

Microsoft Excel
2013/2016 Pivot Tables

Creating PivotTables

PivotTables are powerful data analysis tools. They let you summarize data in various ways and instantly change the view you use. A PivotTable not only subtotals groups of related data; it also compares one group to another.

Arranging the Source Data

You create PivotTables from columns or from a table in an Excel worksheet. The data should contain no blank rows or columns. Converting a list to a table is recommended when records will be added after the PivotTable is created. The additional table data are included automatically within the PivotTable when it is refreshed or updated. Data in a list are not included automatically. The following examples explain two PivotTables based on the worksheet list partially shown here.

	A	B	C	D	E	F
3	Pledge Level	Team Leader	Sponsor Category	Sponsor Name	Year 1	Year 2
4	Level 5	Abbott	Organization Contribution	Accountancy Association	0	15,000
5	Level 4	Faber	Corporate Sponsorship	Accurate Biomedical	10,000	10,000
6	Level 1	Lemus	Federal Government Grant	Admin for Children & Fam	5,129,874	8,075,333
7	Level 3	Faber	Corporate Sponsorship	Alpha Supplies Corp.	125,000	50,000
8	Level 6	Nguyen	Individual Contribution	Andres Padilla	0	500

The worksheet data

PivotTable Example 1

You can sort the preceding table by pledge level or sponsor category, but you cannot easily compare totals for the various pledge levels in each sponsor category. A PivotTable can summarize some or all data in any number of ways, and it creates grand totals. Each column in a PivotTable is a field. Examine the PivotTable and notice that the Sponsor Category field from the table is used for the row labels, the Pledge Level field for the column labels, and the Year 2 field for the data area and grand totals. Each row displays the amount given by each sponsor group in the various pledge levels.

Sum of Year 2	Column Labels						
Row Labels	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
Corporate Grant		1,425,000		0			1,425,000
Corporate Sponsorship	20,300,000	250,000	350,000	22,500	28,750		20,951,250
Federal Government Grant	47,894,948						47,894,948
Individual Contribution					4,100	2,080	6,180
Individual Sponsorship	15,000,000	2,500,000	413,579	15,000	4,475	595	17,933,649
Local Business Contribution					2,634	992	3,626
Local Government Grant			243,500				243,500
Medical Center/Large Facility		90,250					90,250
Medical Ctr Contribution		596,432	122,340				718,772
Organization Contribution			50,000	28,000	39,050	3,160	120,210
Organized Labor/Union Contribution		700,000					700,000
Physician Office Contribution			25,000	20,000	30,500		75,500
Private Grant		2,000,000	0				2,000,000
State Government Grant	35,077,677						35,077,677
Grand Total	118,272,625	7,561,682	1,204,419	85,500	109,509	6,827	127,240,562

This PivotTable summarizes contributions by sponsor category.

PivotTable Example 2

In this example, data is summarized first by pledge level and then by sponsor category. To create this type of view, the PivotTable layout shown in the following illustration contains the Pledge Level and then Sponsor Category fields for row labels, no column labels, and the Year 2 field for the data area and totals.

Row Labels	Sum of Year 2
Level 1	118,272,625
Corporate Sponsorship	20,300,000
Federal Government Grant	47,894,948
Individual Sponsorship	15,000,000
State Government Grant	35,077,677
Level 2	7,561,682
Corporate Grant	1,425,000
Corporate Sponsorship	250,000
Individual Sponsorship	2,500,000
Medical Center/Large Facility	90,250
Medical Ctr Contribution	596,432
Organized Labor/Union Contribution	700,000
Private Grant	2,000,000
Level 3	1,204,419
Level 4	85,500
Level 5	109,509
Level 6	6,827
Grand Total	127,240,562

This PivotTable layout summarizes contributions first by pledge level and then by sponsor category.

How PivotTables Work

Each area of a PivotTable plays a role in data organization. The PivotTable Fields task pane displays after you define the worksheet range to be used. The areas of the task pane are explained in the following illustration, which displays the settings for PivotTable Example I.

The screenshot shows the PivotTable Fields task pane with the following fields: Pledge Level, Team Leader, Sponsor Category, Sponsor Name, Year 1, and Year 2. The fields are organized into four areas: FILTERS (empty), COLUMNS (Pledge Level), ROWS (Sponsor Category), and VALUES (Sum of Year 2).

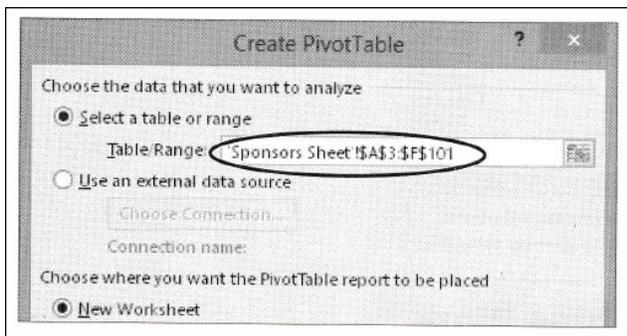
Annotations in the image explain the following parts:

- Here you choose columns that will appear in the PivotTable.** (Points to the list of fields to be added to the report)
- You can filter fields you have chosen by dragging them here.** (Points to the FILTERS area)
- Column labels are displayed here.** (Points to the COLUMNS area)
- Row labels are displayed here.** (Points to the ROWS area)
- This area displays the field on which a calculation is performed within the PivotTable.** (Points to the VALUES area)

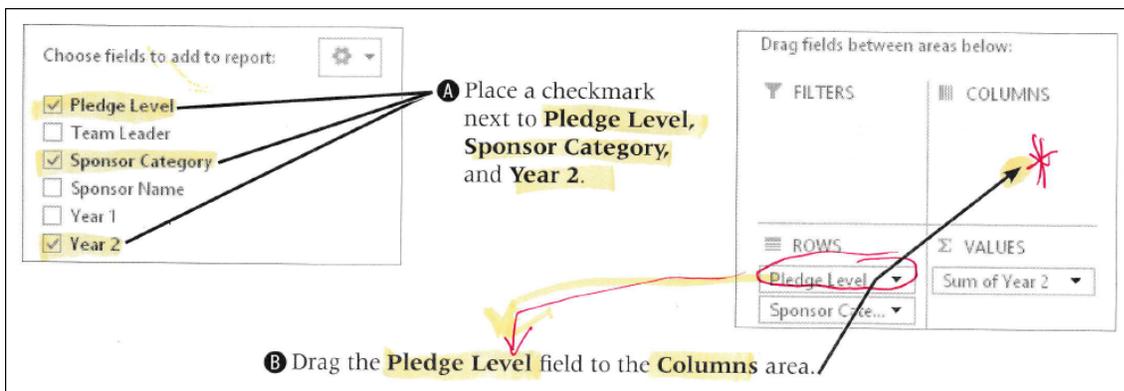
Where you place fields within the PivotTable Fields task pane determines how the PivotTable summarizes the data. By choosing different fields or dragging and dropping a field, you can quickly compare data in various ways. You may choose from several functions—such as SUM, COUNT, and AVERAGE—to calculate fields containing values.

Create PivotTables

1. Open Sponsors from the EX2013 Lesson 01 folder and save it as Sponsors-[FirstInitialLastName].
2. Select cell B4 and choose Insert—Tables, PivotTable.
3. Verify that the table/range agrees with the one displayed here, and then click OK.



4. Rename Sheet I to PivotTable by Sponsor Category, and then select cell A1
5. Select cell A3 to restore the task pane.
6. Follow these steps to define the PivotTable in the task pane:



	A	B	C	D	E	F	G	H
3	Sum of Year 2	Column Labels						
4	Row Labels	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
5	Corporate Grant		1425000		0			1425000
6	Corporate Sponsorship	20300000	250000	350000	22500	28750		20951250
7	Federal Government Grant	47894948						47894948
8	Individual Contribution					4100	2080	6180
9	Individual Sponsorship	15000000	2500000	413579	15000	4475	595	17933649
10	Local Business Contribution					2634	992	3626
11	Local Government Grant			243500				243500
12	Medical Center/Large Facility		90250					90250
13	Medical Ctr Contribution		596432	122340				718772
14	Organization Contribution			50000	28000	39050	3160	120210
15	Organized Labor/Union Contribution		700000					700000
16	Physician Office Contribution			25000	20000	30500		75500
17	Private Grant		2000000	0				2000000
18	State Government Grant	35077677						35077677
19	Grand Total	118272625	7561682	1204419	85500	109509	6827	127240562

7. Choose *PivotTable Tools—Analyze, PivotTable, Options*.
8. Type **BySponsorCategory** in the PivotTable name text box and tap [Enter].
9. Display the **Sponsors Table** worksheet.
10. With any table cell selected, choose Insert, Tables, **PivotTable**, verify that the suggested range is the **Sponsors_Table**, and click **OK**.
11. Rename the new_sheet **PivotTable by Pledge Level**. In the PivotTable Fields task pane, place a checkmark next to field names in this order: **Pledge Level, Sponsor, Category, Year 2**.

	A	B
3	Row Labels	Sum of Year 2
4	Level 1	118,272,625
5	Corporate Sponsorship	20,300,000
6	Federal Government Grant	47,894,948
7	Individual Sponsorship	15,000,000
8	State Government Grant	35,077,677
9	Level 2	7,561,682
10	Corporate Grant	1,425,000
11	Corporate Sponsorship	250,000

12. Choose *PivotTable Tools—Analyze, PivotTable, Options*.
13. Type **ByPledgeLevel** in the PivotTable name text box and tap [Enter].
14. Save the file and leave it **open**; you will modify it throughout this lesson.

Formatting a PivotTable

Values and subtotals in a PivotTable do not automatically display the formatting from the original worksheet cells. You may select and format one or more specific cells in the PivotTable using standard Ribbon commands. Alternatively, the PivotTable Tools Design contextual tab contains a large selection of PivotTable styles that can be used to quickly apply color, shading, and gridlines. The report layout displays in Compact Form by default, but you may choose from two other layouts. The subtotals may be displayed at the top or bottom of each group, or can be hidden.

The image shows two side-by-side screenshots of a PivotTable in Microsoft Excel. The left screenshot is labeled 'Compact form' and shows a PivotTable with two columns: 'Row Labels' and 'Sum of Year 2'. The data is grouped into 'Level 1' and 'Level 2'. The right screenshot is labeled 'Tabular form' and shows a PivotTable with three columns: 'Pledge Level', 'Sponsor Category', and 'Sum of Year 2'. The data is grouped into 'Level 1' and 'Level 2'. Both screenshots show the same data values.

	A	B
3	Row Labels	Sum of Year 2
4	Level 1	118272625
5	Corporate Sponsorship	20300000
6	Federal Government Grant	47894948
7	Individual Sponsorship	15000000
8	State Government Grant	35077677
9	Level 2	7561682
10	Corporate Grant	1425000

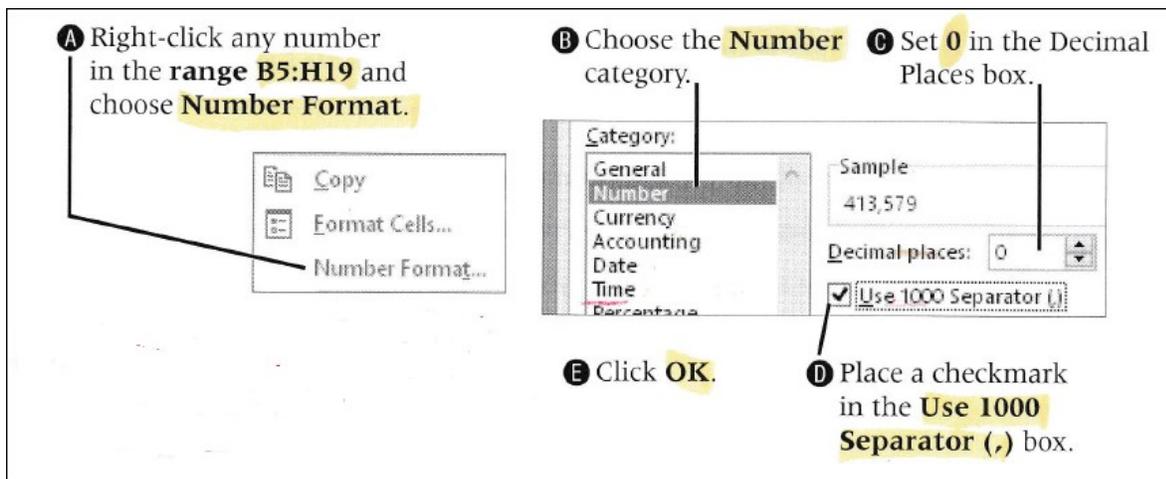
Compact form

	A	B	C
3	Pledge Level	Sponsor Category	Sum of Year 2
4	Level 1	Corporate Sponsorship	20300000
5		Federal Government Grant	47894948
6		Individual Sponsorship	15000000
7		State Government Grant	35077677
8	Level 1 Total		118272625
9	Level 2	Corporate Grant	1425000
10		Corporate Sponsorship	250000

Tabular form

Format a PivotTable

1. Save your file as Sponsors- [FirstinitialLastName].
2. Display the **PivotTable by Sponsor Category** worksheet, select the range **B4:H4**, and right-align the labels.
3. Choose *PivotTable Tools—Design, Layout, Grand Totals*. Experiment by choosing each option and observing its result, and then choose **On for Rows and Columns**.
4. Select any cell in the *PivotTable*.
5. Follow these steps to format the **Year 2** contribution numbers:



6. Display the **PivotTable by Pledge Level** worksheet.
7. Click in the PivotTable, choose *PivotTable Tools—Design, PivotTable Styles, More*, and choose **Pivot Style Medium 9**.
8. Choose *PivotTable Tools—Design, Layout, Report Layout—Show in Outline Form*.
9. Choose *PivotTable Tools—Design, Layout, Report Layout—Show in Tabular Form*.
10. Choose *PivotTable Tools—Design, Layout, Report Layout—Show in Compact Form* to return to the original layout.
11. **Save** the file and leave it open.

Changing PivotTable Fields

You may add or remove fields on a PivotTable simply by adding or removing the checkmark next to the field name in the PivotTable Fields task pane. The PivotTable will automatically reconfigure to display the new data. You may also change the order of fields within the row and column areas. One of the most powerful ways of manipulating data is to move a field from the row area to the column area or vice versa. This is called pivoting the field (hence the name PivotTable). The display of the data field rotates to give you an entirely different view of your data, as illustrated in the two PivotTables you created in the previous exercise. There, you positioned the Pledge Level field to display as columns in the first PivotTable and as rows in the second.

	A	B	C	D	E	F	G	H
3	Sum of Year 2	Column Labels						
4	Row Labels	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Grand Total
5	Corporate Grant		1,425,000		0			1,425,000
6	Corporate Sponsorship	20,300,000	250,000	350,000	22,500	28,750		20,951,250
7	Federal Government Grant	47,894,948						47,894,948
8	Individual Contribution					4,100	2,080	6,180
9	Individual Sponsorship	15,000,000	2,500,000	413,579	15,000	4,475	595	17,933,649
10	Local Business Contribution					2,634	992	3,626
11	Local Government Grant			243,500				243,500
12	Medical Center/Large Facility		90,250					90,250
13	Medical Ctr Contribution		596,432	122,340				718,772
14	Organization Contribution			50,000	28,000	39,050	3,160	120,210
15	Organized Labor/Union Contribution		700,000					700,000
16	Physician Office Contribution			25,000	20,000	30,500		75,500
17	Private Grant		2,000,000	0				2,000,000
18	State Government Grant	35,077,677						35,077,677
19	Grand Total	118,272,625	7,561,682	1,204,419	85,500	109,509	6,827	127,240,562

Pledge Level fields displayed as columns

	A	B
3	Row Labels	Sum of Year 2
4	Level 1	118272625
5	Corporate Sponsorship	20300000
6	Federal Government Grant	47894948
7	Individual Sponsorship	15000000
8	State Government Grant	35077677
9	Level 2	7561682
10	Corporate Grant	1425000
11	Corporate Sponsorship	250000
12	Individual Sponsorship	2500000
13	Medical Center/Large Facility	90250
14	Medical Ctr Contribution	596432
15	Organized Labor/Union Contribution	700000
16	Private Grant	2000000
17	Level 3	1204419
18	Corporate Sponsorship	350000
19	Individual Sponsorship	413579
20	Local Government Grant	243500
21	Medical Ctr Contribution	122340
22	Organization Contribution	50000
23	Physician Office Contribution	25000
24	Private Grant	0
25	Level 4	85500
26	Corporate Grant	0
27	Corporate Sponsorship	22500
28	Individual Sponsorship	15000
29	Organization Contribution	28000
30	Physician Office Contribution	20000

Pledge Level fields displayed as rows

Change PivotTable Fields

1. Save your file as **Sponsors-** [FirstinitialLastName].
2. Display the **PivotTable by Pledge Level** worksheet.

3. Place a checkmark next to **Year 1** in the task pane to add this field to the PivotTable.
4. Right-click any cell in the **Sum of Year 1** column of the PivotTable and choose **Number Format**.
5. In the Format Cells dialog box, choose the *Number* category, set **0** decimal places, check the **Use 1000 Separator (,)** option, and click **OK**.
6. Repeat steps 4—5 to format the **Sum of Year 2** column.
7. **Drag** Sum of Year 2 **below** Sum of Year 1 in the Values area.

	A	B	C
3	Row Labels	Sum of Year 1	Sum of Year 2
4	Level 1	117,267,482	118,272,625
5	Corporate Sponsorship	17,460,000	20,300,000
6	Federal Government Grant	49,899,591	47,894,948
7	Individual Sponsorship	12,500,000	15,000,000
8	State Government Grant	37,407,891	35,077,677
9	Level 2	6,254,063	7,561,682
10	Corporate Grant	1,250,000	1,425,000
11	Corporate Sponsorship	250,000	250,000

8. Place a checkmark by the **Sponsor Name** field in the top section of the PivotTable Fields task pane.

	A	B	C
3	Row Labels	Sum of Year 1	Sum of Year 2
4	Level 1	117,267,482	118,272,625
5	Corporate Sponsorship	17,460,000	20,300,000
6	Jensen Pharmaceutical	7,500,000	10,000,000
7	Medical Solutions Corp.	5,460,000	4,300,000
8	Open Systems	4,500,000	6,000,000
9	Federal Government Grant	49,899,591	47,894,948
10	Admin for Children & Fam	5,129,874	8,075,333

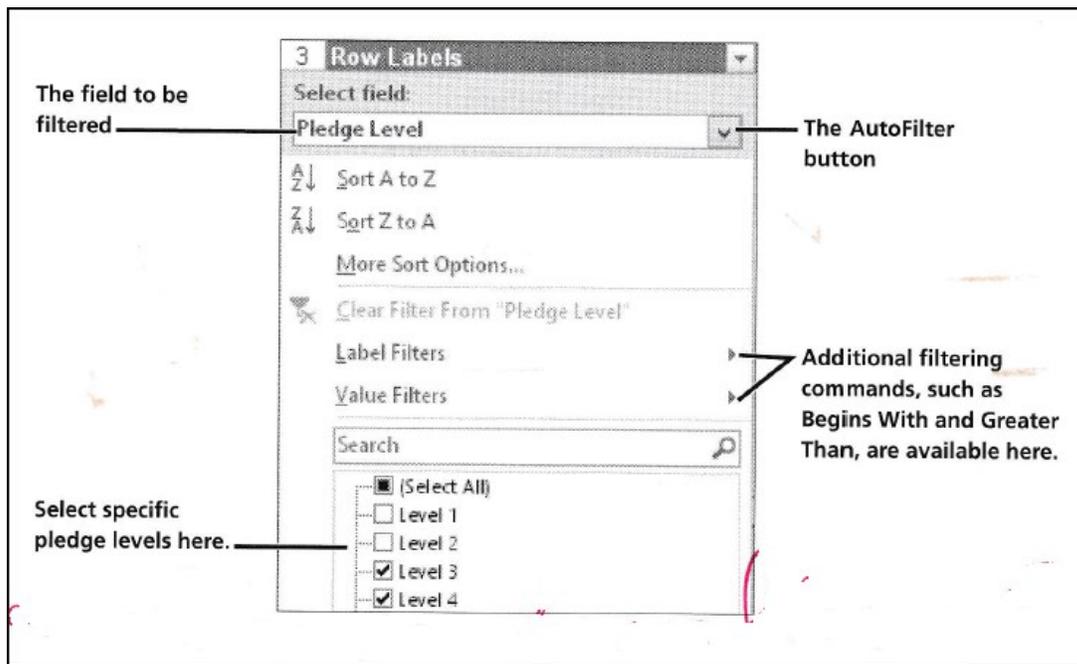
9. Remove the checkmark by the **Sponsor Category** and **Sponsor Name** fields in the PivotTable Fields task pane; add a checkmark next to **Team Leader**.
10. Drag the **Team Leader** field from the Rows area to the **Columns** area below the Values field.

Row Labels	Abbott	Debowski	Faber	Lemus	Martinez	Nguyen	Park	Weinstein	Abbott
Level 1				17,460,000	87,307,482				12,500,000
Level 2		750,000	250,000	2,000,000	754,063			2,500,000	
Level 3	50,000		412,000	350,000	207,250			298,333	50,000
Level 4	30,000		42,500	50,000	65,000			14,600	28,000
Level 5	14,000		20,000		12,500	5,200	2,262	4,325	39,050
Level 6	10,646					2,595	1,410	535	3,160
Grand Total	104,646	750,000	18,184,500	89,707,482	1,038,813	7,795	3,672	15,317,793	120,210

11. **Undo** the pivot.
12. **Save** the file and leave it open.

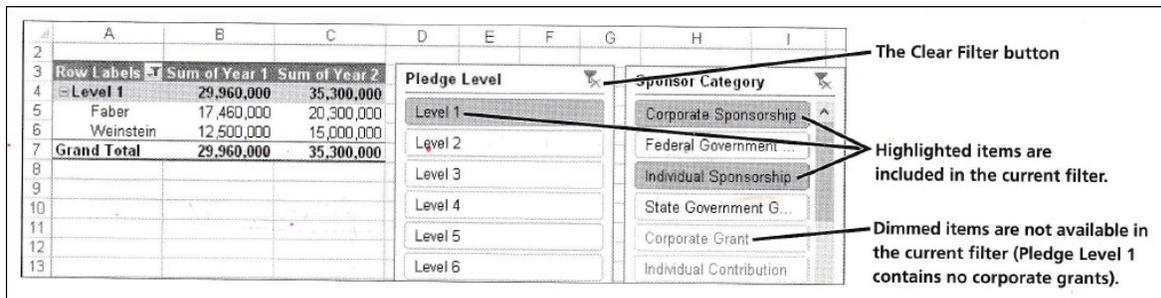
Filtering a PivotTable with AutoFilter

You may set the PivotTable to filter, or include, specific items in the data summaries. The totals and subtotals are recalculated for the selected items. The Row Labels and Column Labels headings have an AutoFilter button that displays the same sorting and filtering options that are available on the columns of worksheet lists and tables.



Filtering PivotTables with Slicers

Slicers are menu frames displayed on worksheets that contain all filtering choices in one field. Selected items are highlighted in slicers, making it easy to identify currently applied criteria. Slicer frames may be resized, moved, and formatted with styles for a consistent appearance. Slicers may also be shared in other worksheets of the same workbook for use with multiple PivotTables based on the same data set. Changing the filtering selections in a shared slicer causes all connected PivotTables to update automatically.



Filter a PivotTable with Slicers

1. Save your file as **Sponsors-** [FirstinitialLastName].
2. Display the **PivotTable with Slicers** worksheet.
3. Select any cell in the PivotTable and choose *PivotTable Tools—Analyze, Filter, Insert Slicer*.
4. Place a checkmark next to **Pledge Level, Team Leader, and Sponsor Category**; click **OK**.
5. Select cell **A1** to hide the PivotTable Fields task pane, if still displayed.
6. Follow these steps to move and resize the Sponsor Category slicer:

	C	D	E
2			
3	Sum of Year 2	Sponsor Category	
4	1,425,000	Corporate Grant	
5	20,951,250	Corporate Sponsorship	
6	47,894,948	Federal Government ...	
7	6,180	Individual Contribution	
8	17,933,649	Individual Sponsorship	
9	3,626	Local Business Cont...	
10	243,500	Local Government G...	
11	90,250	Medical Center/Larg...	
12	718,772		
13	120,210		
14	700,000		
15	75,500		
16	2,000,000		
17	35,077,677		
18	127,240,562		

A If necessary, drag **Pledge Level** and **Team Leader** slicers away from columns D–E.

B Point at the **Sponsor Category's** title bar and drag the slicer to the right of the PivotTable.

C Point at the **lower-right corner handle** on the slicer frame and drag down and right to display all sponsor category names.

7. Drag the **Pledge Level** and **Team Leader** slicers to row 19.

	A	B	C	D	E
18	Grand Total	125,114,701	127,240,562	Medical Ctr Contribution	
19	Pledge Level	Team Leader		Organization Contribution	
20	Level 1	Abbott		Organized Labor/Union C...	
21					
22					

8. Click the Pledge Level title to display the slicer's frame, and then hold down [Shift] and click the **Team Leader** title.
9. Choose *Slicer Tools—Options, Buttons, Columns* and change the number of columns to 2.
10. Click the **Sponsor Category** title in the slicer at the right of the PivotTable, choose *Slicer Tools—Options, Slicer Styles, More*, and choose any style.
11. Apply the styles of your choice to the **Pledge Level** and **Team Leader** slicers.
12. Choose **Level 2** in the Pledge Level slicer.

Pledge Level		Team Leader	
Level 1	Level 2	Debowski	Faber
Level 3	Level 4	Lemus	Martinez
Level 5	Level 6	Weinstein	Abbott
		Nguyen	Park

13. Click the **Clear Filter** button on the Pledge Level slicer.

14. Select **Corporate Sponsorship** in the Sponsor Category slicer, hold down [Ctrl], and select **Individual Sponsorship**.
15. **Save** the file and leave it open.

Editing PivotTable Calculations

You are not limited to summing values in a PivotTable, and you may create formulas within PivotTables when necessary.

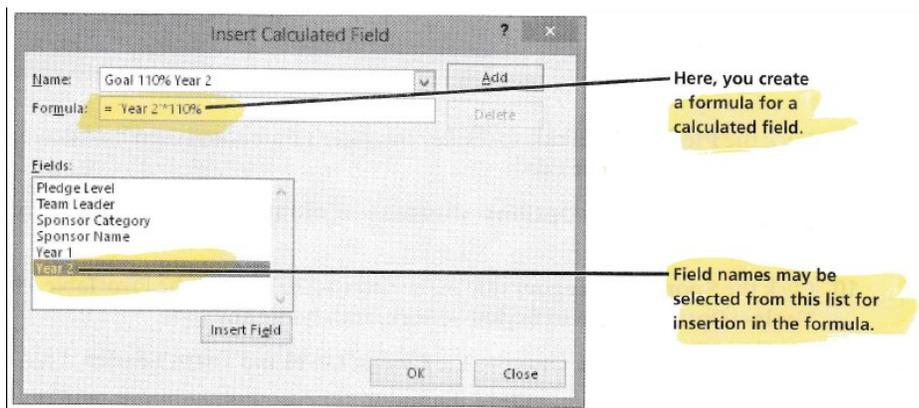
Changing the Function for a Values Area Item

By default, the subtotals and grand totals in a PivotTable sum the values in a field. You may change the SUM function to a different function, such as AVERAGE, MAX, or COUNT

If the Values area of the PivotTable Fields task pane contains only one entry, all SUM columns will change to the function you selected. If multiple entries exist in the Values area, you may change the function for one entry at a time.

Creating a Calculated Field

Some functions are not available on the Summarize Values By tab of the Value Field Settings dialog box. These functions may be typed in the Insert Calculated Field dialog box. A calculated field contains a formula using values from one or more existing fields. For example, the formula could subtract the value in one field from another to find the difference.



Converting Column Data to a Calculation

The Show Values As tab of the Value Field Settings dialog box can be used to create formulas employing preset options. For example, you can calculate percentages of a total, the difference between values in two columns, a running total, or a ranked order. If you want to display the original column data along with the converted data, simply drag and drop the field name from the field list to the Values area to create a duplicate field.

Refreshing PivotTable Data

PivotTables are often created with data from sources external to the Excel workbook containing the PivotTables. After you change the source data— even if in a worksheet range or table within the same workbook—you must refresh the PivotTables manually. You may refresh just the active PivotTable or all PivotTables in the workbook. You may also set a PivotTable option to refresh data from external sources when the workbook is opened.

Change PivotTable Calculations

1. Save your file as **Sponsors-** [FirstinitialLastName].
2. Display the **PivotTable by Pledge Level** worksheet.
3. Select a number cell in **column B** of the PivotTable, and then choose *PivotTable Tools, Analyze, Active Field—Field Settings*.
4. Select **Average** on the **Summarize Values By** tab and click **OK**.
5. Choose *PivotTable Tools, Analyze, Calculations, Fields, Items, & Sets— Calculated Field*.
6. Follow these steps to create a calculated field:

A Type **Goal 110% Year 2** in the **Name** box.

B Type an equals sign to begin the formula.

C Double-click **Year 2** and type ***110%**.

D Click **Add**.

E Click **OK**.

	A	B	C	D
3	Row Labels	Average of Year 1	Sum of Year 2	Sum of Goal 110% Year 2
4	Level 1	13,029,720	118,272,625	130,099,888
5	Faber	5,820,000	20,300,000	22,330,000
6	Lemus	17,461,496	82,972,625	91,269,888
7	Weinstein	12,500,000	15,000,000	16,500,000

7. Display the **Sponsors Table** worksheet.
8. In cell **F98** change **250,000** to **200000**, and then display the **PivotTable by Pledge Level** worksheet.
9. Choose *PivotTable Tools, Analyze, Data, Refresh menu, Refresh All*.
10. **Save** the file and leave it open.

Creating PivotCharts

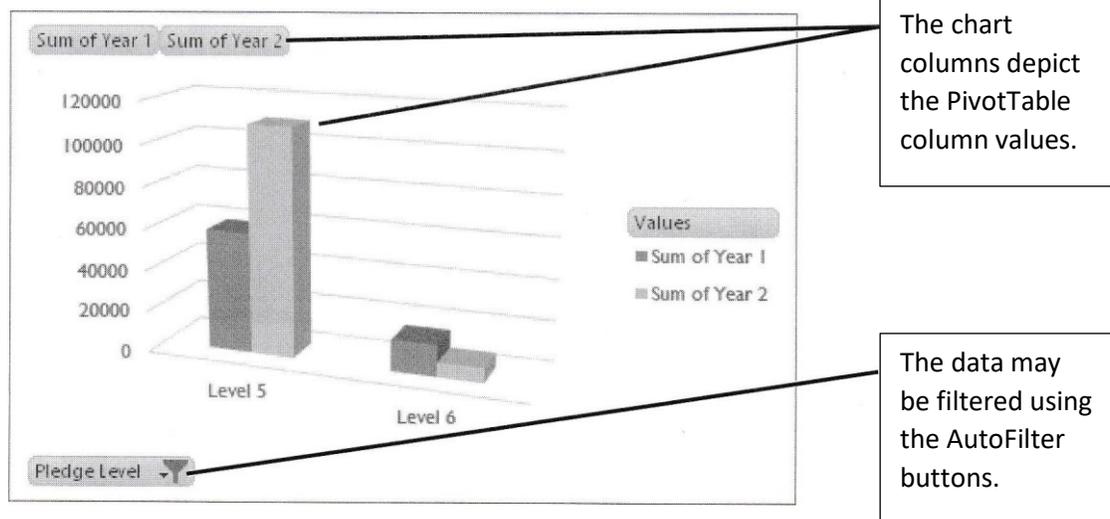
A PivotChart presents data from a PivotTable. There are two ways to create a PivotChart.

1. Chart an existing PivotTable by choosing a chart type from the Insert tab, as you would do for a normal Excel chart.
2. Use the PivotChart command to create a PivotTable and PivotChart from the source data at the same time. The chart builds as you choose fields in the PivotTable Fields task pane.

The fields in the values area of the PivotTable are displayed as data series in the chart. The row labels in the PivotTable are used as the axis labels in the chart; the column labels are the data series in the chart legend.

Filtering PivotCharts

The PivotChart may be filtered using the AutoFilter buttons on the chart, AutoFilter buttons on the PivotTable, or slicers added to the worksheet. The filtering is applied to the related PivotTable as well.



Formatting and Printing PivotCharts

You format PivotCharts using the same Ribbon commands as you do for normal Excel charts. Some chart formatting, such as data labels, is not preserved after a PivotChart is refreshed.

Create a PivotChart

1. Save your file as **Sponsors-** (FirstinitialLastName)].

2. Display the **PivotChart** worksheet.
3. Select any cell within the PivotTable, and then choose *Insert, Charts, Insert Column Chart, 2-D Column, **Clustered Column***.
4. Point at the chart frame and **drag** the chart just below the PivotTable.
5. Place a checkmark next to **Year 2** in the PivotChart Fields list.
6. To filter the PivotChart, choose the **Pledge Level AutoFilter** button at the lower-left corner of the PivotChart, remove the checkmark next to **Level 4**, and click **OK**.
7. Select the chart, choose *PivotChart Tools, Design, Type, Change Chart Type, Column, **3-D Clustered Column***, and click **OK**.
8. **Save** and close the file.

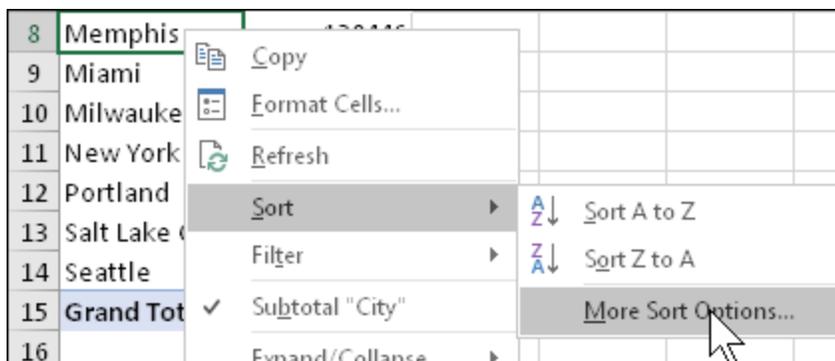
Quick items for PivotTables

Using the Quick Analyzes feature

1. Open the **PivotTablesWithCtrl+q** Excel file.
2. With the *3 years of sales* sheet selected, press **Ctrl + q**.
3. Click the **Tables** menu at the top.
(You will see 4 PivotTables with question marks listed)
4. **Move** the mouse over each one to see the Pivot table you can build.
5. Click the **Sum of Sales by City**, the first one with the question mark.

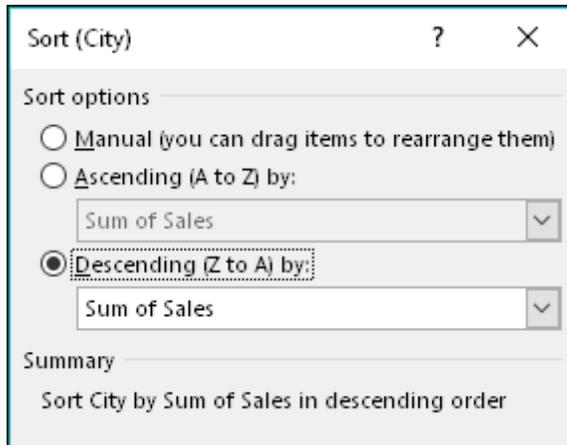
To sort by sales and have that city at the top

6. Right click in the cities list.
7. Point to Sort on menu, click **More Sort Options...** menu.



8. In the Sort (City) dialog box, select the **Descending** option.

- Click the down arrow and select **Sum of Sales**.



This will list cities with the most sales first going down the PivotTable.

- Click the **OK** button.

Using another quick feature for percent

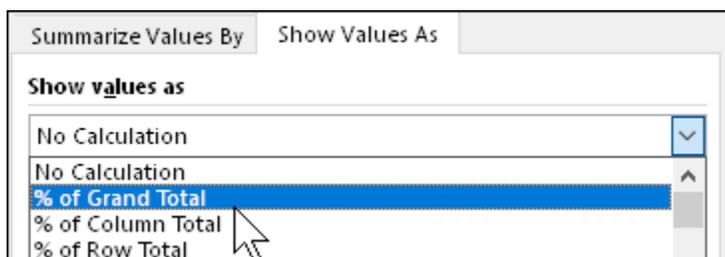
- Drag **Sales** into *Values* box for a second Sales field.

But what we really want here is the percent of sales for each city.

- Click the down arrow for the “Sum of Sales2”.
- Click **Value Field Settings...** menu.



- Click the tab **Show Values as**.
- Click the down arrow for **Show values as** list.



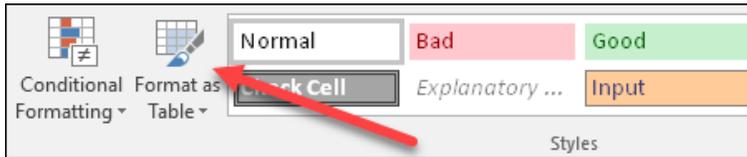
- Select the **% of Grand Total** from the drop-down list.

7. Click **OK** button to apply the *% for Sales*.
8. Click in cell **C3** and type: **Percent of Sales**
9. Press [**Enter**] to complete your new heading.

Create a Relationship a cross sheets to build a Pivot Table

In Excel 2013 and 2016/365 you can now create a relationship between tables of data. This is a feature that can be used to pull data from the different tables to build a PivotTable.

The first step in this process is to format the data/table with the **Format as Table** feature. This can be found on the **Home** tab, as part of the **Styles** group.



Once you have formatted the table you need to give it a name. Naming the tables will make it easier to identify and work with your data in the Pivot Table. Third, you will need to setup a relationship between each of the three tables.

In the following scenario, using hotel data (*you as the employee*), have downloaded new data into Excel from the hotel's SQL database. You have downloaded three tables that you would like to use in a pivot table. These three tables are; Customers, Reservations and Rooms tables.

As mentioned above, to be able to build a pivot table from all three tables you will need to prepare the data first. The first step is to format each table as a table using the **Format as Table** feature. Second name each table with a unique name. Third, setup a relationship with each table using the **Relationship** feature on the **Data** ribbon.

After the above three steps are done, you will need to use of Excel's Business Intelligent the PowerPivot add-in. If it is not currently one of your tabs in Excel, you will need to activate this add-in.

(Click *File, Options, Add-ins* category. At the bottom of the dialog box click the down arrow for *Manage* and select *COM Add-ins* and click the *Go* button.



In the Add-ins available list check the box for Microsoft Power Pivot for Excel. Then click **OK**.)



Using the Power Pivot ribbon you add each table to your Data Model. After all are added, click Manage, Click Pivot Table on the Home ribbon.

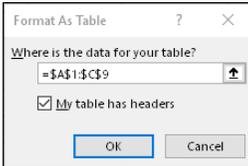
Building a pivot table using multiple tables

1. Click in the **Customers** table.
2. On the Home ribbon, click the Format as Table button and select **Blue, Table Style Medium 6**.

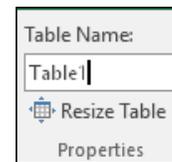


The style is in the Medium section first row.

3. In the Format As Table dialog box, confirm that **“My table has headers”** is checked.



4. Click the **OK** button.
5. On the *Design* ribbon click in the *Table Name* box, type: **Customers** and press [Enter]



You have created your first formatted table and named the table.

1. Repeat steps 1 – 5 for the other two tables.
2. Name the tables the same as the sheet names; **Reservations** and **Rooms**.

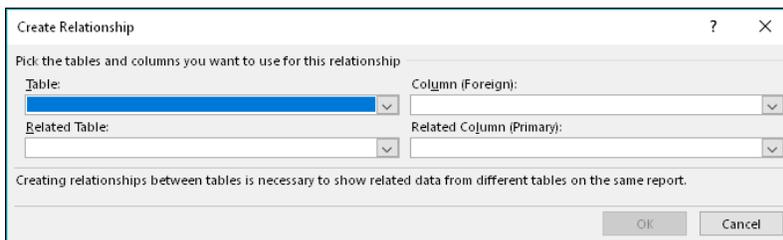
In the next few steps you will create the relationship between the three tables. If you look at each table you will notice that the Customers table has a CustID column and the Reservations table has a CustID column. This unique identifier will be used to create the first relationship. The second will be between the Reservations table which has a RoomID column and the Rooms table which has a RoomID column.

1. With the Customers worksheet selected, click the *Data* tab, in the *Data Tools* group click **Relationships** button.



2. In the *Manage Relationships* dialog, click the **New** button.

Your screen should look like this.



3. Click the Table down arrow and select **Worksheet Table: Customers** from the list.
4. Click the Column (Foreign) down arrow and select **CustID** from the list.
5. Click the Related Table down arrow and select **Worksheet Table: Reservations** from the list.
6. Click the Related Column (Primary) down arrow and select **CustID** from the list.

Your screen should look like this.

Create Relationship

Pick the tables and columns you want to use for this relationship

Table: Worksheet Table: Customers

Column (Foreign): CustID

Related Table: Worksheet Table: Reservations

Related Column (Primary): CustID

Creating relationships between tables is necessary to show related data from different tables on the same report.

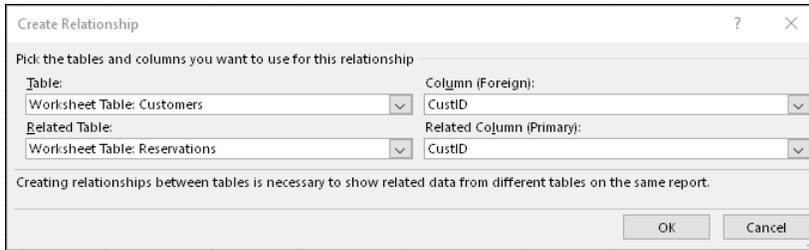
OK Cancel

7. Click the **OK** button to complete the first relationship.

Next you will create the second relationship.

1. Click the **New...** button in the *Manage Relationships* dialog.
2. Click the *Table* down arrow and select **Data Model Table: Reservations** from the list.
3. Click the *Column (Foreign)* down arrow and select **RoomID** from the list.
4. Click the *Related Table* down arrow and select **Worksheet Table: Rooms** from the list.
5. Click the *Related Column (Primary)* down arrow and select **RoomID** from the list.

Your screen should look like this.

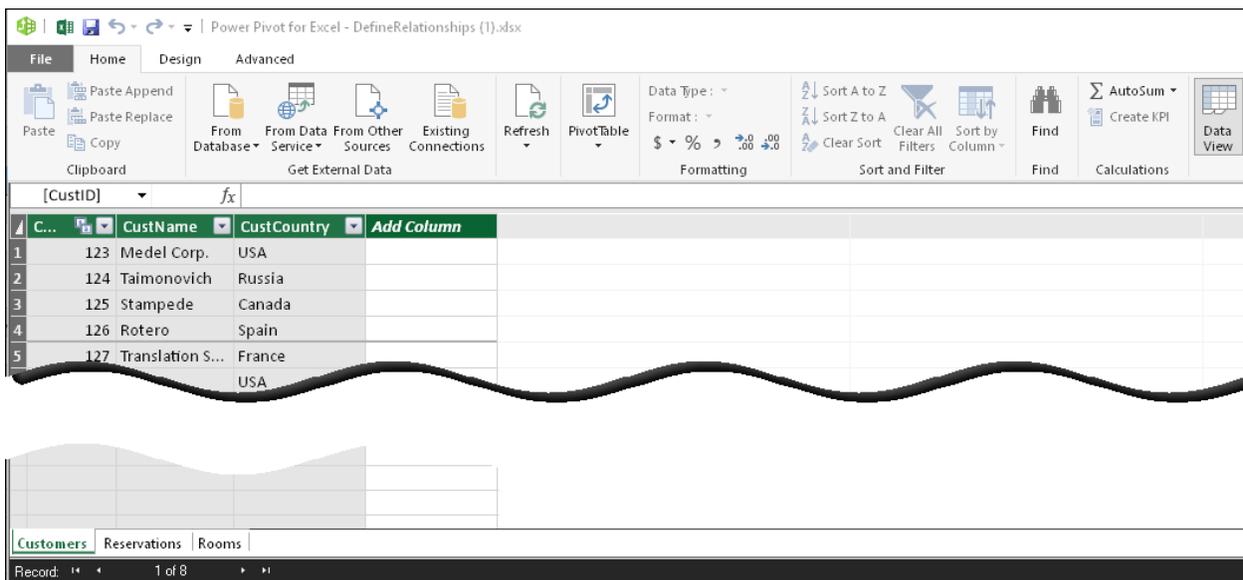


6. Click the **OK** button to complete the second relationship.
7. Click the **Close** button to exit the *Manage Relationships* dialog.

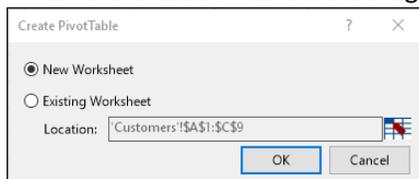
Now you are ready to view your Data Model in the Power Pivot Data Model Manager. On the **Home** ribbon of Power Pivot **Manage** feature you can create a Pivot Table.

1. Click the **Power Pivot** tab and click the **Manage** button in the *Data Model* group.

Your screen should look like this.

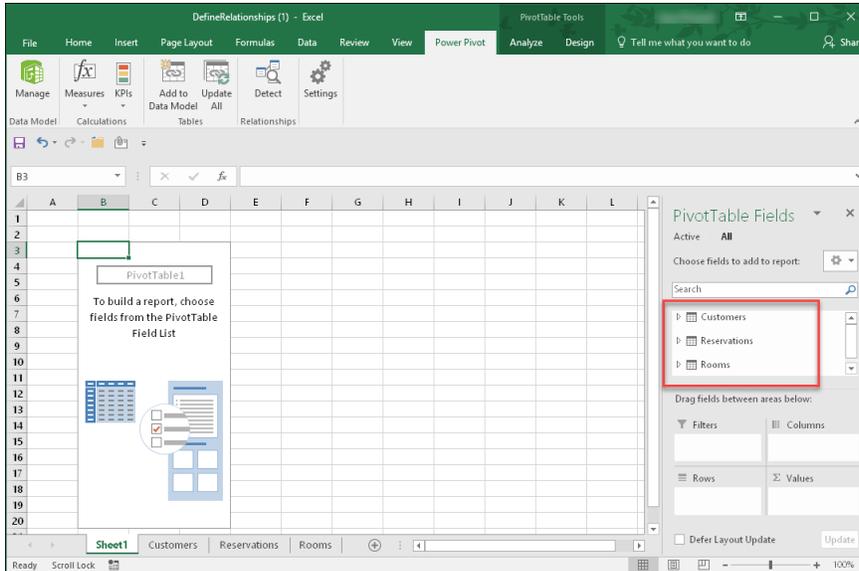


2. Click **each** of the sheet tabs at the bottom of the *Manage* window to view the data.
3. On the *Home* tab of the *Power Pivot Manage* ribbon, click the top half of the **PivotTable** button.
4. When the *Create PivotTable* dialog appears, click the **OK** button to place on a new worksheet.



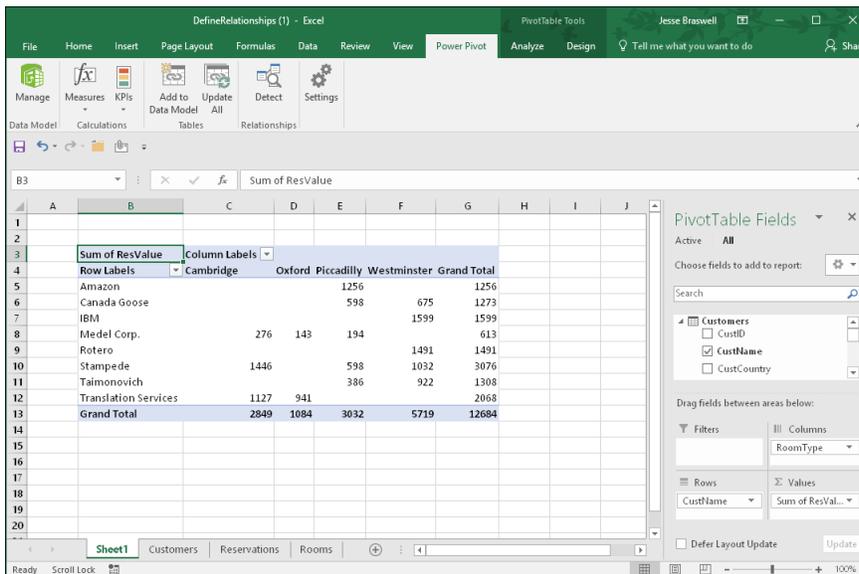
A new sheet is added to your workbook and the PivotTable structure appears. However; this PivotTable is a little different from ones you may have created before. In the PivotTable Fields pane you notice there are three items listed; Customers, Reservations and Rooms. But these are not fields these are the header for a field list.

Your screen should look like this.



1. Click the arrow head next to *Customers* to expand and drag **CustName** down to *Rows* box.
2. Click the arrow head next to *Reservations* to expand and drag **ResValue** down to *Values* box.
3. Click the arrow head next to *Rooms* to expand and drag **RoomType** down to *Columns* box.

Your screen should look like this.



You have created a PivotTable from 3 different sheets of data, using a relationship to connect all three together which creates a Data Model.

What is DAX

DAX stands for Data Analyze Expression and is used in Excel to write formulas using words rather than cell addresses. Primarily it is used when working in PowerPivot but can be used with a formatted table.