

WORKING WITH EXCEL

BEGINNER TO INTERMEDIATE IN LESS THAN TWO HOURS

BY

LEGENTO (PSN)

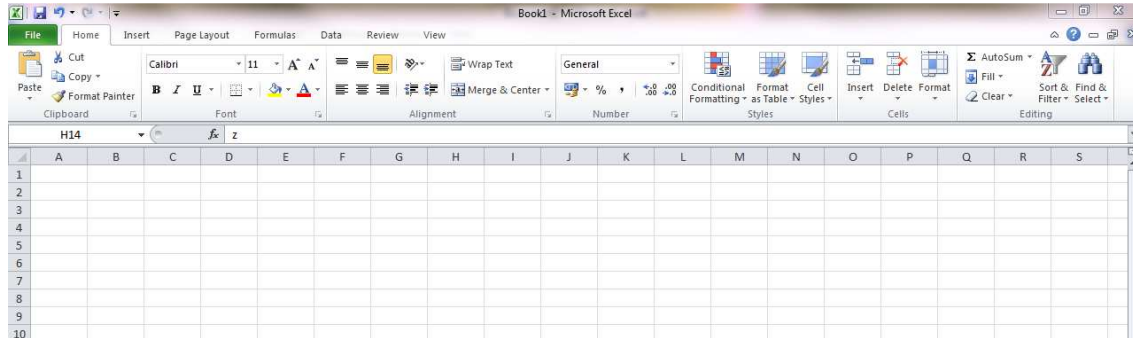
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WORKING WITH EXCEL – INTRODUCTION

Excel is an extremely powerful and complex programme. This however DOES not mean you should be scared or intimidated by it. At the end of the day it will respond to you on your level, if you want excel to be simple it will behave simply, if you want it to behave in complex ways you will be able to tell it to do so. However don't try to make it behave illogically, you will lose...

Below is a screenshot of excel. Basically excel allows us to manipulate information using certain functions so that we can understand things better.

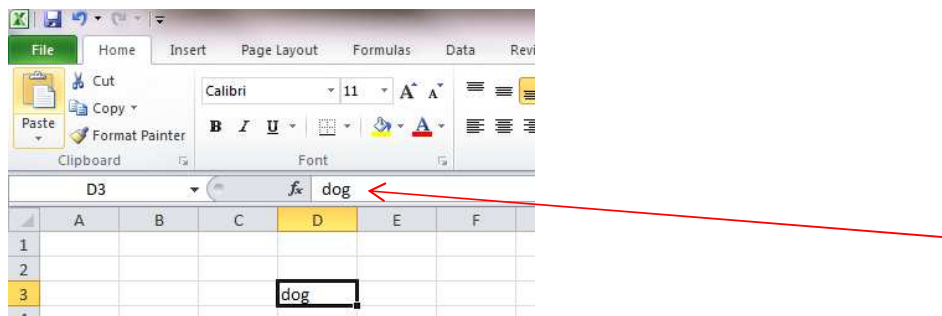


The most important part of the programme lies in the navigation of the spreadsheet. The spreadsheet has columns A onwards and rows which are numbered 1 downwards. Thus at any time you can locate a specific 'cell' at for example B4, which would be column B and row 4.

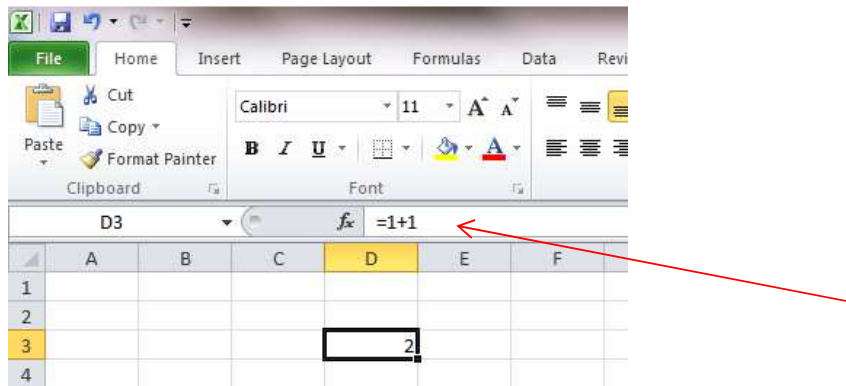
A cell is where data can be entered. This data can be in the form of written text, a number or even a mathematical formula.

The arrow keys are probably the easiest way to navigate your way around the spreadsheet. Move up, down, left, right (ensure scroll lock is off) around the area to select a specific cell. You can also select the required cell with your mouse.

Once you are on the cell into which you want to enter the data press F2 on the keyboard or double click on the cell with your mouse to enter it.

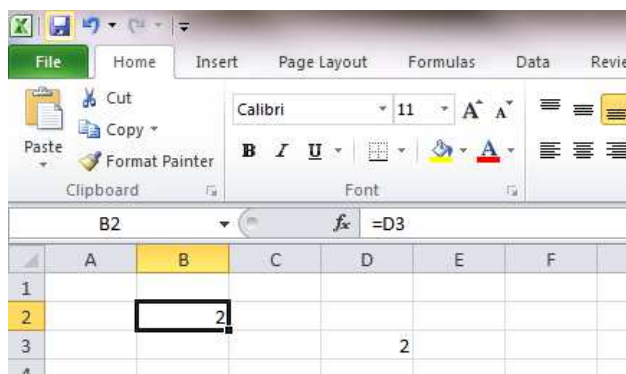


Here I have selected cell D3 and have written the word dog. Note that the word dog shows up on cell D3 as well as in the bar at the top. The difference comes about when I enter a mathematical formula such as =1+1. When I enter a formula it must **always** begin with an = sign otherwise it won't be recognised as a formula. See the below screenshot.

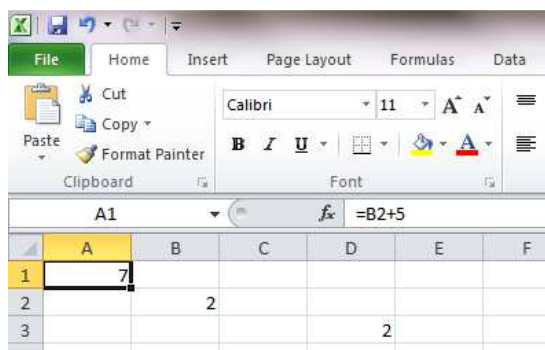


Note that in the above picture I have entered the formula = 1+1 in cell D3 which is displayed in the formula bar but the result or value of the formula '2' is displayed in the cell. When I edit the cell by double clicking on it or pressing F2 on the keyboard both will display the formula.

The ability to enter formulas into a cell makes excel incredibly powerful. Especially if one considers that we can have cells in relationships with each other using a formula. For example, I can make cell B2 = to cell D3 by merely inputting =D3 or by putting an = sign and then clicking on D3 then enter.

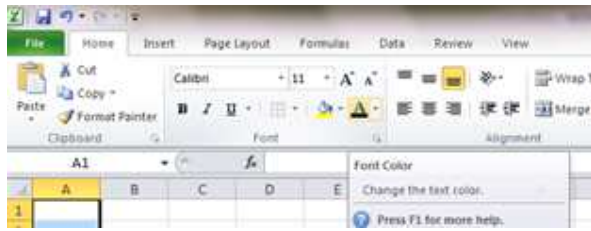


So I entered =D3 as can be seen on the formula bar and cell B2 is now displaying the value 2. I can take this further and make cell A1 =B2+5 and the result will be that Cell A1 will display the value 7

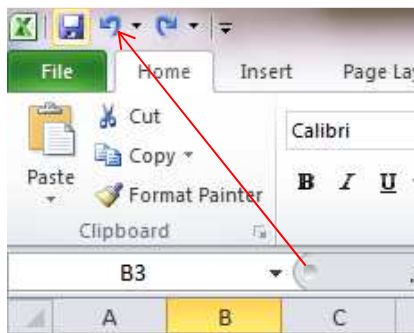


The benefit is now that I can change multiple cells values by merely editing one cell, for example if I change cell D3 to =1+3 then both cell B2 and A1 will change as well. Without me having to change them individually, they are connected to each other in the described relationship. Try it...

Ok, so above the spreadsheet area you will see the 'toolbar'. Basically the toolbar gives us shortcuts to formulas, allows us to edit the format of the cell, among other things. If you hover the mouse cursor over a particular icon on the toolbar it will give you a description of what it does.

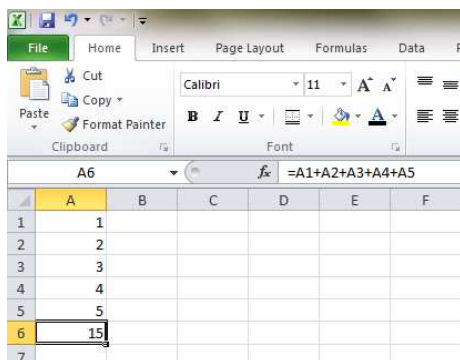


On the home tab, much of it is formatting which can change font colour, bold text etc... I recommend that if you don't know what a button does press it and see. Excel will break you long before you break it. Remember one thing though; one of the most important buttons on the home toolbar, the undo icon which will undo anything that you did that didn't work out the way you wanted it to. The shortcut key for undo is Ctrl Z if you undo too much you can always redo, which is the icon on the right of undo. The disc icon on the left of undo is the save key, press this often, just in case...

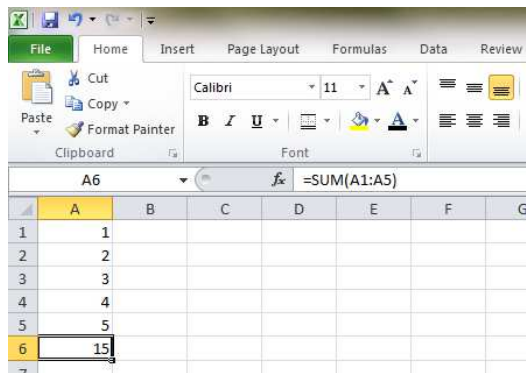


You will notice 'tabs' at the top of the toolbar named file, home, insert, page layout etc... Each tab has functions that fit into the description of the tab name, for example under the formula tab the icons will relate to formula functions, hover and press to see what they do, if nothing happens and you want to know what it can do, use Google which is Excels best friend.

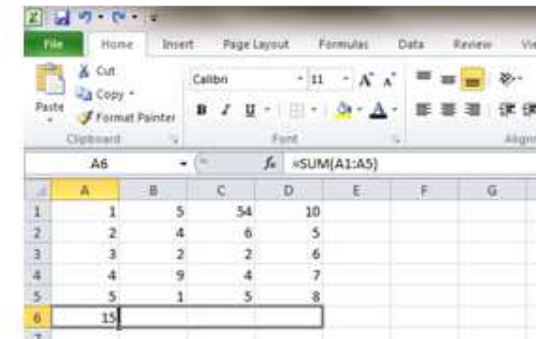
Ok, back to the spreadsheet. There are a number of in built formulas or functions in excel that allow us to quickly perform common tasks. In the below there is a series of numbers ,now there are to options that we can use to add them up, the first is the long way round =A1+A2+A3+A4+A5



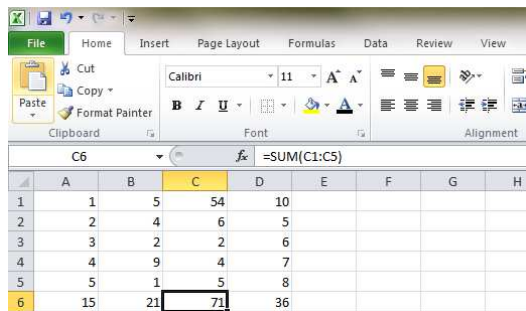
The second option is to use an inbuilt excel function called SUM. Basically you enter =SUM(A1:A5). The word SUM tells excel to add the 'range' of cells (A1:A5). The brackets are NB Once you open the bracket =SUM(you can then click and highlight the desired range, release and close the brackets.



Now comes something that makes excel incredibly powerful and it is important that you understand what happens. Excel can duplicate values in cells quickly by dragging or 'copying' formulas across the spreadsheet. In the below I have a number of columns that I need to sum the values of. This can be accomplished quickly by clicking the little square at the bottom of the highlighted cell. Hold the mouse button in and drag the mouse across the columns.



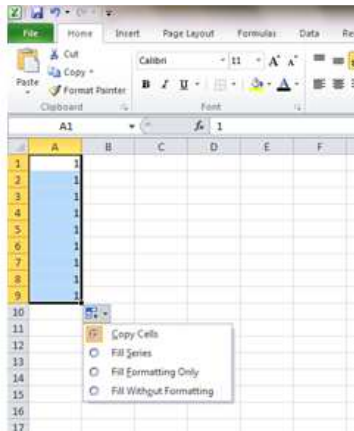
When you release the mouse button it will copy the SUM formula from cell A6 into the highlighted cells.



Now you will notice that it didn't copy the formula exactly! It copied the 'principle' of the formula. Cell C6 is now =SUM(C1:C5) and not =SUM(A1:A5) like our original formula. When you copy and paste a formula from one cell to another it takes the next cell in the sequence of your formula. If I

drag horizontally it moves cell references from A1 to B1 to C1 etc. If I drag vertically it will change from A1 to A2 to A3. It is really important that you understand how copy and pasting works in excel. This also applies when you use the shortcut Ctrl C to copy and Ctrl V to paste from one cell to another.

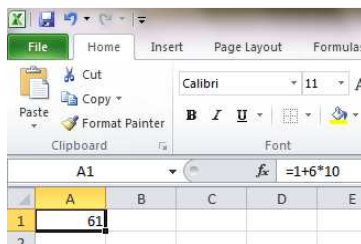
When you have a cell with text in it and you click on the little right hand box and drag to copy it, Excel will copy the text exactly. This is because there is no sequence that excel can adjust, text is text. When you drag sequences such as numbers it will give you the option to copy exactly or to fill the sequence. If you choose fill series it will adjust the cells to 1,2,3,4... This also works with dates (click on the box that shows up to get the drop down list of options).



If you drag a cell with a formula that has a **cell reference**. It will, as discussed above change the cell referenced, from A1, B1, C1... horizontally and A1, A2, A3 vertically. We will discuss how this can be adjusted later on.

The last part of the introduction that I want to discuss is that excel does not function like a calculator. In other words when you enter a calculation into the formula bar excel follows mathematical principles and not the sequence of the input like a calculator does.

For example the formula $=1+6*10$ in excel will calculate as 6 multiplied by 10 + 1 = 61. Not as $1+6 = 7 * 10 = 70$. This is important to remember. If you want to change the order use the brackets $=(1+6)*10$ to make Excel calculate in a specific order.



The order in which Excel and in general maths calculates formulas is as follows;

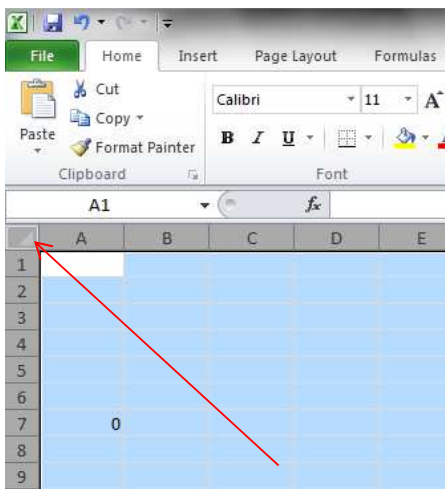
- Parentheses (Brackets)
- Exponents (To the power of)
- Multiplication (*) and division (/)
- Addition (+) and subtraction (-)

NAVIGATION

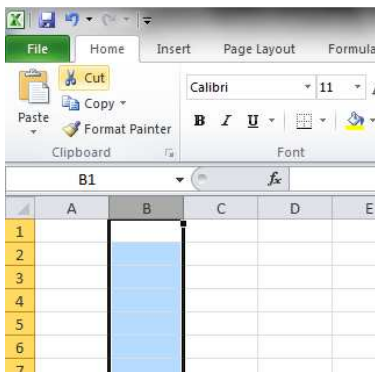
Ok so we have discussed a few introductory topics to give you a taste of how Excel works and now we are going to go into each topic in greater detail, remember if any of my explanations on a topic are unclear use Google, many people have encountered similar problems and there will be numerous explanations.

Ok so in the beginning it might be easier to use mainly the mouse for navigation. As you become more familiar with Excel you will most likely start to use more shortcut keys.

Note you can move across the spreadsheet with the mouse wheel, the arrow keys, or the sliders at the right and bottom of the screen, page up/down etc... If you get lost on your spreadsheet Ctrl Home will take you back to the beginning Cell A1.



Ok so it is possible to select multiple cells in excel. If you click on the area that the arrow is pointing to it will select every cell in the spreadsheet. If you click on the letter of the column or number of the row it will select all cells in that column or row. This can be useful in copying and pasting.

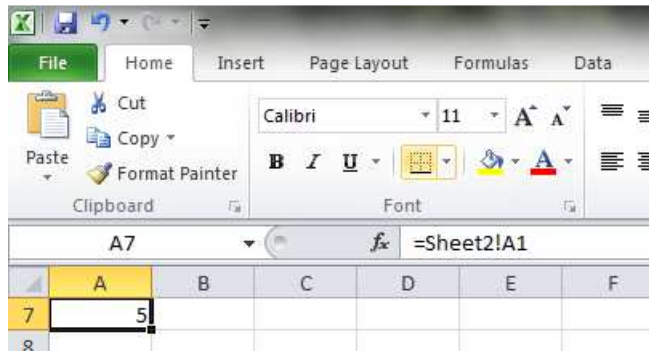


Each Excel file has multiple spreadsheet pages. At the bottom of the page you will see the following.



You can change the name of the worksheet by right clicking on them. The tab that the cursor is pointing to allows you to add another sheet, you can add as many as you like. The benefit is that you can split your data over multiple sheets in order to make it more understandable and usable.

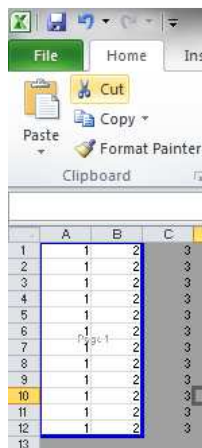
Now it is still possible to have relationships between cells on different worksheets, for example in the cell below A7 on sheet 1 one is now equal to A1 on sheet2 as can be seen in the formula bar.



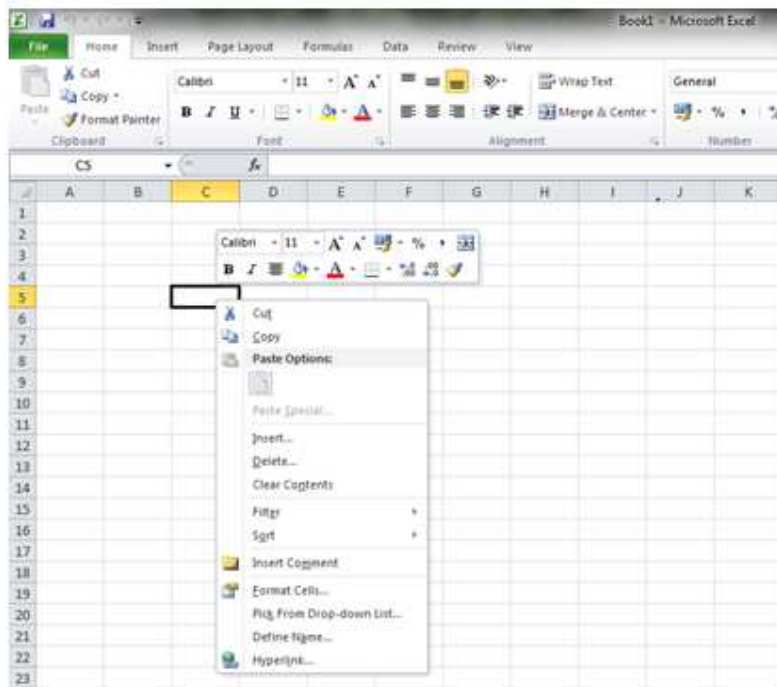
It is important to note that when making cells equal to each other you can enter the description or an easier way is it put an = sign in the cell you want to show the value and then click on the original cell, Excel will then automatically enter the cell reference. Note, not only can you build relationships with cells across different worksheets but you can also build relationships between different Excel files.



On the bottom right of the spreadsheet you will see three little icons and a slider bar. The slider will zoom in or out of your spreadsheet. The other little buttons are different types of layouts. The one on the far right one is the print preview button which shows the print margins as per the below. You can drag the blue margins around to set your print area. The one on the far left is the normal view. Click on the icon to select which view you want.



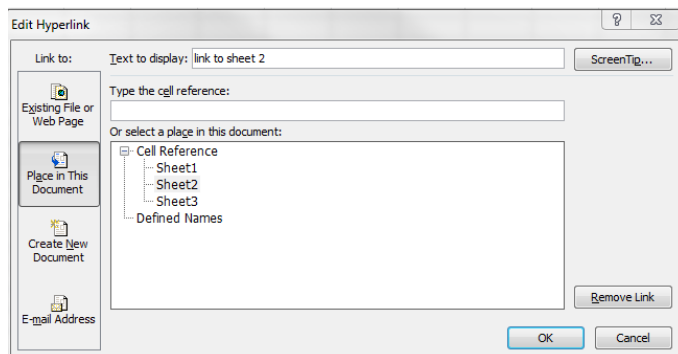
So when you left click on a cell select it selects that cell. If you right click on a cell it brings up a number of other options.



Cut, Copy, Insert, Delete, Clear Contents are reasonably self explanatory. Ignore filter for now. Insert comment allows you to insert an explanation into the cell. If a cell has commentary it will show a small red triangle in the top right of the cell. Hover over it to see the commentary, alternatively once a comment is entered you will have a show/hide comment option. Enter a comment and see.

Format cells allows you to change the type of data in the cell. You can change format of the cell to general, accounting, date, text etc... we will discuss this later.

Hyperlink allows you to move between/link quickly between files, spreadsheets, websites etc.... They are very useful. The below shows how to move to a place in the same spreadsheet, just fill in the fields and hit ok (Note selection on the left hand side which specifies what you are linking to).



Right clicking on the letter of a column or number of a row will also show you a similar number of options with which you can experiment.

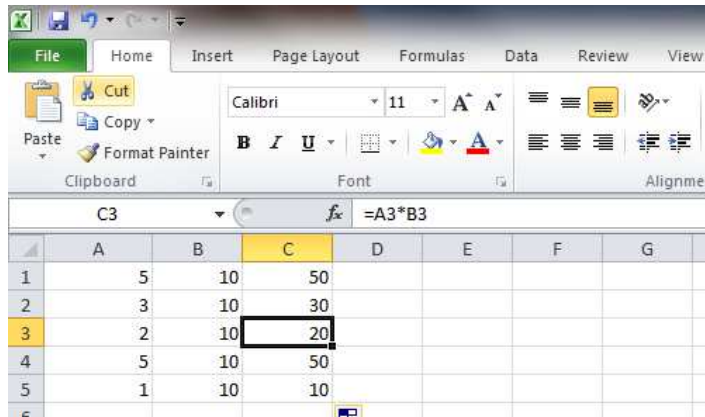
Here are some navigation shortcuts and tips, play with them and see exactly what each one does (Adapted from Excel for Dummies).

Arrow keys(↑↓←→)	Complete cell entry and move cell cursor one cell in direction of the arrow
Shift+arrow keys	Highlight cells in direction of arrow (Hold shift in)
Shift+Ctrl+Arrow	Highlight cells to end of row or column (Direction of arrow)
Enter	Complete cell entry and move cell cursor down one row
Shift+Enter	Complete cell entry and move cell cursor up one row
Ctrl+Enter	Complete cell entry in all cells in selected range
Alt+Enter	Begin a new line in a cell entry (Useful for text)
Tab	Complete cell entry and move cell cursor right one column
Shift+Tab	Complete cell entry and move cell cursor left one column
Esc	Cancel current cell entry
Ctrl +	Insert cell (Highlight row/column to insert whole rows or columns)
Ctrl -	Delete Cell (Highlight row/column to delete whole rows/columns)

BASIC FORMULAS

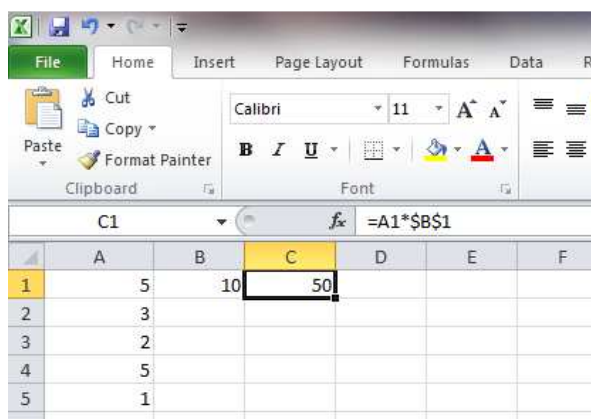
Previously we discussed dragging and copying formulas from cell to cell. In this section we are going to go into this principle more in depth as well as learn about dollarisation.

In the below we have a set of numbers in column A, what we want to do is multiply each number by 10. One option is to put a 10 next to each number in column B and then in column C put the formula $=A1*B1$ and drag this formula down the rows.



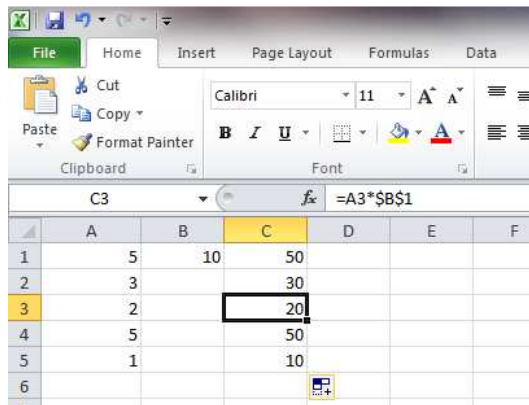
	A	B	C	D	E	F	G
1	5	10	50				
2	3	10	30				
3	2	10	20				
4	5	10	50				
5	1	10	10				

Once we have done this is done you can see C3 is now $=A3*B3$. I dragged down so you can see the row numbers change but the columns remain the same. There is an easier way to do approach this problem and it uses dollarisation. Basically dollarisation allows us to fix a cell so that it does not change when we drag the formula.



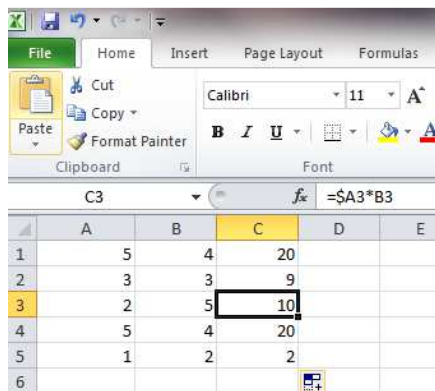
	A	B	C	D	E	F
1	5	10	50			
2	3					
3	2					
4	5					
5	1					

In the above I have dollarised cell B1. The formula reads $=A1*\$B\1 . Now when I drag the formula down the following will happen.

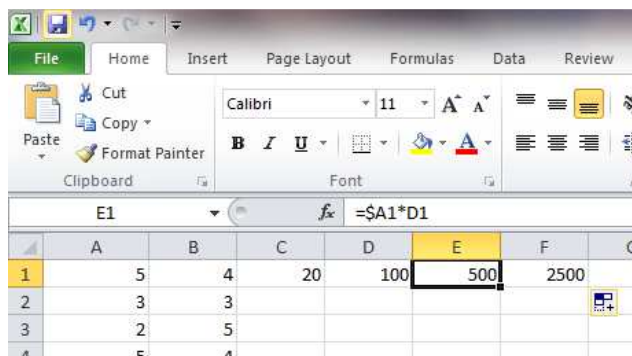


You can see that the formula $=A1*\$B\1 changed to $=A3*\$B\1 . The un-dollarised column A followed the normal Excel sequencing rule. However the dollarised cell $\$B\1 stayed constant. This dollarisation can be very useful when dragging formulas.

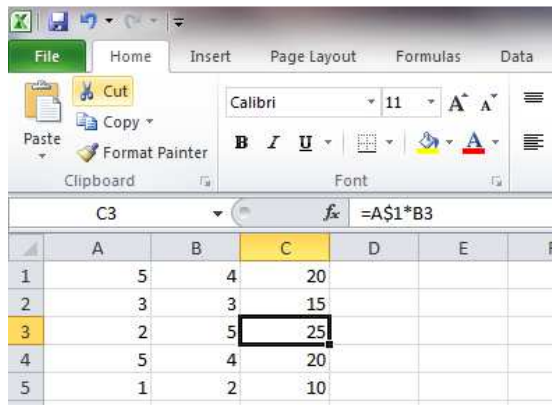
Dollarisation does not stop there, you can also lock the cell horizontally or vertically. For example in the following formula $=\$A1*B1$ I have only locked the cell from changing horizontally. It will still change vertically when I drag the formula.



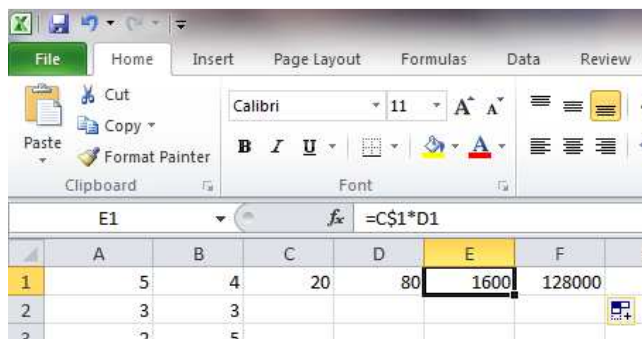
As you can see when I copy the cell downwards it follows the normal excel logic. However if I drag it horizontally you can see the it locks cell $\$A1$ in the formula.



You can also lock the formula vertically using the $=\$A1*B1$. You can see when I drag downwards A1 remains constant. If I drag the formula horizontally then it will follow the normal excel sequencing.



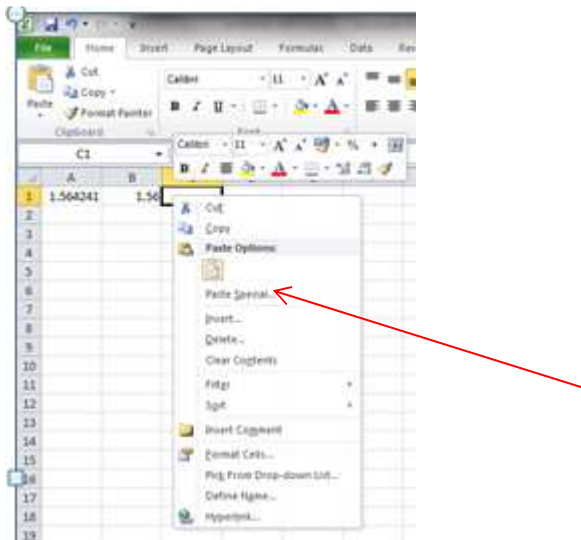
In other words when I drag horizontally it will not lock on A1



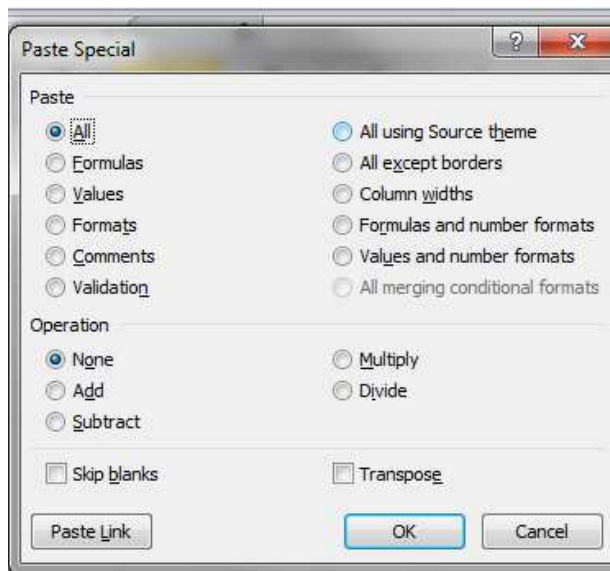
Play with this function as it is a very important part of excel, make sure you understand it. When you are typing in a formula F4 is the shortcut key to dollarise a cell. Tap F4 to cycle through the three types.

A quick tip If you want to quickly copy a cell Ctrl ' will copy the exact formula from the cell above. If you highlight the row Ctrl ' enter will copy the entire row of formulas above to the highlighted cells below.

We have learnt how to use the standard excel logic when copying and pasting cells as well as dollarization. Excel has a few extra tricks up its sleeve. For example, if you get the answer from a formula and now you want to copy the answer and not the formula you can do the following. Click on the cell you want to copy, right click on it and select copy (Ctrl C shortcut). Now go to the cell that you want the value in and right click on it, you will get the following pop up.



Select the Paste Special option and the following pop up will appear.



All is the default selection. Paste special gives you a number of options. If you select values, it will paste the answer not the formula. Formats will paste only the cell formatting etc...

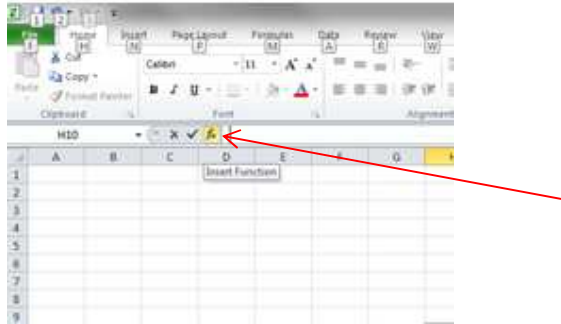
Under operation you can see add, subtract, multiply and divide. These are useful and do exactly what they say. If you select add, it will add the value that you have copied to the destination cell. A neat trick if you need to change values from positive to negative or vice versa is to copy a cell with the value -1 in it and paste special multiply over numerous selected cells.

Another useful paste special option is the transpose button. This will convert data that you have copied in a column to a row and vice versa, give it a try.

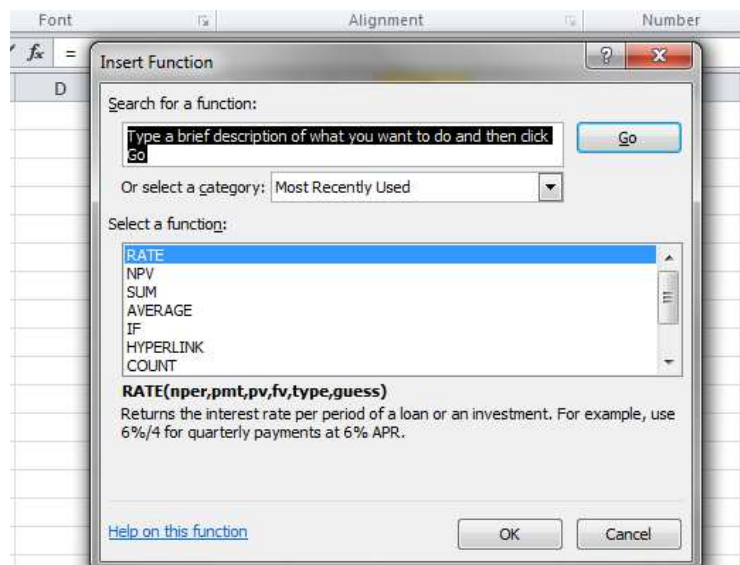
Note, that when you cut a cell (Ctrl x) Excel will remove the cell entirely from the workbook and any linked cells will display the #REF error (which we will come to later). Pasting will return the value but not the links.

USING FUNCTIONS

After having learnt some of the logic of excel I think it's time to move onto some basic formula functions. If you click the little fx button next to the formula bar it will bring up a tool that allows us to choose/search for functions in excel.

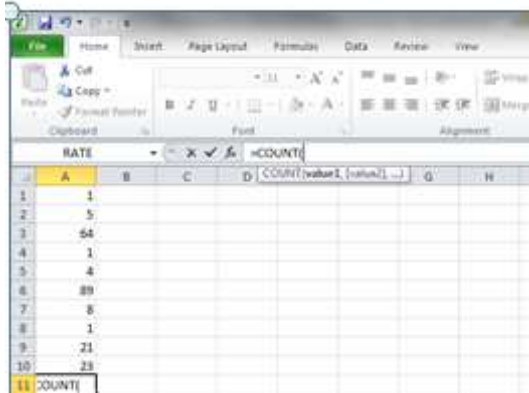


As you can see there are numerous functions to choose from. You can enter a brief description of what you are trying to do and Excel will give you function options. If you need any help with a particular function, Google.

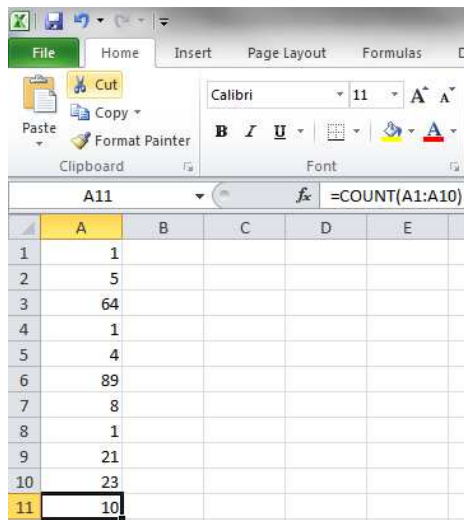


I am going to run through a few of the most common functions. So we have already looked at the SUM function. Other common functions include; COUNT, ROUND, AVERAGE, CONCATENATE.

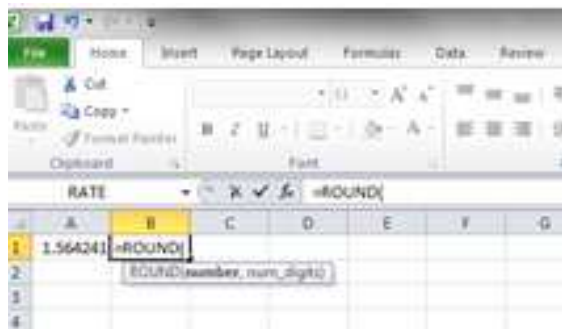
Let's first look at COUNT. Count enables us to count the number of values in a specified range. Very importantly, if I enter a function we must use an = and put the values between brackets (). Excel helpfully provides a description of how the formula works while you are entering it. Sometimes it is a bit obscure but you will get used to deciphering it.



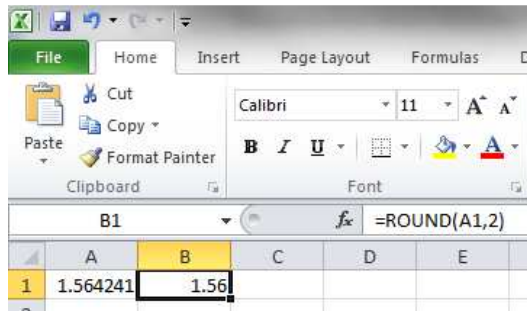
As you open the brackets below the formula bar Excel tells you what order and which values need to be entered. Count is a simple formula and you can see =COUNT(value1, value 2....), basically Excel is asking you to enter which values it must count. Here you could enter each cell individually, =COUNT(A1,A2,A3,A4...) or I can select a range of cells by clicking and dragging the mouse over them as per the below. Note that it counts values not cells. If a cell in the range doesn't have a value inputted it won't be counted. Delete the value in one cell and see (click on the cell backspace or del).



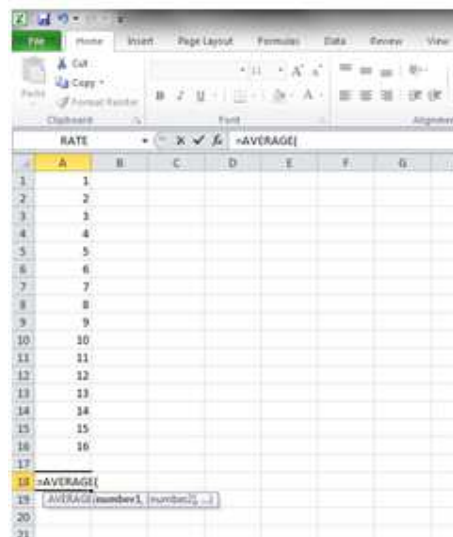
The next formula is ROUND. As the name states round enables us to round a number to a specific number of digits. Again as we enter the formula excel tells us what it needs.



Excel says the formula must be as follows =ROUND(number, num_digits) Firstly we have to tell Excel which number we want to round, we could enter a value however here I am going to click on cell A1, REMEMBER each Excel input into a formula is separate by a **comma** , Excel then asks you for num_digits. This refers to how many points you wish to round the number to. I want it rounded to 2 decimal places so my formula will be =ROUND(A1,2) You can see the result below.



AVERAGE will calculate the mean of a bunch of selected values.

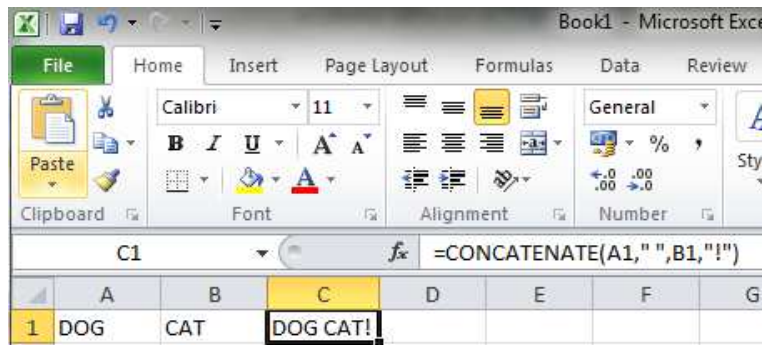


Again it asks for =AVERAGE(number 1, number 2...) same principle as COUNT. Select each cell or select a range of cells.

CONCATENATE allows us to combine the text in two different cells together. For example in cell A1 I have written dog and in cell B1 I have written cat. Concatenate will allow me to combine these two cells into one. The excel explanation for CONCATENATE is as follows, =CONCATENATE(text1, text2...). This means we need to select the cells or range of cells with **text** that we need to combine. If I want to include any other text such as a space I need to include it in the formula using " " .

Therefore the formula with a space would be =CONCATENATE(A1," ",B1) . The quotation marks show Excel that the value between them is text. Any value can be included between the text indicators such as punctuation or even a complete word. Below I have inserted a space and an exclamation mark at the end. There are other useful text functions like RIGHT, LEFT etc... (Google) that can also

be used to manipulate text by shortening the text in a cell to a specified number of digits from the right or left etc... Remember you just need to understand the principles which you can then apply to any function you wish.

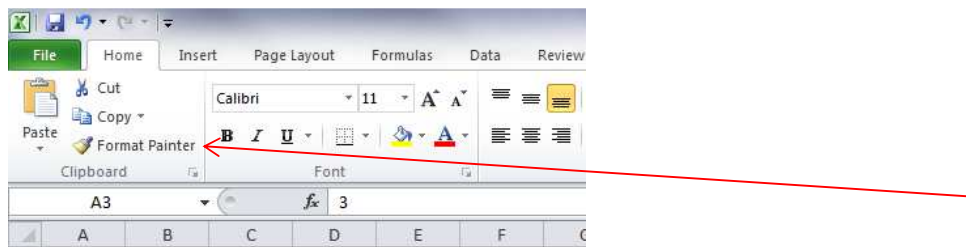


When we enter our formula incorrectly into excel it will often display a completely incomprehensible error message. The below decodes them into English, somewhat (Source; Excel for Dummies)

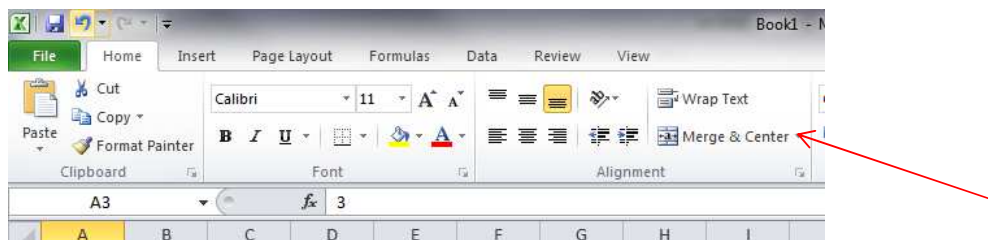
- **#DIV/0!** Appears when the formula calls for division by a cell that either contains the value 0 or, as is more often the case, is empty.
- **#NAME?** Appears when the formula refers to a range name that doesn't exist in the worksheet. This error value appears when you type the wrong range name or fail to enclose in quotation marks some text used in the formula, causing Excel to think that the text refers to a range name(" ").
- **#NULL!** Appears most often when you insert a space (where you should have used a comma) to separate cell references used as arguments for functions.
- **#NUM!** Appears when Excel encounters a problem with a number in the formula, such as the wrong type of argument in an Excel function or a calculation that produces a number too large or too small to be represented in the worksheet.
- **#REF!** Appears when Excel encounters an invalid cell reference, such as when you delete a cell referred to in a formula or paste cells over the cells referred to in a formula.
- **#VALUE!** Appears when you use the wrong type of argument or operator in a function, or when you call for a mathematical operation that refers to cells that contain text entries.

FORMATTING

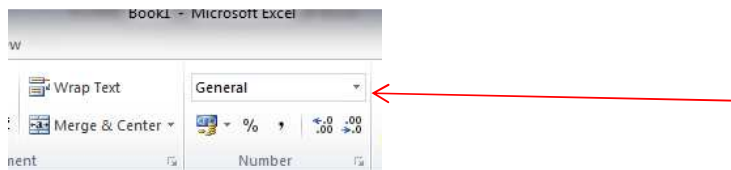
Let's take a break from formulas and functions for a bit and talk a little about formatting. It is possible to change the cell colour, font colour, font type etc... A very useful tool when formatting is the format painter. The format painter copies the format in one cell to another/range. Double clicking on the format painter will lock it in format painter mode (Click on it again to unlock).



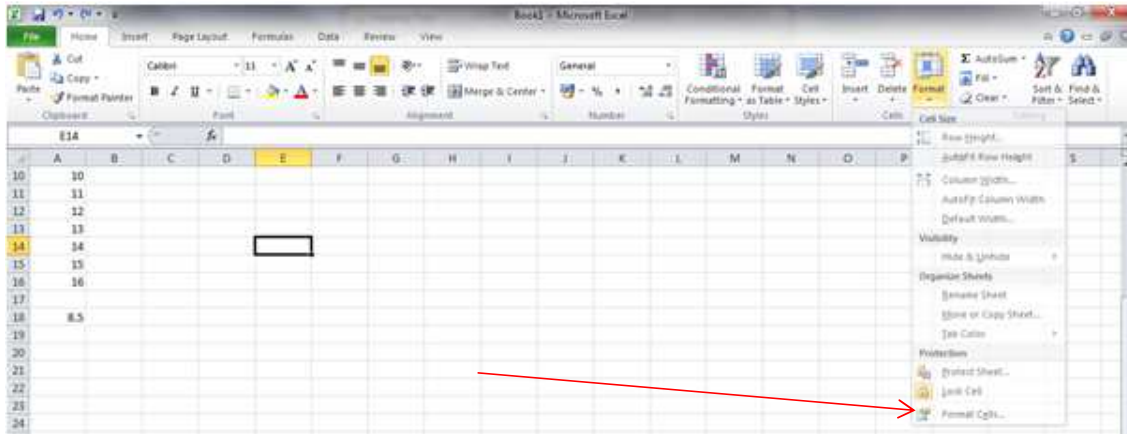
Merge and wrap text are useful tools as well. Wrap text fits all the text into one cell so that it doesn't overlap into the next cell.



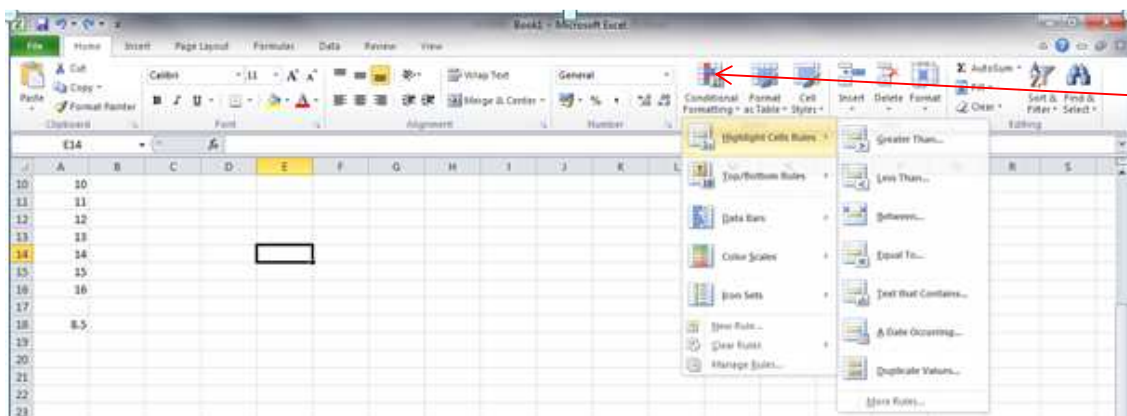
Merge and centre combines the highlighted cells into one cell and centres the value in the now supersize cell.



The next set of buttons on your toolbar relates to the type of format in a cell, basically they're 'readymade' ways of displaying data. The percentage makes all entries into the cell percentages. The , turns the cell into accounting format with the , number separators. You might encounter a situation where Excel is recognising your numbers as text, or it is recognizing something you want as text as a number. Fiddle with the format of the cell (text vs general) or even use the text to columns function (Google). There are a number of format options which can be explored in the following spot.



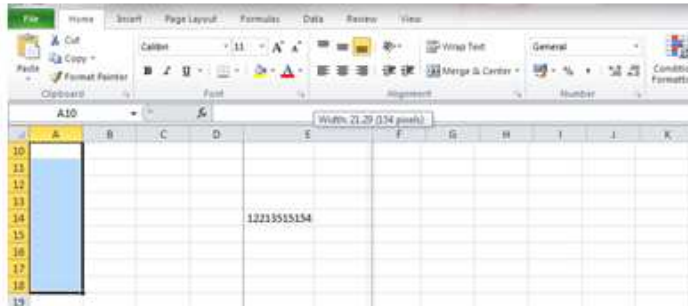
Another useful formatting tool is conditional formatting.



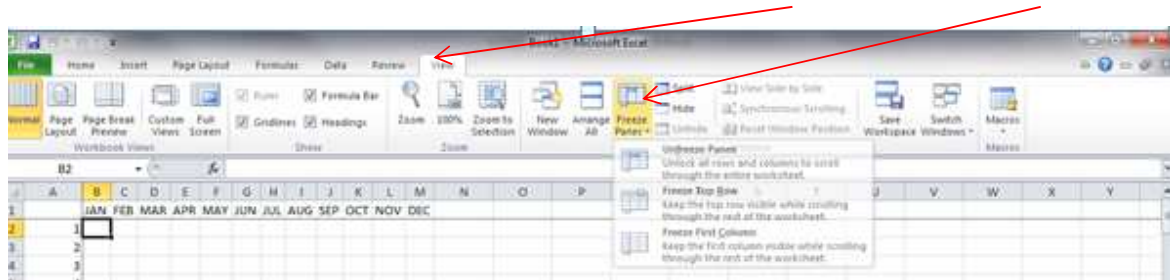
Basically you can format cells based on a set of rules. For example you can highlight cells with a value greater than 5 quickly and effectively with conditional formatting. Conditional formatting gets quite advanced as you can even use a formula to determine which cells formatting must be applied to. Again if you find yourself with the need to highlight cells based on certain criteria, conditional format is your man, and Google is your friend.

You might encounter the following strange cell reference when you are using excel. The repeated hash ### indicates that the column is not wide enough to display the value in the cell A1. You can make the column or cell broader by hovering the mouse on the line between two columns and then clicking and dragging to the desired width. If you double click on the line it will make the column just wide enough to display all values properly

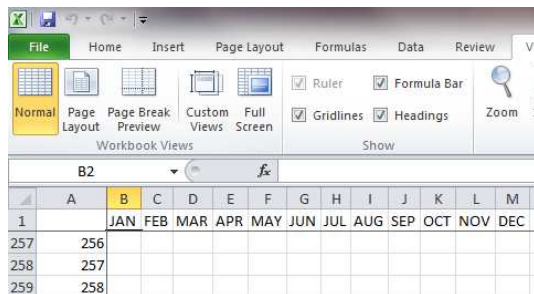




Another useful tool when displaying your data is freeze panes. To get to freeze panes go to the VIEW tab and then select freeze panes

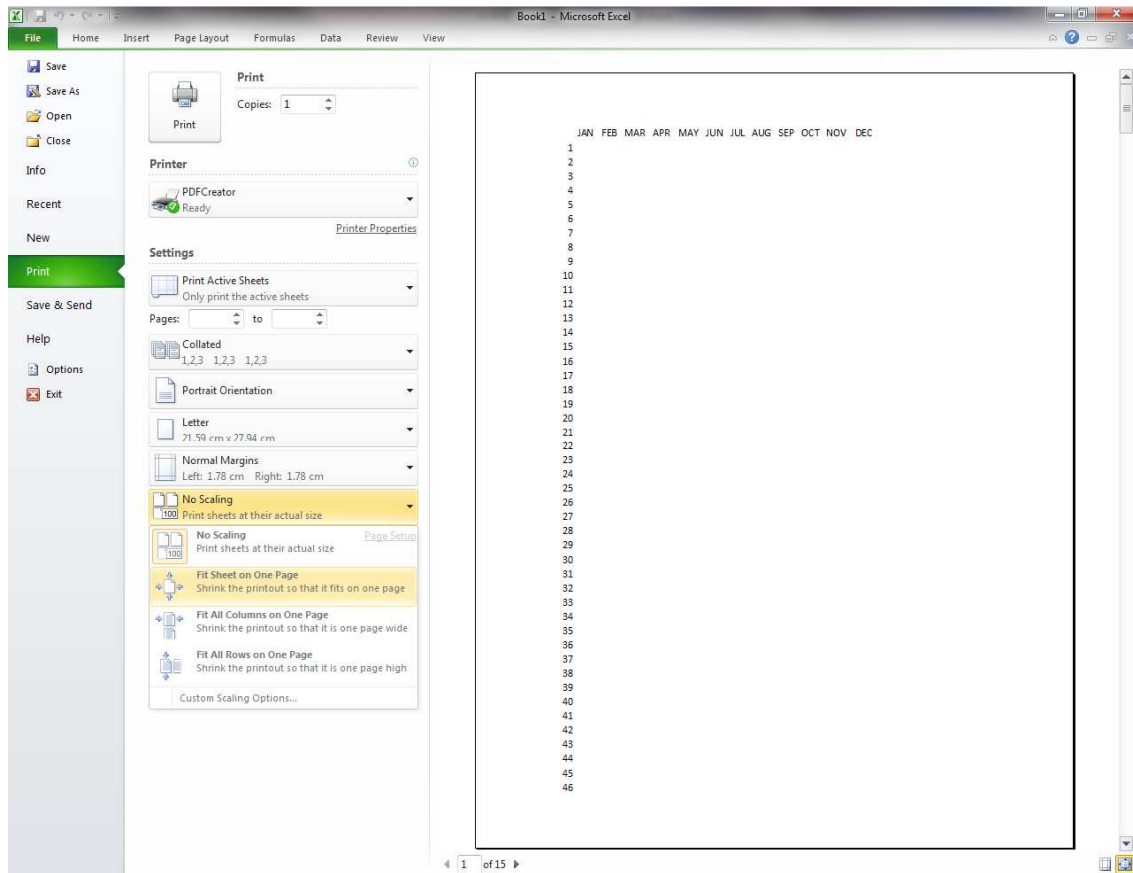


Freeze panes freezes the selected row and column so that even when you scroll down or across with the sliders or arrow keys the frozen cells remain visible. In the below you can still see row one despite the fact that I have scrolled down to row 257.



I have already discussed the print page break preview and dragging the blue lines to select pages. When printing a page often it is nice to quickly fit all data on the spreadsheet onto one page. Select the no scaling option and then you can select to fit the sheet on one page or all columns/rows on one page.

Print active sheets changes to selection (highlighted cells only) or entire book (all spreadsheets in the workbook, not just the active one).

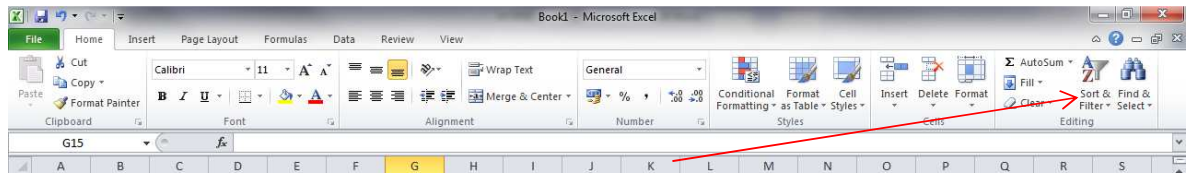


A useful tip when working with text is that you can change text to capitals or small letters using the =LOWER or =UPPER functions. Or you can use the =PROPER function which would capitalise the first letter of text.

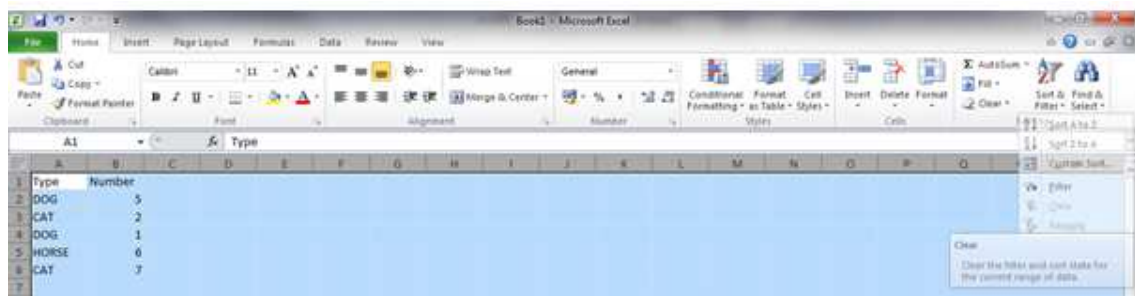
Formatting in excel can be very comprehensive and you can make it as pretty as you like. You can put things in tables using the format as table button next to conditional formatting. Basically the possibilities are endless just play and explore.

FILTERING AND SORTING

The last aspect of the Home toolbar that I want to discuss is filtering and sorting.

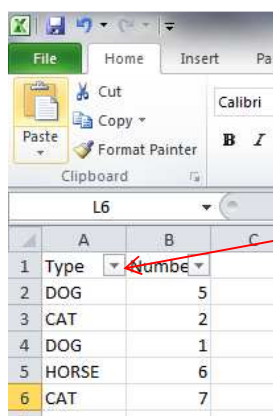


Filtering and sorting allows you to manage large amounts of data easily in Excel. Firstly you need to highlight the cells that you want to sort or filter.

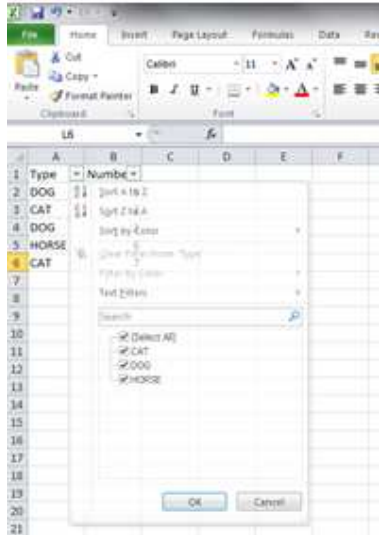


When you click on the sort and filter button it will give you drop down list, select the filter option.

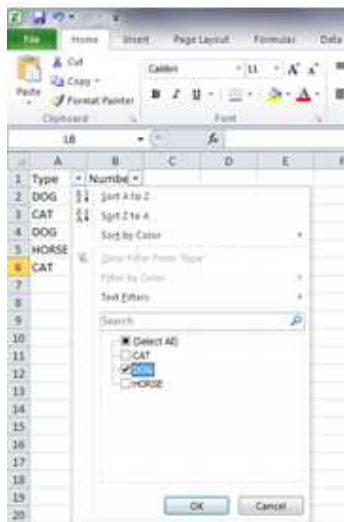
You will notice that little grey buttons appear on your spreadsheet.



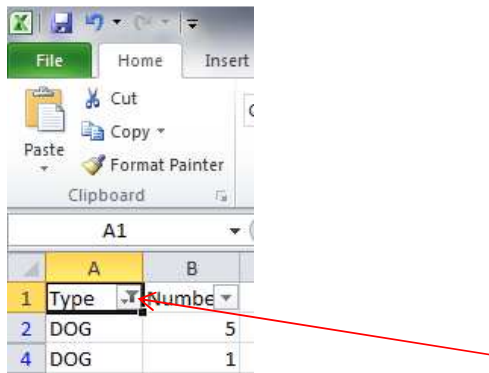
If you left click on the little grey arrow button at the top of column A it will give you a drop down list as per the below.



You will see that there is a list of all the values in the cell with a ticked box next to their name. Click on the select all box to deselect everything and then click on the DOG box.



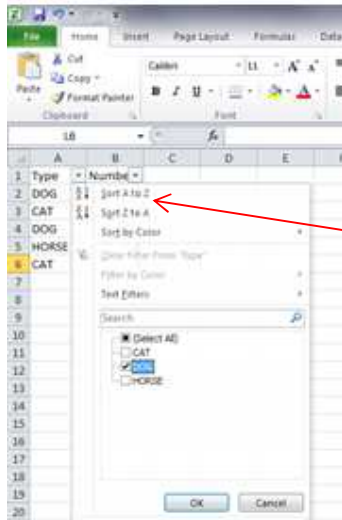
When you hit the OK button it will hide all the cells except for cells with DOG in them.



You will notice that the filter arrow has changed slightly which means that a filter is on.

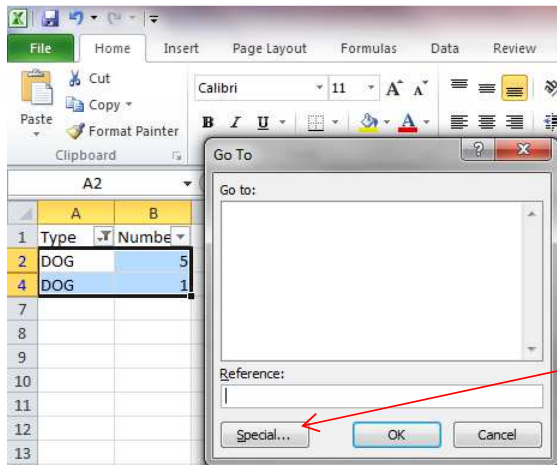
You can also filter using colour. For example if you highlight cells via formatting or even conditional formatting you can then filter on the results using colour (it is an option on the drop down list).

You will see that there is also a Sort function on the drop down filter button.

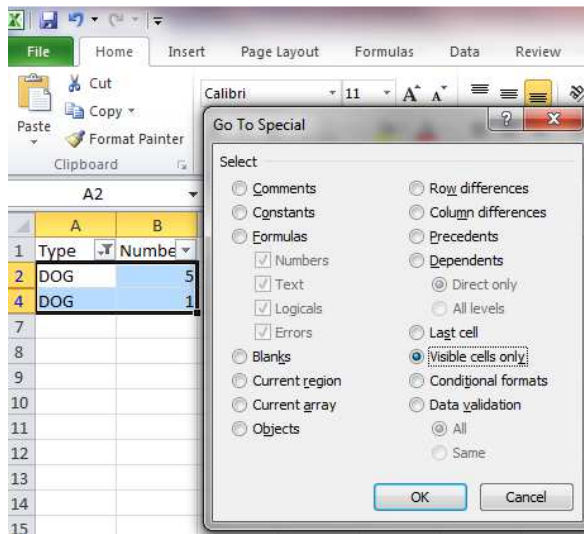


This will sort the results in numerical or alphabetical order. Be careful when using sort especially if you have applied a filter. Note that it will sort the entire row, i.e. the columns will remain aligned. You can use custom sort under the sort and filter icon on the toolbar to perform more complex sorting of various columns.

Remember that when filters are applied and you highlight a group of cells or try to paste next to the cells it might not work correctly. This is because Excel is still working with **all** the cells despite the filter being applied. If you want to select only the visible cells you can do the following. First highlight the cells you wish to use and then hit Ctrl G on your keyboard.

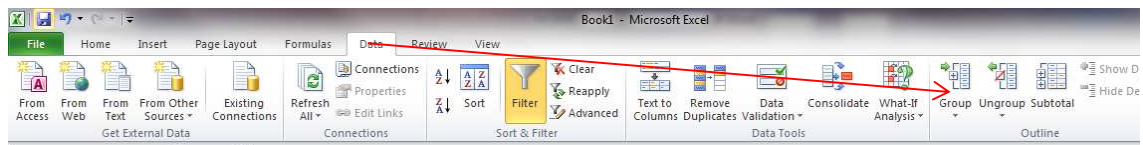


Hit the special button and then the following pop up will come about

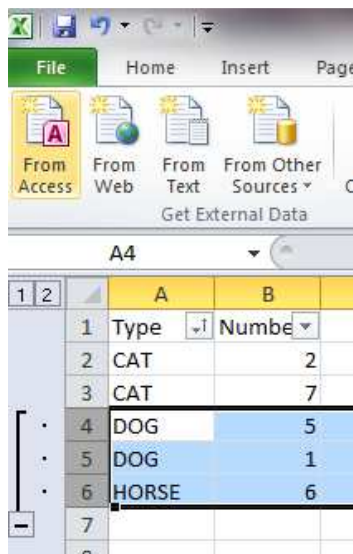


Select visible cells only and then hit ok. The result is that you will only select the cells that you highlighted, any hidden cell will not be affected.

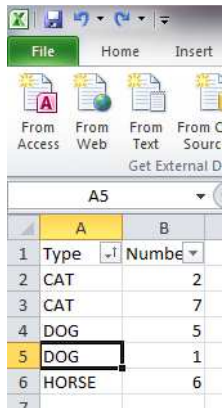
A few useful functions that also help sort data that I am briefly going to discuss under the Data tab are group/ungroup and subtotal.



Not that you can group a bunch of rows or columns together. Highlight a bunch of rows or columns and select the group icon. By clicking on the – or + sign you can hide/unhide rows or columns

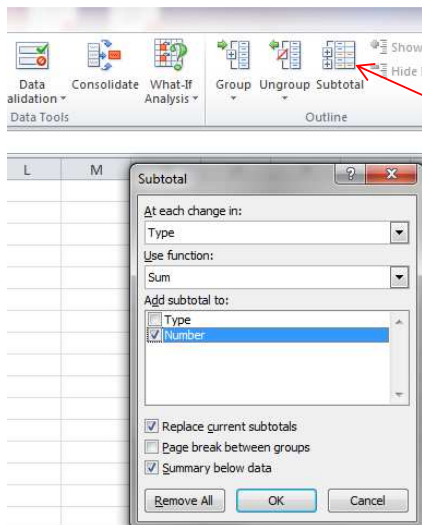


Ok, so I sorted the data A to Z, you will see that the filter button is different again, this indicates that a sort has been applied to the column.

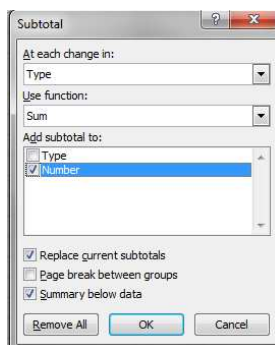


	Type	Number
1	CAT	2
2	CAT	7
3	DOG	5
4	DOG	1
5	HORSE	6
6		
7		

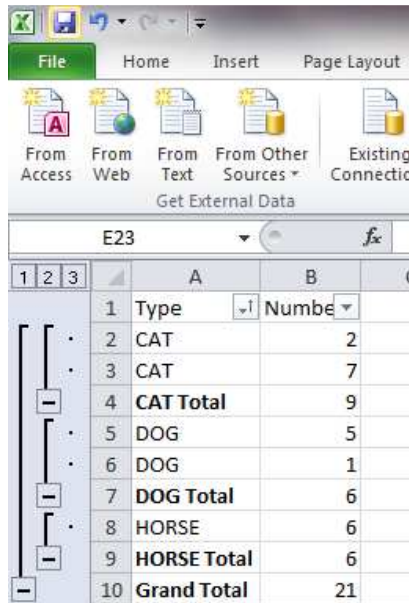
What I want to do now is show you how the subtotal function works.



After highlighting my data I click on subtotal the following Pop Up appears . The first option specifies 'At each change in", this means that it will add a subtotal in when the values in the specified column change. I select the column that I want which is the TYPE column (note heading Column A). The "use function" tells it what you want to do, count, sum etc... I want it to sum. The last selection says which column must it SUM as a subtotal, here I am going to select 'number' column B.



Once I hit OK the following will happen to my data. Excel will provide a total each time the value in the column A 'type' changes. It also groups the data for added convenience.



The screenshot shows the Microsoft Excel interface with the 'Get External Data' ribbon selected. Below the ribbon, the PivotTable is displayed with the following data:

	A	B
1	Type	Number
2	CAT	2
3	CAT	7
4	CAT Total	9
5	DOG	5
6	DOG	1
7	DOG Total	6
8	HORSE	6
9	HORSE Total	6
10	Grand Total	21

IF FUNCTIONS

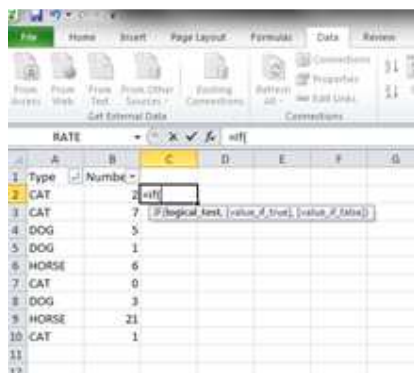
Lets look at some more advanced formula functions in excel, the so called IF functions. IF functions use logical arguments in order to sort or manage your data. The logical arguments can be,

- equal to (=)
- not equal to (<>),
- great than (>),
- great than or equal to (=>),
- less than (<),
- less than or equal to(=<)

Don't be put off, the IF functions are really useful and so spend some time getting to understand them.

Starting with the simplest IF fuction =IF()itself

When I enter =IF(in a cell excel will again tell us what it requires for the function.



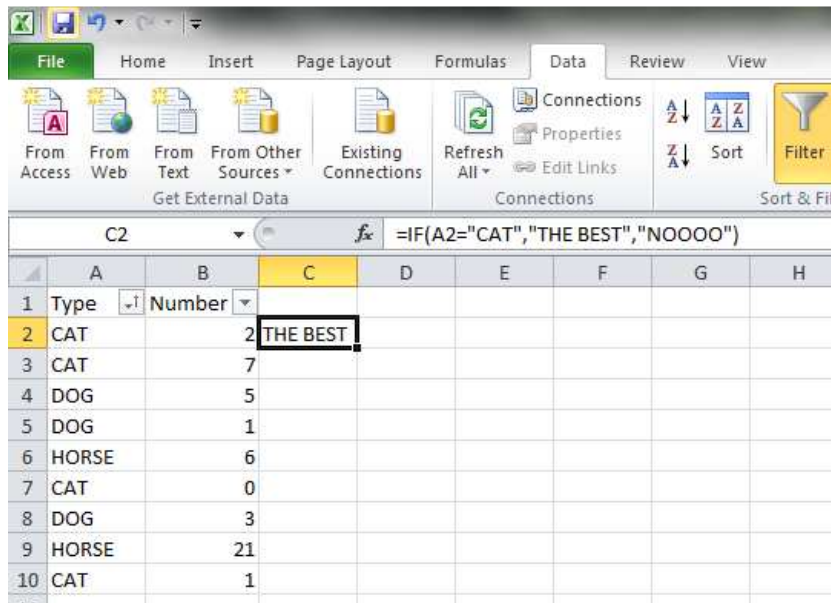
=IF(logical_test,[value if true],[value if false])

Firstly I need to input a logical test. Here I am going to say, If cell A2 is equal to CAT which would be =IF(A2="CAT", in Excel language. Note that I must enter any text inbetween quotation marks " " when I use it in a formula.

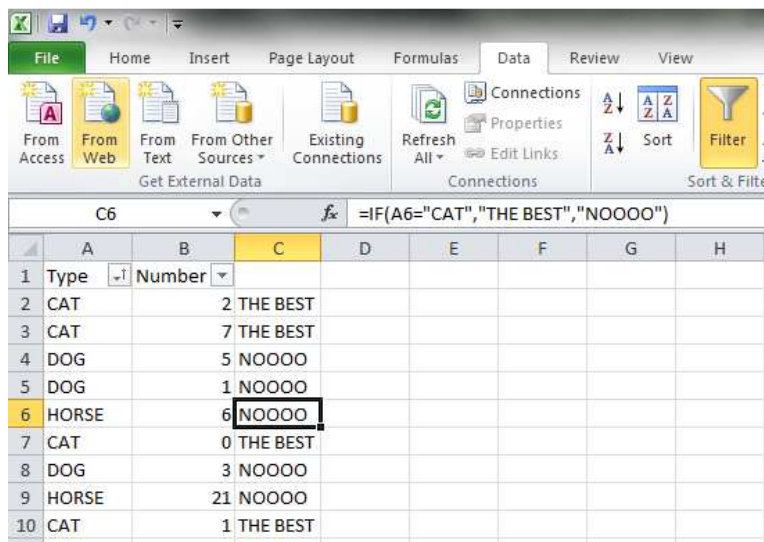
The next step is [value if true]. Here we enter what we want to happen if the logical test is true, i.e. if A2 does in fact = "CAT". Here I am going to input text again so I need the quotation marks again "THE BEST". So my formula so far is =IF(A2="CAT", "THE BEST",

The next part of the formula says what must the result be if the logical test is false i.e. A2 is not equal to CAT. Here I am going again use text "NOOOO"

So my ultimate formula would be =IF(A2="CAT","THE BEST","NOOOO")



When I drag the formula down due to excels sequencing logic the logical test will change from A2 to A3 to A4 etc...



You can see the result above.

Now I used text just to illustrate how the formula works. But you can use cell references, formulas, dollarisation, just about anything you want in each part of the formula as needed.

For example, I am going to use cell references and dollarisation to achieve the same effect. I have entered values in column F as I want to use it as cell reference.

	A	B	C	D	E	F
1	Type	Number				
2	CAT	2				CAT
3	CAT	7				NOOOOO
4	DOG	5				THE BEST
5	DOG	1				
6	HORSE	6				
7	CAT	0				
8	DOG	3				
9	HORSE	21				
10	CAT	1				
11						

Ok, so the first part of the formula is the logical test. Here I going to use the same logic if A2 is equal to cat but I am going to use cell F2 as a reference and make it =IF(A2=F2. Remember though if I drag that down it will change from =IF(A3=F3 due to excel sequencing. Therefore I must dollarise F2, so my logical test would be =IF(A2=\$F\$2\$,

Next step is the value if true. Again here I want to use a cell reference cell F4 which I also need to dollarise due to Excels sequencing. So my Formula so far would be =IF(A2=\$F\$2\$,F\$4\$, Note that I don't need to put =F\$4\$ as excel already performs the logical test, basically the , serves as the separator. **DON'T FORGET THE COMMA ,**

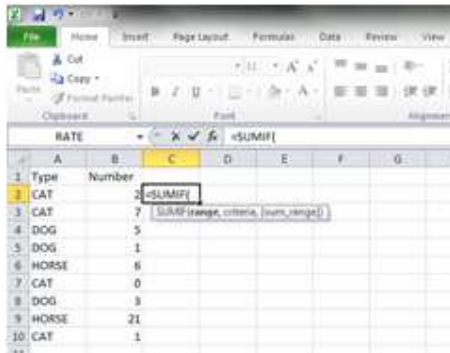
Next step is value if false. I also want to use a cell reference , F3. Again I must dollarise. My total formula will now read. =IF(A1=\$F\$2\$,F\$4\$,F\$3\$)

	A	B	C	D	E	F
1	Type	Number				
2	CAT	2	THE BEST			CAT
3	CAT	7	THE BEST			NOOOOO
4	DOG	5	NOOOOO			THE BEST
5	DOG	1	NOOOOO			
6	HORSE	6	NOOOOO			
7	CAT	0	THE BEST			
8	DOG	3	NOOOOO			
9	HORSE	21	NOOOOO			
10	CAT	1	THE BEST			
11						

I know the formula now looks like a lot of squiggly nonsense, but don't be intimidated by it. Remember the formula, =IF(Logical test, then, else). The dollarisation just locks cells so they don't change when I drag the formula. Whatever you fill the test and results with is totally up to you, the possibilities are endless.

The next IF formula I want to look at is SUMIF. Basically SUMIF will add the values in a column if a certain criteria is met.

When I enter the beginning of the formula in to Excel it tells us the requirements of the formula.
 =SUMIF(range,criteria, sum_range)

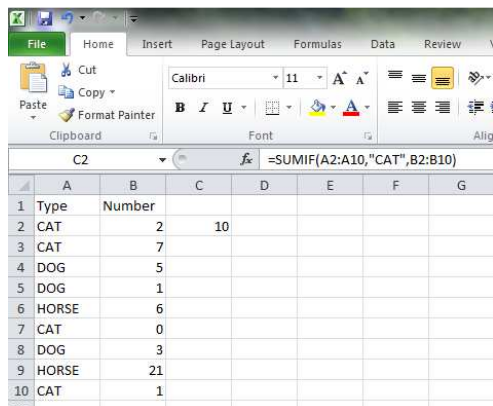


Lets discuss what Excel wants. The first variable 'range' relates to the range in which Excel must look for the requirement that it needs to SUM. Here the range would be =SUMIF(A2:A10,

The next requirement 'criteria' is what value is Excel looking for in order to include it when it SUMS the values, here I am going to use text "CAT" (note that you can use a cell reference etc...). So the formula now reads =SUMIF(A2:A10,"CAT",

The next criteria is 'sum_range' which relates to the range in which excel should look for the values that it needs to SUM. Here the 'sum_range' would be B2:B10. Note that the Range and the sum_range need to be equal in length. In other words you could not put the sum range B2:B5 because the range has 10 values in it and the sum range would have only five.

The final formula would then be =SUMIF(A2:A10,"CAT",B2:B10). Remember if I want to drag the formula and I don't want to change the range you would have to dollarise the formula.



The dollarised formula would look like. =SUMIF(\$A\$2:\$A\$10,"CAT",\$B\$2:\$B\$10). Note that if you dragged that formula anywhere on the sheet the answer would remain 10. If you wanted to sum DOGS you would need to change the criteria from "CAT" to "DOG".

The same principles apply for =COUNTIF =AVERAGEIF etc...

IF functions become even more powerful when I need to do something with multiple requirements in the logical test. For this we are going to add the AND OR functions to the formula. Please note that when you use multiple functions in a formula that you need to get your **brackets right!**

First lets include the AND function into an IF function. The beginning of the formula would look like this =IF(AND(It is very important that you note the way the brackets have been opened. The AND function tells Excel to look for multiple variables in the logical test. Here I am going to require that A2="CAT" AND that the number of cats must be greater than 2.

My logical test would now look like this =IF(AND(A2="CAT",B2>2), That is the logical test in excel language. PLEASE NOTE THAT I CLOSED THE 'AND 'FUNCTION BRACKETS TO TELL EXCEL I AM DONE WITH THE 'AND' FUNCTION INPUT.

If you remember the next criteria it is what to do if the logical test is TRUE. Here I will have Excel say "YAY" thus the formula becomes =IF(AND(A2="CAT",B2>2),"YAY",

The last requirement if the value if false which we are going to make "AHH" so our whole formula would now look as follows.

=IF(AND(A2="CAT",B2>2),"YAY","AHH") Note that I close the IF function brackets at the end when I am done entering all the arguments for the function. The result of the formula would be as follows.

	A	B	C	D	E	F	G	H
1	Type	Number						
2	CAT	2	AHH					
3	CAT	7	YAY					
4	DOG	5	AHH					
5	DOG	1	AHH					
6	HORSE	6	AHH					
7	CAT	0	AHH					
8	DOG	3	AHH					
9	HORSE	21	AHH					
10	CAT	1	AHH					
11								

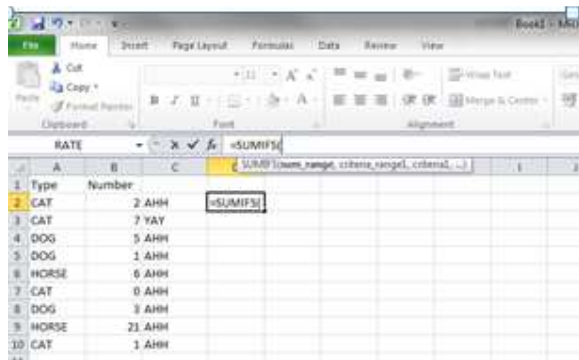
Note that only cell C3 has the value YAY in the cell as the number of all the other cats is 2 or lower. The logical test states greater than 2.

The OR function works very similiarly. Except the OR function tells Excel that if any of the specified criteria are true then it will return the 'true' portion of the function. Note that in the AND and OR functions you can have endless requirements and not just two as per the example.

To summarise the AND OR functions, AND requires that all the logical tests are TRUE in order to return the TRUE value. Whereas the OR function only requires one of the logical tests to be true in order to return the TRUE value.

The last bit of torture that I am going to put you through is using =SUMIFS which sums values using multiple criteria.

When I enter =SUMIFS(sum_range, criteria_range1,criteria1,...)

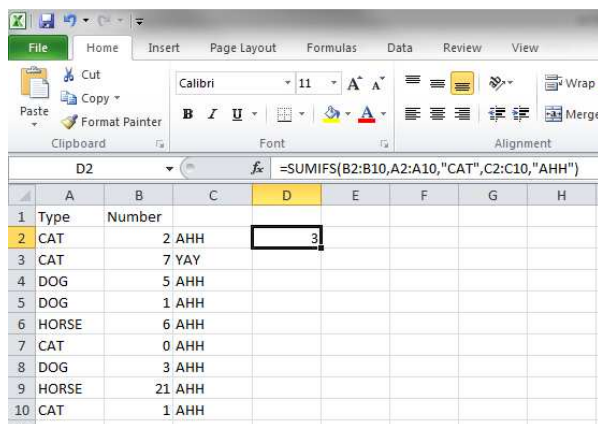


It is very similar to SUMIF however the order of the data entry changes. The first item 'sum_range' is the same as in SUMIF it's just first instead of last. It relates to the range in which excel should look for the values that it needs to SUM. Here the 'sum_range' would be B2:B10,

The next part of the formula refers to criteria_range, criteria1,... which is reasonably self explanatory. The first criteria_range we are going to use is A2:A10 and the criteria1 is going to be "CAT". Our formula so far is going to look like =SUMIFS(B2:B10,A2:A10,"CAT")

Now we are going to add our next criteria to be included in the sum formula. We are going to say that values with CAT that read AHH should be counted. So the criteria_range is C2:C10 and the criteria is "AHH".

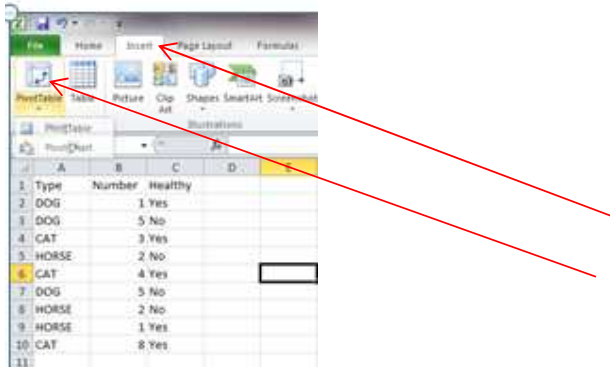
Our final formula would look like =SUMIFS(B2:B10,A2:A10,"CAT",C2:C10,"AHH"). Excel has summed all values in column B where column A=CAT AND COLUMN C=AHH.



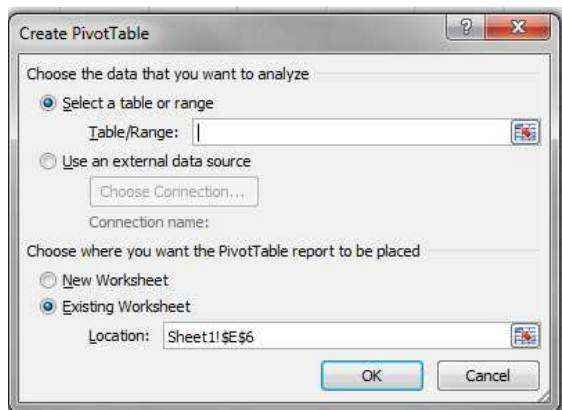
The purpose of discussing IF formulas was not to make you an expert on them. All I am trying to do is give you an introduction to them so that you can experiment with them. Remember more important that your Excel skills are your Google skills. You can find so much information on Excel online, you just need to have the confidence to play with Excel and look for quicker and new ways of accomplishing things.

PIVOTS & VLOOKUPS

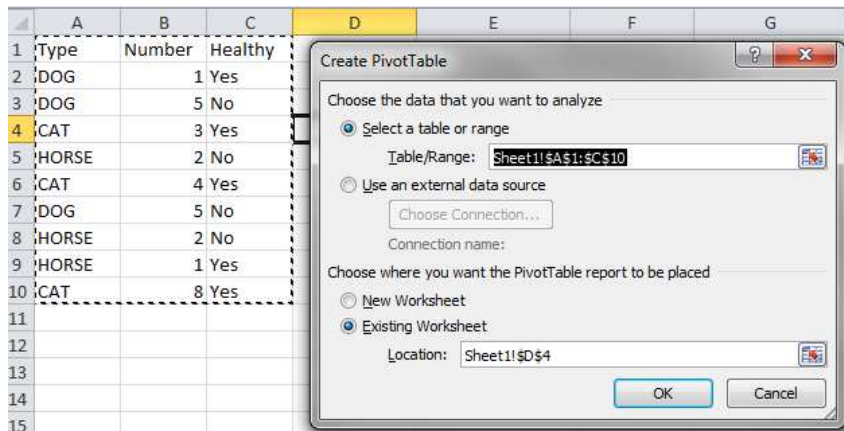
A very powerful tool for organising your data in Excel is called a pivot table. Basically pivot tables can take massive amounts of data and summarise it quickly and efficiently.



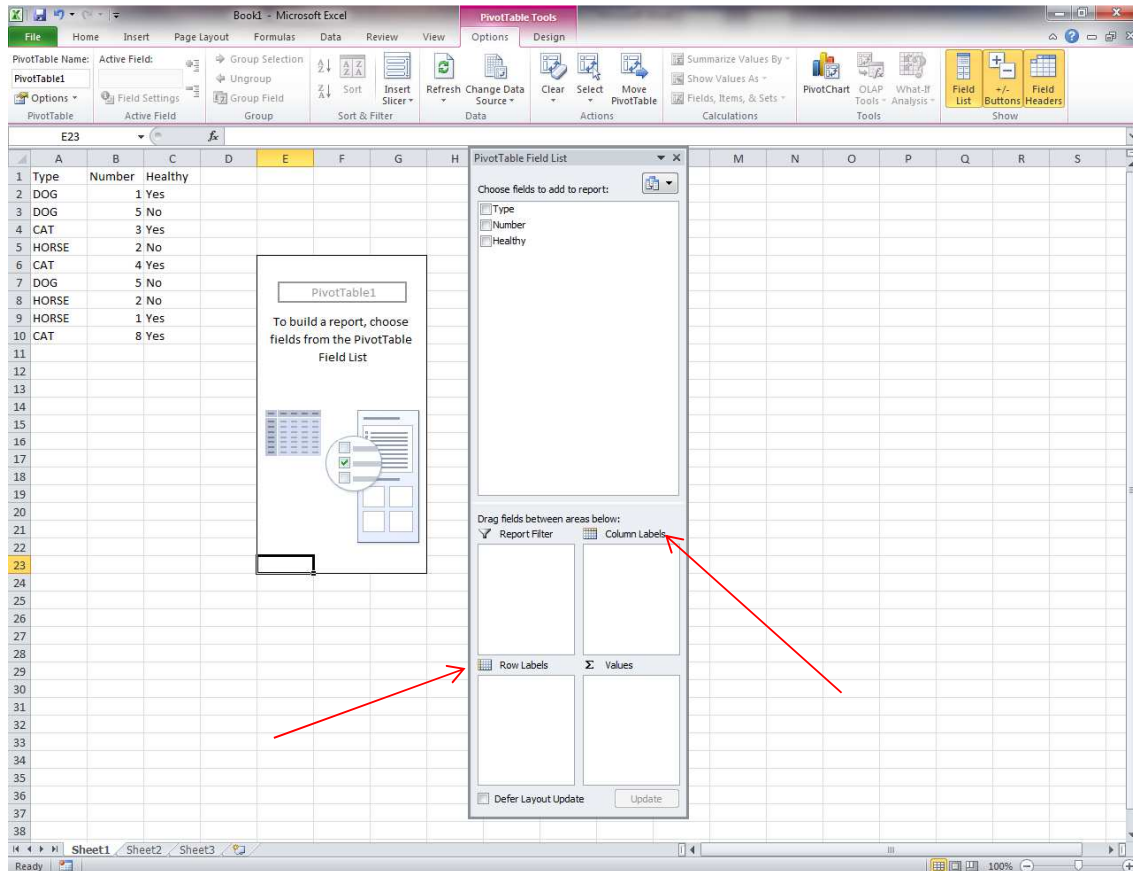
Pivot tables can be found under the Insert Tab. When you click on Pivot table under the drop down list the following pop up appears.



The first option is to choose the data that you want to analyse, here I am going to click in the Table/Range line, and then highlight the data with my mouse. You could enter the location manually or click on the box at the end to locate and enter your data.



The Location selection line just specifies where you want the Pivot table to appear. I am going to leave it on the existing worksheet and hit ok. You should see something like the following on your screen. If an error message is displayed when you are selecting your data it is most like that there is a cell in your array that is blank, i.e. has no value.



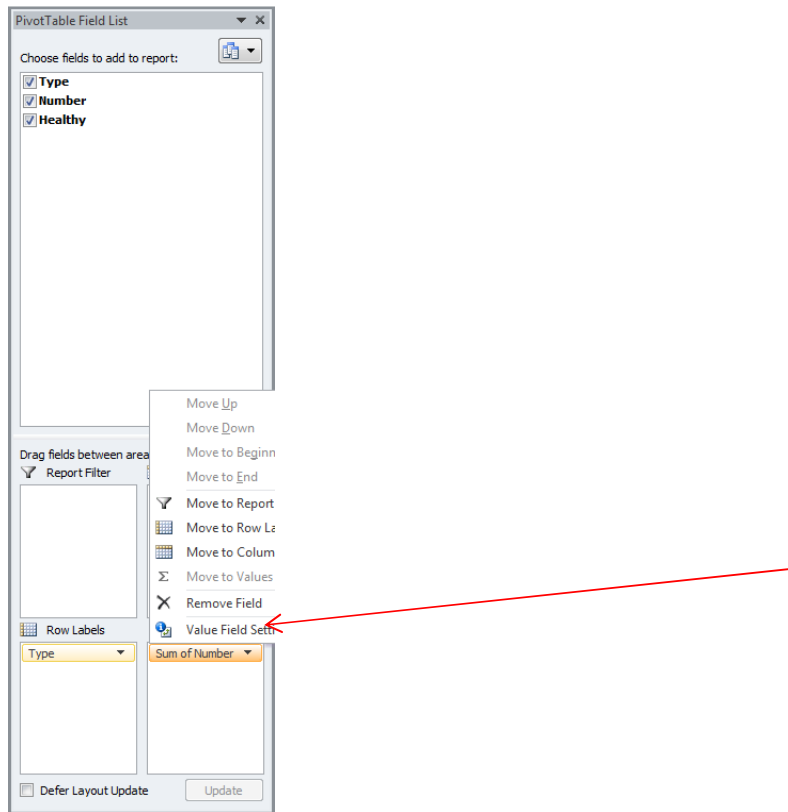
So a pivot table is basically a summary of your data. How you want to display the data is up to you. I am going to drag the fields that I want displayed into the relevant parts of the pivot table. I want the data under the column A 'type' to be on the row labels (vertical axis). I want column B 'healthy' to be on the column labels (horizontal axis). So I click and drag the values from the "choose fields to report box' down to the relevant box underneath. You should see something like the below, your pivot table is beginning to take shape.

The screenshot shows an Excel spreadsheet with a PivotTable. The data source is a table with columns 'Type', 'Number', and 'Healthy'. The PivotTable is set up with 'Type' as Row Labels and 'Healthy' as Column Labels. The Values field is currently empty. The PivotTable Field List task pane is open on the right, showing 'Type' in the Row Labels area, 'Healthy' in the Column Labels area, and 'Number' in the Values area. The 'Defer Layout Update' checkbox is checked.

Type	Number	Healthy
DOG	1	Yes
DOG	5	No
CAT	3	Yes
HORSE	2	No
CAT	4	Yes
DOG	5	No
HORSE	2	No
HORSE	1	Yes
CAT	8	Yes
		Grand Total

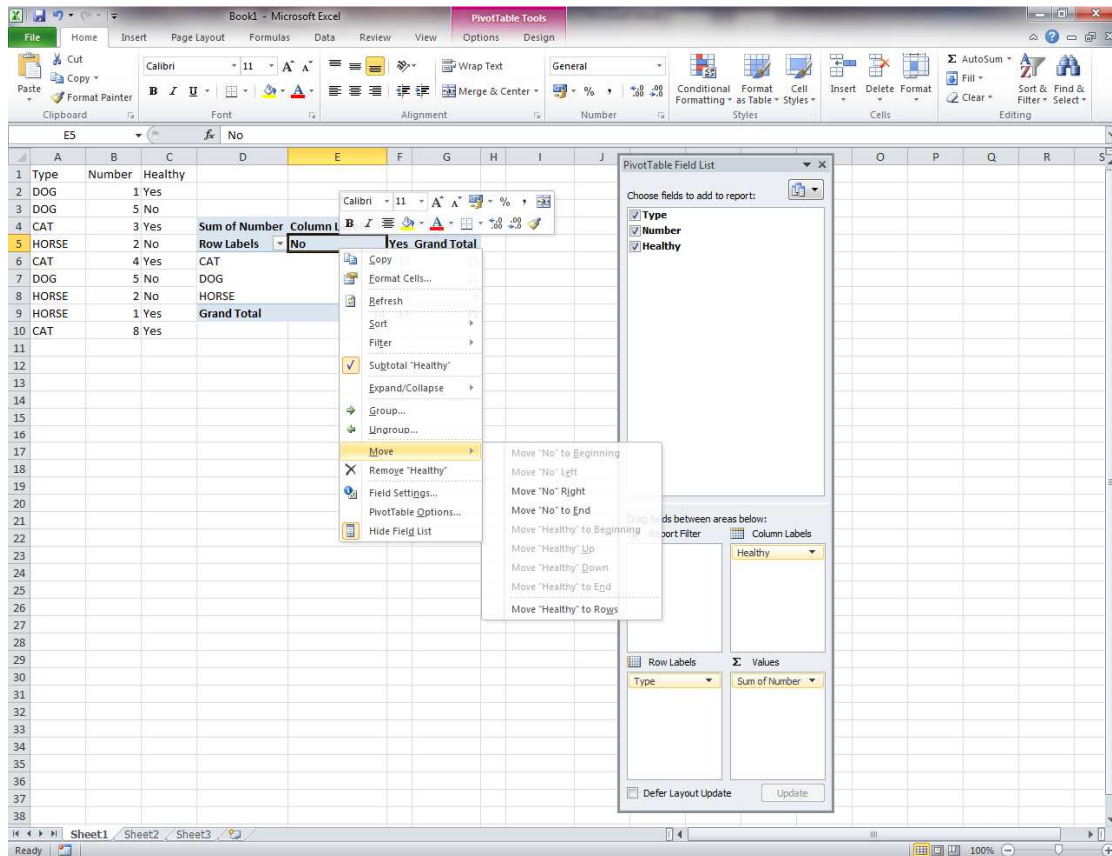
Now you can see that there are no values in the table. I want the values under the number column to be displayed on my table. So I drag 'number' down to values.

Note that under values it will say 'sum of number' or 'count of number etc'... In order to change the function click on the drop down list and select value field settings. I have changed mine to sum.



So now we have our pivot table. Which is a good summary of our data.

Sum of Number		Column Labels		
Row Labels	No	Yes	Grand Total	
CAT			15	15
DOG		10	1	11
HORSE		4	1	5
Grand Total		14	17	31



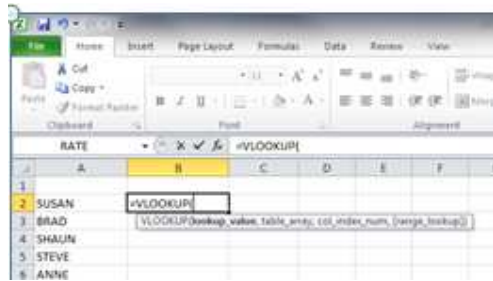
We can edit the format of the table to make it pretty and adjust whether there are subtotals etc... I want YES to be the first column so I right click on no and follow the relevant drop down lists.

Sum of Number		Column Labels		
Row Labels	Yes	No		Grand Total
CAT		15		15
DOG		1	10	11
HORSE		1	4	5
Grand Total		17	14	31

So my final table looks like the above. I can quickly see how many sick dogs or cats I have at a single glance. Play with the table, and I know I sound like a stuck record but if you have any issues, Google.

The final function that I want to discuss is =VLOOKUP which allows us to fetch data and transport it to a different location. I am going to work on two separate spreadsheets just to give you an example of how to work on multiple sheets (It doesn't have to be on a separate sheet).

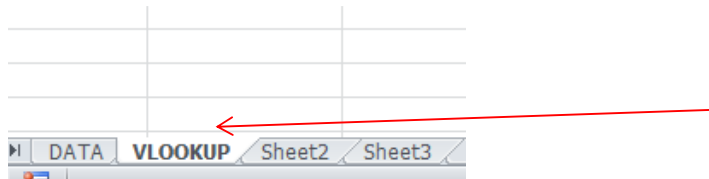
When I enter the function =VLOOKUP(Excel indicates that it needs the following data.



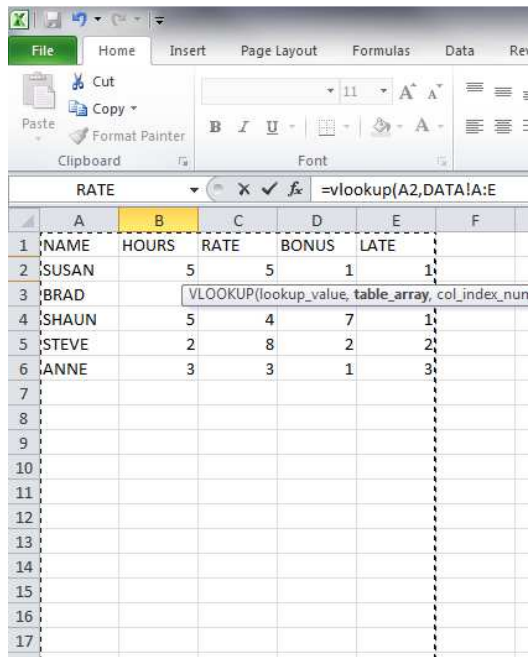
=VLOOKUP(lookup_value, table_array, col_index_num, [range_lookup])

The first argument in the function specifies what you want to look up. Here I want Excel to find the value Susan so I am going to specify =VLOOKUP(A2,

The next argument is 'table_array' which is the array or location that I want excel to look for the data. So after I have entered =VLOOKUP(A2, I am going to click on the bottom tab to take me to the data that I am reading from. I have named the tab data.



I highlight the 'array' which contains the data. You will note that I have highlighted the entire column by holding and dragging the mouse across the column letters and not on the spreadsheet itself. This is to simplify the need for dollarisation when I drag downwards.



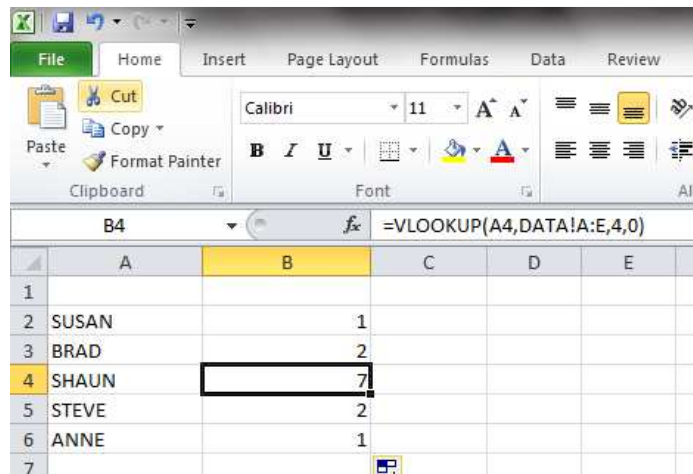
The next step after inserting the comma is col_num. This refers to the column number that I wish to return. VLOOKUP will look for the requirement in the first column of your array, once it finds the requirement it will return the data in the specified column. Please note that your requirement must always be in the first column of your array,

So basically I want it to look for Susan in the first column and then return the value in the 'bonus' column D. So I have to enter the bonus columns number in the array. So counting, including the first column, the column D 'bonus' is the fourth column in the array. So my the formula becomes,

=VLOOKUP(A2,DATA!A:E,4

The next aspect is [range_lookup] . This specifies if it should search for an exact match or not, 0 says exact match, usually just enter 0 for this argument. So the final formula is;

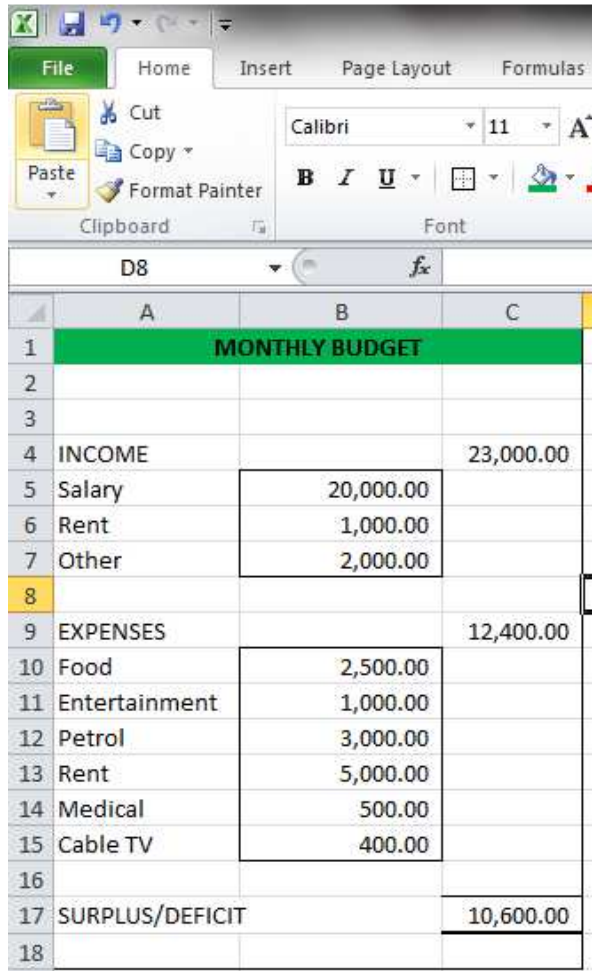
=VLOOKUP(A2,DATA!A:E,4,0)



You will notice that when I drag the formula down A2 becomes A3, A4 etc... However the array remains the same (DATA!A:E) even though it's not dollarised. Dont be confused remember if I highlight the entire column it cannot following sequencing as there are no numbers to move to, it is the entire column. Note that if I dragged/copied the formula across it would change based on the sequencing principle and I would have to dollarisation the reference if I wanted it to be constant.

MODELLING IN EXCEL

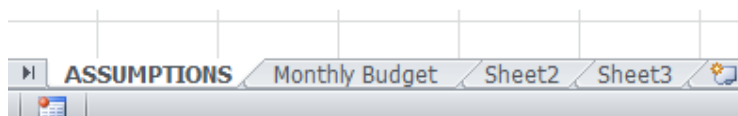
A lot of people use Excel for their monthly budgeting. Now you can do it simply by just writing a couple descriptions and entering amounts. Something like the below.



The screenshot shows an Excel spreadsheet with the following data:

	A	B	C
1	MONTHLY BUDGET		
2			
3			
4	INCOME		23,000.00
5	Salary	20,000.00	
6	Rent	1,000.00	
7	Other	2,000.00	
8			
9	EXPENSES		12,400.00
10	Food	2,500.00	
11	Entertainment	1,000.00	
12	Petrol	3,000.00	
13	Rent	5,000.00	
14	Medical	500.00	
15	Cable TV	400.00	
16			
17	SURPLUS/DEFICIT		10,600.00
18			

However Excel is a lot more powerful than this and can in fact be a lot more useful. I am going to show you a fundamental principle when modelling in Excel. When modelling it is really important to have an **assumptions page that all other spreadsheets link back to**. This helps you to keep track of your variables as well as easily make changes. So lets improve on the budget where I have just entered manual numbers into a cell. Firstly I need to create another spreadsheet that I am going to label Assumptions



Now on the assumptions tab I am going to build various assumptions into the budget.

	A	B	C	D
1	INCOME			
2				
3	SALARY		22,000.00	
4	Job 1	10,000.00		
5	Job 2	12,000.00		
6				
7	RENT		1,000.00	
8	Rent 1	600.00		
9	Rent 2	400.00		
10				
11	OTHER INCOME		900.00	
12	Bonus	300.00		
13	Interest	500.00		
14	Dividends	100.00		
15				
16	EXPENSES			
17				
18	FOOD		3,000.00	
19	Average shop	1000		
20	No Shops in month	3		
21				
22	ENTERTAINMENT		1,000.00	
23	Eating out	500		
24	movies	200		
25	partying	300		
26				
27	PETROL		1050	
28	Cost of tank	350		
29	Average tanks	3		
30				
31	RENT		2000	
32	Rent 1	2000		

You can see that I have built a number of assumptions into each line item. The items that are inside the blocks are 'hard coded' or manual inputs. I am now going to link this assumption sheet to my monthly budget tab.

The screenshot shows the Excel interface with the 'MONTHLY BUDGET' tab selected. The formula bar shows the formula for cell B5: `=ASSUMPTIONS!C3`. The spreadsheet data is as follows:

	A	B	C	D
1	MONTHLY BUDGET			
2				
3				
4	INCOME		23,900.00	
5	Salary	22,000.00		
6	Rent	1,000.00		

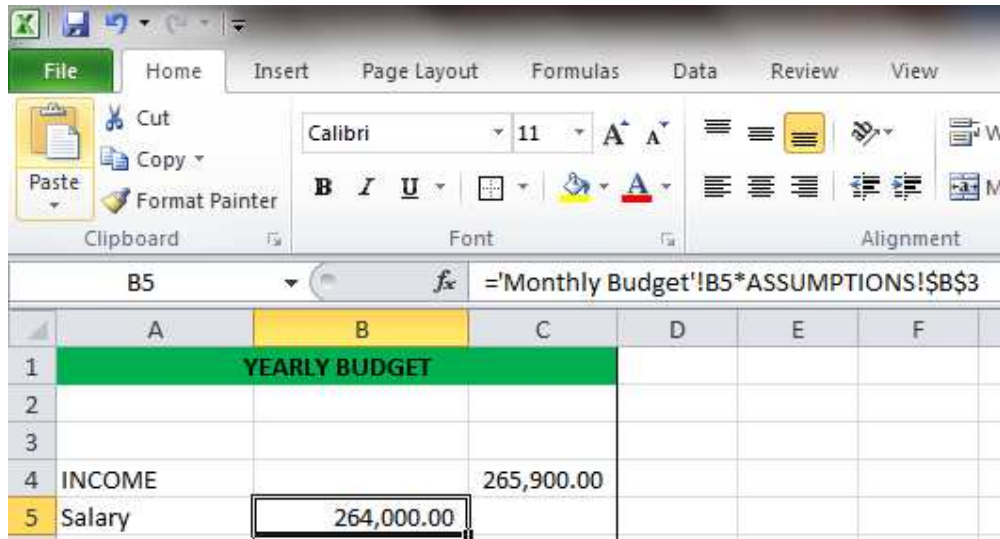
Now nothing on my Monthly Budget tab is hardcoded. Everything is linking back to the assumptions tab or is a SUM formula (INCOME). There is no hard coded data in the monthly budget tab.

The great thing about modelling like this in excel is that if there are any changes in your assumptions, for example you get in raise in your primary job or the cost of petrol goes up. You can change it on the assumptions tab and it will pull through automatically onto your budget page. Also if you have an addition to any category, for example you want to add a specialist DR visit under medical expenses you can easily do it under the assumptions tab.

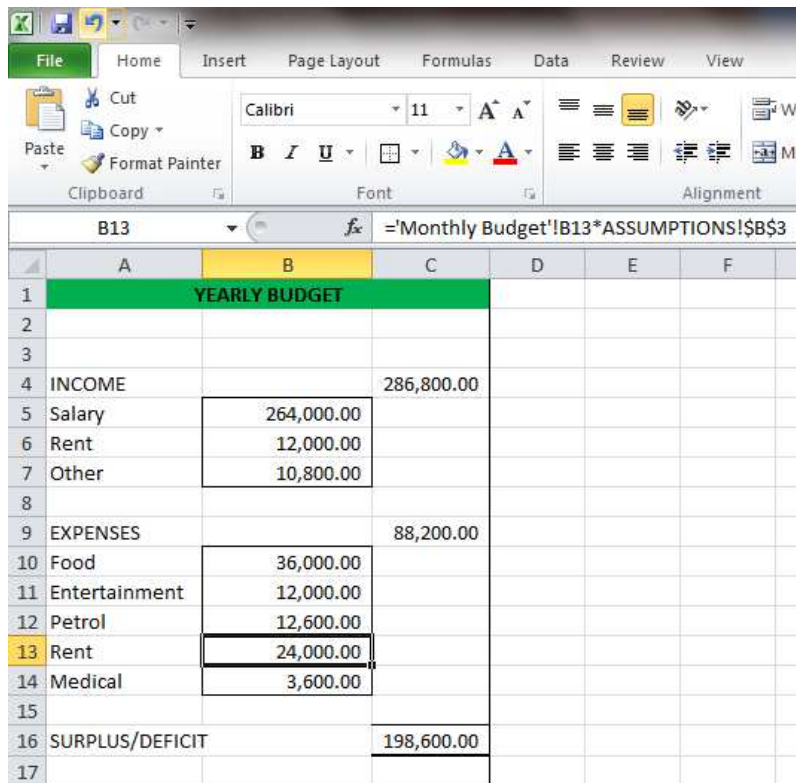
It is also often a good idea to put number of months, days in year etc in your assumptions. For example if I want to add a six month/yearly budget tab I can do it quickly and easily. Copy and past the monthly budget data onto a new spreadsheet and name it Yearly Budget. As you can see I have added 'number of months' on the assumptions page.

	A	B	C	D
1	BASIC ASSUMPTIONS			
2				
3	Number of Months	12		
4	Days	365		
5				
6	INCOME			
7				
8	SALARY		22,000.00	
9	Job 1	10,000.00		
10	Job 2	12,000.00		
11				
12	RENT		1,000.00	
13	Rent 1	600.00		
14	Rent 2	400.00		
15				
16	OTHER INCOME		900.00	
17	Bonus	300.00		
18	Interest	500.00		
19	Dividends	100.00		
20				
21	EXPENSES			
22				
23	FOOD		3,000.00	
24	Average shop	1000		
25	No Shops in month	3		
26				
27	ENTERTAINMENT		1,000.00	
28	Eating out	500		
29	movies	200		
30	partying	300		
31				
32	PETROL		1050	

So when I go to the Yearly budget page I change the formula to take the values on the monthly budget multiplied by the number of months on the assumptions page (Don't forget to dollarise the monthly value cell (ASSUMPTIONS!\$B\$3)).



You can then easily copy that formula to the other cells on the yearly budget. Note the first cell reference will change to the relevant cell and the second cell reference remains locked.



The awesome thing now is not only can I change the assumptions which will pull through to the monthly and yearly budget. I could even change the yearly budget to a quarterly budget by changing the months on the assumptions page to 3 or 6 for a half year budget.

Note that you can link spreadsheets to each other, but it is usually not a good idea to hardcode data on any other spreadsheet than the assumptions page when modelling. This will make your spreadsheet easy to manage and use.

In closing, I told you that I would take you from being a beginner to being intermediate on Excel in less than two hours. In my mind being intermediate on Excel is not about how much you know. The reason for this is you will probably forget exactly how certain functions or formulas work if you don't use them on a daily basis. Being intermediate is about being comfortable enough on Excel to understand what Excel is capable of and confident enough to experiment with it in order to find the best possible solution to your problem. Being intermediate is not about how much you know, it is about how willing and able are you to understand and learn. Google will always know more than you and there are many helpful forums where community members will help you if you encounter problems or even offer you solutions. Basically don't be afraid, Excel is monstrously powerful but it is logical and responds to you on your level. The more advanced you become the more you will realise how little you actually know. Macros and coding your own functions?? I'll leave that to the professionals.

I spent quite a lot of time putting this introduction together, so if you found it at all useful, please spend an hour of your time doing something positive for other people, thanks.

Please excuse any spelling or grammatical errors.