Tutorial: Conducting Data Analysis Using a Pivot Table

An earlier version of this tutorial, authored by Brian Kovar, is part of a larger body of work titled "The Pivot Table Toolkit". The "Pivot Table Toolkit" was published in 2009 by the Information Systems section of the American Accounting Association in the Compendium of Classroom Cases and Tools for AIS Applications, volume 4. (B. Kovar, S. Kovar, R. Vogt 2009).

In a business setting, Excel spreadsheets typically contain an extensive amount of detailed data. However, the numerous rows and columns of data can be overwhelming. This makes it difficult to get a clear picture of the story that can be told by examining the data.

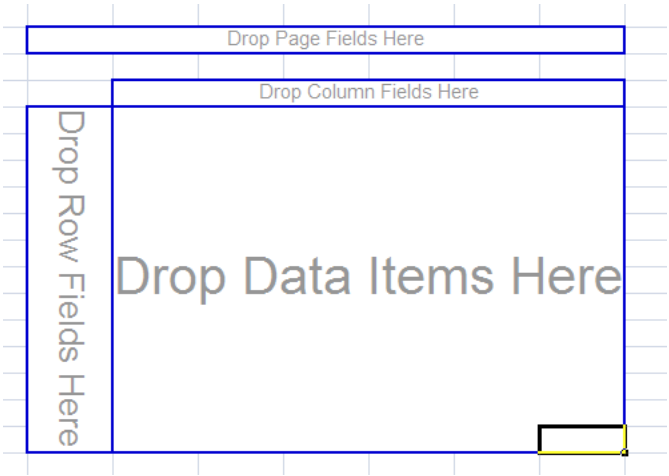
Through the creation of an Excel pivot table, you can quickly summarize lists of data by category in a tabular format. Furthermore, this data can be "pivoted," or rearranged, so that the same data can be examined from a different angle or dimension. A pivot table can summarize data into categories using functions such as SUM, MAX, MIN, AVERAGE, COUNT, as well as other Excel functions. You can even display pivot table data as a percentage of the grand total for the data being examined. A pivot table is an interactive data-mining tool that can be used to extract information from the raw data that is being examined.

All areas of business (accounting, marketing, finance, management) use pivot tables as part of their data analyses. Employers recruiting students from universities for internships and post-graduation jobs include the skills of building pivot tables and being able to interpret the data found in pivot tables as part of their desired skill sets. This is further seen in business advisory board meetings conducted by university departments where board members indicate the need for student pivot table skills and improved student pivot table skills.

Despite this importance, many students wonder "what are pivot tables?" and "how do you build a pivot table?" often indicating that "I have never heard of pivot tables before." Contributing to this problem is that many textbooks that cover spreadsheet skills include minimal pivot table coverage. Pivot table coverage is often toward the end of the textbook because textbook authors consider pivot tables to require "advanced skills." The goal of this tutorial is to overcome that.

In order to build a pivot table and conduct your data analysis, the following dimensions of data should be specified.

- The field to be used to create row items in the pivot table.
- The field to be used to create column headings in the pivot table.
- The field or fields to be used as data items.



At its most basic level, a pivot table is composed of rows, columns and data. Once the basic concepts of pivot table creation have been mastered, more complex and advanced pivot tables can be created. Examples of more advanced and complex pivot tables include:

- A pivot table that has rows, but not columns.
- A pivot table that has columns, but not rows.
- A pivot table that can be filtered using an additional data field.

- A pivot table that contains multiple fields as data items, often displaying data being summarized using different function operators.

As part of this tutorial exercise, you will gain experience building pivot tables, starting with simple pivot tables and then progressing to more advanced and complex pivot tables.

The Scenario

Recently, you have been hired by Pro Golf USA, a seller of golf equipment and apparel. One of the first tasks you have been given is to help the company analyze the extensive amount of customer data that it has collected in an Excel spreadsheet in the worksheet called **GolfData**. A sample of that data has been included as part of this narrative. Understanding each of the fields contained in the spreadsheet is an important component that will assist you in your data analysis. The spreadsheet contains the following fields:

Pro Golf USA: Seller of Golf Equipment and Apparel

CUST ID	REGION	PRO SHOP VS RETAIL STORE	YEARS AS A CUSTOMER	STORE SQUARE FEET	TOTAL DOLLARS PURCHASED	NUMBER OF PURCHASES MADE
1	North	Pro Shop	1	Greater than 10,000	$19,000.00	10
2	South	Pro Shop	4	5,000 to 10,000	$15,000.00	40
3	North	Retail Store	3	1,000 to 5,000	$9,500.00	30
4	West	Pro Shop	5	1,000 to 5,000	$10,500.00	60
5	East	Pro Shop	6	Less than 1,000	$17,500.00	70
6	South	Pro Shop	2	Greater than 10,000	$13,500.00	50
7	East	Pro Shop	3	5,000 to 10,000	$13,000.00	30
8	West	Retail Store	4	1,000 to 5,000	$12,500.00	60
9	North	Pro Shop	5	Less than 1,000	$15,000.00	80
10	West	Retail Store	7	1,000 to 5,000	$13,000.00	20
11	North	Pro Shop	1	Less than 1,000	$10,500.00	40
12	East	Pro Shop	2	5,000 to 10,000	$14,500.00	90
13	South	Pro Shop	5	Greater than 10,000	$10,000.00	70
14	South	Pro Shop	4	1,000 to 5,000	$13,500.00	100
15	South	Retail Store	3	Less than 1,000	$9,500.00	20
16	West	Pro Shop	5	1,000 to 5,000	$9,500.00	60
17	North	Pro Shop	6	Less than 1,000	$64,500.00	50
18	East	Retail Store	2	Greater than 10,000	$49,500.00	70
19	West	Pro Shop	3	1,000 to 5,000	$49,500.00	40
20	North	Retail Store	1	Less than 1,000	$59,500.00	30

- CUST ID: Serves as a unique identifier for each customer.
- REGION: The sales area has been categorized into one of four regions (north, south, east, west).
- PRO SHOP VS RETAIL STORE: Pro Golf USA sells to golf course pro shops and retail stores.
- YEARS AS A CUSTOMER
- STORE SQUARE FEET: In order to better understand the customers of Pro Golf USA, data have been collected regarding the size of each of the pro shops or retail stores that is a customer of Pro Golf USA. Customer stores have been categorized into one of four categories, based on square feet of the store (Less than 1,000 square feet; 1,000 to 5,000 square feet; 5,000 to 10,000 square feet; Greater than 10,000 square feet).
- TOTAL DOLLARS PURCHASED: This field represents the dollar amount that Pro Golf USA received from a given customer in the last year.
- NUMBER OF PURCHASES MADE. This field represents the number of orders that a given customer placed with Pro Golf USA in the last year.

After making sure that you understand the data that you will be working with, it is now time to begin your analysis. You will use the **GolfData** sheet to create the first 6 pivot tables described in this tutorial.

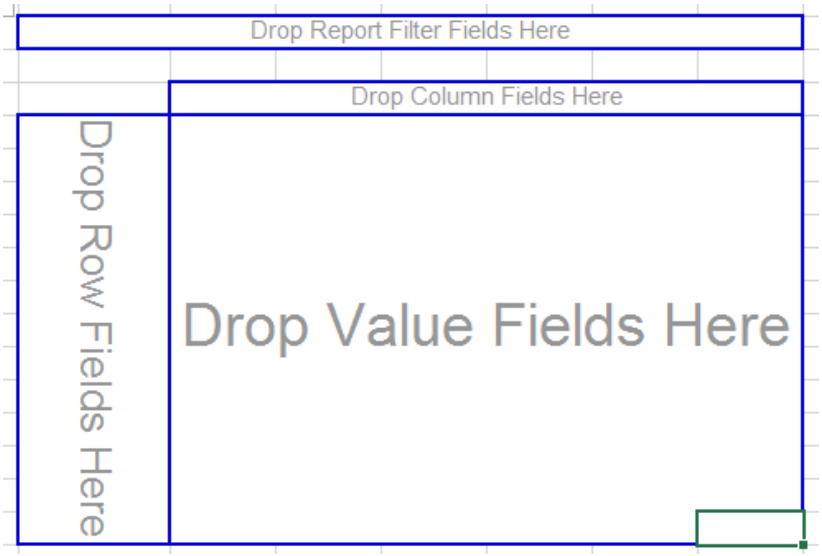
Determining the fields that comprise your pivot table

Your first data analysis task is to **analyze the total dollars purchased by region and the category of "Pro Shop vs Retail Store**."

Prior to using Excel to construct a pivot table, a user must visualize in his or her mind the general layout of the pivot table. This is probably the biggest challenge for someone who is a novice in regards to pivot table creation. Without this visualization taking place, the user will be at a loss as to what needs to be done. The starting point is the problem statement: **the total dollars purchased by region and the category of "Pro Shop vs Retail Store."**

The word "**by**," or similar wording, can serve to differentiate the fields that comprise the data from fields that comprise the rows or columns of the desired pivot table. Prior to the word "by" is "total dollars purchased." This

serves as the indicator of the field that you want to analyze. After the word "by" are the words "region" and "Pro Shop vs Retail Store." Region can serve as the row (or column) of your pivot table and the category of Pro Shop/Retail Store can serve as the column (or row) of your pivot table. It does not matter which of those two fields serves as the column or row since both combinations yield the same results.

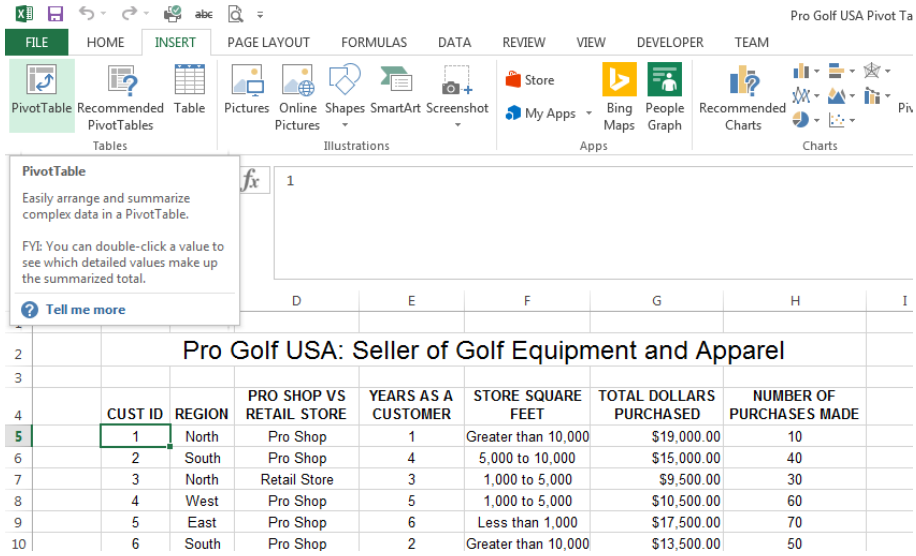


Therefore, the first pivot table will be comprised of the following:

- **Region** will occupy the row fields position in the pivot table.
- The category of "**Pro Shop vs Retail Store**" will occupy the column fields position in the pivot table.
- **Total Dollars Purchased** will occupy the value fields position in the pivot table.

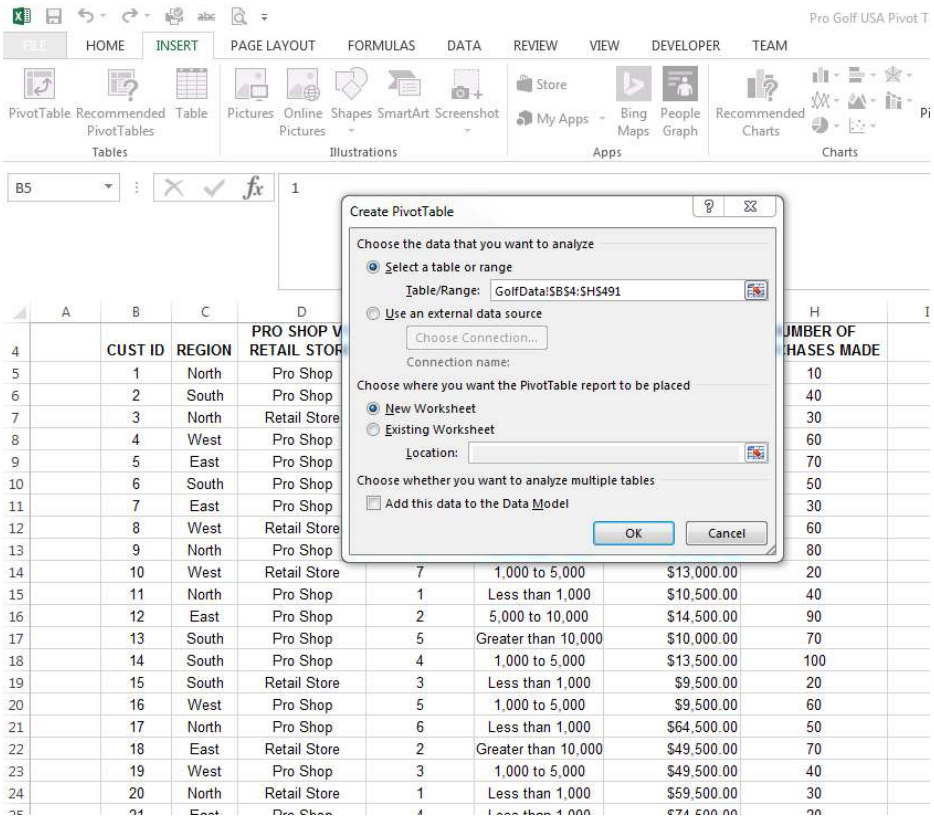
Once the required fields have been determined, it is now time to construct the actual pivot table.

- Open the file called **Pro Golf USA Pivot Table Data.xlsx**
- Place the cursor on one of the records that is displayed in the spreadsheet.
- Using the Excel ribbon, click on the **Insert tab**, and then click **Pivot Table**.

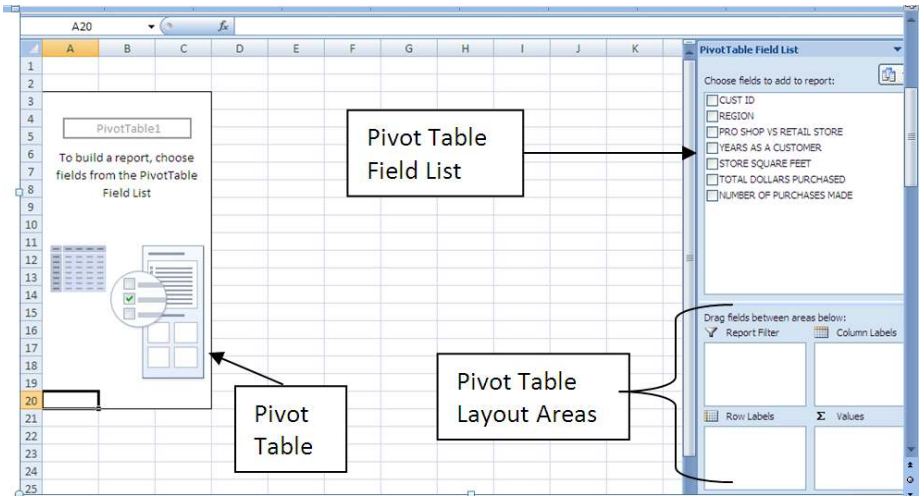


- The **Create Pivot Table dialog box** should now appear. Make sure that all of the data that you wish to analyze are highlighted, which should be the range of $B$4:$H$491. You should also select where you want the new pivot table to be placed, either on a new worksheet or in a specified location within the current worksheet. Make sure that **New Worksheet** is selected.

- After selecting those options, click OK, and the skeleton structure of a pivot table should now appear as a separate worksheet.



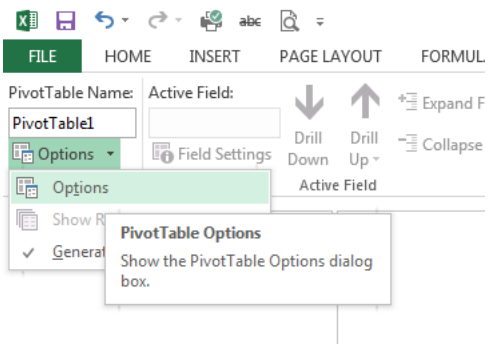
The pivot table skeleton is comprised of three main areas. On the left-hand side of the screen, you can see the actual pivot table. Fields of information will eventually be dropped into this area. On the right-hand side of the screen, you will find the Pivot Table Field List and the Pivot Table Layout Areas. The Pivot Table Field List is simply a listing of all of the available fields in your spreadsheet that you can use in your Pivot Table. The Pivot Table Layout Areas are individual components that make up your pivot table (row labels, column labels, values and report filter). More information related to each of those four items will be provided shortly.



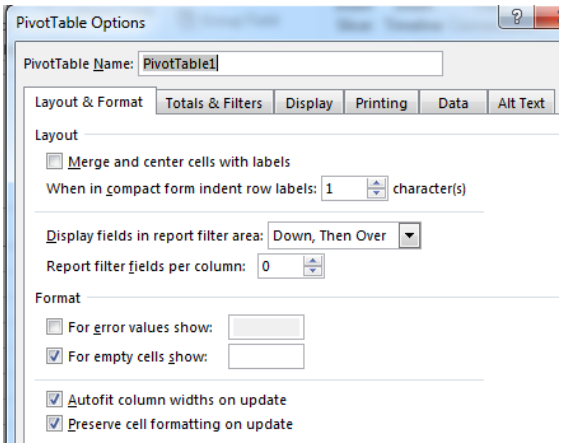
Traditionally, pivot tables were created by dragging a field from the listing on the right over to the appropriate location in the pivot table skeleton, on the left. Beginning with Excel 2007, the default technique used to make a pivot table has slightly changed. Drag-and-drop is still used, but now, fields are dragged from the listing on the right down to the appropriate pivot table layout area, in the lower right corner.

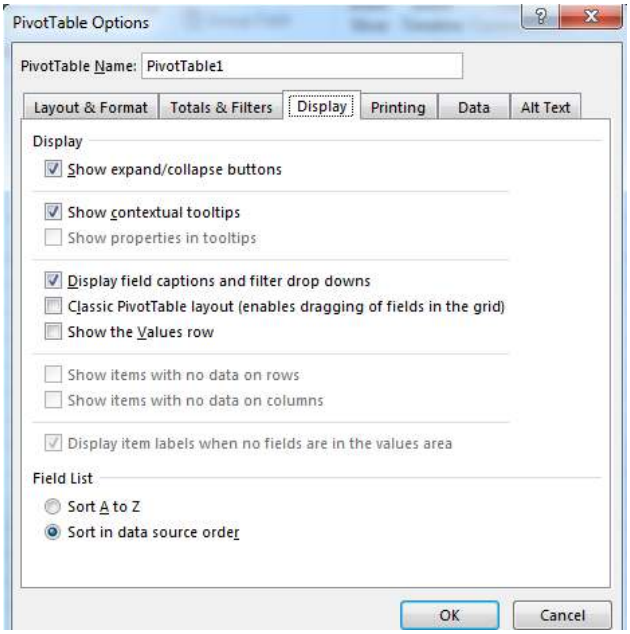
Most students find that the "classic" pivot table creation technique is easier to visualize and easier for students to build. Therefore, while the differences between the two views are discussed below, all of the illustrations in the remainder of the tutorial will features screen shots from the "classic" view.

- Make sure that the pivot table is still the currently selected object. The Pivot Table Tools, Options ribbon should be visible, showing various features related to pivot tables. On the far-left of the ribbon, **Options** should be visible. **Click the drop-down arrow** and **Options** should appear. Clicking Options should result in the **PivotTable Options dialog box** appearing on the screen.



- Select **Display.** A number of different display options should appear.





- Select **Classic Pivot Table layout**. Then click OK.

Selecting the Classic Pivot Table layout allows you to drag fields into the pivot table skeleton grid (the way pivot tables used to be created). Now, you have the option of dragging fields directly into the grid (the traditional way) or you can drag fields into the pivot table layout area (the new way). Both ways will be described.