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Course Reference Handout

MICROSOFT EXCEL - INTRODUCTION TO DATA ANALYSIS

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Lists and Tables:

A list consists of data being stored in the rows of a worksheet, which are known as records. Each record in a list will have common categories of information tracked for it, which will be organized into columns of the list, known as fields. Technically, a List does not become a Table until you apply one of Excel's Table formatting options to the List. Once a List has been formatted as a Table, Excel will automatically apply Table formats and AutoFilters, and will provide other instant options, such as a Totals Row and automatic updating as new records are entered.

Why convert Lists to Tables?

Though lists and tables are identical in structure, when you actually apply Table formatting to a list, there are some key benefits you gain:

- A table allows you to refer to a data set dynamically. Because tables automatically expand when new records are added, you can reference the data in a table in tools, such as Pivot Tables and Charts, and as new records are added to the table, your Pivot Tables or Charts can easily be updated to display the new results.

Rep	Month	Sales
John Wade	Nov-11	$120.00
John Wade	Nov-11	$168.00
Mike Davies	Apr-11	$130.50
Mike Davies	Apr-11	$130.50
Roland Wahlquist	Nov-11	$54.00
Mark Shield	Nov-11	$120.00
Mark Shield	Oct-11	$234.00
Mark Shield	Sep-11	$168.00
Mark Shield	Sep-11	$168.00
Roland Wahlquist	Aug-11	$72.00
Roland Wahlquist	Aug-11	$185.40

- Table formatting automatically incorporates filter and sorting options into the header row.
- Tables are more forgiving. For example, having a blank row in a table will not have the same adverse effect as a blank row in a list.
- They can be named for easier reference from the Table Tools > Options Ribbon, where you'll also find many more easy-to-apply commands to use, such as the Totals Row command.
- The easy-to-apply formatting comes in several different options, allowing you to increase readability, as well as simply make the table look pretty.

Sorting:

The term "sorting" refers to the way a list is organized. For example, if a list of employee records is alphabetized by the employees' last names, then the list is considered sorted by the Last Name field. Excel's sorting commands allow you to reorganize records in a list by any field in the list, using up to three fields.

Sorting Records:

Single Level (Field) Sorting:

Sorting by a single field, known as Single Level Sorting

- In a properly designed list, click anywhere in the field, or column, you want to sort by.
- Click the Sort & Filter button located in the Editing group toward the right side of the Home Ribbon.
- You will also find Sort & Filter buttons located on the Data Command Tab of the Ribbon.

Ascending Sort Button:

Sorts text A-Z, numbers 0-9, dates Older-Recent

Descending Sort Button:

Sorts text Z-A, numbers 9-0, dates Recent-Older

Multiple Level (Field) Sorting:

To sort by two or more fields, known as Multiple Level Sorting:

- In a properly designed list, click any cell in the list. If there are blank rows or columns in your list, you must select the entire list of records manually.
- Click the Sort & Filter button as mentioned above and select the Custom Sort button.
- In Excel 2016, you can sort up to a maximum of 64 fields!

Filtering Records:

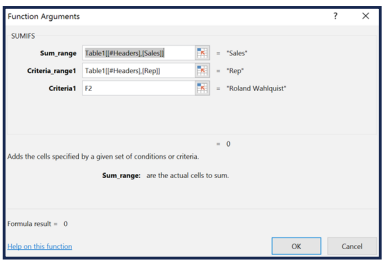
When filtering records, you can hide records from a list by using criteria for the records you do wish to see. To activate Excel's AutoFilter feature, do the following:

- In a properly designed list, click anywhere in the list. If there are blank rows or columns in your list, you must select the entire list of records manually.
- Click the Sort & Filter button as mentioned above and select the Filter button. Use the drop-down arrows provided to the right of your List's header row (labels) to select filtering criteria.
- You can also find similar Filtering options available on the Data Command Tab of the Ribbon.

Auto-Filters are also automatically inserted into a List if you use the Format as Table command located in the Styles group of the Home Ribbon.

Using summary based IFS functions:

You've used summary functions such as SUM, AVERAGE, and COUNT, which can apply their respective summaries to a range of numbers regardless of other criteria present in the records. When you need to create more selective summaries and want to add only values in records where other conditions are present (for example, only adding values in a Sales column when the State column contains "CA" and the Region column contains "North"), you can use the version of the functions that allow for criteria to be entered: SUMIFS, AVERAGEIFS, and COUNTIFS.



To insert a summary based IFS function:

- Select the cell in which you want the result of the function to appear.
- From the Formulas Ribbon, open the Math & Trig Library of functions to select SUMIFS, or select the More Functions menu and then the Statistical Library to select AVERAGEIFS or COUNTIFS.
- For SUMIFS and AVERAGEIFS, in the Function Argument window, select the range of cells to be summarized. COUNTIFS does not require this function argument. The range can be a cell range, worksheet column, or table column.
- For Criteria Range 1, select the range of cells you want Excel to look in for the criteria.
- For Criteria 1, reference the actual criteria value you want Excel to look for. This can be a reference to a cell value, or you can type the value in directly.
- Continue referencing additional Criteria Ranges and Criteria values as needed. Excel will support up to 127 conditionals.

Creating a Pivot Table:

A Pivot Table is a powerful data analysis tool that is used to summarize and analyze record data stored in a list or table. Pivot Tables allow you to reorganize the data so that you can cross-reference information within the rows and columns of the table.

Pivot Chart:

When creating a Pivot Table, you will also have the option of creating a Pivot Chart, which can be used to graphically represent the data organized in the Pivot Table.

Creating Pivot Tables:

- In a properly designed list, click any cell in the list. If there are blank rows or columns in your list, you must select the entire list of records manually.
- Select the Insert Command Tab from above the Ribbon and then click on the Pivot Table button located in the Tables group on the far left side of the Ribbon. Select either Pivot Table or Pivot Chart.
- In the Create Pivot Table window, verify that the correct range for your data list is selected.
- Select whether to have the new Pivot Table inserted into a new worksheet or a location within the currently active worksheet.
- Use the Pivot Table Field List on the right to drag and drop data fields into the various areas of the Pivot Table using the Area sections provided at the bottom of the Pivot Table Field List. You can also drag data fields directly into the actual Pivot Table once you have begun constructing the Pivot Table itself.
- The Data area is where mathematical operations take place, such as adding sales revenue. The Page area gives you the ability to filter your Pivot Table by the data located in the Page area.

Using a Slicer to Filter a Pivot Table:

- Select the Analyze tab of the Ribbon (under Pivot Table tools.)
- Click the Slicer button and select the fields in which you want to filter the Pivot Table data.
- Select values from the Slicer panels to filter your Pivot Table accordingly.
- Use the Slicer Tools Contextual Ribbons to modify Slicer panel options.

Creating Pivot Charts:

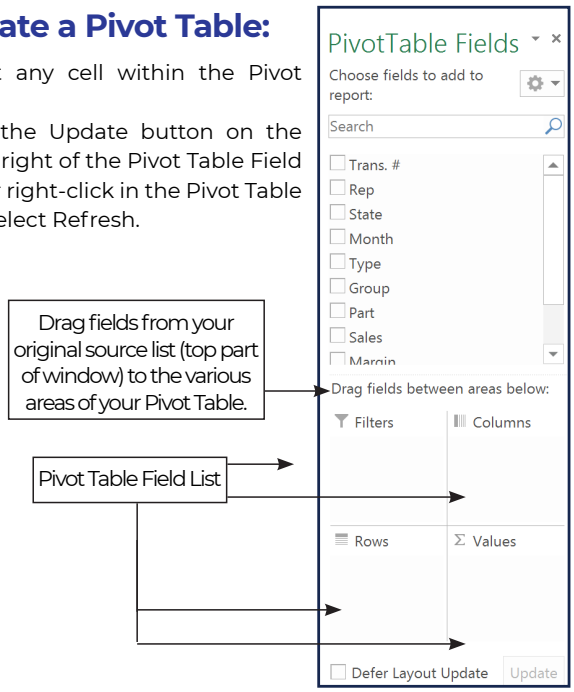
- Click anywhere in the Pivot Table in which you want to graph data.
- Select the Pivot Table tools > Options Contextual Tab from above the Ribbon and then click on the Pivot Chart button.
- Select a Chart type and click OK.
- Use the Pivot Chart Tools Contextual Ribbons to add and modify chart elements and formatting.
- Pivot Charts also have the unique ability to be filtered and are directly linked to the Pivot Table data they are based on.

Note:

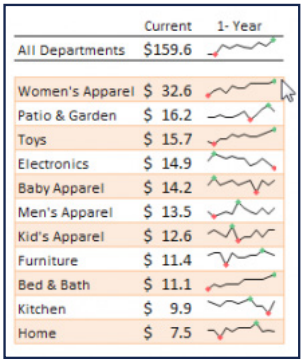
You may add, edit, or delete records from the data source, and therefore you need your Pivot Table to reflect these changes. Pivot Tables DO NOT update automatically!

To update a Pivot Table:

- Select any cell within the Pivot Table.
- Click the Update button on the lower right of the Pivot Table Field List or right-click in the Pivot Table and select Refresh.



Sparklines:

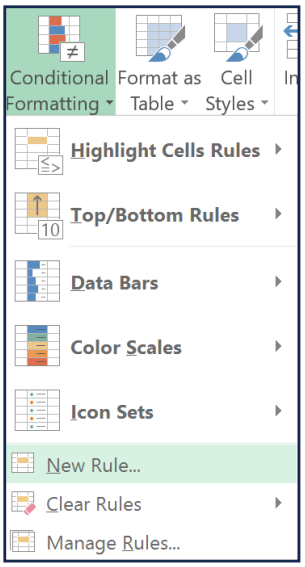


Sparklines are charts that appear within a single spreadsheet cell and are used to graph only a single row or column of data. Sparklines help bring meaning and context to numbers being reported, and, unlike charts, they are meant to be embedded into cells near the data they describe. To insert a Sparkline, select Sparkline from the Insert tab of the Ribbon.

Conditional Formatting:

With Conditional Formatting you can have the appearance of a cell change by selecting formatting options that are activated only when certain data within the cells meets certain conditions. To set Conditional Formatting options for cells, do the following:

- Select the cell or cells to which you want to apply the Conditional Formatting.
- Select the Conditional Formatting command from the Styles group of the Ribbon and select from Excel's built-in Conditional Formatting options. To create your own rule instead, click on New Rule.
- To add additional conditions and formats, select the Conditional Formatting command from the Styles group of the Ribbon and then click on Manage Rules. Click Add to begin adding a new Conditional Format.



Conditional Formatting Graphics:

Excel 2013 now also provides Data Bars, Color Scales & Icon Sets that insert more graphical representations of Conditional Formatting. To use these new Conditional Formatting options, do the following:

- Select the Conditional Formatting command from the Styles group of the Ribbon and then click on Data Bars, Color Scales, or Icon Sets. Set the condition that the cell must meet in order for the formatting to be applied.
- To adjust the rule settings of the graphics, select the cells, click the Conditional Formatting command, and then select Manage Rules.

Data Validation:

Excel's Data Validation options allow you to set limitations or conditions for the data being entered into cells. To set Data Validation rules for a cell or range of cells, do the following:

- Select the cell or cells you want to apply the Data Validation rules to.
- Select the Data Command Tab from the Ribbon and then click on Data Validation located in the Data Tools group of the Ribbon.
- From the Settings tab, chose the type of data you want to allow for and any parameters the data must adhere to.
- From the Input Message tab, create any messages you want someone to see if they choose any of the cells you applied your Data Validation rules to.
- From the Error Alert tab, choose an error message type and then create a message that will be displayed if the validation rules are broken.