University of Glasgow

Excel: Pivot tables

V1.1

e-mail: training@glasgow.ac.uk

web: gla.ac.uk/services/it/training

Course content created by Blair Thompson

Last edited by Blair ThompsonBlair Thompson on 16/09/19

Contents

Introduction

Find out how to use data lists and Pivot tables to extract, manipulate and analyse information in Excel 2016. Familiarity with Windows and a working knowledge of Excel, as found in the Introduction to Excel course, is required.

Objectives

On successful completion of this course participants will be able to:

- Create a pivot table
- Apply filtering to pivot table data
- Use grouping tools to combine pivot table results
- Create calculated fields within a pivot table
- Create Pivot Tables and Charts to manipulate data.
- Work with Data Models to integrate data from multiple tables

Excel: Pivot tables

1 Using a Pivot table or Pivot chart to analyse data

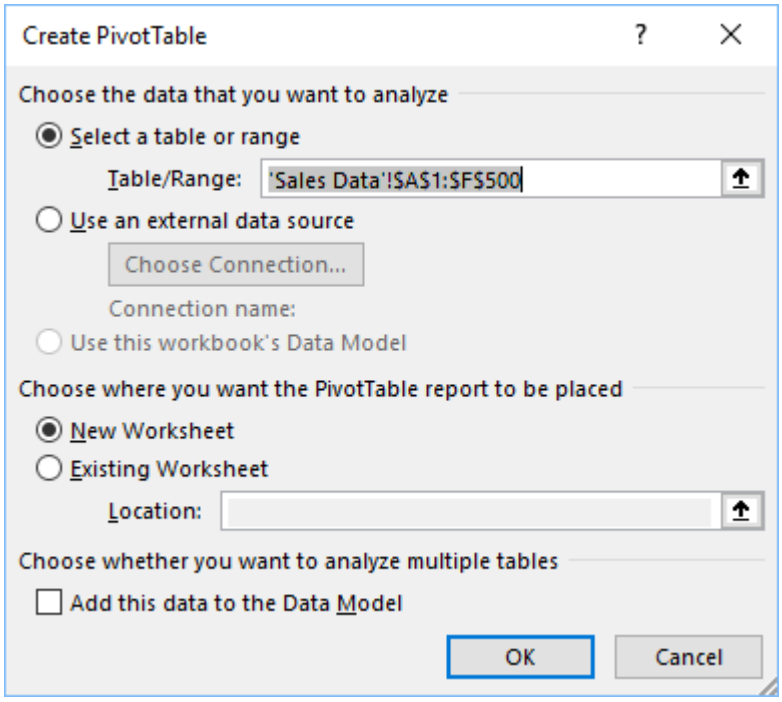
A Pivot table is an interactive table that displays two-dimensional summaries of selected data from a list. You can rotate its rows and columns, filter the data by displaying different pages, or display the details for areas of interest - thus enabling lots of different summarised views of the same data. You can create a Pivot table from any tabular sheet or database that includes rows or column headings and data in the cells following.

a. Creating a Pivot table Report

1 Open the 1 – Create Pivot Table.xlsx file from your practice folder

2 Place your selection anywhere within the table of data

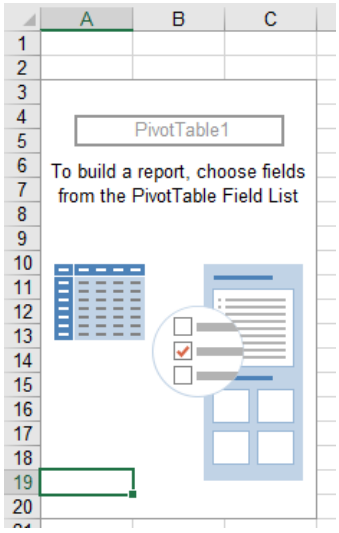
3 On the **Insert** tab, **Tables** group, choose **Pivot table** 



The data range **'Sales Data'!$A$1:$F$500** should be selected in the **Table/Range:** field

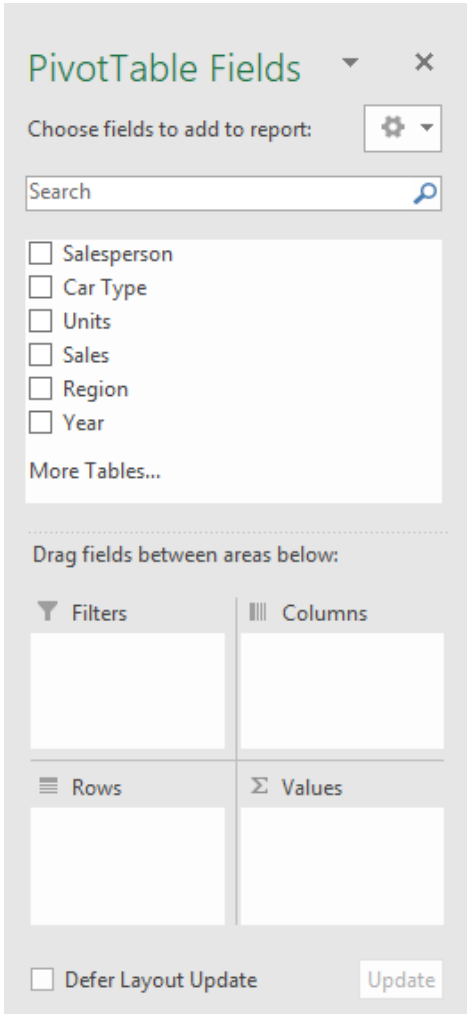
4 Check that the **Choose where the Pivot table is to be placed** setting is set to **New Worksheet.**

5 Click **OK**



6 The Pivot table outline now appears

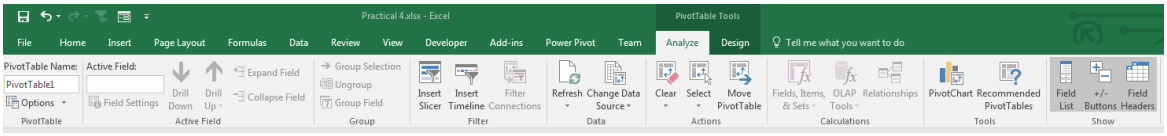
7 The Pivot table task pane also appears –

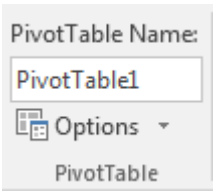


b. The Pivot table tab

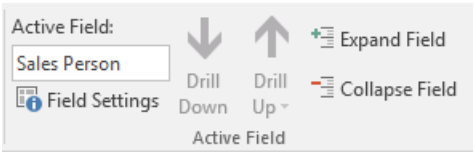
When working with a Pivot table, if your cursor is located in the table, a new tab appears (**Pivot table Tools**), with 2 sub-tabs (**Analyze** and **Design**) –

Analyze

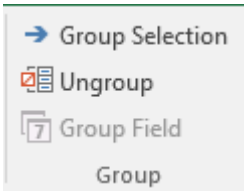




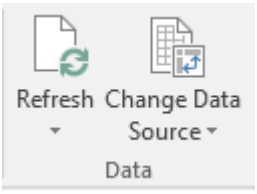
From this group you can give the Pivot table a name and select options for what is displayed (e.g. grand totals for rows/columns, how zero values should be displayed)



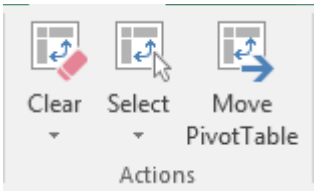
This group displays the active field in the table and, if possible, allows you to expand to see further detail relating to a field, or when it is visible, collapse that detail



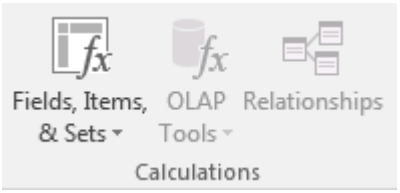
From here you can group or ungroup selected fields



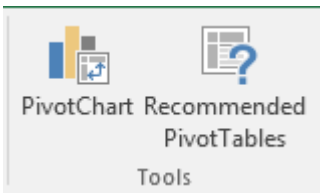
From this group you can refresh the data in the table after changes have been made to the original data



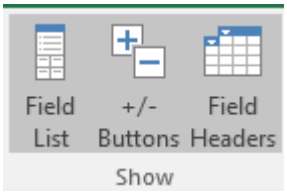
This group gives you options for clearing, selecting and moving the Pivot table



The Calculations group allows you to change how you are summarising values in your table, create custom calculations to show your values in relation to other rows and columns in the table and create and modify calculated fields

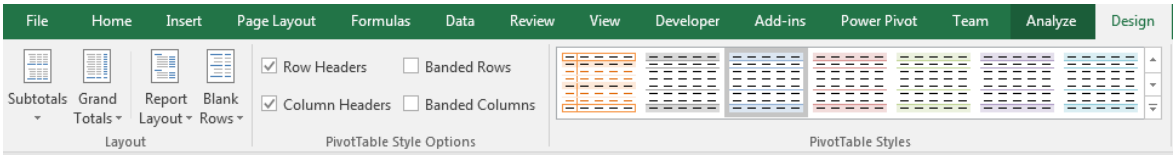


This group offers extra tools, including the option to create a Pivot chart



On/off buttons changing how the table displays

Design



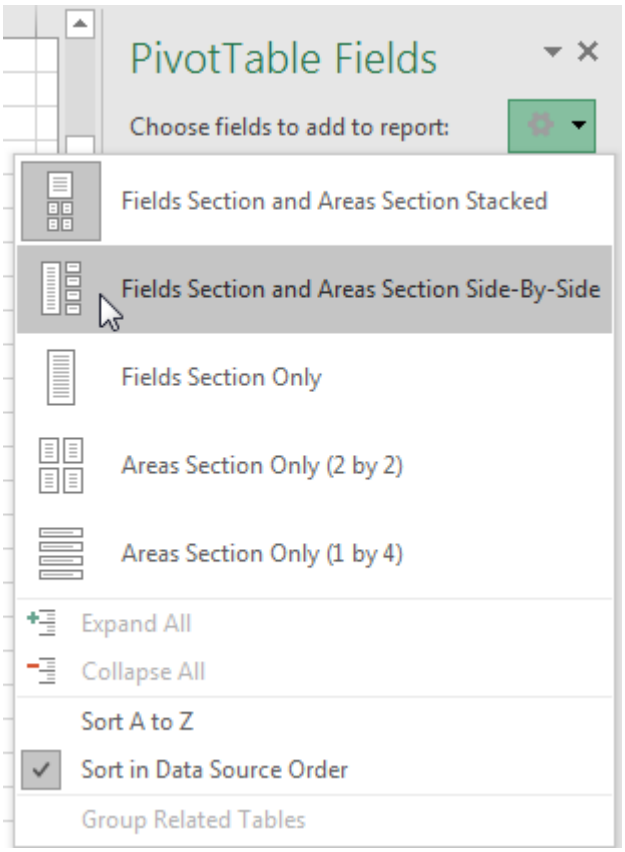
This offers numerous options for altering the format/look of the table

c. Layout a Pivot Table

The way that you layout a pivot table will affect the calculations that are performed. This is controlled from the PivotTable Fields dialog box.

Decide how you want your table to display by dragging field name buttons from the top and placing them at the relevant points, either in the table itself, or any of the four layout areas at the bottom of the task pane

The layout of the task pane itself can be changed at -



Σ Values

If you drag a field into the **Σ Values** area some form of calculation will occur. The content of the fields will determine the default calculation. Should the field contain numerical data, the calculation will automatically be a SUM, should the filed contain text or a mixture of data it will perform a COUNT.

1 Drag the **Sales** field (numerical data) into the **Σ Values** area

Observe the calculation that has occurred

2 Drag the **Salesperson** field (text) into the **Σ Values** area

Observe the calculation that has occurred

3 Drag the **Count of Salesperson** field from the **Σ Values** area and drop it either back in the fields list or outside the **PivotTable Fields** pane altogether

Rows and Columns

If you drag fields into the **Rows** or **Columns** area the pivot table, the data will be subdivided by the labels contained within that field. For this to be effective you need to have a field that contains recurring data labels.

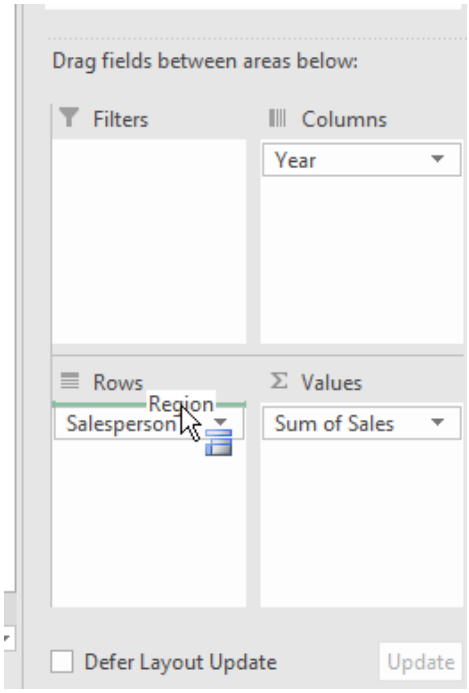
1 Drag the **Salesperson** field into the **Rows** area from the **Fields** list above

Observe the changes made to the pivot table

2 Drag the **Year** field into the **Columns** area

Observe the changes made to the pivot table

3 Drag the **Region** field into the **Rows** area, drop it just above the **Salesperson** field that is already there

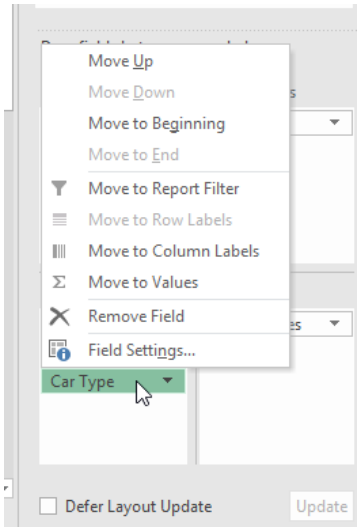


Observe the changes made to the pivot table

4 Drag the **Car Type** field below the **Salesperson** field

Observe the changes made to the pivot table

5 Click on the **Car Type** field



6 From the menu that appears click **Remove Field**

You can also remove a field by dragging it out of the areas all together.

d. Rename a Pivot Table

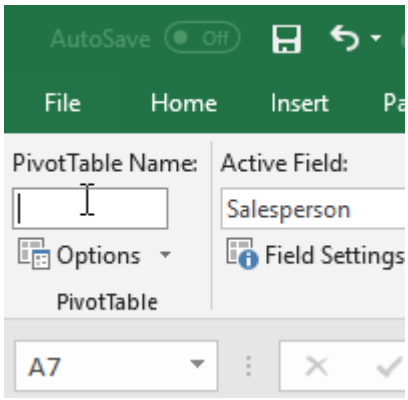
Like **Tables** you may name a Pivot Table which then allows you to reference it in formulas and when using other features. There are some rules around how you name a PivotTable, for instance:

- The PivotTable name may not begin with a number, letter or symbol
- The name cannot contain spaces

To rename our Pivot:

1 If it is not open, click on the **Analyze** Tab

2 From the **PivotTable** group click the **PivotTable Name:** text box



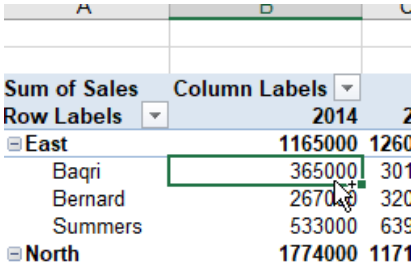
3 Type “sales_pivot”

4 Hit “ENTER”

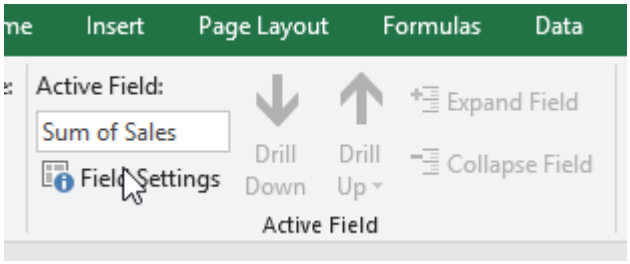
e. Change the Calculation

By default, when you place a field into the **Σ Values** area either a SUM calculation (in the case of a field containing numbers) or a COUNT calculation will occur. However, this may not be the calculation that you wish to see. Changes to how a field is presented in the PivotTable is controlled by the **Field Settings**.

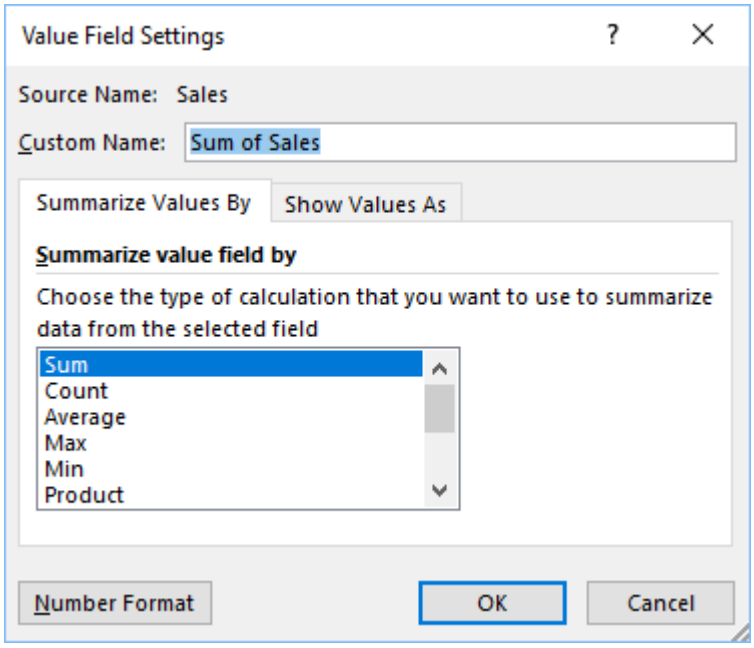
1 Click any of the figures in the Sum of Sales area of your PivotTable



2 In the **Analyze** ribbon, observe that the **Active Field** is the **Sum of Sales.**



3 Click the **Field Settings.** control just below.



The **Value Field Settings** dialogue box will appear. The **Summarize value field by** control allows you to select the calculation that will be performed in the PivotTable

4 Select **Average** from the list

Notice that the **Custom Name:** control has changed to Average of Sales

5 Edit the **Custom Name:** to read just “Average”

6 Click **OK**

Observe the result

7 Click the Field Settings control again.

8 Change the **Summarize value field by** setting to **Sum**

9 Click the **Show Values As** tab

10 Try selecting **% of Parent Row Total**

11 Click **OK**

Observe the result

12 At the far-right side of the screen, drag the **Sales** field from the list to the **Σ Values** area

Notice that you now have two columns of results for each year

f. Show Details (Drilling down)

When you analyse your data with tools such as PivotTables, it is not uncommon to notice results that are unusual or interesting. Drilling down into your data can be done using the **Show Details** tool.

1 Click on one of the totals in the open pivot table to select it

2 Right click the cell

3 From the menu that appears select **Show Details**

4 Observe the new table of data that is created

Note: You can do the same simply by double clicking on the cell that you are interested in.

2 Refresh Pivot Tables

a. Refresh

1 Open the **2 - Refresh Data.xlsx** file

2 Click on the **Refresh** tab to select the worksheet

3 Note the **Grand Totals** for the PivotTable

4 Click the **Sales Data** worksheet tab

5 Select cell **C2**

6 Change the value to **8**

7 Select cell **D2**

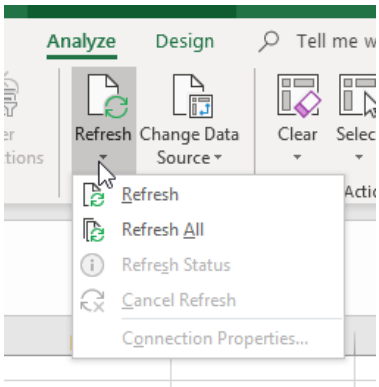
8 Change the value to **176000**

9 Click the **Refresh** worksheet tab

10 Observe the PivotTable

Notice that the figures have not changed!

11 From the **Analyze** Ribbon, select the drop-down arrow below the **Refresh** command



12 Select **Refresh All**

13 Observe the changes to your PivotTable

Note: In this example we refreshed all the PivotTables in the workbook, if we had wished to refresh just this table, we could have just chosen refresh

b. Change Data Source

With the **2 - Refresh Data.xlsx** workbook still open:

1 Click the **Sales Data** worksheet tab

2 In **row 501** enter the following data:

500	Williams	7 Series	1	35000	North	2014
501	Thompson	5 Series	3	66000	South	2019
502						

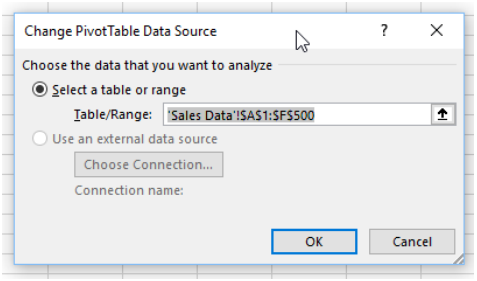
3 Click the **Change Source Data** worksheet tab

4 Right click the pivot table and attempt to refresh the data

Notice the data does not change

5 If necessary, select the **Analyze** tab

6 From the **Data** group, click **Change Data Source**



The **Change PivotTable Data Source** dialog box appears, the **Table/Range** has a grey shadow which means that you are ready to replace the range there

7 Select any cell in the data table

8 Press **CTRL + A** to select all the data in the table.

9 Click **OK**

10 Observe the changes made to your PivotTable

Note: If you are working with a set of data that is frequently changing in size, using the **Change PivotTable Data Sour**ce tool is time consuming. If you base a PivotTable on an **Excel Table** object (See our working with data course), then you no longer need to perform this step, you can instead just use the Refresh tool whenever your data changes

3 Working with Filters

To analyse our data effectively sometimes we will need to filter the data to the information that we are most interested in. Excel 2016 offers several different ways that we can filter our data.

a. Filter by Report

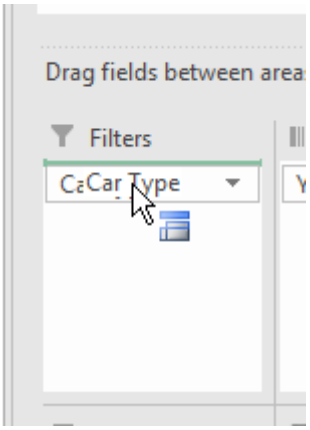
To filter a Pivot Table by report we place at least one field within the **Filters** area. This will allow us to filter the entire pivotable.

1 Open the **3 – Filter Pivot Table.xlsx** file from the practice folder

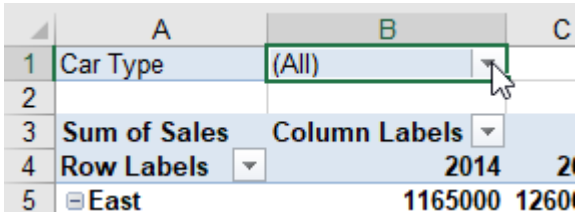
2 Select the **Filters** worksheet tab

3 Click one of the cells within the displayed pivot table

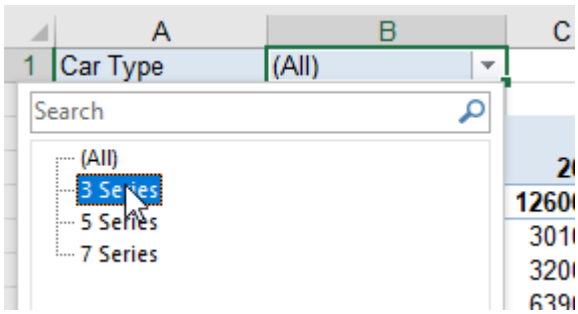
4 Within the **PivotTable Fields** pane on the right-hand side of the application, drag the **Car Type** field into the **Filters** area



Above the pivot table a filter control will appear



5 Click the drop-down control and apply a filter that shows only 3 Series related records

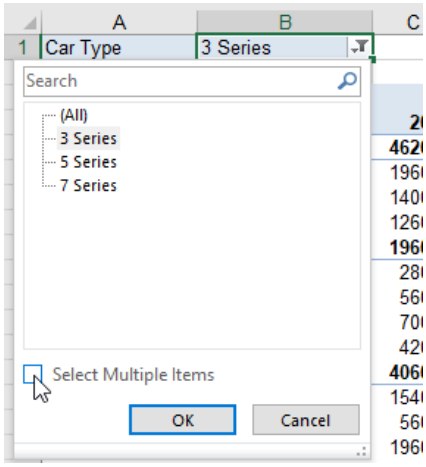


6 Click **OK**

7 Observe the changes to your pivot table

8 Click the drop-down control again

9 Click the **Select Multiple Items** control



10 Click the **5 series** check box

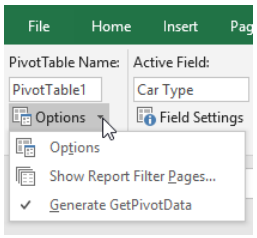
11 Click **OK**

12 Observe the changes made to the pivot table

b. Show Report Filter Pages

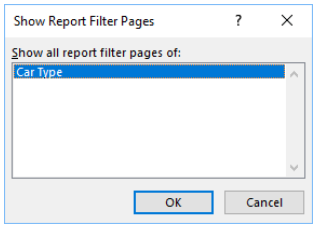
Excel 2016 is able to produce multiple PivotTable that replicate a pivot table for each unique item in a field. This feature requires that you first add a field to the **Filters** area of your pivot table as we did previously

1 From the **Analyze** ribbon, click the drop-down control to the right of the **Options** control



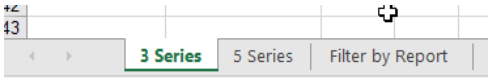
2 From the menu that appears, select **Show Report Filter Pages…**

3 From the **Show Report Filter Pages** dialogue box select the field that you wish to use (if not already selected)



4 Click **OK**

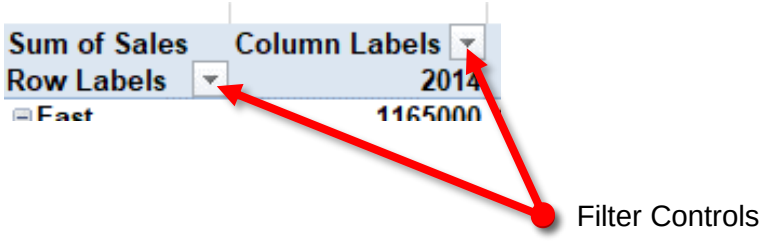
5 Observe the worksheet tabs at the bottom of the worksheet



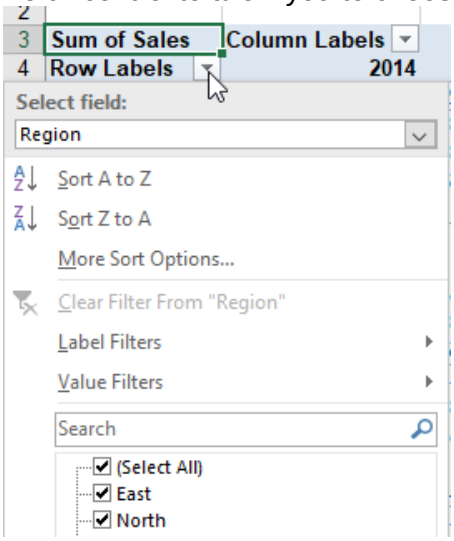
Additional worksheets have been created, if there were already filters applied to the original PivotTable, then the selected filters will determine what and how many worksheets are created.

c. Filter by Row or Column Labels

Within your Pivot Tables there are filter controls that can be used to filter your data

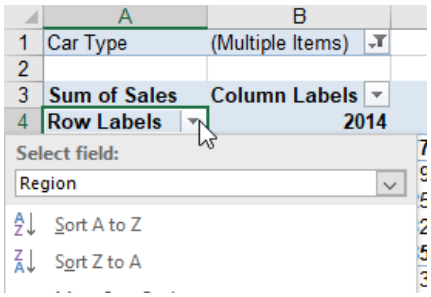


Clicking on these will offer a number of choices for both sorting and filtering these columns. Where a Row or Column contains more than one filed there will be a **Select field:** control to allow you to choose what filed will be sorted or filtered.

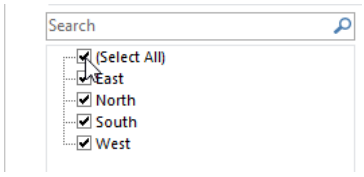


1 Click into the pivot table (if required)

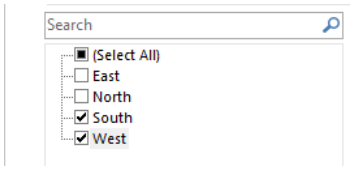
2 Click the drop-down control on the **Row Labels**



3 From the drop down that appears untick **(Select All)**



4 Tick **South** and **West**

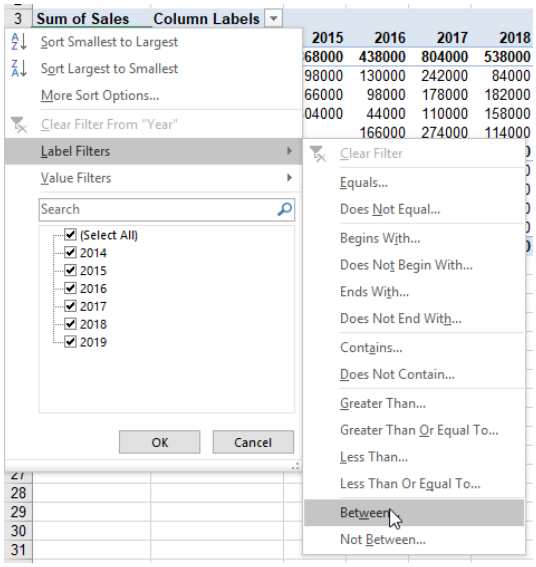


5 Click **OK**

6 Observe the changes to your pivot table

7 Click the drop-down control on the **Column Labels**

8 From the dropdown that appears, select **Label Filters** and then **Between…**



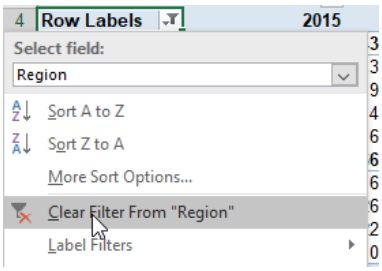
9 Fill the dialogue as follows:

10 Observe the changes to your pivot table

d. Filter by custom lists

e. Clearing Filters

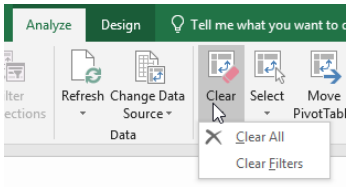
All the filter controls that we have examined so far have had a control within that allows you to clear the filters applied.



Generally, these clear filter controls will remove the filter from that specific column, row or report. You can also use the **Clear** menu to clear all filters that are currently applied to your pivot

With the current pivot table selected:

1 Click **Clear** from the **Actions** group of the **Analyze** ribbon



2 Select **Clear Filters**

3 Observe the changes to your pivot tables

4 Slicers and Timelines

As well as being able to filter your data using PivotTable filters Excel 2016 offers other more visual and touch friendly set of tools to achieve the same.

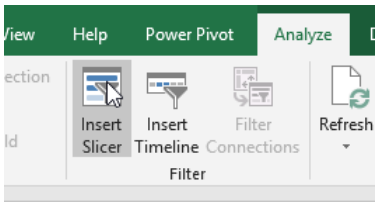
a. Using Slicers

Slicers are used to filter a pivot table based on the labels contained within a field.

1 Click the **Filter by Slicer** worksheet tab

2 If required, click any cell within the PivotTable that is there

3 From the **Analyze** ribbon, click **Insert Slicer**



4 From the **Insert Slicers** dialogue box, tick **Car Type** and **Region**

5 The slicers will appear, you can move them using a drag and drop action with your mouse

6 Click on the **East** button on the **Region** slicer

7 Observe the changes to your pivot table

8 With the **CTRL** key held down on your keyboard, Click on the **North** button on the **Region** slicer

9 Observe the changes to your pivot table

10 Click the **3 Series** button on the **Car Type** slicer

11 Observe the changes to your pivot table

12 Within the region slicer click the clear control 

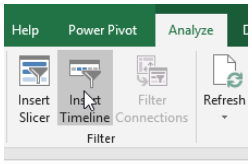
13 Observe the changes to your pivot table

b. Using Timelines

1 Select the **Filter by Timeline** worksheet tab

2 If required select one of the cells of the pivot table

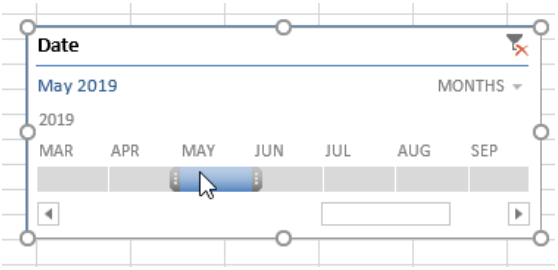
3 From the **Analyze** ribbon, select **Insert Timeline** command from the **Filter** group



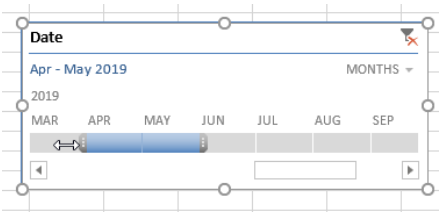
4 Tick the **Date** box in the **Insert Timelines** dialogue box

5 Click **OK**

6 From the timeline control that appears, click on **May 2019**



7 Using the sliders adjust the selected months to include Mar – May 2019



8 Observe the changes in the pivot table

5 Grouping Tools

Among the function of Pivot Tables is that you can group items that you are analysing using the Group Open the

a. Group by Label

Grouping by label is a useful feature that allows you to group the pivot table results according to discrete labels. For instance, using this tool you could group geographical regions into larger regions .i.e. North + West = NorthWest

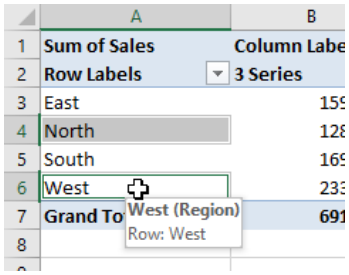
1 Open the **5 - Grouping Pivot Tables .xlsx** file from you practice files folder.

2 Click on the **Label** worksheet tab

3 Arrange the pivot table to look like this:

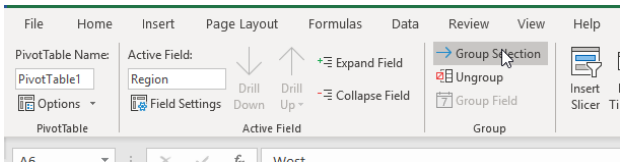
Sum of Sales	Column Labels			
Row Labels	3 Series	5 Series	7 Series	Grand Total
East	1596000	2024000	3640000	7260000
North	1288000	3102000	3080000	7470000
South	1694000	2596000	3465000	7755000
West	2338000	3674000	6020000	12032000
Grand Total	**6916000**	**11396000**	**16205000**	**34517000**

4 Select the **North** and **East** row labels



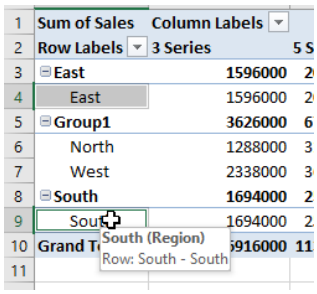
Hint: You can make a multiple selection by clicking on the **North** label and then with the **CTRL** key held down click on the **West** label. Don't worry if the whole row is selected, the next step will still work.

5 From the **Analyze** ribbon, click **Group Selection**

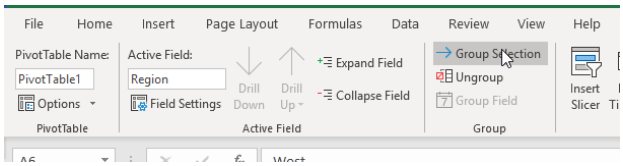


A group named **Group 1** will be created

6 Select the non-bolded **East** and **South** row labels



7 From the **Analyze** ribbon, click **Group Selection**



A group named **Group 2** will be created

b. Rename a Group

When you create groups by grouping row or column labels the groups created are given generic labels. You can edit these labels to something more representative.

1 Click on the **Group 1** row label

2 Type **North West**

3 Click on the **Group 2** row label

4 Type **South East**

c. Group by Number

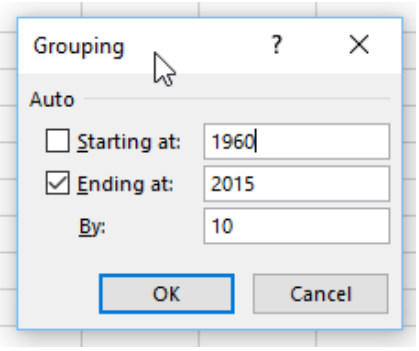
With the 3 **- Grouping Pivot Tables .xlsx** file (still open)

1 Select the Numeric worksheet from the tabs at the bottom of the worksheet

2 Click one of the labels in the **Row Labels** column

3 From the **Analyze** ribbon, select **Group Selection** from the **Group** field

4 In the dialogue box that appears fill in the following:



5 Observe the changes to the pivot table and its pivot chart

d. Group by Date

With the 3 **- Grouping Pivot Tables .xlsx** file (still open)

1 Select the **Date** worksheet using the tabs at the bottom of the app

2 Using the **PivotTable Fields** pane, drag the **Date** field into the **Rows** area

3 Observe that the dates are automatically grouped into Months

4 Click on any of the row labels in the PivotTable

5 From the **Analyze** ribbon select **Ungroup**

6 From the **Analyze** ribbon select **Group Selection**

7 Select **Quarters** and **Years**

8 Click **OK**

6 Sorting Pivot Tables

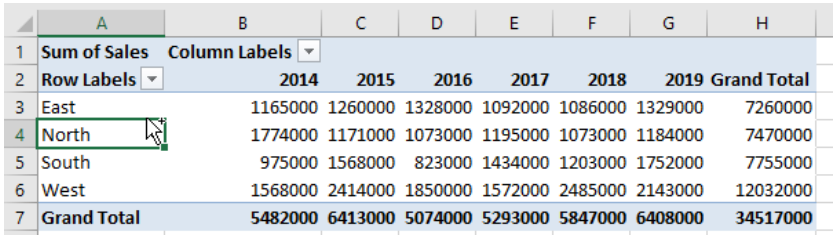
You may find that the order that rows or columns are organised within your PivotTables may not be to your liking, these can be altered by using Sort tools.

a. Sort manually

One of the more basic options open to you when it comes to sorting you pivot table is to manually move a row or column

1 Open the **6 – Sorting Pivot Tables.xlsx** file

2 Click to select the **North** row label

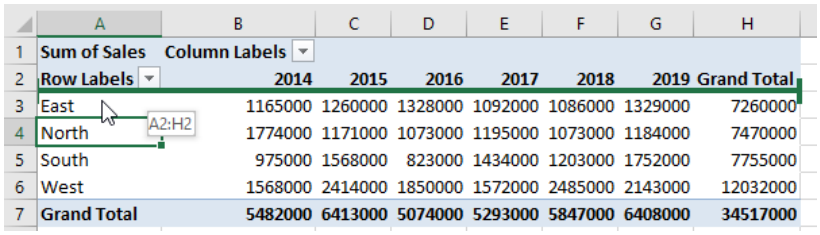


	A	B	C	D	E	F	G	H
1	Sum of Sales	Column Labels						
2	Row Labels	2014	2015	2016	2017	2018	2019	Grand Total
3	East	1165000	1260000	1328000	1092000	1086000	1329000	7260000
4	North	1774000	1171000	1073000	1195000	1073000	1184000	7470000
5	South	975000	1568000	823000	1434000	1203000	1752000	7755000
6	West	1568000	2414000	1850000	1572000	2485000	2143000	12032000
7	Grand Total	5482000	6413000	5074000	5293000	5847000	6408000	34517000

3 Hover your mouse over the green outside edge of selected cell.

You will see the mouse pointer change to a four-way arrow.

4 Left mouse click, hold and drag it to the position you want (i.e. upwards to the first row)



	A	B	C	D	E	F	G	H
1	Sum of Sales	Column Labels						
2	Row Labels	2014	2015	2016	2017	2018	2019	Grand Total
3	East	1165000	1260000	1328000	1092000	1086000	1329000	7260000
4	North	1774000	1171000	1073000	1195000	1073000	1184000	7470000
5	South	975000	1568000	823000	1434000	1203000	1752000	7755000
6	West	1568000	2414000	1850000	1572000	2485000	2143000	12032000
7	Grand Total	5482000	6413000	5074000	5293000	5847000	6408000	34517000

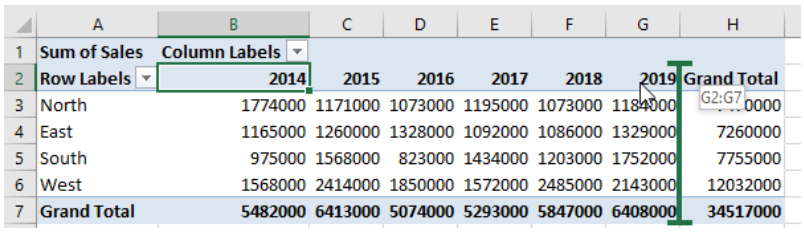
The green line will move to show you the new location for the row.

5 Observe the order of the regions will now change

6 Click on the **2014** column header.

7 Hover over the green border of the cell until you see the four arrows.

8 Left mouse click, hold and drag it to the position you want (i.e. all the way to the right)

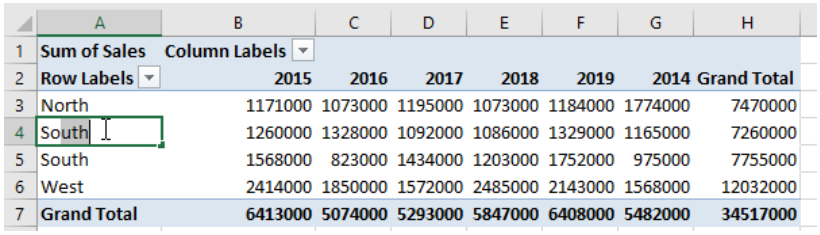


	A	B	C	D	E	F	G	H
1	Sum of Sales	Column Labels						
2	Row Labels	2014	2015	2016	2017	2018	2019	Grand Total
3	North	1774000	1171000	1073000	1195000	1073000	1184000	0000
4	East	1165000	1260000	1328000	1092000	1086000	1329000	7260000
5	South	975000	1568000	823000	1434000	1203000	1752000	7755000
6	West	1568000	2414000	1850000	1572000	2485000	2143000	12032000
7	Grand Total	5482000	6413000	5074000	5293000	5847000	6408000	34517000

9 Observe the order of the years has now changed

10 Click in the **East** row header

11 Start typing **South**, hit **ENTER** when you see South appear



	A	B	C	D	E	F	G	H
1	Sum of Sales	Column Labels						
2	Row Labels	2015	2016	2017	2018	2019	2014	Grand Total
3	North	1171000	1073000	1195000	1073000	1184000	1774000	7470000
4	South	1260000	1328000	1092000	1086000	1329000	1165000	7260000
5	South	1568000	823000	1434000	1203000	1752000	975000	7755000
6	West	2414000	1850000	1572000	2485000	2143000	1568000	12032000
7	Grand Total	6413000	5074000	5293000	5847000	6408000	5482000	34517000

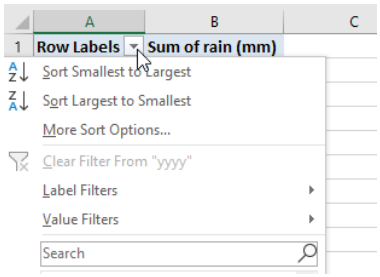
12 Observe the South and East rows swap places

b. Sort Ascending/Descending

With the 6 – Sorting Tools.xlsx currently open:

1 Click the **Descending** worksheet tab

2 Click the **Row Labels** drop down arrow



3 Select **Largest to Smallest**

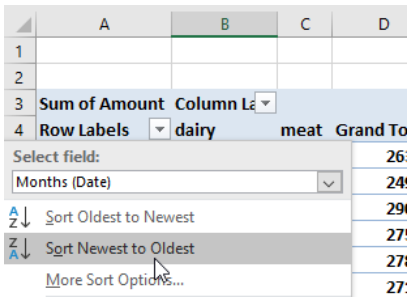
4 Observe the changes that are made to the row labels

c. Sort by Date

With the 6 – Sorting Tools.xlsx currently open:

1 Click the **Descending** worksheet tab

2 Click the **Row Labels** drop down arrow



3 Click **Sort Newest to Oldest**

4 Observe the changes that are made to the row labels

7 Calculated Items and Fields

Excel 2016 allows you to perform other calculations from within your pivot table in the form of **Calculated Items** or **Calculated Fields**.

a. Insert a calculated field

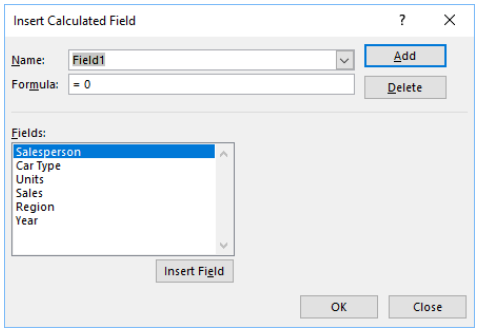
In this example we will create a calculated field that reports commission paid to sales people.

1 Open the **7 – Calculated Items and Fields.xlsx** workbook

2 Select the **Calculated Fields** worksheet

3 Click **Fields, Items & Sets**

4 From the drop-down menu that appears, select **Calculated Field…**



5 In the **Name:** field, type **Commission**

6 In the **Formula:** field, type = **Sales * 5%**

7 Click **OK**

8 Observe the changes that are made in the PivotTable

b. Insert a calculated item

Using the **7 – Calculated Items and Fields.xlsx** worksheet still open:

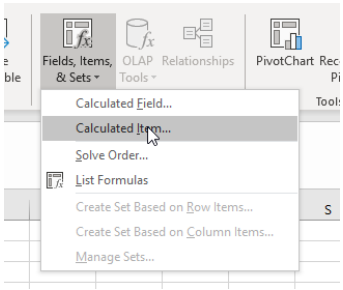
1 Click the **Calculated Items** worksheet tab

2 Click on any one of the row labels

3 Click the **Analyze** ribbon

4 Click **Fields, Items & Sets**

5 From the drop-down menu that appears, select **Calculated Item…**



6 In the **Name:** field type **NorthWest**

7 In the **Formula** field type **= North + West**

8 Click **OK**

9 Observe the changes that occur to the PivotTable, The **NorthWest** item has been added, however the **Grand Total** has been increased. Obviously in this case the Grand Total is now wrong

8 Altering the Appearance of a PivotTable

a. Format a field

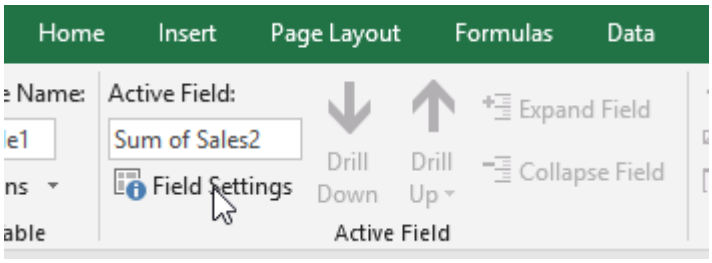
As well as being able to alter the calculation that occurs in the **Σ Values** area of the PivotTable we are also able alter the formatting of the displayed answers. You can format the individual cells to your liking, but it is easier and more consistent to format the field itself.

1 Open the **8 – Format a Pivot Table.xlsx** workbook

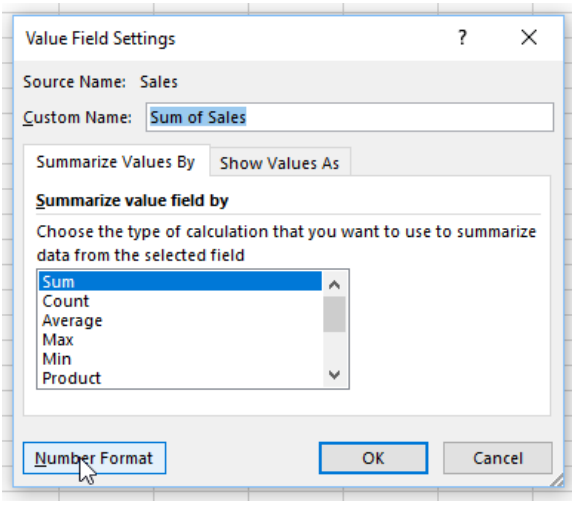
2 Click the **Formatting** worksheet tab

3 Click on cell **C6** (a cell that has a calculated value in it)

4 From the **Analyze** ribbon, select **Field Settings**

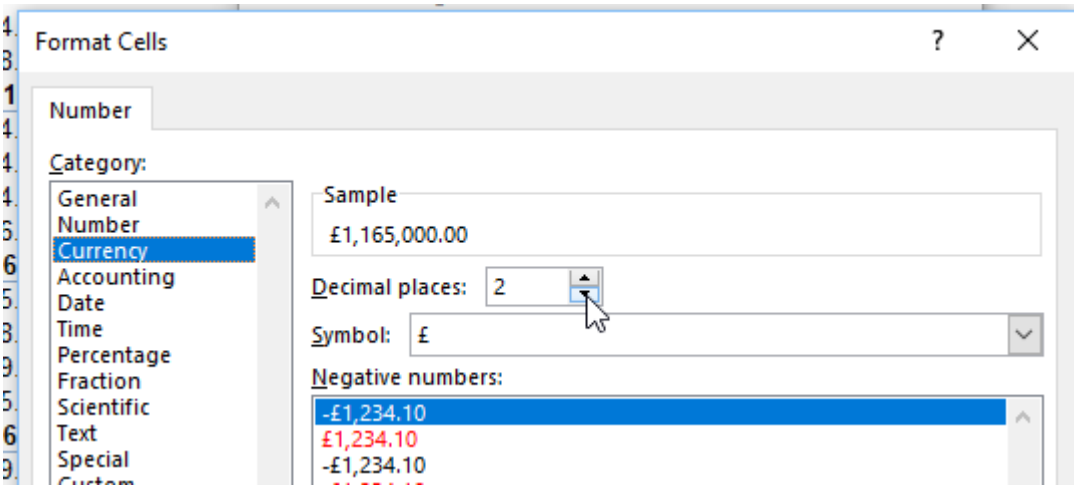


5 From the **Value Field Settings** dialogue box click **Number Format**



6 From the **Format Cells** dialogue box that appears select **Currency**

7 Change the Decimal places to 0



8 Click **OK** to close the **Format Cells** dialogue box

9 Click **OK** to close the **Value Filed Settings** dialogue box

b. Highlight Cell Rules based on values

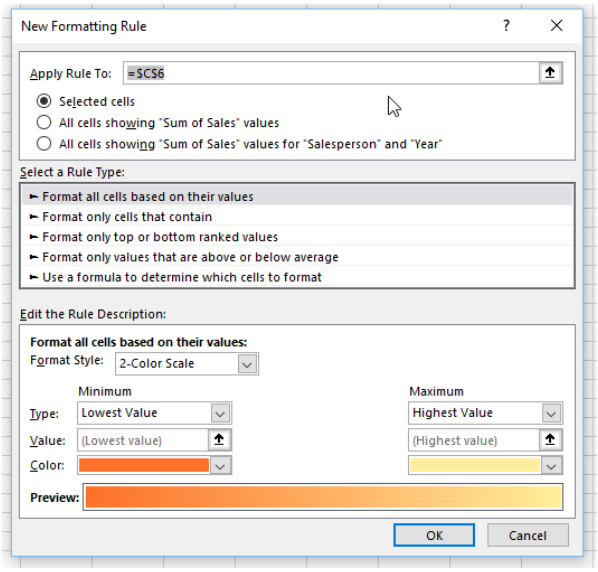
A great way to highlight values within your data set, Excel Table or Pivot Table is to use Conditional Formatting rules.

When your criteria reference a cell, then you can make this conditional format interactive.

1 Select the **C6** cell in your Pivot Table.

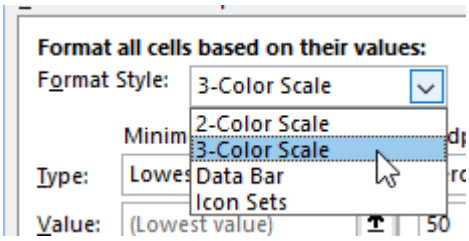
2 From the **Home** Ribbon select **Conditional Formatting**

3 From the menu that appears select **New Rule**



4 In the **Apply Rule To** section select **All cells showing "Sum of Sales" values for "Salesperson" and "Year"**

5 In the **Format Style** dropdown select **3-Color Scale**



6 Click **OK**

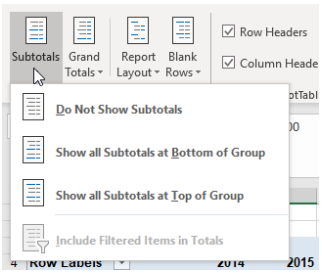
7 Observe the changes to the PivotTable

c. Subtotals

To alter the appearance of your

1 Click the Design tab

2 Click the Subtotals button



3 From the menu that appears select **Show all subtotals at Bottom of Group**

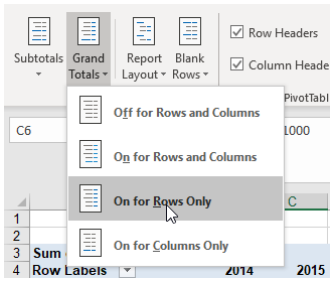
4 Observe the change that occurs in the PivotTable

d. Grand Totals

From Design Ribbon still open:

1 Click **Grand Totals**

2 Select **On for Rows Only**

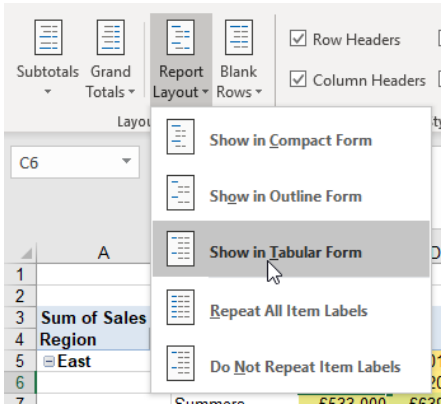


3 Observe the results

e. Report Layouts

From the Design Ribbon still open:

1 Select **Report Layout**



2 Select **Show in Tabular form**

3 Observe the results

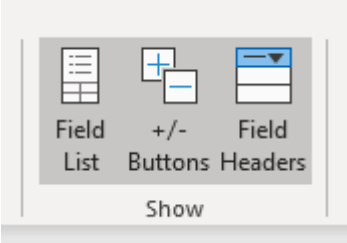
4 Try some of the other options from the **Report Layout** menu

f. Pivot Table Styles

The overall appearance of the PivotTable can be altered by adjusting the PivotTable Style Options or selecting a PivotTable Style

g. Show/Hide Pivot Table Controls

You may prefer your PivotTables to be simplified once you are happy with the layout and design



1 From the **Design** Ribbon click **Field List**

2 Click the **+/- Buttons** control

3 Click the **Field Headers** control

4 Observe the changes that have occurred in the PivotTable

9 Pivot Table Related Functions

a. GETPIVOTDATA

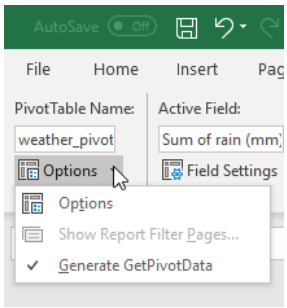
The GETPIVOTDATA function can be used to extract answers from a PivotTable

You can type the function within a cell, or use the Insert Function tool to build the formula. However, it is much easier to create the calculation like this:

1 Open the **8 – Pivot Table Functions.xlsx** workbook

2 Click the **Analyze** tab

3 From the **PivotTable** group select the drop-down arrow to the right of the **Options** command



4 From the menu that appears, check that the **Generate GetPivotData** option is ticked, if not click it so that a tick appears

5 Select the cell **F3** (where you would like the answer to appear)

6 Type **=**

7 Click the **B11** cell within the pivot table

Observe the formula that is created

8 Hit **ENTER**

9 Repeat this action to calculate the Total Sunshine

10 Working with Data Models

Data Models are a recently added feature within Excel. They allow you to effectively join together more than one data source and report on their data

To use this feature, your data must be arranged in Tables. The creation of tables is covered in a different course.

1 Open the **– Data Models.xlsx**

In our example we have two tables containing source data, the **student_data** table and the **grade_data** table

The **grade_data** table contains fields named **Student ID** and **Grade**

The **student_data** table contain fields named **Student ID**, **Student First Name** and **School**

Neither of the two tables in themselves allow us to perform meaningful analysis, however there is a relationship between the data in each table. Data Models allow us to describe that relationship to Excel and for Excel to then perform analysis.

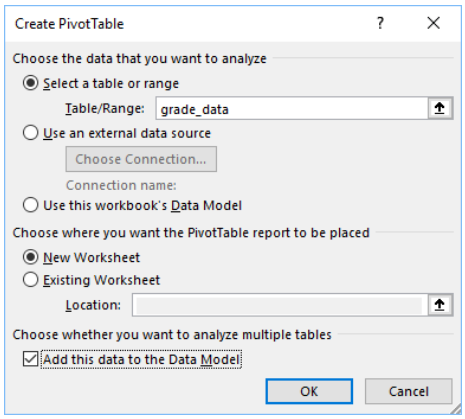
2 Click on the Grades worksheet

3 Click any cell within the grade_data table

4 Click the Insert Tab

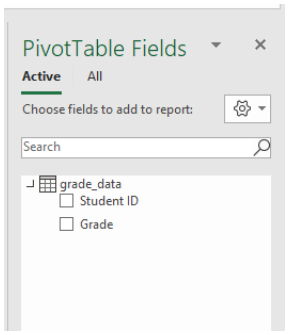
5 Click PivotTable

6 Click **Add this data to the Data Model**



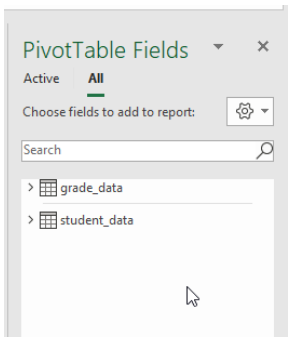
7 Click **OK**

8 Observe the PivotTable Fields pane on the right and side of the screen.

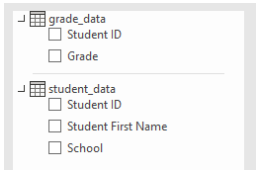


When you create a pivot table using the Data Model you can then add additional tables to the Data Model.

9 Click on the **All** control



The student_data table will appear. If you need to you can expand any of the tables to see their related fields by clicking the corresponding > symbols

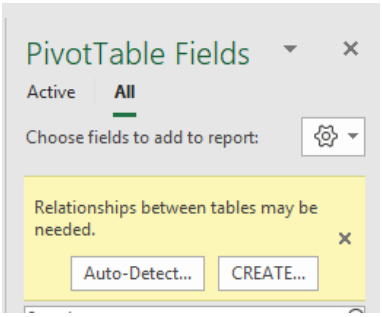


10 Drag the **Grade** field into the Values area

11 Drag the Student First Name field into the Rows area

The Pivot Table will respond, but the answers it gives you make no sense. At this point Excel does not understand the relationship between the two tables.

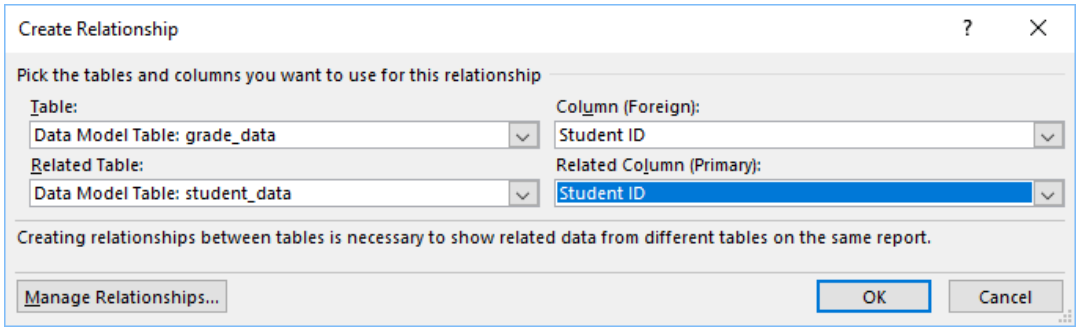
You will also see a yellow dialog appear near the top of the PivotTable Fields pane



12 Click the CREATE… button

Note: In this case the Auto-Detect feature would correctly guess the relationship between the two tables. However, depending on the complexity of the tables you are adding to a data model you may experience varying results when using your own data.

13 Complete the dialog box that appears like this:



14 If you look at the pivot table now, there will be some changes to the report. Have a look at the Mia row, this answer has been created because there are two people with that name

15 Drag the School field above the Student First Name in the Rows area

16 Drag the Student First Name field out of the Rows area

17 Change the calculation of the Grades to an average.

11 Creating a Pivot chart Report

A Pivot chart report must be associated with a Pivot table report in the same workbook. If your workbook doesn't contain a Pivot table report, Microsoft Excel creates one when you create the Pivot chart report. When you change a Pivot chart report, the Pivot table report changes and vice versa.

When you use the Pivot chart option, Excel creates an associated Pivot table report in the location you specify (on the existing worksheet or on a new worksheet in the same workbook).

The Pivot table report uses the layout that you specify for the Pivot chart report: Category fields in the chart are row fields in the table and series fields in the chart are column fields in the table.

When you create a Pivot chart report that is based on an existing Pivot table report, the fields in the chart are laid out like the fields in the Pivot table report: row fields in the table become category fields in the chart and column fields in the table become series fields in the chart.

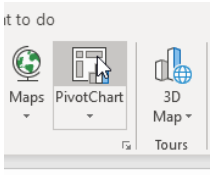
Creating a Pivot chart with a Pivot table

1 Open the 11 – **Create a PivotChart.xlsx** file

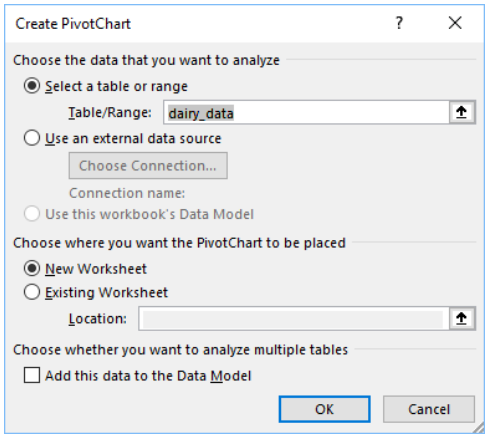
2 Click the **PivotChart from Table** worksheet tab

3 Sit your cursor anywhere in the Table

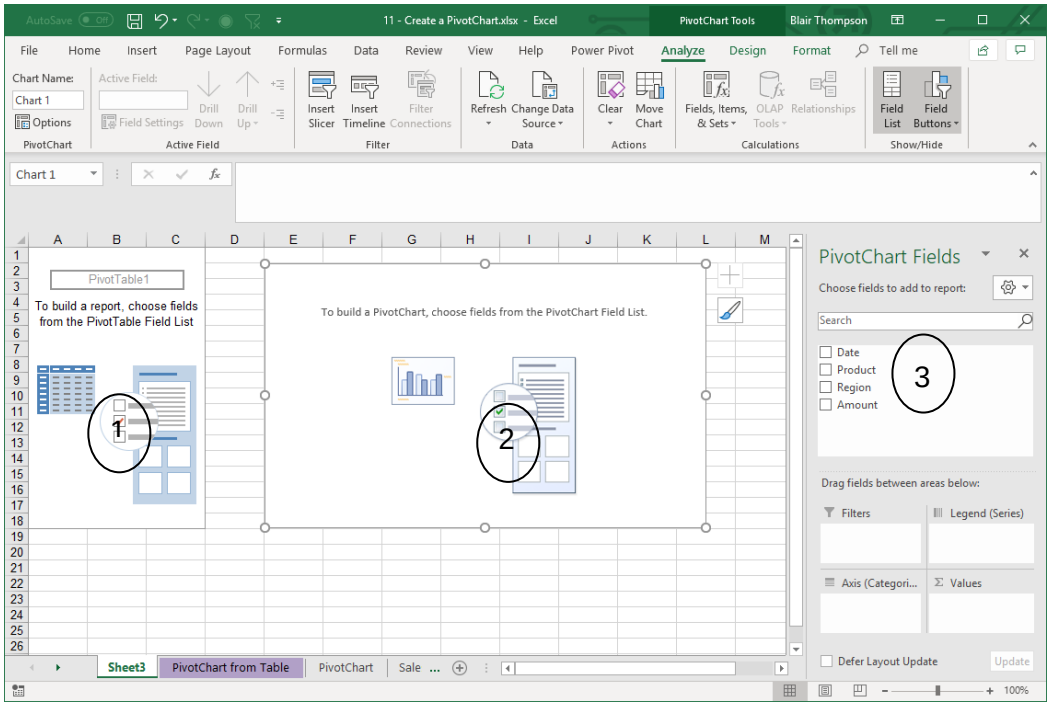
4 Choose the **Insert** tab, **Charts** group, and select **Pivot chart**



5 Make sure the range of cells you want to use is selected and decide if you want the chart on a new sheet or existing worksheet



6 When you click **OK** you will see –

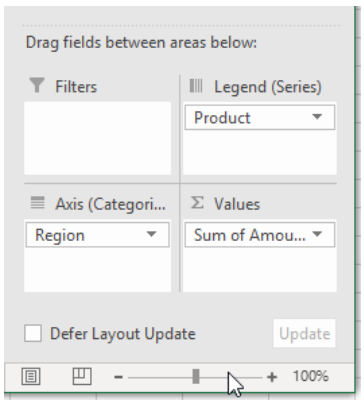


1 The area where the Pivot table will be placed

2 Information box indicating how to build the chart

3 Field list allowing you to place fields in the appropriate chart area

7 Place the field in the PivotTable Areas as shown:



Creating a Pivot chart from an existing Pivot table

1 Click the **PivotChart from PivotTable** worksheet tab

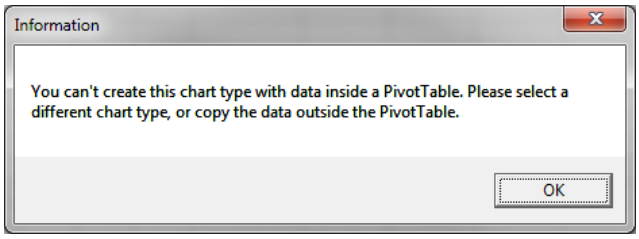
2 Sit your cursor in the PivotTable

3 Choose **Analyze** tab, **Tools** group and click the **PivotChart** control

4 Choose the most appropriate option, in this case we will select a **Clustered Column**

5 The Chart will display close to the table

Note, you cannot use the following chart types – xy (scatter), bubble or stock. If you try you will see –



Useful Shortcut keys

Using keyboard shortcuts can help you become more efficient when creating documents in Microsoft applications. Most keyboard shortcuts require you to use two or more keys at the same time. To use a keyboard shortcut first press and hold down the modifier key or keys (i.e. SHIFT, CTRL, ALT) and then press the corresponding standard key on your keyboard.

Function	Shortcut
Go to "Tell me what you want to do"	ALT+Q
Open	CTRL+O
Save	CTRL+S
Close	CTRL+W
Cut	CTRL+X
Copy	CTRL+C
Paste	CTRL+V
Select all	CTRL+A
Bold	CTRL+B
Italic	CTRL+I
Underline	CTRL+U
Cancel	Esc
Undo	CTRL+Z
Re-do	CTRL+Y
Create a Pivot Table	Alt + N + V
Group Selected Pivot Table Items	Alt + Shift + Right Arrow
Ungroup Selected Pivot Table Items	Alt + Shift + Left Arrow