Download and Install PowerPivot for Excel

1. Go to the Microsoft Web site (http://go.microsoft.com/fwlink/?LinkId=155905).
2. Download either the x86 (32-bit) or the x64 (64-bit) version of **PowerPivot_for_Excel.msi** installation program:
   a. To install the 32-bit version, click the **Download** button. The 32-bit version is the default. Clicking **Download** selects the default.
   b. To install the 64-bit version, scroll down the page and select the 64-bit installation package.
3. Double-click the .msi file to start the Setup wizard.
4. Click **Next** to get started.
5. Accept the license agreement, and then click **Next**.
6. Enter your name, and then click **Next**.
7. Click **Install**.
8. Click **Finish**.

Verify Installation

Start Excel. After you install the add-in, you can open the PowerPivot window by clicking the **PowerPivot** tab on the Excel ribbon, and then clicking **PowerPivot Window**. An empty PowerPivot window opens over the Excel application window. You can then use the Import Wizard to add tables of data, create relationships between the tables, enrich the data with calculations and expressions, and then use this data to create PivotTables and PivotCharts..

Tutorial: PowerPivot for Excel

This tutorial examines International electronic sales over time and compare sales by product type, year, and country for Contoso Company. Imagine you are an analyst for an electronics company called Contoso Electronics. You want to examine sales over time and compare sales by product type, year, and country. Make sure that the following are installed:

- Microsoft
- Microsoft Excel 2010

You will need the PowerPivot for Excel Tutorial Sample Data – Version 2. The sample data that is used in this tutorial is from the fictional company Contoso and is stored in Access databases and Excel worksheets. Note that you have to unzip the files and store them in your selected folder.

ETL: Import data from multiple sources; Access databases and Excel worksheets

To Create a Connection to an Access Database

1. Navigate to the location on your computer where you downloaded the samples and double-click **Stores**. You will use the stores data in a later lesson.
2. In the Excel window, on the **PowerPivot** tab, click **PowerPivot Window**.
3. In the PowerPivot window, on the **Home** tab, click **From Database** and select **From Access**. This launches the Table Import Wizard which guides you through setting up a connection to a data source.
4. In the **Friendly connection name** field, type **ContosoDB from Access**.
5. In the **Database name** field, click **Browse**. Navigate to the location where you downloaded the sample files, select **ContosoSales**, and click **Open**.
6. Click **Next** and verify that **Select from a list of tables and views to choose the data to import** is selected.
7. You want to select from a list of tables and views, so click **Next** to display a list of all the source tables within the database.
8. Select the check box for the following tables: DimChannel, DimDate, DimProduct, DimProductSubcategory, and FactSales.

To Filter the Table Data prior to Importing

1. Select the row for the **DimProduct** table and click **Preview & Filter**.
2. The **Preview Selected Table** window opens with all the columns in the DimProduct table displayed.
3. Clear the checkboxes at the top of the columns for all the columns from **ClassID** through **StockTypeName** (a total of 15 columns) and then click **OK**.
4. Notice that the words **Applied filters** are now displayed in the **Filter Details** column in the **DimProduct** row; if you click on that link you'll see a textual description of the filters that you just applied.
5. Now select the row for **DimProductSubcategory** and click **Preview & Filter**.
6. Since you're interested in only some of the products, you will apply a filter so that you import only the data for these categories.
   At the top of the **ProductCategoryKey** column, click the arrow and deselect **7** and **8**. Categories 7 and 8 include games and home appliances, and you don't want to include those in your analysis.
7. At the top of the **ProductSubcategoryDescription** column, clear the checkbox. Since the descriptions are almost identical to the names, there is no need to import both columns, and eliminating unnecessary columns will make your workbook smaller. Click **OK**.

Review your selections. If everything looks OK, click **Finish**. While importing the data, the wizard displays how
many rows have been fetched. When all the data has been imported, a message indicating success is displayed. Notice that you imported more than 2 million rows from the **FactSales** table alone. Click **Close**.

To Add Data by using a Custom Query

1. In the PowerPivot window, on the **Home** tab, click **From Database** and select **From Access**. This starts the Table Import Wizard which guides you through setting up a connection to a data source.
2. In the **Friendly Name** box, type **Product Category Access DB**.
3. In the **Database name** field, click **Browse**. Navigate to the location where you downloaded the sample files, select **ProductCategories**, and then click **Open**.
4. Click **Next**.

To Use the Query Designer Tool to Select the Data to Import

1. Select the **Write a query that will specify the data to import** option, and then click **Next**.
2. In the **Friendly Query Name** box, type **Product Category Query**.
3. Click **Design** to open the **Query Builder** window.
4. Click **Import** and navigate to the location on your computer where you saved the samples.
5. If you do not see the file listed, click the file down arrow and select **All files (*.*)**.
6. Select SQLQuery and then click **Open**.
7. The SQL Statement appears in the window. This query selects all data from the ProductCategory table except **GAMES and TOYS** and **HOME APPLIANCES**.
8. Click **OK**, **Validate**, and then **Finish.** A summary of the columns you are importing is displayed.
9. When the import is finished, click **Close**.
10. Rename the new table by right-clicking the **Product Category Query** tab and selecting **Rename**. Type **ProductCategory** and then click **Enter**.

To Add Data by using Copy and Paste

Copy and Paste from an External Excel Worksheet. The Sales department has an Excel spreadsheet that contains data about the location of areas where Contoso is currently selling products. You will copy the data that you need from this worksheet, and paste it into your PowerPivot workbook.

To Copy and Paste from an External Excel Worksheet
1. Navigate to the location on your computer where you downloaded the samples and double-click **Geography**. This opens a new Excel worksheet and you are no longer in the PowerPivot window.
2. Highlight and copy cells **A1** through **J675**. Be sure to select only this range of cells and not whole rows and columns. Selecting whole rows and columns imports empty cells, which might affect your ability to create relationships with this data.
3. Back in your PowerPivot window, on the **Home** tab, click **Paste**.
4. The **Paste Preview** dialog displays the new table that will be created. Make sure that the table data is correct, select **Use first row as column headers,** and then click **OK**.
5. The new table is created in the PowerPivot window. To rename the table, right-click the tab, click **Rename**, and then type **Geography**.

To Add Data by using an Excel Linked Table
A *Linked Table* is a table that has been created in a worksheet in the Excel window, but is linked to a table in the PowerPivot window. The advantage of creating and maintaining the data in Excel, instead of importing it or pasting it in, is that you can continue to modify the values in the Excel worksheet, while you are using the data for analysis in PowerPivot. In the previous task the **Geography** table is static because after you pasted the data, it is not automatically updated. Linked tables, on the other hand, automatically reflect changes that were made to the source. Linked tables must reference Excel data found in a separate Excel window *within the same PowerPivot workbook*.

To Create a Linked Table
1. In the Excel window, put your pointer in any of the cells of the **Stores** worksheet and format it as a table (CTRL+T). Be sure to select **My table has headers**.
2. Click OK
3. The new table that will appear in the PowerPivot window always has the same name as the table in Excel. Therefore, you should give the Excel table a meaningful name before you create the linked table in PowerPivot. By default, Excel automatically generates names for tables (Table1, Table2, etc) but you can easily rename tables by using the Excel interface.
   a. Click the **Design** tab.
   b. In the **Properties** area, under **Table Name:** type **Stores**. Enter
   c. Copy stores worksheet
   d. Paste into powerpivot excel sheet
4. On the PowerPivot tab in Excel, click **Create Linked Table**. This opens the PowerPivot window and you can see that a new table has been created – notice the Link icon on the tab.
5. In the PowerPivot window, on the **Linked Table** tab, click **Go to Excel Table** to return to the source table in the Excel window. Change the value in cell **C2** from **35** to **37**.
6. Return to the PowerPivot window; and you'll see that the corresponding row has now been updated to the new value as well.

To Save your PowerPivot Workbook
1. In the Excel window, click the **File** tab.
2. Click **Save As**. The **Save As** dialog box opens.
   You will save the workbook as the default file type of Excel Workbook (*.xlsx). For a list of supported file types.
3. In the **File name** text box, type **PowerPivotTutorialSample** and then click **Save**.

To Create Relationships between Tables
Why Create Relationships? In order to perform any meaningful analysis, your data sources must have relationships between them. More specifically, relationships enable you to:
- Filter data in one table by columns of data from related tables.
- Integrate columns from multiple tables into a PivotTable or PivotChart.
- Easily look up values in related tables using Data Analysis Expressions (DAX) formulas.
Review Existing Relationships
You already have data from three different sources in your PowerPivot workbook:

- Sales and product data imported from an Access database. Existing relationships were automatically imported for you together with the data.
- Product category data imported from an Access database.
- Data copied from, and linked to, an Excel spreadsheet that contains store information.

To Review Existing Relationships

1. In the PowerPivot window, on the **Design** tab, in the **Relationships** group, click **Manage Relationships**.
2. In the **Manage Relationships** dialog box, you should see the following relationships, which were created when the first Access database was imported:

Table	Related Lookup Table
DimProduct [ProductSubcategoryKey]	DimProductSubcategory [ProductSubcategoryKey]
FactSales [channelKey]	DimChannel [ChannelKey]
FactSales [DateKey]	DimDate [Datekey]
FactSales [ProductKey]	DimProduct [ProductKey]

3. Click **Close**.

To Create Your First Relationship

1. Click the **Stores** tab.
2. Right-click the **GeographyKey** column header and select **Create Relationship**.
   The **Table** field and the **Column** field are auto-populated.
3. In the **Related Lookup Table** field, select **Geography**.
4. In the **Related Lookup Column** field, select **GeographyKey**.
5. Click **Create**.
6. When the relationship is created, an icon displays at the top of the column. Pause the pointer over the icon to display the relationship details.

To Create More Relationships between the data from Access and Excel

1. Click the **Stores** tab.
2. Select the **StoreKey** column.
3. On the **Design** tab, click **Create Relationship**.
   The **Table** field and the **Column** field are auto-populated.
4. In the **Related Lookup Table** field, select **FactSales**.
5. In the **Related Lookup Column** field, select **StoreKey**.
   Notice the icon next to the **Related Lookup Column** field. This tells you that this relationship is being created in the wrong order. When you create a relationship, you must select a column with unique values for the **Related Lookup Column**.
6. Reverse the order. Move **FactSales** to the **Table** field and select **StoreKey** as the **Column**.
   Select **Stores** as the **Related Lookup Table** and select **StoreKey** as the **Column**.
7. Click **Create**.
8. Repeat the steps for **DimProductSubcategory** (as the table) and **ProductCategory** (as the lookup table), using the **ProductCategoryKey** column in both tables.
9. Check that all relationships have been successfully created by clicking **Manage Relationships** and reviewing the list.

Create a Calculated Column

1. In the **PowerPivot** window, select the **FactSales** table.
2. On the **Design** tab, in the **Columns** group, click **Add**.

3. In the formula bar above the table, type the following formula. AutoComplete helps you type the fully qualified names of columns and tables, and lists the functions that are available. For tips on how to use AutoComplete, see Build Formulas for Calculations.
=[SalesAmount] - [TotalCost] - [ReturnAmount].

4. When you have finished building the formula, press ENTER to accept the formula.
Values are populated for all the rows in the calculated column. If you scroll down through the table, you will see that rows can have different values for this column, based on the data that is in each row.

5. Rename the column by right-clicking **CalculatedColumn1** and selecting **Rename Column**. Type **TotalProfit**, and then press ENTER.

To Add a PivotTable to Your Analysis

1. In the PowerPivot window, on the PowerPivot **Home** tab, click **PivotTable**.
2. Select **New Worksheet**.
Excel adds an empty PivotTable to the location you specified and displays the PowerPivot Field List. The Field List displays two sections: a field section at the top for adding and removing fields, and a section at the bottom for rearranging and repositioning fields.
3. Select the empty PivotTable.
If you get an error message telling you the data list is no longer valid, right-click the table and select **Refresh Data**.
4. In the PowerPivot Field List, scroll down and locate the **FactSales** table.
5. Select the **SalesAmount** field. Ensure this field displays in the **Values** window of the Field List.
6. In the **DimChannel** table, select the **ChannelName** field. Ensure this field displays in the **Column Tables** window of the Field List.
7. In the **DimDate** table, select the **CalendarQuarter** field. In the PivotTable Field List, move this field from the **Values** box into the **Axis Fields** box.
8. Rename the PivotTable by double-clicking **Sum of SalesAmount** in the first cell, erasing the current text, and typing **Sales by Channel**.
9. Format the display of the data to make it easier to read and compare. Highlight the data cells, right-click and select **Format Axis**. In the **Format Axis** window, select **Currency** and make sure that **2** is selected in the **Decimal places** dropdown. Select **$** for **Symbol**. Click **OK**. Change column widths if numbers aren't readable.

The **Sales by Channel** PivotTable lists the sum of sales for Contoso and for each Sales Channel, by quarters from first quarter 2007 through fourth quarter 2009.

To Add Another PivotTable to Your Analysis

1. In the Excel window, on the **PowerPivot** tab, click **PivotTable**.
2. Select **New Worksheet**.
Excel adds an empty PivotTable to the location you specified and displays the PowerPivot Field List.
3. Select the empty PivotTable.
If you get an error message telling you the data list is no longer valid, right-click the table and select **Refresh Data**.
4. In the PowerPivot Field List, scroll down and locate the **FactSales** table.
5. Select the **TotalProfit** field. Ensure this field displays in the **Values** window of the Field List.
6. In the PowerPivot Field List, locate the **ProductCategory** table.
7. Select the **ProductCategoryName** field. Ensure this field displays in the **Legend Fields** window of the Field List.
8. In the PowerPivot Field List, locate the **DimDate** table.
9. Select the **CalendarYear** field. In the PivotTable Field List, drag this field from the **Values** window into the **Axis Fields** window.
10. Rename the PivotTable by double-clicking **Sum of TotalProfit** in the first cell, erasing the current text, and typing **Profit by Category**.
11. Format the display of the data to make it easier to read and compare. Highlight the data cells, right-click and select **Format Cells**. In the **Format Cells** window, select **Currency** and make sure

that **2** is selected in the **Decimal places** dropdown. Select **$** for **Symbol**. Click **OK**. Change column widths if numbers are not readable.

The **Profit by Category** PivotTable lists the sum of profits, by year, for each Contoso product category. These are simple analyses of your data. To dig deeper, you will add a PivotChart and Slicers.

<u>To Delete a PivotTable</u>
1. Click inside the PivotTable.
2. In the **PivotTable Tools** tab, select **Options**.
3. In the **Actions** group, click **Select**.
4. Select **Entire PivotTable**. On the **Home** ribbon select **Delete** and then click **Delete Sheet**.

<u>To Add a PivotChart to Your Analysis</u>
1. Start on the worksheet that contains your **Sales by Channel** PivotTable.
2. On the **PowerPivot** tab in Excel, click the arrow below **PivotTable** and select **PivotChart**.
3. Select **Existing Worksheet** and click **OK**.
   Excel adds an empty PivotChart to the same worksheet that contains your **Sales by Channel** PivotTable.
4. Select the empty PivotChart and in the **PivotChart Tools** tab, select **Design** and then **Change Chart Type**.
5. Select the first chart in the **Line** group and then click **OK**.
6. In the **FactSales** table, select the **SalesAmount** field. Ensure this field displays in the **Values** window of the Field List.
7. In the **DimChannel** table, select the **ChannelName** field. In the PivotTable Field List, move this field from the **Axis Fields** box into the **Legend Fields** box.
8. In the **DimDate** table, select **CalendarQuarter**. In the PivotTable Field List, move this field from the **Values** box into the **Axis Fields** box.
   The PivotChart and PivotTable now display the same data – in very different layouts.
9. Format the display of the data to make it easier to read and compare. Right-click the axis numbers and select **Format Axis**.
   a. Click **Number** and in the **Category** list, select **Currency**.
   b. Set **Decimal places** to **0**, and then click **Close**.
   c. Right-click the **Sum of SalesAmount** axis label and select **Value Field Settings**.
   d. Change **Custom Name** to **Sales by Channel** and then click **OK**.

<u>To Add Another PivotChart to Your Analysis</u>
1. Start on the worksheet that contains your **Profit by Category** PivotTable.
2. On the **PowerPivot** tab in Excel, click the arrow below **PivotTable** and select **PivotChart**.
3. Select **Existing Worksheet** and click **OK**.
   Excel adds an empty PivotChart to the same worksheet that contains your **Profit by Category** PivotTable.
4. In the **FactSales** table, select the **TotalProfit** field. Ensure this field displays in the **Values** window of the **Field List**.
5. In the **ProductCategory** table, select the **ProductCategoryName** field. Ensure this field displays in the **Axis Fields** window of the **Field List**.
6. In the **PivotChart Tools** tab, select **Design** and click **Change Chart Type**.
7. Scroll down and select the first Pie chart type and click **OK**.
8. In the **Chart Styles** group, select the 3-dimensional style with a black background and click **OK**.
9. On your pie chart, select the title (**Total**) and change it to **Profit % by Category**.
1. Next, you add and format data labels.
   a. On your pie chart, right-click and select **Add Data Labels**.
   b. Right-click again and select **Format Data Labels**.
   c. Highlight **Label Options**, then select the **Percentage** checkbox and deselect **Value**.
   d. Click **Close**. Resize the chart to make sure that all product categories are displayed.

     e.   Resize the chart to make sure that all product categories are displayed.
2. Save your PowerPivot workbook. Note: This PivotChart displays percentage values for each product category. Because FactSales and other tables are filtered, the percentages are percentages of total sales in six of the eight categories of Contoso products.

These are simple analyses of your data. To dig deeper, you will add Slicers. Keep the PivotCharts in the workbook in order to complete the tutorial, but if you want to delete a chart at some point, follow these steps.

To Delete a PivotChart
1. To delete a PivotChart, click inside the PivotChart.
2. Right-click and select **Cut**.
   Deleting the PivotChart does not delete any associated PivotTable reports or data.

Add Slicers to PivotTables
1. Click anywhere inside the **Profit by Category** PivotTable to display the PowerPivot **Field List**.
2. In the **PivotTable Tools** area of the Excel ribbon, click **Options**.
3. Click **Insert Slicer**.
4. In the **Insert Slicers** window, locate the **Geography** table and select **RegionCountryName**.
5. Under the **DimChannel** table, select **ChannelName**.
6. Under the **ProductCategory** table, select **ProductCategoryName**.
7. Under the **DimProductSubcategory** table, select **ProductSubcategoryName**.
8. Click **OK**.

To Format Slicers
1. Arrange the slicers so that they can all be seen. To move the Slicers, click the gray border and drag.
2. The title of the ProductSubcategoryName Slicer is truncated. To format this Slicer, right-click the Slicer and select **Slicer Settings**.
       a.   In the **Caption** box, type **Subcategory**.
       b.   Verify that **Display header** is selected.
       c.   Click **OK**.
1. Sometimes Slicers must be resized in order to display their contents correctly. Resize the **RegionCountryName** Slicer by adding columns.
       a.   Right-click the **RegionCountryName** Slicer and select **Size and Properties**.
       b.   Highlight **Position and Layout**.
       c.   In the **Number of columns** dropdown, select **4**. Click **Close**.
       d.   Drag the corners until all content is visible.
2. Continue to format your Slicers as needed.

To Use Slicers to Analyze your PivotTable Data
1. At Contoso we want to evaluate our sales profit trends by channel. Based on what we discover, we may have to redistribute marketing budgets and/or close channels.
       a.   In the **ChannelName** Slicer, select **Catalog**. **Catalog** should now be the only shaded item in the Slicer list.
       b.   By looking at the PivotTable you see that catalog sale profits are declining.
       c.   One at a time, click **Online**, **Reseller**, and **Store** to reveal those profit trends. You see that online profits are increasing, store profits are decreasing and reseller profits are decreasing slightly.
       d.   Clear the filters you have set by clicking the icon in the upper-right corner of the Slicer.
2. Dig a bit further by slicing your profit data by subcategory and country. Here are several interesting things that you might discover:
       a.   Profits have more than doubled for cellphone accessories, televisions, and recording pens with the biggest percentage increase coming from online sales. While most sales

were made in stores, store profit percentage increase was the lowest. Given that most sales come from stores, what can be done to maximize profits from this channel?

    b. Cellphone accessories profits took a significant jump in 2009 for the **Reseller** and **Store** channels. Prior to that, profit increase was fairly flat in those 2 channels. To what can this jump be attributed?

    c. Overall profits from the sales of televisions more than doubled from 2007-2009. However, most of that increase came in 2008 with very little profit increase seen in 2009. Why were profits flat in 2009 and how can they be increased?

    d. Sales of Desktops dropped significantly. With total profits of almost 260 million, only 21 million came from catalog sales. Catalog sales saw profits drop from almost 10 million (2007) to 4 million (2009). Perhaps Contoso should close this channel?

    e. Profits in Asian countries are increasing whereas profits in European countries, and North America are decreasing.

Contoso can use this information, and much more, to make intelligent business decisions.

To Add Slicers to PivotCharts

Slicers are one-click filtering controls that narrow the portion of a data set shown in PivotTables and PivotCharts. Slicers can be used in both Microsoft Excel workbooks and PowerPivot workbooks, to interactively filter and analyze data.

In this task you will use PowerPivot Slicers to control what data appears in your PivotChart.

To Add Slicers to a PivotChart

1. Click anywhere inside the Profit % by Category PivotChart to display the PowerPivot **Field List**.
2. In the **PivotChart Tools** area of the Excel ribbon, click **Analyze**.
3. Click **Insert Slicer**.
4. In the **Insert Slicers** window, locate the **DimDate** table and select **CalendarYear** and **CalendarMonth**.
5. Under the **Geography** table, select **RegionCountryName**.
6. Click **OK**.

To Format Slicers

1. Arrange the Slicers so that they can all be seen. To move the Slicers, click the gray border and drag the Slicers.
2. Sometimes Slicers must be resized in order to display their contents correctly.
        a. Select the **CalendarYear** Slicer and resize it so that only 2007, 2008, and 2009 are displayed.
        b. Right-click **RegionCountryName** and select **Size and Properties**.
        c. Highlight **Position and Layout**.
        d. In the **Number of columns** dropdown, select **6**. Click **Close**.
3. **By default, Slicer items are displayed in alphabetical and numeric order, with items with no data displayed** last. To change this view:
3. Right-click the **CalendarMonth** Slicer, and select **Slicer Settings**.
4. Uncheck **Show items with no data last**. Click **OK**.
5. Continue to format your Slicers as needed.

To Use Slicers to Analyze your PivotChart Data

6. Use the **CalendarYear** Slicer to explore profit by year. The PivotChart clearly shows the profit share increase for **COMPUTERS** and **TV and VIDEO** (at the expense of **CAMERAS and CAMCORDERS**) from 2007 to 2009. Profit share for the other categories shows almost no fluctuation.
7. To dig even deeper, use the **CalendarMonth** Slicer. You will discover that **CAMERAS and CAMCORDERS** had the highest profit share in the latter months of 2007**.**
8. Explore your data more by using the **RegionCountryName** Slicer. Clicking through the countries reveals many interesting facts.
9. Contoso can use this information to make intelligent business decisions