

EXCEL 2007 LEVEL 3

Making the most of Excel

T r a i n i n g G u i d e

EXCEL 2007 LEVEL 3

MAKING THE MOST OF EXCEL

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Queries

If you have any comments or queries about this document mail iser-docs@bristol.ac.uk

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Production Acknowledgments

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READ ME FIRST

Who this document is for.....	Excel 2007 level 3 Making the most of Excel is designed for users who are confident users of Excel who would like to find out about some of the advanced more facilities
What you need to know before working through this document...	Before working through this document you should be confident with using a variety of basic functions (including conditional functions such as IF), range names, conditional formatting and filtering.
Aims....	You should acquire skills and knowledge to be able to use the software at an efficient level.
Objectives...	<p>At the completion of Excel 2007 level 3 Making the most of Excel you should be able to:</p> <ul style="list-style-type: none">• create and use labels and names in a workbook• use a range of logical functions• use some of Excel's maths and statistical functions• use a range of lookup and reference functions• use data validating to control the values that go into a spreadsheet• summarise and present information in a PivotTable report
Files needed for this document...	This document and all its associated practice files are available on the web. To find these go to www.bristol.ac.uk/is/learning/resources and in the Keyword box type the document code given in the bottom right corner of the cover page.

WORKING WITH TOPIC SHEETS

The majority of this book comprises single-page topic sheets. There are two types of topic sheets: **task** and **reference**. The layout of both is similar – an *overview* at the top, *detail* in the centre and

additional reference (optional) material at the bottom. *Task* sheets contain a *Try This Yourself* step-by-step exercise panel in the detail area as shown below.

1 **OPENING A DOCUMENT**

Although there are a number of different ways to open a Word file, which include using the **Start** menu or clicking directly on an icon of the file, perhaps the best and simplest way to do it is from within the Word program itself using the **File > Open** command. The **Open** dialog box has tools that help you to identify file types and location.

2

3 **Try This Yourself:**

Before you begin ensure that Word 2000 has started...

- 1 Select **File > Open** to display the **Open** dialog box.
- 2 Click on the drop arrow for **Look in** to display a list of possible locations available to your computer where documents may be found.
- 3 Click on **Drive C (C:)** or its equivalent on your computer.
- 4 The contents of drive C: will now be displayed in the **Open** dialog box.
- 5 Double-click on **Course Files For Word 2000** – this is the folder where files for this course can be found.
- 6 The contents of the folder **Course Files For Word 2000** will now be displayed.
- 7 Click on **W002 Document Essentials_1.doc** to select it as the file that you wish to open, then click on **[Open]** to open the document on the screen.

4

5 **For Your Reference...**

To open a document in Word:

1. Select **File > Open** to display the **Open** dialog box
2. Locate the file and folder (if necessary)
3. Click on **[Open]**

6 **Handy To Know...**

There is more than one way to open a document in Word. Alternatively you could:

- Click on the **Open** tool
- Select a recently opened file from the **File** menu.

Skillgate Learning Centres Page 10 Chapter 2: Working With A Document

- 1 Topic name
- 2 General topic overview provides an introduction to the topic
- 3 *Try This Yourself* (Task-based topic sheets) is a detailed step-by-step practice exercise for you to work through. In *Reference* topic sheets this is usually replaced by a box with reference information.
- 4 In *Task* topic sheets screen shots and graphics provide a visual clue as to what will happen when you work through the *Try This Yourself* practice exercise. In *Reference* topic sheets the screen shots and graphics are used to visually represent information and concepts.
- 5 The *For Your Reference* (optional) element provides a quick summary of the steps required to perform a task. These usually only appear in Task-based topic sheets.
- 6 The *Handy To Know* (optional) element provides additional information such as alternate ways of accomplishing a task or further information providing handy tips.

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CHAPTER 1

In

Focus

UoB_ARPE_E775

LABELS AND NAMES

Labels and names are used to identify cells and ranges using a tag that is more meaningful than ordinary cell references such as **B6** or **C5:D11**. These names and labels can be used in formulas and in links between worksheets and workbooks to make the formulas easier to understand. They can also be used to identify specific print areas or to help you to locate a specific place in a spreadsheet.

If you haven't worked on your workbook for a while, or have to work with someone else's, the clever use of labels and names will help you to find your way around the workbook and to understand the formulas.

In this session you will:

- learn about the problems which may be caused by relative formulas
- learn how to use range names.

PROBLEMS WITH RELATIVE FORMULAS

Copying formulas can present problems when the **shape** of the formula varies from cell to cell. This can occur when one or more values in a formula must be located in a specific cell, row,

column – that is, the formula must include an **absolute** cell reference. In this exercise you will see some strange values when you copy a formula to other cells using the default copying method.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file called *Formulas.xlsx...*

- 1 Click on the **Euros** sheet
- 2 Enter the formula shown opposite in cell C3 to calculate the value in euros of £1.00
- 3 Copy the formula to cells **C4:C6** using **Autofill**.
Note the unexpected results
- 4 Examine the formula in each of the cells C3:C6
*When you create a formula, references to cells or cell ranges are usually based on their position relative to the cell that contains the formula. The formula **=B3*C9** entered in cell **C3** means “multiply the cell one to the left by the sixth cell below”. When you copy a formula that uses relative references, Excel automatically adjusts the references to refer to different cells relative to the new position of the formula. For example, when copied to cell **C4**, the formula still says “multiply the cell one to the left by the sixth cell below”, ie **=B4*C10**.*
- 5 Delete the formulas in **C3:C6**. We will solve this problem on the next page

1

	A	B	C
1		Today's transactions:	
2		Sterling	Euros
3		£1.00	=B3*C9
4		£10.00	
5		£100.00	
6		£1,000.00	
7			
8			
9		£1=	€ 1.40
10			

For Your Reference...

When you copy a formula that uses relative references, Excel automatically adjusts the references to refer to different cells relative to the new position of the formula. This causes problems if the formula in fact needs to refer to one cell as a constant. **Range Names** can be used to solve this problem.

Handy to Know...

- Absolute references can also be used to fix cell references. See the **Formula Referencing** chapter for more information.

USING RANGE NAMES

Range Names are used to refer to individual cells or ranges of cells as an alternative to using cell references. We will now use a range name to fix part of the cell reference so that it will not

change when a formula is copied. We need to allow the B3 part of the formula to be relative, but to fix the C9 part so that it always multiplies by the exchange rate.

Try This Yourself:

Same
File

Continue using the previous file with this exercise, or open the file *Formulas.xlsx*...

1

We will make C9 a named cell

Click in cell C9

2

Click in the **Name Box** and type **Euro_rate** and then press

See the notes opposite

3

Click on the **Name Box** drop down arrow to see that the name is listed. Click on this name and notice that your cursor will jump to that cell

4

To use a range name in a formula, in cell **C3**, enter the formula **=B3*Euro_rate**

You can do this in 1 of 3 ways:

1. Type the name
2. Click the named cell (C9)
3. Press the key to show the Past Name box and double click on the name you want to use

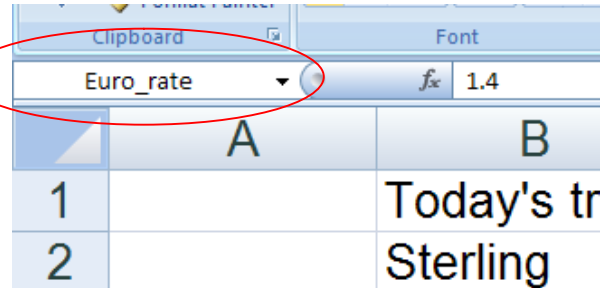
5

Copy the formula to **C4:C6** using **Autofill**. The results should be correct this time

6

To delete a name, on the **Formulas** tab, in the **Defined Names** group, click on **Name Manager**. Click on the name you want to remove and click on **[Delete]**

2



2

Need to Know...

There are two important rules to follow when creating **Names**:

1. You can only use letters of the alphabet, numbers or the underscore character (_) in names. Spaces and other special characters such as &, * or % are not allowed.
2. Names must not begin with a number. Use a letter or an underscore as the first character of your name, for example, Yr1996 or _2005.

For Your Reference...

To create a named cell:

1. Click on the cell to name
2. In the Name Box type a name & press

To use a named cell in a formula:

1. Type the name, click in the named cell, or press to list all the names

Handy to Know...

- As well as being used to create fixed references, names can be used to clarify formulae and make them easier to create and understand

RANGE NAMES

Practice Exercise

Tasks:

Completed:

Before starting this exercise you MUST have completed all of the topics in the chapter Labels And Names...

- | | | |
|----------|--|---|
| 1 | Open the workbook called PE_Formulas.xlsx (it can be found in the student files folder) | C |
| 2 | Practice using names by creating the formulae required on the Tax sheet in the above workbook. Follow the instructions headed If using Named cell ranges | C |
| 3 | Continue with the VAT sheet | C |
| 4 | If you have time, follow the instructions on the absolute sheet, which is more complicated | C |

Files required for exercise: **PE_Formulas.xlsx**

Files/work created by student:

Exercise Completed: C

CHAPTER 2

In

Focus

UoB_AR_E714

LOGICAL FUNCTIONS

Logical functions are used in spreadsheets to test whether a situation is true or false. Depending on the result of that test, you can then elect to do one thing or another.

These decisions can be used to display information, perform different calculations, or to perform further tests.

In this session you will:

- learn how to display text using the IF function
- learn how to use IF to calculate values.

USING IF TO DISPLAY TEXT

The **IF** function can be used to display different information depending on the outcome of the condition test. The resulting text will appear in the cell where the formula containing the **IF** function

resides. In this example, the **IF** function is used to indicate where figures in a neighbouring column meet or exceed a specified target. This makes identifying the successful sales people far easier.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file E714 Logical Functions_1.xlsx...

We want to work out whether someone's monthly sales were above or below target


1

Create the following range names:

- **E2** name **target**
- **E3** name **commission**
- **C7:C15** name this whole range of cells, **sales**

2

Click on **D7** and then open the **Insert Function** box by

clicking on . Then, search for the **IF** function.

3

Complete the three boxes as shown.

4

Click **[OK]** to finish, then use **Autofill** to copy the formula from **D7** to **D15**

Notice that the result for Jerry Hancock is *Below Target* even though she achieved 34,000? Let's modify the formula...

6

Click on **D7**, then click in the Formula bar immediately to the right of **>** and type **=** then press **Enter**

7

Use **Autofill** to copy the new formula to the rest of the column

3

Function Arguments

IF

Logical_test = {T
Value_if_true = "E
Value_if_false = "B

Checks whether a condition is met, and returns one value if TRUE, and

Value_if_false is the value that is returned FALSE is returned.

4

	B	C	D	E	F	G
Global Enterprises						
missions			Target	34,000		
			Commission	5%		
			Monthly Sales	Status	Commission	
			Costas	45,000	Exceeded Target	
			Daniels	25,000	Below Target	
			Grayson	27,800	Below Target	
			Hancock	34,000	Below Target	
			Houson	18,350	Below Target	
			Kai	12,500	Below Target	
			Maunga	75,880	Exceeded Target	
			Nguyen	43,778	Exceeded Target	
			Rualowy	23,400	Below Target	

For Your Reference...

IF(logical test, value_if_true, value_if_false)

This function performs the **test**, then if the result is true, uses the entry in the position **true**. If the result is not true, the entry for **false** is used.

Handy to Know...

- If you only want text to appear if the result is true, you can enter **""** (two double quotes) in the position for **false**. For example, **=IF(C7>=Target, "Exceeded Target", "")** will only display text if the target was met or exceeded.

USING IF TO CALCULATE VALUES

One of the most common uses of the IF function is to perform numerical computations based on the outcome of the condition test. This is achieved by putting formulas that would normally

be used to calculate values in place of the **true** and **false** components in the function. You can also use this structure to show a specific value according to the result of the condition test.

Try This Yourself:

Same
File

Continue using the previous file with this exercise

- 1 Click in cell **E7** and then open the **Insert Function** box and search for the **IF** function
- 2 Complete the different sections as shown opposite
- 3 Click **[OK]** to finish the formula
- 4 Click on **E7** and double-click on the fill handle to copy the formula down to **E15**

Due to the formatting of the Commission column, instead of a 0, the dash symbol appears where no commission is to be paid
- 5 For further practice, open the file **IFS.xls** and look at the different sheets, starting from the **IF MOT** sheet. Some of the sheets have already been completed for you, so you can study how they work, then delete the formulas and create them again. Some use named cells, so you'll need to check which cells have been named

2

Function Arguments

IF

Logical_test sales>target = {
Value_if_true sales*commission = {
Value_if_false 0 = 0

Checks whether a condition is met, and returns one value if TRUE, and

Value_if_false is the value that is returned FALSE is returned.

4

	B	C	D	E	F
	Global Enterprises				
ssions			Target	34,000	
			Commission	5%	
		Monthly Sales	Status	Commission	
	Costas	45,000	Exceeded Target	2,250	
	Daniels	25,000	Below Target	-	
	Grayson	27,800	Below Target	-	
	Hancock	34,000	Exceeded Target	-	
	Houson	18,350	Below Target	-	
	Kai	12,500	Below Target	-	
	Maunga	75,880	Exceeded Target	3,794	
	Nguyen	43,778	Exceeded Target	2,189	
	Rualowy	23,400	Below Target	-	

For Your Reference...

IF(test, true-calculation, false-calculation)

- This function performs the **test**, then if the result is true, performs the calculation in the position **true**. If the result is not true, the entry for **false** is used.

Handy to Know...

- You could have used absolute references rather than range names for cells which are constants

CHAPTER 3

In

Focus

UoB_AR_EU701

MATHS & STATISTICAL FUNCTIONS

The **maths** group of functions is one of the largest and most diverse group of functions in Excel, with functions ranging from simple **SUM** to complex and specialised functions.

Excel also contains a large number of **statistical** functions. These can be used to perform relatively simple operations such as summing, averaging and finding minimum and maximum numbers, as well as calculating standard deviation, variance etc.

Only a few functions are covered here. Have a look at the Insert Function dialog box for a full list.

In this session you will:

- learn how to use the SUMIF function
- learn how to count conditionally
- learn how to use the SUMIFS function.

USING SUMIF

The **SUMIF** function can be used to add the contents of cells specified by particular criteria. For instance, in an alphabetical listing of all the children in a school, you could use the **SUMIF**

function to add the total raised by each class in a recent fundraising event. The criteria in this case is the class name and the cells to sum would be the amount raised by each child in that class.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file E716 Maths Functions_11.xlsx...

1

Click on the **Sum** worksheet tab to make this the active worksheet

2

Click on **H2** and from the **Insert Function** button search for the **SUMIF** function.

3

Set up the function as shown opposite

In this example, the **Range** is the Type column, the **Criteria** is the contents in cell G2 and the **Sum_range** is the Annual Fee...

4

Click **OK** to finish.

The total Annual Fee for Gold is £32,639.50. What about Silver?

5

Click on **G2** and type **Silver** then press **Enter**

As the text in cell G2 is used as the criteria in the function, the value is automatically updated

3

Function Arguments

SUMIF

Range H9:H110 = {"Gold"
Criteria G2 = "Gold"
Sum_range I9:I110 = {1125.50
= 32639.50

Adds the cells specified by a given condition or criteria.

4

D	E	F	G	H	I	J
			Gold	£32,639.50		
Joined	Years	Months	County	Type	Annual Fee	Due
12/1/88	20	3	Buckinghamshire	Gold	1,125.50	January

5

E	F	G	H	I
		Silver	£18,000.00	

For Your Reference...

SUMIF(range,criteria,sum_range)

This function adds the contents of cells in the **sum_range** that satisfy the **criteria** specified in **range**. **Sum_range** is only required if the range to sum differs from the range to be searched. The criteria can take the form of a number, text, or an expression.

Handy to Know...

- Using the **SUMIF** function, if you wanted to add all of the Annual Fees in the range H9:H72 that were greater than 55, your formula would read **=SUMIF(H9:H72,">55")**. You would not require a **sum_range** argument in this situation.

USING COUNTIF

You might need to count cells that contain a specific value or conform to specific guidelines. For instance, you may wish to know how many cells have a value greater than 10, or hold a

particular label. This type of counting can be achieved with the **COUNTIF** function. This function requires two arguments: a range and a value, text or condition to base the search on.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file *E717 Stat Functions_4.xlsx*...

- 1 Click in cell **E13** and from the Insert Function button search for the **COUNTIF** function.

In this example we will count only the Tuesdays where the takings exceeded \$30,000...

- 2 Set up the **Range** as **B5:N5** and the **Criteria** as **">30000"**

- 3 Click **OK** to complete the formula

The number of days is 3...

- 4 Copy the formula down for the other days

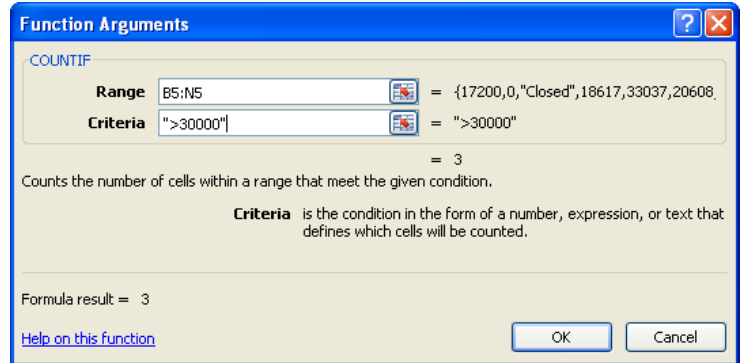
- 5 For further practice, open the **Functions_1.xlsx** workbook and look at the **Trees2** sheet.
NOTE You'll need a mixture of SUMIF and COUNTIF to complete these exercises

- 6 What is the total area of larch?

- 7 Work out how many plantations have larch trees

- 8 Click on the **Property** sheet and calculate the total value and total number of houses on the list

2



4

		Count	CountA	CountBlank	Countif	Mode	Median
13	Tuesday	11	12	1	3		
14	Wednesday	13	13	0	8		
15	Thursday	13	13	0	12		
16	Friday	13	13	0	11		
17	Saturday	13	13	0	13		
18	Sunday	13	13	0	11		
19							
20							

For Your Reference...

COUNTIF(range, criteria)

This function counts the number of cells in the **range** that satisfy the **criteria**. The criteria can take the form of a number, text or an expression. For example, the criteria could be 100, "100", "Gold" or ">100".

Handy to Know...

- SUMIF and COUNTIF only allow one criteria for comparison. To use 2 you can use the SUMIFS or COUNTIFS functions. Or for more than 2 criteria, use the DSUM or DCOUNT function. See Excel's Help system or look at the Bristol University document Advanced Filtering, code exl07all-10.

USING SUMIFS

The **SUMIFS** function is used to add the contents of cells in a range when **multiple criteria** are met. For instance, in a datasheet listing sales figures for different products in different regions,

you are able to use the **SUMIFS** function to add all the sales figures for a particular product in a specified region. In this way you could create a summary of each product by region.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file E716 Maths Functions_12.xlsx...

1

Ensure that the **Sum** worksheet is currently active

2

Click on **N6** then click on the **Insert Function** icon and search for the **SUMIFS** function.

The structure of this function is

SUMIFS(sum_range,criteria_range1,criteria1,[criteria_range2,criteria2],...)

In this example we want to know the Annual Fees for the Gold membership renewals due in January...

3

Fill in the **Function Arguments** as shown opposite, where:

Sum_range = I9:I110

Criteria_range1 = J9:J110

Criteria1 = N5

Criteria_range2 = H9:H110

Criteria2 = M6

Click **[OK]** to finish

4

Repeat the process to calculate the totals shown opposite

3

Function Arguments

SUMIFS

Sum_range I9:I110

Criteria_range1 J9:J110

Criteria1 N5

Criteria_range2 H9:H110

Criteria2 M6

3

		January	February
	Gold	£2,251.00	
	Silver		

4

		January	February
	Gold	£2,251.00	£7,878.50
	Silver	£1,500.00	£4,500.00

For Your Reference...

SUMIFS(sum_range,criteria_range1,criteria1,[criteria_range2,criteria2],...)

This function adds the contents of cells in **sum_range** that satisfy the **criteria** in **criteria_range1**, **criteria_range2** etc.

Handy to Know...

- If at all practical, it is advisable to run a quick manual calculation to ensure that the arguments in your functions are recorded correctly.
- The **SUMIFS** function effectively replaces the **SUMPRODUCT** function in earlier versions of Excel.

CHAPTER 4

In

Focus

UoB_AR_E715

LOOKUP FUNCTIONS

Excel provides a number of functions that allow you to look up and extract data from a list or table. These are known as **Lookup** functions and they can be used for a variety of purposes.

In this session you will:

- gain an understanding of data lookup functions
- learn how to use VLOOKUP
- learn how to use VLOOKUP for exact matches
- learn how to use HLOOKUP.

UNDERSTANDING DATA LOOKUP FUNCTIONS

Data lookup functions are used to retrieve data from a table. They generally require at least two pieces of information; **what** to look for and **where** to look for it. The **what to look for** part is often

part of table of information which can be referred to as a **calculation area**. The **where to look for it** is known as a **data table** – a table in which a list of rates, figures, text or other items are held.

Data Area

The **data area** is often on a worksheet by itself, protecting it from accidentally being modified or deleted. It holds all of the possible values for the data. The values are laid out in a table format, and they are listed in numerical or alphabetical order of the code that the lookup function will search for.

In this example, we have created the name **Pay_Rates** for the range **B3:C7** that holds the data. The resulting formula in the calculation area will be easier to understand.

The name **Pay_Rates** has been created as a quick way to reference the data table B3:C7

Pay_Rates			
	A	B	C
1		Hourly Rates	
2			
3		1	23.5
4		2	30.0
5		3	35.0
6		4	38.5
7		5	42.5
8			
9			

Calculation Area

The calculation area is usually on a worksheet by itself unless you require the data values to be visible as well as the resulting calculations.

The calculation area uses a formula, such as **VLOOKUP**, to find the correct data for each situation. In this example, the **VLOOKUP** function shown is comparing the value in **C5** with the values in the range **Pay_Rates**. It then returns the value in the second column of the data table, determined by the **2** in the formula.

D5					
	A	B	C	D	E
1	Weekly Payroll				
2					
3					
4	First Name	Last Name	Pay Scale	Hourly Rate	
5	Michelle	Calahan	2	\$30.00	
6	Kira	Convery	3		
7	Paddy	Deegan	4		
8	Marty	Doyle	3		
9	Connor	Healy	2		
10	Alana	Keane	1		
11	Siobhan	Kelliher	1		
12	Anthony	O'Brien	3		
13	Melissa	Quinn	4		
14					

The formula here takes the Pay Scale value in C5, which is 2, and finds the corresponding row in the Pay_Rates table (i.e. B4). It then returns the value in the second column of the corresponding row, which in this case is \$30.00.

USING VLOOKUP

The classic lookup function is **VLOOKUP** – the vertical lookup. This function searches vertically down a sorted data table looking for a match with the lookup-value (or the next lowest value).

It then looks across the table to the column you have specified to find the value to return. This is ideal for looking up numeric values within a range, such as tax rates, or commission amounts.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file *E715 Lookup Functions_2.xlsx*...

1

Click on the drop arrow ▼ for the **Name Box** and click on **Tax_Table**

This is the data table for our VLOOKUP. See the Note opposite. Notice also that someone earning less than 500 does not pay any tax...

2

The structure of the function is **=VLOOKUP(lookup_value,table,col_index_num)**

Or, to put it another way:
=VLOOKUP(what to look up, where to look it up, which column is the information in?)

3

Click on the **Payroll** sheet tab and click in **G5**. From the **Insert Function** box, search for **VLOOKUP**, set up the function as shown then click **OK**.

This means we are looking up the gross pay value in the Tax_Table and it will return the value from the second column in the table

4

0% appears because the gross pay is less than \$500...

5

Copy the formula in **G5** to the range **G6:G13**

6

Change **Michelle Calahan's** hours worked to 30, and notice that she is now due to pay 10% tax

Note: The range of cells that make up the data table need to either be named or fixed in the VLOOKUP formula using Absolute References. Otherwise, when you copy a formula down a column, the data table will change.

Also, it's important that it's the **leftmost** column of this table that contains the data to look through.

1

Tax Table	
Salary Range	Tax Rate
\$0.00	0%
\$500.00	10%
\$1,000.00	12%
\$1,200.00	16%
\$1,400.00	18%
\$1,600.00	20%
\$1,800.00	22%
\$2,000.00	24%
\$2,200.00	26%
\$2,400.00	28%
\$2,600.00	30%

3

Function Arguments

VLOOKUP

Lookup_value	F5	= 375
Table_array	Tax_Table	= {0,0;5
Col_index_num	2	= 2
Range_lookup		= logical
		= 0

4

Hourly Rate	Hours Worked	Gross Pay	Tax Rate	Tax	Net Pay
\$30.00	12.5	\$375.00	0%		
\$35.00	9.0	\$315.00			
\$38.50	16.0	\$616.00			
\$35.00	35.5	\$1,242.50			
\$30.00	5.0	\$150.00			
\$23.50	41.0	\$963.50			
\$23.50	2.0	\$47.00			
\$35.00	25.0	\$875.00			
\$38.50	32.0	\$1,232.00			
	Totals	\$5,816.00		\$0.00	\$0.00

For Your Reference...

VLOOKUP(lookup_value,Table,Col_index_num)

This function searches down the left-most column of the **data table** until it finds the **lookup-value** or the row with the next lowest value. It then refers to the **column index number** nominated in the function, and returns the value found in the corresponding row and column.

Handy to Know...

- An alternative to the **VLOOKUP** function is the horizontal or **HLOOKUP** function. This looks for a value in the top row of a table or array of values, and returns the value from the same column in the row you specify.

USING VLOOKUP FOR EXACT MATCHES

Generally, the **VLOOKUP** function uses three arguments: the lookup-value, the table location and the column number. This lookup will find a row based on a numeric range. However, you

may only want to return a value if you get an exact match, and the optional fourth argument, **match-type**, makes this possible. By adding **FALSE** to the function, **#N/A** is returned if a match isn't found.

Try This Yourself:

Same
File

Continue using the previous file with this exercise, or open the file *E715 Lookup Functions_3.xlsx*...

- 1 Click on the drop arrow ▼ for **Name Box** and click on **Items_List**

This lookup table includes specific product codes that require an exact match...

- 2 Click on the **Invoice** sheet, then click in **B11** and add the item **TEL00004**. Put **3** in **D11**

- 3 We'll now look up the price of these items. Click in cell **E7** and set up the VLOOKUP function as shown, then click **OK** to finish

Adding 'FALSE' to the *Range_lookup* forces Excel to find an exact match in the lookup table. If it doesn't find one, it returns the error **#N/A**

- 4 Copy this formula to cells **E8:E11**

Notice that in **E11**, **#N/A** is displayed. This is because item number **TEL00004** isn't a real Item code, and returning the price of the previous item in the list isn't appropriate

- 5 Use VLOOKUP to fill in the **Description** and **Deposit**

2

Item	Description	Quantity	Price	Deposit	Total Cost
TEL00001		2			
TEL00003		1			
TEL00005		2			
TEL00007		1			
TEL00004		3			

3

Function Arguments

VLOOKUP

Lookup_value	B7
Table_array	Items_List
Col_index_num	3
Range_lookup	False

Item	Description	Quantity	Price	Deposit	Total Cost
TEL00001	World Communicator 223	2	£234.50	12%	
TEL00003	Master Communicator 10 Plus	1	£1,237.90	22%	
TEL00005	Global Roamer 514	2	£237.80	22%	
TEL00007	Global Roamer 516	1	£677.00	12%	
TEL00004	#N/A	3	#N/A	#N/A	

5

For Your Reference...

To use **VLOOKUP** for **exact matching**:

VLOOKUP(Lookup_value,Table_array,Col_index_num,Range_lookup)

Use the value of **FALSE** for **range_lookup** when you want to ensure exact matches only. **#N/A** will be returned if an exact match isn't found.

Handy to Know...

- You can use the **ISNA** function to trap **#N/A** results. For example, the structure **=IF(ISNA(lookup),"Code not found",lookup)** will display a useful message when an exact match is not possible, rather than **#N/A** which does not explain the problem clearly.

USING HLOOKUP

Another commonly used lookup function is **HLOOKUP** – the horizontal lookup. This function searches horizontally across a sorted data table looking for a match with the lookup-value (or the

next lowest value). It then looks down the table to the row you have specified to find the value to return. This can be used to search for text, numbers, or logical values.

Try This Yourself:

Open
File

Continue using the previous file with this exercise, or open the file *E715 Lookup Functions_4.xlsx*...

- 1 Click on the **Index** worksheet tab then click in cell **D14** and examine the formula

This is an example of the VLOOKUP function. This scans down the list of options looking for the corresponding Equipment number. When it finds a match, it returns the description.

You can use HLookup in a similar way...

- 2 Click on the drop arrow ▼ for **Name Box** and click on **Rate_Type** to see the data table. An exact match is required here

- 3 Click in cell **D15** and type **=HLOOKUP(C15,Rate_Type,2,FALSE)** then press **Enter** to finish

- 4 The name of the Rate Type will be returned and displayed...

- 5 Experiment with different values in cells **C14** and **C15**
You'll find that the formulas return the corresponding descriptions

D14 =VLOOKUP(C14,Equipment_List,2,FALSE)

	A	B	C	D	E
1					
2					
3					
4	No	Description	Corporate	Frequent	Private
5	1	World Communicator 223	\$60.00	\$51.00	\$66.00
6	2	Planet Tamer 34e	\$75.00	\$63.75	\$82.50
7	3	Master Communicator 10 Plus	\$120.00	\$102.00	\$132.00
8	4	Global Roamer 514	\$60.00	\$51.00	\$66.00
9	5	Global Roamer 515	\$75.00	\$63.75	\$82.50
10	6	Global Roamer 516	\$85.00	\$72.25	\$93.50
11	7	Global Roamer 517	\$95.00	\$80.75	\$104.50
12					
13					
14	Equipment Item No		5	Global Roamer 515	
15	Rate Type		1		
16	Number of Days		10		
17					

1

D16 =HLOOKUP(C15,Rate_Type,2,FALSE)

	A	B	C	D	E
1					
2					
3					
4	No	Description	Corporate	Frequent	Private
5	1	World Communicator 223	\$60.00	\$51.00	\$66.00
6	2	Planet Tamer 34e	\$75.00	\$63.75	\$82.50
7	3	Master Communicator 10 Plus	\$120.00	\$102.00	\$132.00
8	4	Global Roamer 514	\$60.00	\$51.00	\$66.00
9	5	Global Roamer 515	\$75.00	\$63.75	\$82.50
10	6	Global Roamer 516	\$85.00	\$72.25	\$93.50
11	7	Global Roamer 517	\$95.00	\$80.75	\$104.50
12					
13					
14	Equipment Item No		5	Global Roamer 515	
15	Rate Type		1	Corporate	
16	Number of Days		10		
17					

4

For Your Reference...

HLOOKUP(lookup_value,table,row_index_num,range_lookup)

This function searches the top-most column of a **table** to find the **lookup_value** (or the next lowest value if an exact match isn't required), then refers to the **row index number** and returns the value from the same column and corresponding row.

Handy to Know...

- If the **lookup_value** is smaller than the smallest value in the first row of **table**, HLOOKUP will return the **#N/A** error value.
- **Range_lookup** is an optional argument. If TRUE or omitted, it will find the closest match in the top row. FALSE forces an exact match.

CHAPTER 5

In

Focus

UoB_AR_E765

VALIDATING DATA

Data validation is all about making workbooks as foolproof and as user-friendly as possible. The idea is to create workbooks that don't let people make mistakes.

Data validation is similar to cell formatting in that you apply it to a cell. Unlike a format that changes the look of a cell or its contents, data validation checks the data being entered into a cell. If the data is incorrect, data validation can prevent it from being entered.

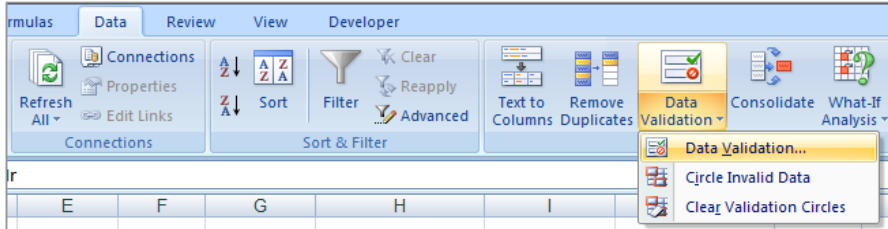
In this session you will:

- gain an understanding of how to restrict data entry using Data Validation settings
- learn how to restrict data to a specific number range
- learn how to test data validation
- learn how to create input messages
- learn how to create error alerts
- learn how to create drop-down data validation lists
- learn how to identify existing data that doesn't match new data validation rules.

UNDERSTANDING DATA VALIDATION

Data validation is used to define restrictions on what data can or can't be entered in a cell. You can set validation to prevent users from entering data that is not valid. If you prefer, you can allow

users to enter invalid data but warn them when they try to type it in the cell. You can also provide messages to say what input you expect for the cell, and instructions to help users correct any errors.

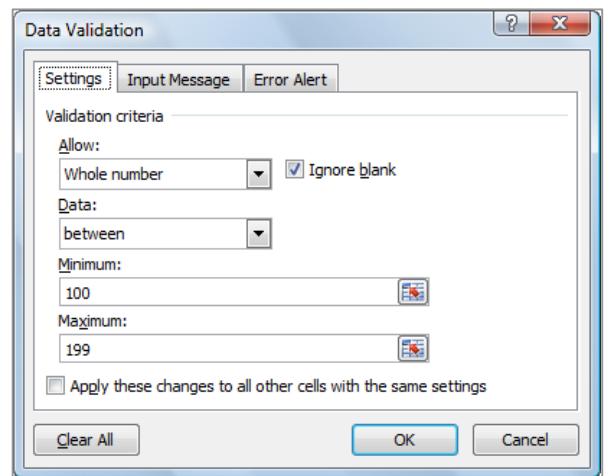


Access the **Data** tab. Click on the drop-down arrow on the **Data Validation** button to select from the available menu list. Alternatively, click on the top section of the **Data Validation** button to instantly access the **Data Validation** dialog box.

Data Validation Settings

Data validation is invaluable when you want to share a workbook with others in your organisation, and you want the data entered in the workbook to be accurate and consistent. You can enter **settings** to restrict the type of information that a user can enter. Here are some examples:

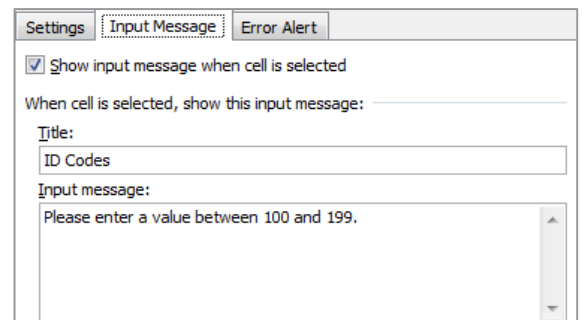
- Restrict entry to predefined items in a **List**.
- Restrict numbers outside of a specified range.
- Restrict dates outside a certain time frame (date or time).
- Limit the number of text characters entered into a cell.
- Validate data based on formulas or values in other cells.



On the **Settings** tab, use the **Allow** option to control what type of restriction you wish to set. In the above example, the **Allow** option has been set to **Whole number** and the range of numbers set between **100 and 199**.

Input Messages

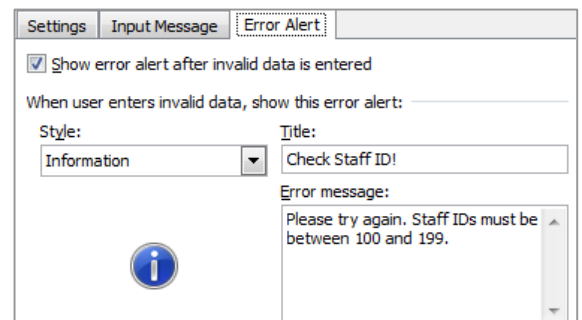
In addition to the validation settings, you can also choose to show an input message when the user selects the cell. This type of message appears near the cell. You can move this message, if you want to, and it remains until you move to another cell or press **Esc**.



Error Alerts

You may want to provide a meaningful error message if a user types in the wrong information. Using an **error alert**, you can choose a **warning**, **stop** or **information** error message to appear. Used with an input message, the error alert gives the user instructions as to what they have done wrong and what information should be entered instead.

Input messages and error alerts appear only when data is typed directly into the cells, not when the data is copied or filled into the cells.



CREATING A NUMBER RANGE VALIDATION

One of the simplest types of data validation is to restrict data to a specific number range. The data validation is set so that Excel expects you to type a number in the cell, and the number must fall

between a set minimum and maximum value. Any other data, such as text, or a number outside the range, is rejected. This is ideal for large volumes of data entry, and helps to reduce the risk of error.

Try This Yourself:


Open
File

Before starting this exercise you **MUST** open the file *E765 Validation_1.xlsx*...

- 1 Click in cell **A10** where the first **Staff ID** is to appear

When you create a validation, you can apply it to the entire range that will be affected or just to one cell and then you can copy the validation to other cells

- 2 On the **Data** tab click the **Data Validation** drop-down arrow and then click on the **Data Validation** option

- 3 Click on the drop arrow  for **Allow** and click on **Whole number**

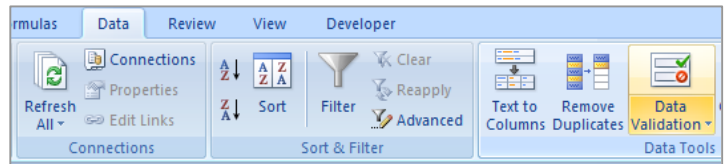
- 4 Click in **Minimum** and type **100**

- 5 Click in **Maximum** and type **199**

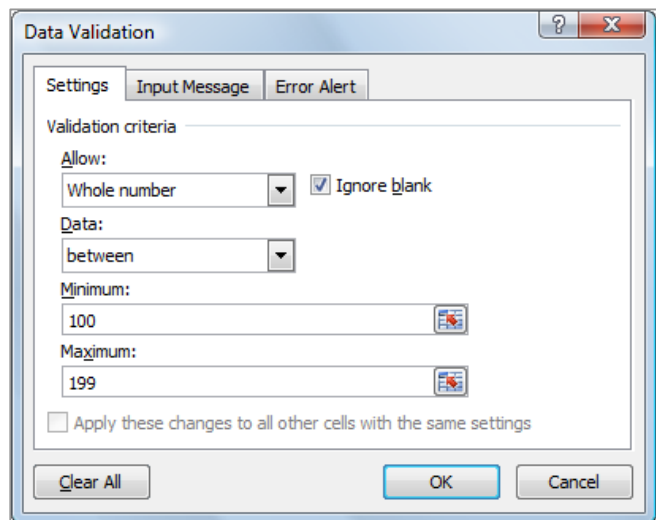
- 6 Click on **[OK]**

Nothing appears to have happened to the cell, but the validation criteria will control what you try to type into it

2



6



*Note: If you click the top of the **Data Validation** button, the **Data Validation** dialog box is automatically displayed. If you click the drop-down arrow in the lower part of the button, a menu of **Data Validation** sub-choices appears.*

For Your Reference...

To apply a **number range** as **data validation**:

1. Select the cells to have validation applied
2. On the **Data** tab click **Data Validation** and then the **Data Validation** option
3. Select a numerical option for **Allow** and set the values, clicking **[OK]** to complete.

Handy to Know...

- The **Data Validation** dialog box can be used to limit the data to **any value**, to **whole numbers** or to **decimals**. You can also use it to set a maximum and minimum length for information typed into a cell, irrespective of whether it is text, a value or a formula. This setting is called **text length**.

TESTING DATA VALIDATION

Any data validation applied to a worksheet should be tested thoroughly before it is unleashed on any unsuspecting user. You must ensure that it not only prevents or dissuades the entry of invalid

numbers, but that you have allowed for all possible situations. You must also ensure that any messages that appear explain clearly how to correct the error that has been made.

Try This Yourself:

Same
File

Continue using the previous file with this exercise, or open the file E765 Validation_2.xlsx...

1

Click on cell **A10**

2

Type **1** and press

Because this number falls outside the validation range specified for this cell (100 – 199), a message box will appear...

3

Click on **[Retry]**

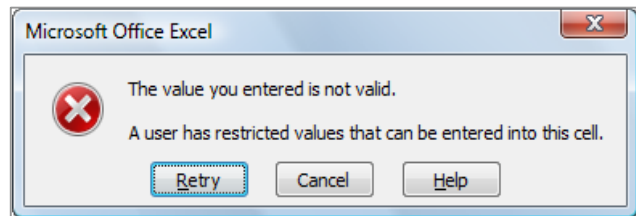
This will select the contents of the cell so that you can type another number...

4

Type **106** and press

This time the number is within the acceptable range, so the message does not reappear

2



4

	A	B	C	D	E
1					
2		Alpheus Global Enterprises Auckland Office			
3					
4					
5					
6					Empl
7					
8	Staff ID	Title	First Name	Last Name	Date Hired
9					
10	106				
11					
12					
13					

For Your Reference...

To **test data validation**:

1. Try entering a range of values within and outside the defined range
2. If an error message appears, click on **[Retry]** or **[Cancel]**

Handy to Know...

- If you type text in a cell that is expecting numbers, it will display the same non-specific error message.

CREATING AN INPUT MESSAGE

An **input message** is a message that is displayed when you click on a cell. This provides clear guidance to the user about the values that are expected for a cell. It is far more satisfying

than being faced with a non-specific error message and not knowing how to fix the error. Input messages should be used with validation criteria to ensure the best possible result.

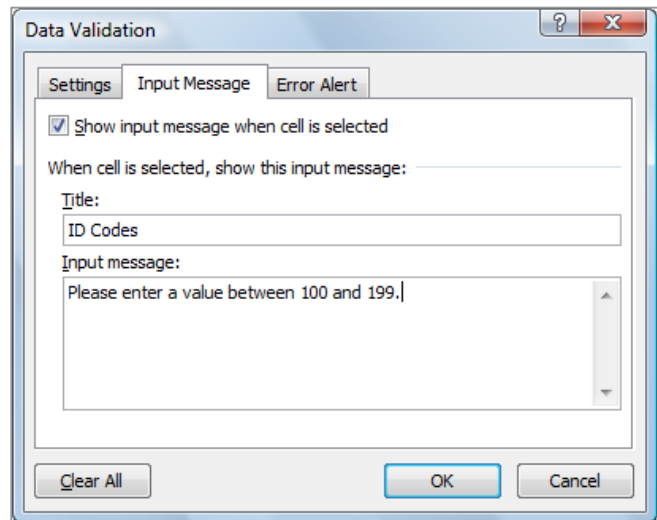
Try This Yourself:

Same
File

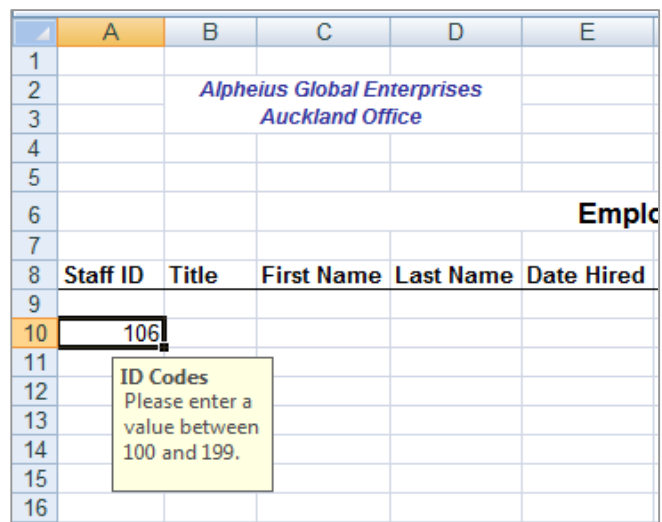
Continue using the previous file with this exercise, or open the file E765 Validation_3.xlsx...

- 1 Click on cell **A10**
- 2 On the **Data** tab, click on the top part of the **Data Validation** button to display the dialog box
- 3 Click on the **Input Message** tab
- 4 Click in **Title** and type **ID Codes**
- 5 Click in **Input message** and type **Please enter a value between 100 and 199.**
- 6 Click on **[OK]**
Because cell A10 is still selected, the message you have just typed will be displayed
Click **[Esc]** to hide the input message

2



6



For Your Reference...

To **create** an **input message**:

1. Click in the cell(s) where the validation is
2. On the **Data** tab, click **Data Validation**, **Data Validation** to display the dialog box
3. Click on **Input Message** and type a **Title** and **Message** and then click **[OK]**

Handy to Know...

- By removing the tick from the checkbox for **Show input message when cell is selected**, you can hide the input message without deleting the message text permanently.

CREATING AN ERROR MESSAGE

Error alerts enable you to replace the standard error message with something more meaningful. The message "Please enter a value between 100 and 199." indicates that there is an error, and

clearly explains what is required. Users will find it much easier to complete their tasks if they know exactly what to do. The three styles of error alerts are **Stop**, **Warning** and **Information**.

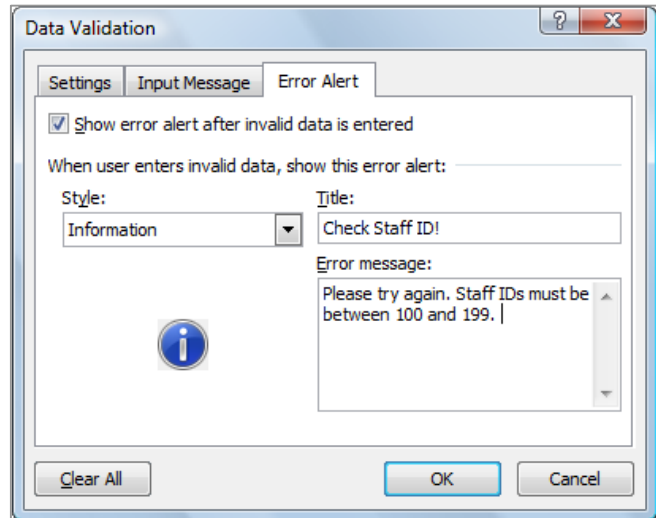
Try This Yourself:

Open
File

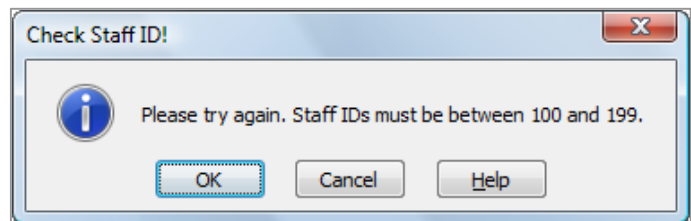
Continue using the previous file with this exercise, or open the file *E765 Validation_4.xlsx*...

- 1 Click on cell **A10**
- 2 On the **Data** tab, click the **Data Validation** button and then click on the **Error Alert** tab
- 3 Click on the drop arrow ▼ for **Style** and click on **Information**
Notice that the red Stop symbol has been replaced by the Information symbol...
- 4 Click in **Title** and type **Check Staff ID!**
- 5 Click in **Error message** and type **Please try again. Staff IDs must be between 100 and 199.**
- 6 Click on **[OK]**
- 7 Type **45** and press **Enter**
Your customised error message will appear...
- 8 Click on **[OK]**
- 9 Click in **A10**, then type **106** and press **Enter**

2



7



For Your Reference...

To create an **error alert**:

1. On the **Data** tab click **Data Validation**
2. Click on the **Error Alert** tab
3. Select a message **Style**
4. Type a **Title** and **Error message**
5. Click on **[OK]**

Handy to Know...

- There are three **styles** of error alert – **Stop**, **Warning** and **Information** – so you can select one that suits your message.
- An alert only works when data is directly entered into a cell. Data that is copied or moved from other cells won't activate the message.

CREATING DROP-DOWN LISTS

If you have a limited number of possible options for a cell, you can create a drop-down **list** for the user to select from. This ensures that the spelling of the choices is consistent, and makes it much

easier for the user to complete their data entry tasks. Lists are created using the **Data Validation** settings and a separate list of items is stored in the workbook.

Try This Yourself:

Same File

1

Continue using the previous file with this exercise, or open the file E765 Validation_5.xlsx...

Click on the **Sources** worksheet tab and look at the lists. Select cells A3:A7 and notice that this range of cells has been named **Titles** (look in the Name Box when the cells are selected).

We'll use the **Titles** list as the entries for the drop-down list...


2

Click on the **Payroll** tab, then click on cell **B10**

3

On the **Data** tab, click on the **Data Validation** button and then click the **Settings** tab

4

Click on the drop arrow  for **Allow** and click on **List**

5

Click in **Source** and press **F3** to display a list of range names

6


Click on **Titles** to select it, then click on **[OK]**

7

Click on **[OK]** to apply the settings

Because cell B10 is already selected, a drop arrow will appear...

8

Click on the drop arrow  for **B10** to display a list of titles

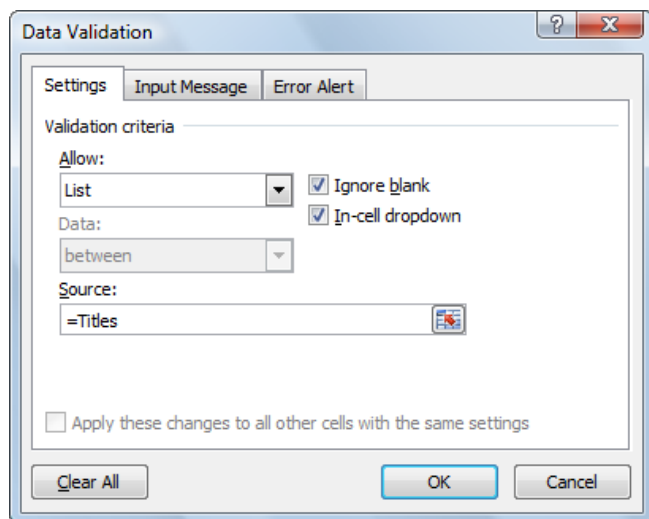
9

Click on **Mr** to select it and enter the text in the cell

1

	A	B	C	D	E	F	G
1	Titles	Depts					
2			These are lists that are used in validations.				
3	Mr	Banking and Finance					
4	Mrs	Buildings					
5	Ms	Communications					
6	Miss	Health					
7	Dr	Insurance					
8		Legal					

6



Data Validation

Settings Input Message Error Alert

Validation criteria

Allow: List

Data: between

Source: =Titles

☒ Ignore blank

☒ In-cell dropdown

☐ Apply these changes to all other cells with the same settings

Clear All OK Cancel

8

						Employee Det
6						
7						
8	Staff ID	Title	First Name	Last Name	Date Hired	Position
9						
10	106					
11		Mr				
12		Mrs				
13		Ms				
14		Miss				
15		Dr				

For Your Reference...

To **create** a **drop-down list**:

1. Type a list of items in a worksheet, then click where you want the list to appear
2. On the **Data** tab, click on the **Data Validation** to and then click the **Settings** tab
3. Select **List** in **Allow**, type the list range for **Source**, then click on **[OK]**

Handy to Know...

- The list we used has been given a range name (**Titles**) to make it easier to locate. It has also been placed on a separate worksheet to protect it. To provide even better protection, you could hide the worksheet by right clicking on the worksheet tab and selecting **Hide**.

CIRCLING INVALID DATA

You can apply data validation to cells that already have data entered in them. However, Excel does not automatically inform you that the existing cells contain invalid data. In these instances, you

can highlight invalid data by instructing Excel to **circle** it on the worksheet. Once you have identified the invalid data, you can hide the circles again.

Try This Yourself:

Open
File

Continue using the previous file with this exercise, or open the file E765 Validation_7.xlsx...

- 1 Click on the **HR** worksheet tab to display its data
- 2 Select **B9:B30** which contains existing **Staff IDs** and blanks
- 3 On the **Data** tab, click the top section of the **Data Validation** button

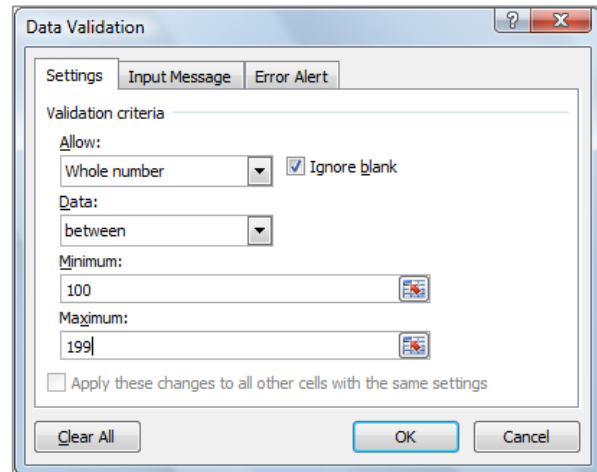
We'll now create a validation setting so that only IDs between 100 and 199 are valid

- 4 Complete the **Settings** tab as shown in the example and then click **[OK]**
- 5 Click in **B21** and type **300** and press **Enter**

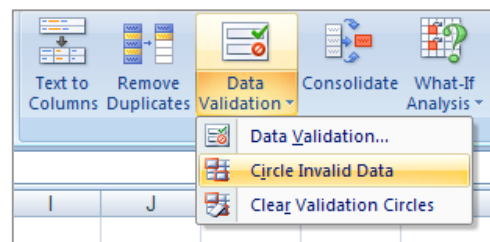
An error message will appear because you've entered a number outside of the validation range. Click **[Retry]** and then enter **100**

- 6 Now on the **Data** tab, click on the lower part of the **Data Validation** button and select **Circle Invalid Data**
- 7 Notice that some of the data in the **Staff ID** column that was entered before the validation rule was set is now circled because it doesn't match the validation settings

4



6



7

Staff ID	Title	First Name
201	Mr	Peter
102	Ms	Mary
103	Prof	Helen
401	Mr	Norris
105	Miss	Vivian
106	Dr	Grace
107	Ms	Kate
801	Mr	Brian
109	Miss	Tara
110	Ms	Nora
111	Prof	Kris
112	Mrs	Kelly
100		

For Your Reference...

To **circle** invalid data:

1. Now on the **Data** tab, click on the lower part of the **Data Validation** button
2. Select **Circle Invalid Data**

Handy to Know...

- To find cells which have data validation, on the **Home** tab, in the **Editing** group, click **Find & Select**, and then **Data Validation**. You can then change, remove or copy validation settings.
- To remove invalid data circles, on the **Data** tab, click the bottom of the **Data Validation** button and select **Clear Validation Circles**.

CHAPTER 6

In

Focus

PIVOTTABLES

UoB_ARPE_EK771

PivotTable reports are a quick and easy way to summarise, analyse, investigate and present data. They are particularly useful if you are working with large amounts of list data.

In this session you will:

- gain an understanding of how and when to use PivotTables
- gain an overview of how to work with the PivotTable Field List
- learn how to create a PivotTable report
- learn how to add fields to a PivotTable report
- learn how to change field settings in a PivotTable report
- learn how to apply a filter to a PivotTable report
- learn how to refresh the information in a PivotTable
- learn how to add new data to a PivotTable
- learn how to create a PivotChart report
- learn how to change the layout of a PivotTable report
- learn how to expand and collapse the detail levels in a PivotTable report.

UNDERSTANDING PIVOTTABLES

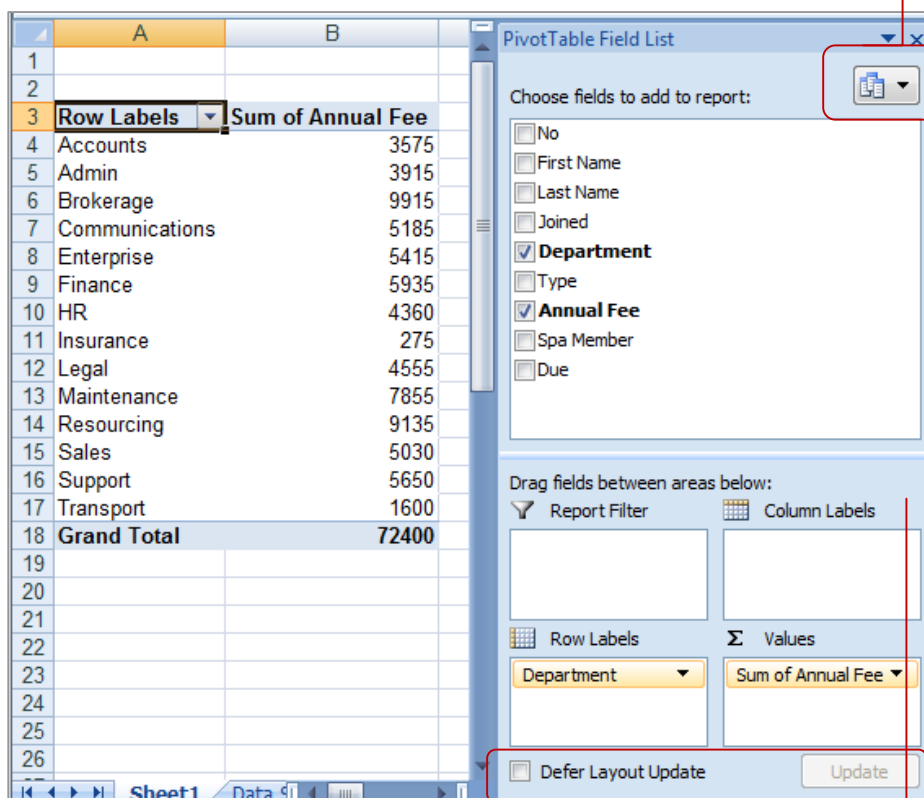
PivotTable reports are an interactive way to quickly summarise large amounts of data. You can use them to analyse numerical data in detail and to answer unanticipated questions about

your data. Using the unique **PivotTable Field List** you can literally manipulate your data at the click of the mouse button.

When to Create a PivotTable Report

Create a PivotTable report when you want to:

- Query large amounts of data quickly and easily.
- Subtotal and aggregate numeric data, summarising data by categories and subcategories, and creating custom calculations and formulas.
- Expand and collapse levels of data to focus on your results, drilling down to the details from the summary data for areas that most interest you.
- Move rows to columns or columns to rows (or "pivoting") to see different summaries of the source data.
- Filter, sort, group, and conditionally format subsets of data to enable you to focus on the information that you want.
- Present accurate, summary, online or printed reports.



The PivotTable report reflects the choices that you make in the **PivotTable Field List** pane. In this example, the data is summarised by **Department** calculating the total **Annual Fees**.

If you're working with very large amounts of data, you might want to check the **Defer Layout Update** option so that the PivotTable only updates when you click the **[Update]** button.

Use this button to change the layout of the **PivotTable Field List** pane. For example, if you are working with lots of field names, you might like to **Fields Section only** when you make your field choices.

Use the **PivotTable Field List** to add fields to the **areas** section at the bottom of the list. You can include fields by clicking in their check box or by dragging them to a particular box in the **areas** section.

In this section, you can move fields from one box to another. You can also click on a field to display a menu of choices. Some of these choices are to move the field to other locations, to move its position within the current box (if there are multiple fields in a box), to change its field settings, etc.

WORKING WITH THE PIVOTTABLE FIELD LIST

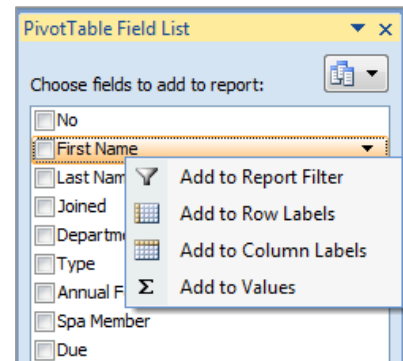
It's important to understand how the **PivotTable Field List** works and the ways in which you can arrange different types of fields. This will help to ensure that you achieve the best results that you

want when you lay out a PivotTable report.

Adding Fields

To add fields to the report, do one or more of the following:

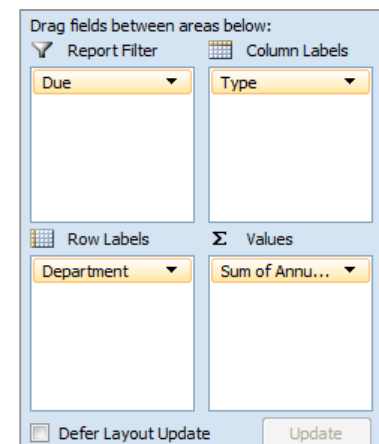
- Select the check box next to each field name in the **PivotTable Field List** section. The field is placed in a default area of the layout section, but you can rearrange the fields if you want.
- By default, non-numeric fields are added to the **Row Labels** area, numeric fields are added to the **Values** area, and OLAP (Online Analytical Data Processing) date and time hierarchies are added to the **Column Labels** area.
- Right-click the field name (as shown in the example) and then select the appropriate command, **Add to Report Filter**, **Add to Column Label**, **Add to Row Label**, and **Add to Values**, to place the field in a specific area of the layout section.



Rearranging Fields

You can rearrange existing fields or reposition those fields by using one of the four areas at the bottom of the layout section:

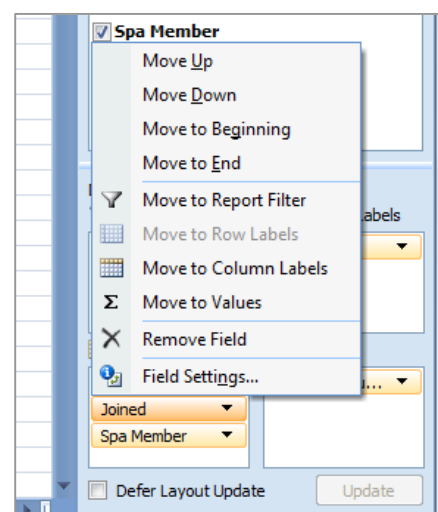
- **Values** – used to display summary numeric data.
- **Row Labels** - used to display fields as rows on the side of the report. A row lower in position is nested within another row immediately above it.
- **Column Labels** - used to display fields as columns at the top of the report. A column lower in position is nested within another column immediately above it.
- **Report Filter** - used to filter the entire report based on the selected item in the report filter.



Manipulating Individual Fields

You can click on any field in the layout section and use the shortcut menu to manipulate the field to another one of the four boxes, or to another position within its current box. You can also use this shortcut menu to delete a field from the layout section.

*By default, each time that you make a change in the PivotTable Field List, the report layout is automatically updated. To improve performance when you are accessing a large amount of external data, you can switch to manual updating. When you switch to manual updating, you cannot use the report until you switch back to automatic updating. However, you can quickly add, move, and remove fields from the field section to the layout section, and then switch back to automatic updating to see your results. Use the **Defer Layout Update** to switch to manual updating.*



CREATING THE PIVOTTABLE


The first step when creating a PivotTable is to identify the data source and then the location of where the PivotTable should be stored. This can be either on the same worksheet as the data or

on another worksheet. With this information, Excel then creates an empty PivotTable in the specified location ready for you to use the **PivotTable Field List** to construct your PivotTable report.

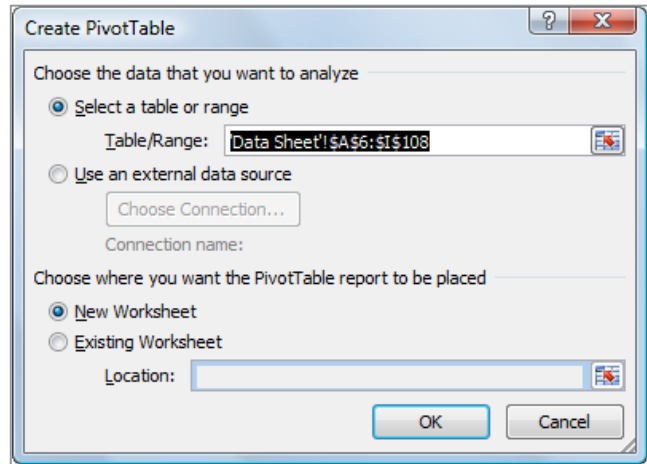
Try This Yourself:

Open File

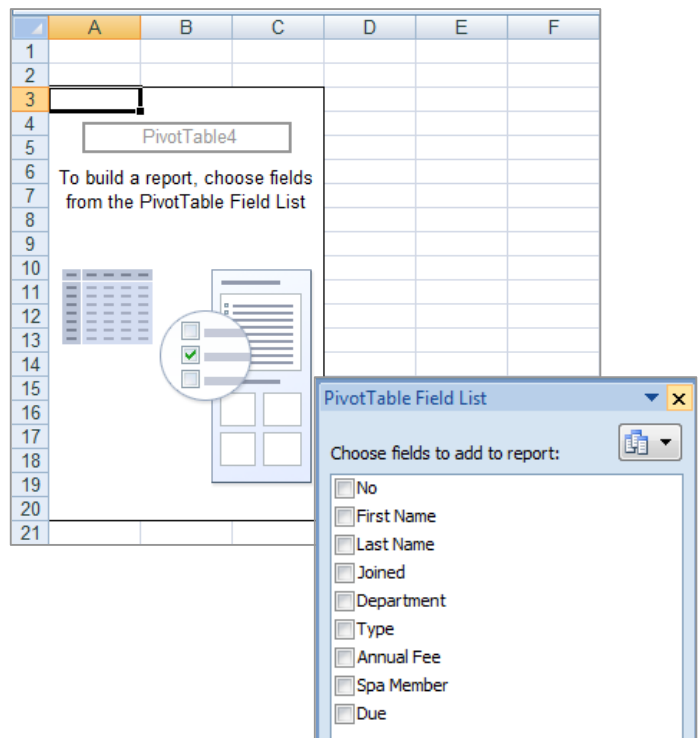
Before starting this exercise you MUST open the file EK771 PivotTables_1.xlsx...

- 1 Click anywhere in the table then click on the **Insert** tab
- 2 Click on the bottom half of **PivotTable** button and choose **PivotTable** to display the **Create PivotTable** dialog box
- 3 Check that the range selected is **\$A\$6:\$I\$108** then click on **[OK]**
A PivotTable report will be created in a new sheet ready for you to start adding fields. The PivotTable Field List will appear on the right of the screen...
- 4 Click on the **close** button  on the **PivotTable Field List** to close it
- 5 On the **PivotTable Tools: Options** tab, click on **Field List** in the **Show/Hide** group to redisplay the field list
- 6 Click outside of **PivotTable**
The field list and other panes will be closed...
- 7 Click back inside the **PivotTable** to redisplay the **PivotTable Field List**

2



3



For Your Reference...

To **create** a **PivotTable report**:

1. Click within the data that is to be used
2. Click on the **Insert** tab and then click on **[PivotTable]** and select **PivotTable**
3. Specify your options and click on **[OK]**

Handy to Know...

- Make sure that your data has column headings which can be used as field names.
- It is a good idea to convert your data to a table before creating a PivotTable from it. Changes to the data in tables including new rows are automatically included in the PivotTable when it is refreshed.

ADDING FIELDS TO A PIVOTTABLE

Once you've create a PivotTable report, you can use the **PivotTable Field List** to add, rearrange and remove fields. By default, the **PivotTable Field List** displays two sections: a **field** section

at the top for adding and removing fields, and a **layout** section at the bottom for rearranging and repositioning fields including the **Report Filter**, **Column Labels**, **Row Labels** and **Values**.

Try This Yourself:

Open
File

Continue using the previous file with this exercise, or open the file EK771 PivotTables_2.xlsx...

- 1 Ensure you are working on **Sheet 1**
- 2 In the **PivotTable Field List** check the **Type** field and then the **Annual Fee** field
Notice where they are placed in the bottom section of the panel and how the report now appears
- 3 Now drag the **Type** field in the **Row Labels** section across to the **Column Labels** section
- 4 Now click on the checkbox for the **Due** field to add it as a **Row Label**
- 5 Click on the checkbox for **Department** to add it as a **Row Label**
The report will now show the annual fees for each membership type, by month and department. You may like to right-align the headings such as Gold so that they appear above the figures that they relate to
- 6 Click on the arrow next to **Due** and select **Move Down** and notice how the report changes
- 7 Now use the arrow on **Due** to move it back up again

2

	A	B	C
1			
2			
3	Row Labels	Sum of Annual Fee	
4	Gold	32625	
5	Junior	935	
6	Life	440	
7	Silver	18000	
8	Theatre	20400	
9	Grand Total	72400	
10			

Row Labels	Σ Values
Type	Sum of Annu...

5

	A	B	C	D	E	F	G
1							
2							
3	Sum of Annual Fee	Column Labels					
4	Row Labels	Gold	Junior	Life	Silver	Theatre	Grand Total
5	January	2250			1500	850	4600
6	Brokerage	1125			1500		2625
7	Communications					850	850
8	Resourcing	1125					1125
9	February	7875	55		4500	3400	15830
10	Admin		55		1500		1555
11	Brokerage	3375			750		4125
12	Finance	1125					1125
13	Legal						
14	Maintenance						
15	Sales						
16	Support						
17	Transport						
18	March						

Drag fields between areas below:	
Report Filter	Column Labels
	Type
Row Labels	Σ Values
Due	Sum of Annu...
Department	

For Your Reference...

Options for **adding fields** to a **PivotTable report**:

- **Drag** a field from the **PivotTable Field List** down into an appropriate layout box
- Click in the **checkbox** next to the field that you wish to add to the layout
- **Right-click** on the field and select the layout box to place it in

Handy to Know...

- Once a field has been added to the layout you can drag it into another layout box to change the structure of the report.
- You can **remove** a field from the report by dragging it out of the layout area or by clicking on the field's checkbox in the **PivotTable Field List** to remove the tick.

VALUE FIELD SETTINGS

Each field in a PivotTable report has predefined field settings which can be changed to suit your report requirements. For example, by default, fields that are added to the **Values** area are set

to **sum** the data thus displaying totals in the PivotTable report. You can change the setting so that the report displays different statistical results, such as **average** values, **maximum** values, etc.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file EK771 PivotTables_3.xlsx...

1 Click on **Sum of Annual Fee** in the **Values** area and select **Value Field Settings** to display the **Value Field Settings** dialog box

2 Click on **Count** and then click on **[OK]**

Now the PivotTable report shows a count of records rather than a sum. You can also select averages ...

3 Click on **Count of Annual Fee** in the **Values** area and select **Value Field Settings**

4 Click on **Average** and then click on **[OK]**

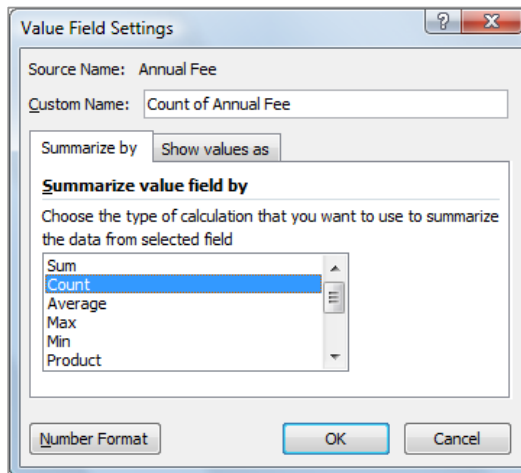
The new figures have too many decimal places!

5 Click on **Average of Annual Fee** in the **Values** area and select **Value Field Settings**

6 Click on **[Number Format]** to display the **Format Cells** dialog box

7 Click on **Number** and ensure **Decimal places** is set to **2** then click on **[OK]** twice to update your report

2



3

	A	B	C	D	E	F	G
1							
2							
3	Count of Annual Fee Column Labels						
4	Row Labels	Gold	Junior	Life	Silver	Theatre	Grand Total
5	January	2			2	1	5
6	Brokerage	1			2		3
7	Communications					1	1
8	Resourcing	1					1
9	February	7	1		6	4	18
10	Admin		1		2		3
11	Brokerage	3			1		4
12	Finance	1					1

7

	A	B	C	D	E	F	G
1							
2							
3	Average of Annual Fee Column Labels						
4	Row Labels	Gold	Junior	Life	Silver	Theatre	Grand Total
5	January	1125.00			750.00	850.00	920.00
6	Brokerage	1125.00			750.00		875.00
7	Communications					850.00	850.00
8	Resourcing	1125.00					1125.00
9	February	1125.00	55.00		750.00	850.00	879.44
10	Admin		55.00		750.00		518.33
11	Brokerage	1125.00			750.00		1031.25
12	Finance	1125.00					1125.00

For Your Reference...

To **change** the **value field settings**:

1. Click on the field you wish to change in the **Values** box in the layout area
2. Select **Value Field Settings**
3. Make a selection from the **Value Field Settings** dialog box and click on **[OK]**

Handy to Know...

- You can further customise how results are shown in a report by using the **Show values as** tab in the **Value Field Settings** box.
- If you click on a field's data in the report area, you can use the **PivotTable Tools: Option** tab and **Field Settings** to make changes to the field settings options.

APPLYING A FILTER TO A PIVOTTABLE

Filtered data displays only the subset of data that meet the criteria that you specify and hides data that you do not want displayed. Unlike filtering a cell range or table, you do not need to reapply a

filter. Filters are automatically reapplied every time the PivotTable is refreshed or updated.

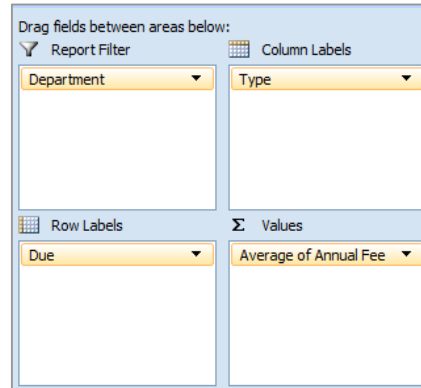
Try This Yourself:

Same
File

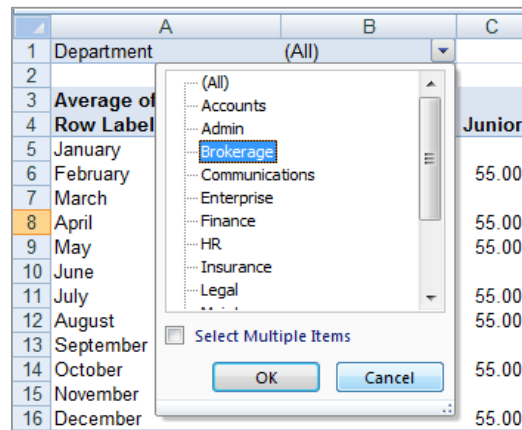
Continue using the previous file with this exercise, or open the file EK771 PivotTables_4.xlsx...

- 1 Examine the areas below the **Field List** which are **Report Filter**, **Row Labels**, **Columns Labels** and **Values** areas
- 2 Drag the **Department** field from **Row Labels** up into the **Report Filter** area
- 3 Click on the drop-arrow for the **Department** field on the **PivotTable**, click on **Brokerage** and click on [OK] to display the **Brokerage** totals
- 4 Click on the drop-arrow for the **Department** field, click the checkbox for **Select Multiple Items** and click **Accounts**, **Admin**, **Brokerage**, **Communications** and then click [OK]
- 5 Using the **Department** field, now select **(All)** to display all of the records again

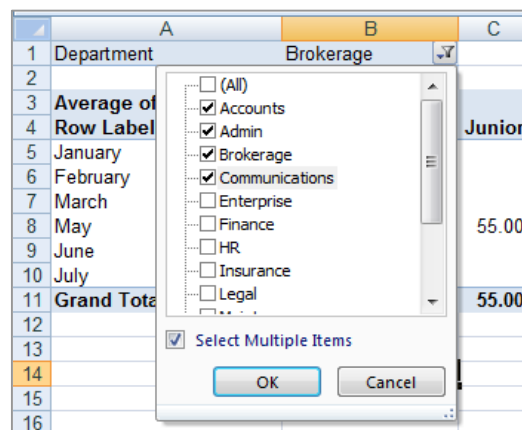
2



3



4



For Your Reference...

To **create a report filter**:

1. Add a field to the **Report Filter** area
2. Click on a drop-arrow on the filtered field and click on the value that you want the data filtered by
3. Use **Select Multiple Items** if needed then click on [OK]

Handy to Know...

- To make the Filter menu wider or longer, click and drag the grip handle at the bottom.
- To display different options on the Filter menu click on either **Row** or **Column Labels** on the PivotTable area. To filter numerically click on **Value Filters** and choose one of the commands.

REFRESHING A PIVOTTABLE

When you alter data on the original spreadsheet, these changes will not automatically transfer to the PivotTable. It is necessary to refresh the data.

Try This Yourself:

Same File

Continue using the previous file with this exercise...

- 1 Adjust the **Values** field to show the **Sum** of Annual Fee rather than the average.
- Examine the PivotTable and notice that **£2250** is due from **Gold** members in **January**
- 2 Click on the **Data Sheet** tab to return to the original data set
- 3 **Roger Wilson**, member number 1 is a Gold member due to pay in January. Change his membership to **Silver** and press
- 4 Notice that his Annual Fee is now **750.00**
- 5 Click back on the **Sheet 1** tab to return to the PivotTable
- 6 Again, look at **Annual Fee** due from **Gold** members in **January** and notice that it is still **£2250**
- 7 On the **PivotTable Tools: Options** tab, click on **Refresh** in the **Data** group

Gold membership fees due in January should now be £1125
Changes made within the original data set (including new rows of data) can be updated in the PivotTable by clicking the Refresh button

1

	A	B	C	D	E	F
1	Department	(All)				
2						
3	Sum of Annual Fee	Column Labels				
4	Row Labels	Gold	Junior	Life	Silver	Theatre
5	January	2250.00			1500.00	850.00
6	February	7875.00	55.00		4500.00	3400.00
7	March	3375.00		110.00	750.00	1700.00
8	April		220.00		1500.00	2550.00
9	May	6750.00	275.00		2250.00	
10	June			220.00	2250.00	1700.00
11	July	5625.00	55.00		750.00	5100.00
12	August	3375.00	110.00	55.00		850.00
13	September	1125.00		55.00	2250.00	
14	October	1125.00	110.00		1500.00	1700.00
15	November	1125.00			750.00	

4

A	B	C	D	E	F	G	H
No	First Name	Last Name	Joined	Department	Type	Annual Fee	Spa Me
1	Roger	Wilson	12/1/92	Brokerage	Silver	750.00	Ye
2	Max	Braceall	22/2/08	Sales	Theatre	850.00	Al

7

	A	B	C	D	E
1	Department	(All)			
2					
3	Sum of Annual Fee	Column Labels			
4	Row Labels	Gold	Junior	Life	Silver
5	January	1125.00			2250.00
6	February	7875.00	55.00		4500.00
7	March	3375.00		110.00	750.00
8	April		220.00		1500.00
9	May	6750.00	275.00		2250.00
10	June			220.00	2250.00

For Your Reference...

To **refresh** a PivotTable after amending details within the original data set:

1. Make the change on the original data set
2. Return to the PivotTable and in the **PivotTable Tools: Options** tab, click **Refresh**

Handy to Know...

- If new information is added to the bottom of the original data set, this will not be included by simply refreshing the spreadsheet. In this case, you will need to extend the data source of the PivotTable – see later task.

ADDING NEW DATA TO A PIVOTTABLE

New data added in the middle of the original data source will be included in the PivotTable when it is refreshed. However, data added at the bottom of the original data source, will not be added as it

is outside the original source data range. In this case it is necessary to extend the data source to include the new data.

Try This Yourself:

Same
File

Continue using the previous file with this exercise...

- 1 Click on the **Data Sheet** tab to go to the original data set
- 2 Add the new member whose details are opposite at the bottom of the data set, in row 109
- 3 Copy the formula from **G108** to **G109** and from **I108** to **I109**, to work out the **Annual Fee** and **Due** date

Notice that Rachel Afan is a Gold member whose Annual Fee is due in January

- 4 Return to the PivotTable on **Sheet 1** and notice that Annual Fee due from Gold members in January is £1125. Refresh the table. The figure for Gold members annual fee due in January will not change, as Rachel Afan was added outside the range of the original data set

- 5 We need to extend the data source: On the **PivotTable Tools: Options** tab, click on **Change Data Source**

- 6 Your data set will be displayed. Scroll to the bottom of this and see that Rachel Afan is outside the selected range

- 9 Hold down **Shift** and click on cell **I109** to extend the data source, then click **[OK]**. Refresh your data again and check Annual Fee due from Gold Members in January is now £2250

2

Add the new member Rachel Afan:

No. 103

First Name: Rachel

Last Name: Afan

Joined: 11/1/04

Department: HR

Type: Gold

Spa Member: No

6

	A	B	C	D	E	F	G	H	I
84	78	Freida	Little	27/2/02	Brokerage	Gold	1,125.00	Yes	February
85	79	Max	Snell	4/3/02	Brokerage	Life	55.00	Yes	March
86	80	Doug	Reice	12/2/02	Communications	Gold	1,125.00	No	March
87	81	Ascot						No	April
88	82	Henly						es	April
89	83	Karla						No	April
90	84	Amy						es	October
91	85	Vince						es	October
92	86	Norman						No	December
93	87	David						No	February
94	88	Harold						es	February
95	89	Martha						es	February
96	90	Xavier						es	April
97	91	Chuck						es	June
98	92	Wan						es	July
99	93	Cuthbert	Dulong	10/5/05	Finance	Gold	1,125.00	No	May
100	94	Ary	Martin	16/5/05	Communications	Junior	55.00	No	May
101	95	Jade	Wilson	25/5/05	Brokerage	Gold	1,125.00	Yes	May
102	96	Skye	Fever	31/5/05	Brokerage	Junior	55.00	No	May
103	97	Graham	Samson	9/6/05	Support	Theatre	850.00	Yes	June
104	98	Eurlia	Georgiana	14/7/97	Resourcing	Theatre	850.00	No	July
105	99	Karen	Lundren	17/7/97	Resourcing	Gold	1,125.00	No	July
106	100	Alec	Smart	23/7/97	HR	Theatre	850.00	Yes	July
107	101	Bryce	Kreman	29/7/97	Accounts	Theatre	850.00	Yes	July
108	102	Quentin	Adams	7/8/97	Legal	Gold	1,125.00	Yes	August
109	103	Rachel	Afan	11/1/04	HR	Gold	1,125.00	No	January
110									
111									
112									

For Your Reference...

To include new data inserted at the end of a data source in your PivotTable, you need to extend the PivotTable data source: Click on the **PivotTable Tools: Options** tab, choose **Change Data Source**. Then, hold down the **Shift** key and click on the last cell to be included. Click **[OK]** and refresh the PivotTable.

Handy to Know...

- You can sort data included in a PivotTable (eg into alphabetical order) and apply formatting

CREATING A PIVOTCHART

A PivotChart can be created from scratch in a similar way as a PivotTable report. Select your data and then choose **PivotTable, PivotChart** on the **Insert** tab. With PivotCharts, you can create

a single chart and interactively view the data in **different ways by changing the report layout or the detail that is displayed**. You can also create a PivotChart from a PivotTable report.

Try This Yourself:

Open File

Before starting this exercise you **MUST** open the file **EK771 PivotTables_7.xlsx...**

- 1 Click anywhere within the PivotTable report to activate the **PivotTable Tools**
- 2 Click on the **PivotChart** button in the **Options** tab
- 3 Select the **Clustered Cylinder** chart and then click **[OK]**

A chart representing all the data will be displayed

Now let's change the filter so that only the fees payable for the Accounts department are displayed

- 4 Click on the drop-down arrow on the **Department** field in the **PivotChart Filter Pane**

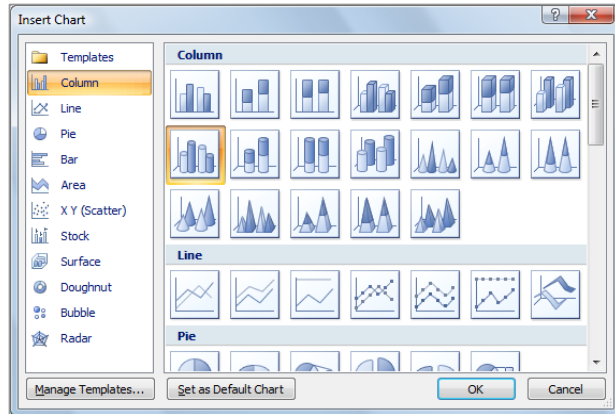
- 5 Uncheck **Select All** and then select only **Support** and click **[OK]**

- 6 Now change the filter for the **Department** field so that the chart only shows data for the **Communications** group

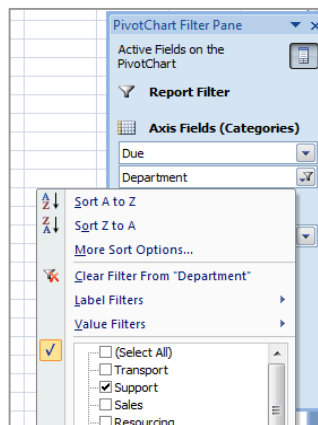
- 7 Save the file, closing it on completion

There are many more features available for PivotTables and Charts – try some more for yourself...

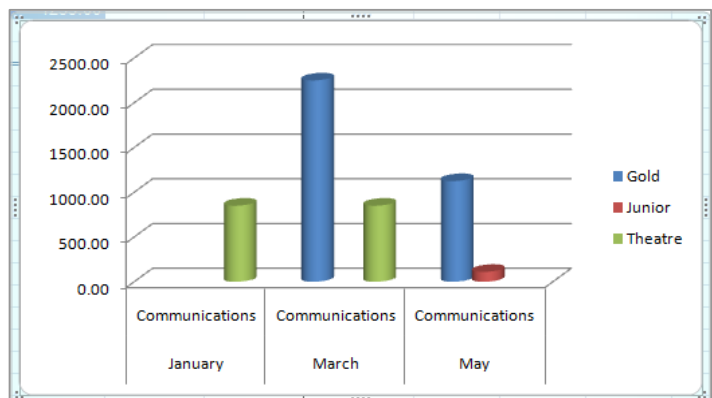
3



5



6



For Your Reference...

To create a PivotChart from a PivotTable:

1. Click in the PivotTable report area
2. On the **PivotTable Tools: Options** tab click the **PivotChart** option
3. Use the **PivotChart Filter Pane** to specify your chart settings

Handy to Know...

- A PivotChart report provides a graphical representation of the data in a PivotTable report. You can change the layout and data that are displayed in a PivotChart report just as you can in a PivotTable report.

(OPTIONAL) CHANGING THE PIVOTTABLE REPORT LAYOUT

Once you have added the fields, displayed the appropriate level of details, created calculations, filtered and grouped data in your PivotTable report, you may also want to enhance the layout

and format of the report to improve readability and to make it more appealing to the reader.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file EK771 PivotTables_5.xlsx...

- 1 On **Sheet1**, ensure you have clicked in the PivotTable area
- 2 Take a few moments to look at the current PivotTable layout
- 3 On the **PivotTables Tools: Design** tab click on **Subtotals** and choose **Show All Subtotals at Bottom of Group**
- 4 Click on **Grand Totals** and select **Off for Rows and Columns**
- 5 Click on **Report Layout** and select **Show in Tabular Form**
- 6 Click on the **Blank Rows** button and select **Insert Blank Line After Each Item**
- 7 On the **PivotTable Styles** box, click on the **More** button and select the style called **Pivot Style Medium 2**
- 8 Try previewing this worksheet to see how it would print if you wanted to output to paper
Click Close Print Preview to return to the worksheet on completion

3

	A	B	C	D	E	F	G
1							
2							
3	Sum of Annual Fee	Column Labels					
4	Row Labels		Gold	Junior	Life	Silver	Theatre
5	January						
6	Brokerage		1125.00		1500.00		2625.00
7	Communications					850.00	850.00
8	Resourcing		1125.00				1125.00
9	January Total		2250.00		1500.00	850.00	4600.00
10	February						
11	Admin		55.00		1500.00		1555.00

5

	A	B	C	D	E	F	G
1							
2							
3	Sum of Annual Fee	Type					
4	Due	Department	Gold	Junior	Life	Silver	Theatre
5	January	Brokerage	1125.00			1500.00	
6		Communications					850.00
7		Resourcing	1125.00				
8	January Total		2250.00			1500.00	850.00
9	February	Admin		55.00		1500.00	
10		Brokerage	3375.00			750.00	
11		Finance	1125.00				
12		Legal	2250.00				

7

	A	B	C	D	E	F	G
1							
2							
3	Sum of Annual Fee	Type					
4	Due	Department	Gold	Junior	Life	Silver	Theatre
5	January	Brokerage	1125.00			1500.00	
6		Communications					850.00
7		Resourcing	1125.00				
8	January Total		2250.00			1500.00	850.00
9							
10	February	Admin		55.00		1500.00	
11		Brokerage	3375.00			750.00	
12		Finance	1125.00				
13		Legal	2250.00				
14		Maintenance				1500.00	
15		Sales	1125.00				850.00
16		Support				750.00	1700.00
17		Transport					850.00
18	February Total		7875.00	55.00		4500.00	3400.00
19							
20	March	Brokerage			110.00		
21		Communications	2250.00				850.00

For Your Reference...

To change the layout for a PivotTable report:

1. Ensure you have clicked within the PivotTable area
2. Click on the **Design** tab under **PivotTable Tools**
3. Use the available layout commands

Handy to Know...

- If you prefer, you can also click on a field in the **PivotTable Field List** and select **Field Settings**. On the **Layout & Print** tab, you can specify the individual printing or layout characteristics for that particular field.

(OPTIONAL) MANIPULATING PIVOTTABLE DETAIL



The **PivotTable Tools: Options** tab contains a selection of different ways that you can manipulate and enhance the structure of a PivotTable. For example, you can expand and

collapse groups, sort data and turn certain elements on and off.

Try This Yourself:

Open
File

Before starting this exercise you **MUST** open the file EK771 PivotTables_6.xlsx...

- 1 Using the **PivotTable Tools: Design** tab change the **Report Layout** to **Show in Compact Form**
- 2 Use the **Grand Totals** button to turn them on for rows and columns
- 3 Click on the **PivotTable Tools: Options** tab and click the **Collapse Entire Field** button  **Collapse Entire Field**
- 4 Expand only the **February** and **March** data using the **Expand** icon 
- 5 Now, in the **Active Field** group, click on the **Expand Entire Field** button  **Expand Entire Field**
- 6 Click on any **Department** name in column A and then click the **Sort Descending** button
- 7 On the **PivotTable Tools: Options** tab, try turning off and on each of the buttons in the **Show/Hide** group

3

	A	B	C	D
1				
2				
3	Sum of Annual Fee	Column Labels		
4	Row Labels	Gold	Junior	Life
5	January	2250.00		
6				
7	February	7875.00	55.00	
8				
9	March	3375.00		110.00
10				

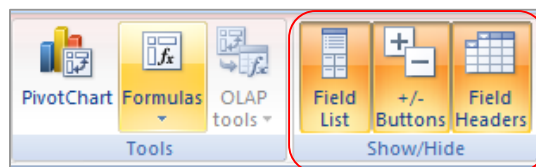
4

2				
3	Sum of Annual Fee	Column Labels		
4	Row Labels	Gold	Junior	Life
5	January	2250.00		
6	Brokerage	1125.00		
7	Communications			
8	Resourcing	1125.00		
9				
10	February	7875.00	55.00	
11	Admin		55.00	
12	Brokerage	3375.00		
13	Finance	1125.00		
14	Legal	2250.00		
15	Maintenance			
16	Sales	1125.00		
17	Support			
18	Transport			

6

2				
3	Sum of Annual Fee	Column Labels		
4	Row Labels	Gold	Junior	Life
5	January	2250.00		
6	Resourcing	1125.00		
7	Communications			
8	Brokerage	1125.00		
9				
10	February	7875.00	55.00	

7



For Your Reference...

To expand or collapse all groups on a PivotTable:

1. Click in the PivotTable
2. On the **PivotTable Tools: Options** tab click **Expand Entire Field** or **Collapse Entire Field**

Handy to Know...

- You can hide specific items in a row label or column label to help you eliminate unnecessary information from your PivotTable report. Hiding an item in a row label or column label removes the item from the report, but the item still appears in the drop-down list for the label.

PIVOTTABLES

Practice Exercise

Tasks:

Completed:

Before starting this exercise you MUST have completed all of the topics in the chapter PivotTables...

- 1 Open the workbook called **PE_PivotTables.xlsx** (it can be found in the student file folder) C
- 2 Create a PivotTable in a new worksheet that sums **Annual Fee** in each **Frequency** (row) by **Type** (column), then add **Town** as the report filter field and select **Mansfield** C
- 3 Use the **Town** field so that that filter shows **All** towns. Now filter out the column for **Lawns** (remember to use the drop-down arrow to manually filter the **Column Labels**) C
- 4 Apply a currency format to the figures (no decimals) using the **Field Settings** button C
When deselected, your table should appear similar to that shown in sample A on the next page...
- 5 Create another PivotTable that shows the number of clients (**Code**) for each **Month Due** (row) by **Type** (column) - right align the data in the columns so that the figures line up correctly C
When deselected, your table should appear similar to that shown in sample B on the next page (the year shown may change as this field is set to update automatically each year)...
- 6 Save the workbooks as **PE_PivotTables (Completed).xlsx** C

Files required for exercise:

PE_PivotTables.xlsx

Files/work created by student:

PE_PivotTables (Completed).xlsx

Exercise Completed:

C

PIVOTTABLES

Practice Exercise

A

	A	B	C	D	E	F	G
1	Town	(All)					
2							
3	Sum of Annual Fee	Column Labels					
4	Row Labels	All	Garden	Hedge	Tree	Grand Total	
5	Annually		£450	£600	£600	£1,650	
6	Fortnightly	£26,000	£9,100		£6,240	£41,340	
7	Monthly		£1,300			£1,300	
8	Quarterly	£4,000	£400	£4,056	£4,320	£12,776	
9	Six Monthly		£400	£1,050	£1,920	£3,370	
10	Grand Total	£30,000	£11,650	£5,706	£13,080	£60,436	
11							

B

	A	B	C	D	E	F	G	H
1								
2								
3	Count of Code	Column Labels						
4	Row Labels	All	Garden	Hedge	Lawns	Tree	Grand Total	
5	April 2008		1	10	1	7	19	
6	August 2008		3	1			4	
7	December 2008		2	1			3	
8	February 2008	8	9	8	13	3	41	
9	January 2009			2			2	
10	July 2008					3	3	
11	June 2008		1	1		1	3	
12	March 2008		3	3	1	7	14	
13	May 2008		2	3	2	3	10	
14	October 2008		2				2	
15	September 2008		1				1	
16	Grand Total	8	24	29	17	24	102	
17								

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