to check a cell to see if it contains text, that text string must be included in quotation marks. For example, cell **C5** could be tested for the word **YES** as follows; **C5="YES"**.

It should be noted that Excel’s logic is, at times, brutally precise. In the above example, the logical test is that sales should be greater than target. If sales are equal to target, the **IF** statement will return the false value. To make the logical test more flexible, it would be advisable to use the operator **>=** to indicate “meeting or exceeding”.

### Value If True / False

Provided that you remember that **TRUE** value always precedes **FALSE** value, these two values can be almost anything. If desired, a simple number could be returned, a calculation performed, or even a piece of text entered. Also, the type of data entered can vary depending on whether it is a true or false result. You may want a calculation if the logical test is true, but a message displayed if false. (Remember that text to be included in functions should be enclosed in quotes).

Taking the same logical test mentioned above, if the sales figure meets or exceeds the target, a **BONUS** is calculated (e.g. 2% of sales). If not, no bonus is calculated so a value of zero is returned. The IF statement in column D of the example reads as follows;

```
=IF(B2>=C2,B2*2%,0)
```

	A	B	C	D
1	Name	Sales	Target	Bonus
2	Bill	580	640	0
3	Karen	1200	1000	24
4	Ted	710	700	14.2
5				

You may, alternatively, want to see a message saying “NO BONUS”. In this case, the true value will remain the same and the false value will be the text string “NO BONUS”;

```
=IF(B2>=C2,B2*2%,"NO BONUS")
```

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A particularly common use of **IF** statements is to produce “ratings” or “comments” on figures in a spreadsheet. For this, both the true and false values are text strings. For example, if a sales figure exceeds a certain amount, a rating of “**GOOD**” is returned, otherwise the rating is “**POOR**”;

```
=IF(B2>1000,"GOOD","POOR")
```

**Nested If**

When you need to have more than one condition and more than two possible outcomes, a **NESTED IF** is required. This is based on the same principle as a normal **IF** statement, but involves “nesting” a secondary formula inside the main one. The secondary **IF** forms the **FALSE** part of the main statement, as follows;

```
=IF(1st logic test , 1st true value , IF(2nd logic test , 2nd true value , false value))
```

Only if both logic tests are found to be false will the false value be returned. Notice that there are two sets of parentheses, as there are two separate **IF** statements. This process can be enlarged to include more conditions and more eventualities - up to seven **IF**'s can be nested within the main statement. However, care must be taken to ensure that the correct number of parentheses are added.

In the example, sales staff could now receive one of three possible ratings;

```
=IF(B2>1000,"GOOD",IF(B2<600,"POOR","AVERAGE"))
```

To make the above **IF** statement more flexible, the logical tests could be amended to measure sales against cell references instead of figures. In the example, column E has been used to hold the upper and lower sales thresholds.

```
=IF(B2>=$E$2,"GOOD",IF(B2<=$E$3,"POOR","AVERAGE"))
```

(If the **IF** statement is to be copied later, this cell reference should be absolute).

	A	B	C	D
1	Name	Sales	Target	Bonus
2	Bill	580	640	poor
3	Karen	1200	1000	good
4	Ted	710	700	poor

*N.B. The depth of nested IF functions has been increased to 64 as previous versions of excel only nested 7 deep*

## Counting And Totalling Cells Conditionally

Occasionally you may need to create a total that only includes certain cells, or count only certain cells in a column or row.

	A	B	C	D	E	F
1	Order date	Customer	Product	Quantity	Price	Total
2	01/01/97	Viking Supplies	Widget	10	5	50
3	02/01/97	Bloggs & Co	Ratchet	23	7	161
4	02/01/97	Jones Brothers	Gimlet	200	3	600
5	03/01/97	Viking Supplies	Gimlet	201	3	603
6	01/01/97	Viking Supplies	Widget	296	5	1480
7	02/01/97	Bloggs & Co	Ratchet	371	7	2597
8	02/01/97	Jones Brothers	Gimlet	446	3	1338
9	03/01/97	Viking Supplies	Gimlet	521	3	1563
10	01/01/97	Viking Supplies	Widget	596	5	2980
11	02/01/97	Bloggs & Co	Ratchet	671	7	4697
12						
13	<b>Viking Supplies Total</b>					
14	<b>Bloggs &amp; Co No. of orders</b>					

The example above shows a list of orders. There are two headings in bold at the bottom where you need to generate a) the total amount of money spent by Viking Supplies and b) the total number of orders placed by Bloggs & Co.

The only way you could do this is by using functions that have conditions built into them. A condition is simply a test that you can ask Excel to carry out the result of which will determine the result of the function.

### Statistical If Statements

A very useful technique is to display text or perform calculations only if a cell is the maximum or minimum of a range. In this case the logical test will contain a nested statistical function (such as **MAX** or **MIN**). If, for example, a person's sales cell is the maximum in the sales column, a message stating "Top Performer" could appear next to his or her name. If the logical test is false, a blank message could appear by simply including an empty set of quotation marks. When typing the logical test, it should be understood that there are two types of cell referencing going on. The first is a reference to one person's figure, and is therefore relative. The second reference represents the **RANGE** of everyone's figures, and should therefore be absolute.

**=IF(relative cell = MAX(absolute range) , "Top Performer" , "")**

	A	B	C	D	E
1	Name	Message	sales		
2	Bill		580		
3	Karen	Top Performer	1200		
4	Ted		710		
5					

In this example the IF statement for cell B2 will read;

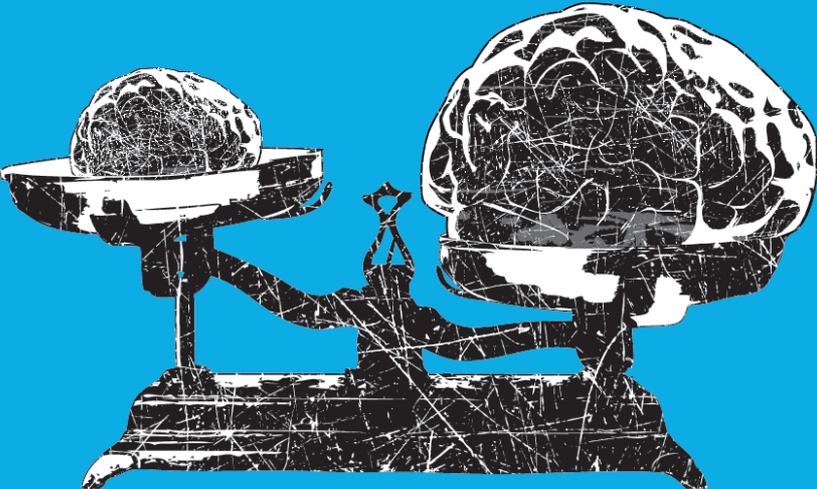
```
=IF(C2=MAX($C$2:$C$4),"Top Performer","")
```

When this is filled down through cells B3 and B4, the first reference to the individual's sales figure changes, but the reference to all three sales figures (\$C\$2:\$C\$4) should remain constant. By doing this, you ensure that the IF statement is always checking to see if the individual's figure is the biggest out of the three.

A further possibility is to nest another IF statement to display a message if a value is the minimum of a range. Beware of syntax here - the formula could become quite unwieldy!

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### Sumif

You can use this function to say to Excel, “Only total the numbers in the **Total** column where the entry in the **Customer** column is Viking Supplies”. The syntax of the **SUMIF()** function is detailed below:

**=SUMIF(range,criteria,sum\_range)**

**RANGE** is the range of cells you want to test.

**CRITERIA.** It is the criteria in the form of a number, expression, or text that defines which cells will be added. For example, criteria can be expressed as 32, “32”, “>32”, “apples”.

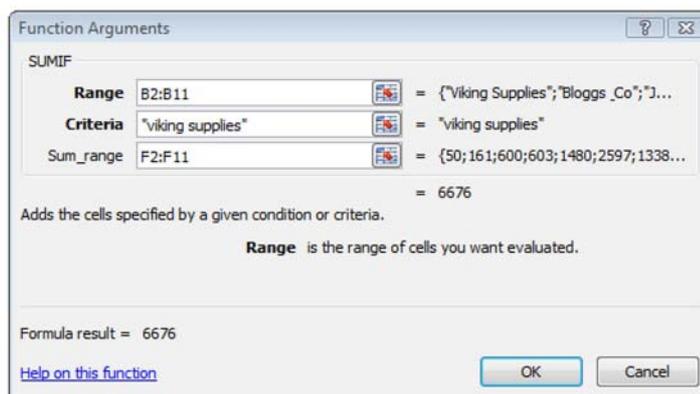
**SUM RANGE.** These are the actual cells to sum. The cells in sum range are summed only if their corresponding cells in range match the criteria. If sum range is omitted, the cells in range are summed.

	A	B	C	D	E	F
1	Order date	Customer	Product	Quantity	Price	Total
2	01/01/1997	Viking Supplies	Widget	10	£ 5.00	£ 50.00
3	02/01/1997	Bloggs & Co	Ratchet	23	£ 7.00	£ 161.00
4	02/01/1997	Jones Brothers	Gimlet	200	£ 3.00	£ 600.00
5	03/01/1997	Viking Supplies	Gimlet	201	£ 3.00	£ 603.00
6	01/01/1997	Viking Supplies	Widget	296	£ 5.00	£1,480.00
7	02/01/1997	Bloggs & Co	Ratchet	371	£ 7.00	£2,597.00
8	02/01/1997	Jones Brothers	Gimlet	446	£ 3.00	£1,338.00
9	03/01/1997	Viking Supplies	Gimlet	521	£ 3.00	£1,563.00
10	01/01/1997	Viking Supplies	Widget	596	£ 5.00	£2,980.00
11	02/01/1997	Bloggs & Co	Ratchet	671	£ 7.00	£4,697.00
12						
13	<b>Viking supplies total</b>					<b>2:F11)</b>
14	<b>Bloggs &amp; Co No.of Orders</b>					
15						

**=SUMIF(B2:B11, “Viking Supplies”, F2:F11)**

With the example above, the **SUMIF** function that you would use to generate the **VIKING SUPPLIES TOTAL** would look as above.

Using the **INSERT FUNCTION** tool the dialog would look like this and show any errors in entering the values or ranges



## Countif

**countif** counts the number of cells in a range based on given criteria.

**COUNTIF(range,criteria)**

**RANGE** is one or more cells to count, including numbers or names, arrays, or references that contain numbers. Blank and text values are ignored.

**CRITERIA** is the criteria in the form of a number, expression, cell reference, or text that defines which cells will be counted. For example, criteria can be expressed as 32, "32", ">32", "apples", or **B4**.

### To use COUNTIF function

#### Mouse

1. Click on the **MORE FUNCTIONS** button in the **FORMULAS** group on the **FORMULAS** ribbon
2. Click on **STATISTICAL**.
3. Select **COUNTIF** from the displayed functions. A dialog will be displayed

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