

Excel Tables –

Database Technology Comes to Spreadsheets



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Introduction

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Learning Objectives

Upon completing this session, participants should be able to:

- Differentiate between an ordinary data range and a Table;
- Create structured reference formulas and list their benefits over formulas built using ordinary cell referencing;
- Select complete rows or columns of data in a Table quickly;
- Utilize advanced filters in Tables to identify unique or duplicate records;

Excel Tables for Reporting and Analysis

Excel Tables embody database technology similar to that found in Microsoft Access. They are designed to overcome the difficulties of working with large data sets in Excel. A table is nothing more than a list of data in which each column has a heading or field name, and each row represents a record. Think of tables as two-dimensional Excel databases with special functionality. In this session, you will learn about the advantages of working with tables, practical applications for using tables in your Excel workbooks, and some of the ways tables can streamline Excel-based processes while simultaneously improving accuracy.

Many worksheets are used to manipulate lists – two-dimensional data sets of employees, customers, vendors, or products, etc. The **Table** features in Excel are designed to ease and enhance the way users sort, filter, format, and analyze list information. Here are some of the built-in features for managing and manipulating tables.

- **Auto Expansion** – Tables expand automatically to include new data entered in adjacent rows or columns. All styles, calculations, data validation, and conditional formats are applied to the extensions.
- **Sorting** – Users can sort on unlimited columns and on font or fill colors. Sorts can be made case-sensitive.
- **Filtering** – Users can filter on single or multiple criteria, icon sets, or on dynamic dates, such as last week or last month.
- **Formula Replication** – Any formula created in an adjacent column to make calculations on Table data is automatically replicated across all rows.
- **Duplicate Data** – Users can highlight or remove duplicate rows with a few simple commands.
- **Table Styles** – A large gallery of Table styles is available for formatting tables automatically. Styles with banded rows auto-adjust the color bands for record additions, deletions, sorting, and filtering. Styles interact with Themes to provide greater consistency in formatting tables.
- **Structured Referencing** – Formulas that reference elements of a Table can use row and column tags rather than cell references in the formula for clarity and ease of use.

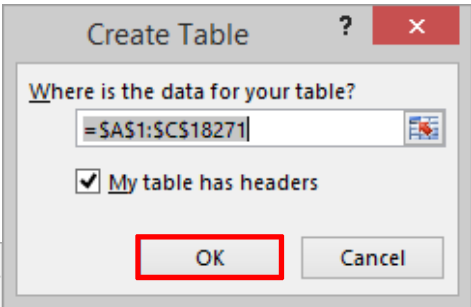
Creating a Table

To create a Table in Excel using the default style, place the cursor inside of the data range and press **CTRL + T**. In the **Create Table** dialog box, confirm the Table range and check **My Table has headers**. Click **OK** to create the Table as shown in **Figure 1**. In this case, the default style shades every other row for readability. Drop-down filter arrows are visible at the top of each column. Click on the arrows to filter or sort the columns. Note that the arrows do not print on reports. Any columns that do not have a name in

the header row at the top of the data set will be named **Column1**, **Column2**, **Column3**, etc. These fields can be renamed by typing over the inserted labels.

CTRL + T

Date	Location	
1/1/2012	Baton Rouge Store No 1	
1/1/2012	Baton Rouge Store No 2	5,183.94
1/1/2012	Jackson Store	4,730.82
1/1/2012	Slidell Store	4,246.96
1/1/2012	Hammond Store	4,083.06
1/1/2012	Lafayette Store	4,530.78
1/1/2012	Biloxi Store	4,126.17
1/1/2012	New Orleans Store No 1	5,245.88
1/1/2012	New Orleans Store No 2	5,268.76
1/1/2012	Shreveport Store	4,719.92
1/2/2012	Baton Rouge Store No 1	5,493.27
1/2/2012	Baton Rouge Store No 2	5,235.78
1/2/2012	Jackson Store	4,778.13
1/2/2012	Slidell Store	4,289.43
1/2/2012	Hammond Store	4,123.89
1/2/2012	Lafayette Store	4,576.09
1/2/2012	Biloxi Store	4,167.43
1/2/2012	New Orleans Store No 1	5,298.34
1/2/2012	New Orleans Store No 2	5,321.45
1/2/2012	Shreveport Store	4,767.12



The 'Create Table' dialog box is shown with the text '=SAS1:SC\$18271' in the input field and the checkbox 'My table has headers' checked. The 'OK' button is highlighted with a red rectangle.

Date	Location	Sales
1/1/2012	Baton Rouge Store No 1	5,438.88
1/1/2012	Baton Rouge Store No 2	5,183.94
1/1/2012	Jackson Store	4,730.82
1/1/2012	Slidell Store	4,246.96
1/1/2012	Hammond Store	4,083.06
1/1/2012	Lafayette Store	4,530.78
1/1/2012	Biloxi Store	4,126.17
1/1/2012	New Orleans Store No 1	5,245.88
1/1/2012	New Orleans Store No 2	5,268.76
1/1/2012	Shreveport Store	4,719.92
1/2/2012	Baton Rouge Store No 1	5,493.27
1/2/2012	Baton Rouge Store No 2	5,235.78
1/2/2012	Jackson Store	4,778.13
1/2/2012	Slidell Store	4,289.43
1/2/2012	Hammond Store	4,123.89
1/2/2012	Lafayette Store	4,576.09
1/2/2012	Biloxi Store	4,167.43
1/2/2012	New Orleans Store No 1	5,298.34
1/2/2012	New Orleans Store No 2	5,321.45
1/2/2012	Shreveport Store	4,767.12

A red arrow points from the 'Lafayette Store' row in the first table to the 'Lafayette Store' row in the second table.

Figure 1 - Creating a Table Instantly with CTRL+T

Alternatively, the table could have been created from the ribbon. Again, position the cursor inside the data range. Then, select **Format as Table** from the **Home** tab. Select the desired style from the gallery and then confirm the table range in the **Create Table** dialog box. Click **OK** to create the table.

Using CTRL + T is a faster and easier way to create a table, but it always creates a table in the default table style. To change the default table style, click **Home, Format as Table** on the ribbon. Right-click on the style to be made the new default and select **Set As Default**.



Styles interact with Themes. Themes contain attributes for fonts, line and fill effects, and the color palette. By changing the Theme, the colors and formats of a Table Style will be affected. To see the impact, select **Themes** from the **Page Layout** tab. Then, roll your mouse over the various themes and watch the Table formats change. Themes give users even greater flexibility

and consistency in formatting their tables.

Tables can be referred to by name. In default, Excel gives each table a generic name – **Table1**, **Table2**, **Table3**, etc. – based on the order in which the table was created in the workbook. Tables can be renamed with a descriptive name, such as Sales or Invoices, to make building formulas easier and more intuitive, especially when multiple tables are present in a single workbook. To rename a table, click in the **Table Name** box on the **Table Tools, Design** contextual tab, as shown in **Figure 2**. The rules and naming conventions that apply to Defined Names also apply to table names.

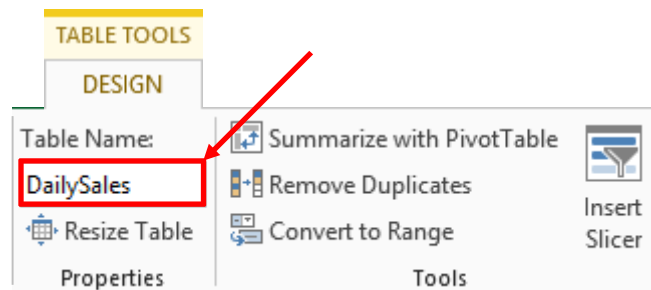


Figure 2 – Giving Tables a Descriptive Name for Ease of Use

Turning a Table into a Range

Some accounting professionals may just want to format their lists with a few clicks. They don't need filtering, sorting, or any of the other advanced features, and they certainly don't want the filter buttons at the top of each column. Here's the trick. Create a table from the data, selecting the desired style in the process. Then, change the table back into an ordinary range from the ribbon by selecting **Convert to Range** on the **Table Tools, Design** tab. Click **OK** in the confirmation dialog box and the table will be transformed into an ordinary range again. Note that the table formatting remains! To turn off the filter buttons in a working table, position the cursor inside the table and click **Filter** on the **Data** tab or click **Sort & Filter, Filter** on the **Home**. The same processes can be used to turn on filtering again whenever it's needed. In Excel 2013, users can enable or disable the filter buttons on the **Table Tools, Design** contextual tab. Check or uncheck **Filter Button** in the **Table Style Options** group.



When a table is turned into a range, the table design becomes cell formatting, which may cause unexpected results if the range is later turned back into a table. If the table formatting is inconsistent, it can be repaired. Click inside the table. From the Ribbon, select **Home, Format as Table**. Right-click on the desired style in the gallery and choose **Apply and Clear Formatting**.

Working with Tables

Excel provides over sixty built-in table styles. Built-in styles can be customized easily to meet a user's needs with just a few clicks. In addition, users can build their own styles. The data in this example consists of four years of weekly sales data for ten fast-food restaurants. First, apply one of the built-in

styles to the table. Then, use the check boxes in **Table Style Options** to explore how styles can be adjusted to meet specific needs. Note that altering the options in **Table Style Options** modifies the styles presented in the **Table Styles** gallery. Formatting tables with styles may be more effective if options are set *before* styles are applied. **Figure 3** shows the results of our efforts.

TABLE TOOLS				
DESIGN				
<div><div><input checked="" type="checkbox"/> Header Row</div><div><input type="checkbox"/> First Column</div><div><input checked="" type="checkbox"/> Filter Button</div><div><input type="checkbox"/> Total Row</div><div><input type="checkbox"/> Last Column</div><div><input type="checkbox"/> Banded Rows</div><div><input checked="" type="checkbox"/> Banded Columns</div></div>				
Table Style Options				

Figure 3 - Using Table Style Options to Adjust Table Formatting

The easiest method for adding new records to a table is to position the cursor in the first blank row immediately below the table and begin typing. Press **TAB** to advance the cursor to the next field as you are typing. Alternatively, you can paste new data to the first blank row below the table. In either case, the table will automatically be expanded to include the rows typed or pasted. A new row can also be added by dragging the resize handle in the lower right-hand corner of the table to expand its size. Type in the following records or paste some new records into the sample table.

1/7/2017	Hammond Store	6,529.40	6,662.75	6,878.64	6,951.27	6,463.56	6,599.14	6,673.20
1/7/2017	Slidell Store	6,538.85	6,208.68	6,610.17	6,678.56	6,344.86	6,612.94	6,476.17

Adding a column to a table is just as easy. In this case, the new column will contain a formula to total weekly sales by store for the last four years. Position the cursor in cell **J1**, type in the column label **EOW Totals**, and press **ENTER**. The table immediately expands to include the new column. Position the cursor in cell **J2** and perform the following steps to create the formula.

1. Type in **"=SUM("** and move left one cell to cell **I2**.
2. Then, hold down the **SHIFT** key while using the **LEFT-ARROW** to expand the range to include cells **I2** through **C2**.
3. Type in **")"** to complete the formula and press **ENTER**.

The formula will be copied down the column automatically to the extent of the data. Note the contents and format of the formula.

=SUM(WeeklySales[@,[Sun]:[Sat]])

The syntax of the formula displayed represents how Excel 2010/2013 creates structured referencing formulas. In Excel 2007, the formula would be presented as shown below.

=SUM(WeeklySales[[@ThisRow],[Sun]:[Sat]])

The format of these formulas is known as *structured referencing*, which allows users to refer to columns, rows, or specific ranges within a table using tags. Try this: position your cursor in any cell *outside* of the table and then enter the formula below.

=SUM(WeeklySales[Wed])

The formula entered totals sales for Wednesday – and it doesn't matter if the table contains 100 records or 500,000! Add another record, and the total will be updated to include whatever sales amount was entered for Wednesday. Detailed coverage of structured referencing will be forthcoming later in this session.

At first glance, auto-expansion of tables may appear to be just another ho-hum feature, but beneath this facade lurks great power because any formula, chart, or PivotTable that references the table will automatically incorporate any new data added to the table. Have you heard of dynamic defined names? Tables in Excel can perform the same function but without the need for creating defined names based on complex formulas that average users have little chance of understanding or applying.

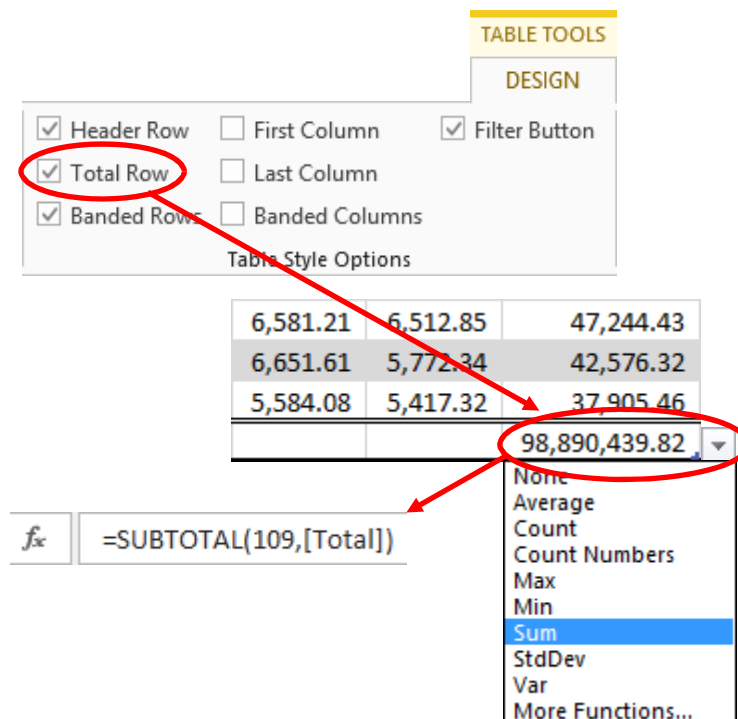


Figure 4 - Adding Totals to a Table

Adding totals to a table is as easy as checking a box. First, position the cursor inside the table and select the **Table Tools, Design** tab on the ribbon. Then, check **Total Row** in the **Table Style Options** group. A grand total will be appended to the bottom of the table in the EOW Total column. Click on the cell containing the total and then click the drop-down arrow on the right to select the desired summarizing function. Select **SUM**, which is the default, to sum the column. Notice the formula in the Formula Bar. Excel entered the **SUBTOTAL** function instead of SUM, so that the total will not include hidden rows when the table is filtered. The process described is displayed in **Figure 4**.

Each column in the table can be totaled independently of every other column. In other words, one column can be summed while another can be averaged or counted. Copy the total formula to the bottom of all sales columns by grabbing the auto-fill box in the lower right-hand corner of the cell containing the grand total and dragging the fill box across the row to the Sunday sales column. The demonstration table should now resemble the one shown in **Figure 5**.

EOW	Location	Sun	Mon	Tue	Wed	Thu	Fri	Sat	EOW Total
1/7/2012	Baton Rouge Store No 1	5,112.55	5,383.40	5,561.94	5,451.69	5,230.12	5,398.02	5,176.37	37,314.09
1/7/2012	Baton Rouge Store No 2	4,821.06	4,973.99	5,109.67	5,079.63	5,237.69	5,029.09	5,030.01	35,281.14
1/7/2012	Biloxi Store	4,002.38	4,000.73	4,168.19	4,002.19	4,128.01	4,128.76	3,920.95	28,351.21
1/7/2012	Hammond Store	3,919.74	4,041.41	3,959.66	3,919.12	3,919.84	5,277.38	3,879.28	28,916.43
1/7/2012	Jackson Store	4,494.28	4,682.57	4,587.84	5,275.46	4,493.08	4,541.70	4,590.34	32,665.27
1/7/2012	Lafayette Store	4,530.78	4,438.81	4,439.62	4,303.09	4,349.66	4,304.66	5,113.39	31,480.01
1/7/2012	New Orleans Store No 1	5,036.04	4,927.46	5,193.32	5,141.26	5,089.18	5,196.15	5,144.07	35,727.48
1/7/2012	New Orleans Store No 2	4,899.95	5,268.24	5,109.52	5,270.15	5,164.63	5,059.06	5,166.50	35,938.05
1/7/2012	Shreveport Store	4,625.52	4,433.42	4,434.23	4,435.04	4,531.24	4,579.77	4,723.74	31,762.96
1/7/2012	Slidell Store	4,119.55	4,289.43	4,032.80	4,076.44	5,221.46	3,991.35	4,163.78	29,894.81
12/31/2016	Biloxi Store	5,259.56	5,151.83	6,934.79	5,315.27	5,207.52	5,045.49	5,263.24	38,177.70
12/31/2016	Hammond Store	7,075.80	5,258.26	5,205.34	5,152.39	5,206.79	5,100.15	5,369.33	38,368.06
12/31/2016	Jackson Store	6,091.62	6,092.47	5,968.97	6,031.99	6,157.22	6,158.08	6,096.73	42,597.08
12/31/2016	Lafayette Store	5,834.85	6,933.82	5,537.93	5,717.37	5,956.43	5,897.69	5,779.35	41,657.44
12/31/2016	New Orleans Store No 1	6,755.77	6,687.77	6,550.80	6,792.76	6,413.78	6,828.53	6,622.53	46,651.94
12/31/2016	New Orleans Store No 2	6,854.48	6,855.44	6,787.14	6,788.09	6,865.22	6,581.21	6,512.85	47,244.43
12/31/2016	Shreveport Store	6,140.45	6,203.35	5,956.05	6,018.93	5,833.59	6,651.61	5,772.34	42,576.32
12/31/2016	Slidell Store	5,189.57	5,301.91	5,525.92	5,582.52	5,304.14	5,584.08	5,417.32	37,905.46
Total		14,128,261.36	14,123,630.87	14,129,267.06	14,119,257.03	14,122,009.36	14,132,666.18	14,135,347.96	98,890,439.82

Figure 5 - Table with a Total Row Displayed

The total row can be turned on or off in **Table Style Options**. The row remembers its content and layout so that the next time it is turned on, it will display just as it did before it was turned off. Further, if the total row is off the screen when it is turned on, Excel will rearrange the display so that the total row is visible.

Sorting and Filtering

In this example, the sales manager for Eat-a-Lot Fast Food would like to display last quarter's sales totals for just one of the restaurants. First, click the drop-down filter button at the top of the **Location** column and clear the **Select All** button in the record list. Next, select the **Hammond** location and click **OK** to apply the filter. To filter the results for the last quarter, click the drop-down filter button at the top of the **EOW** column and select **Date Filters, Last Quarter**. The table should resemble the one displayed in **Figure 6**. Note that the total row calculates the total sales for only the records displayed. Also, note the icons on the filter buttons of the filtered columns, which indicate that a filter is active.

EOW	Location	Sun	Mon	Tue	Wed	Thu	Fri	Sat	EOW Total
1/4/2014	Hammond Store	4,481.51	4,436.03	4,482.97	6,095.70	4,483.69	4,623.12	4,623.87	33,226.89
1/11/2014	Hammond Store	4,300.89	4,625.37	4,441.07	4,580.60	4,442.52	4,582.09	4,629.12	31,601.66
1/18/2014	Hammond Store	5,735.56	4,305.78	4,445.40	4,307.18	4,446.84	4,632.88	4,355.61	32,229.25
1/25/2014	Hammond Store	4,495.35	4,449.72	4,635.88	4,404.80	5,991.95	4,359.14	4,313.46	32,650.30
2/1/2014	Hammond Store	4,406.94	4,546.84	4,640.38	4,594.72	4,595.47	4,456.93	4,550.52	31,791.80
2/8/2014	Hammond Store	4,386.49	5,754.16	4,551.99	4,320.44	4,367.61	4,368.31	4,369.02	32,097.02
2/15/2014	Hammond Store	4,369.72	4,370.43	4,324.63	4,557.88	4,465.58	6,135.30	4,512.82	32,736.36
2/22/2014	Hammond Store	4,513.55	4,607.36	4,375.37	4,329.52	4,609.59	4,470.62	4,611.07	31,517.08
3/1/2014	Hammond Store	4,611.82	4,472.79	6,145.20	4,613.30	4,660.65	4,521.56	4,335.80	33,361.12
3/8/2014	Hammond Store	4,569.65	4,663.66	4,337.90	4,665.16	4,525.93	4,433.33	5,968.58	33,164.21
3/15/2014	Hammond Store	4,480.71	4,628.11	4,342.09	4,389.48	4,530.30	4,671.16	4,625.19	31,567.04
3/22/2014	Hammond Store	4,485.76	4,346.28	4,674.17	6,165.00	4,394.42	4,675.67	4,349.07	33,090.37
3/29/2014	Hammond Store	4,630.40	4,337.24	4,678.67	4,492.24	4,399.36	4,540.49	4,447.55	31,585.99
Total		59,447.35	59,503.77	60,075.72	61,516.02	59,913.91	60,470.60	59,691.72	420,619.09

Figure 6 - Table with Multiple Filters Applied

This next example uses check data exported from QuickBooks. The owner of Hesson Flooring hired you to help him analyze his check payment history. In preparation for the engagement, he exported a list of check data from QuickBooks for the past two years. First, place the cursor in the data and convert it to a table with a style of your choice. Name the table **Checks**.

To begin the analysis, filter the data on the **Date** field so that only checks for last year are displayed. Click on the filter button in the **Date** column. Click on **Date Filters** and then on **Last Year** to set the filter as shown in **Figure 7**. Only checks dated for the previous calendar year should now be visible in the table.

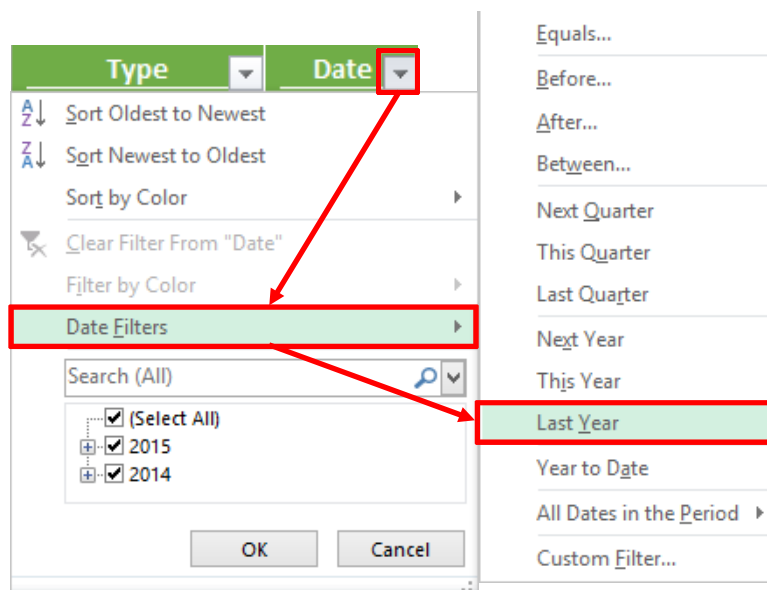


Figure 7 - Setting a Predefined Date Filter

Our attention is focused on those checks that were written for amounts of at least \$1,000. Using a similar process, set a filter on the **Amount** field so that only checks with amounts of \$1,000 or more are displayed. Click on the filter button in the **Amount** column. Click on **Number Filters** and then on **Greater**

Than Or Equal To. In the **Custom AutoFilter** dialog box, enter **1000** as the amount. Click **OK** to set the filter as shown in **Figure 8**. Only checks with amounts of \$1,000 or more should now be visible in the table.

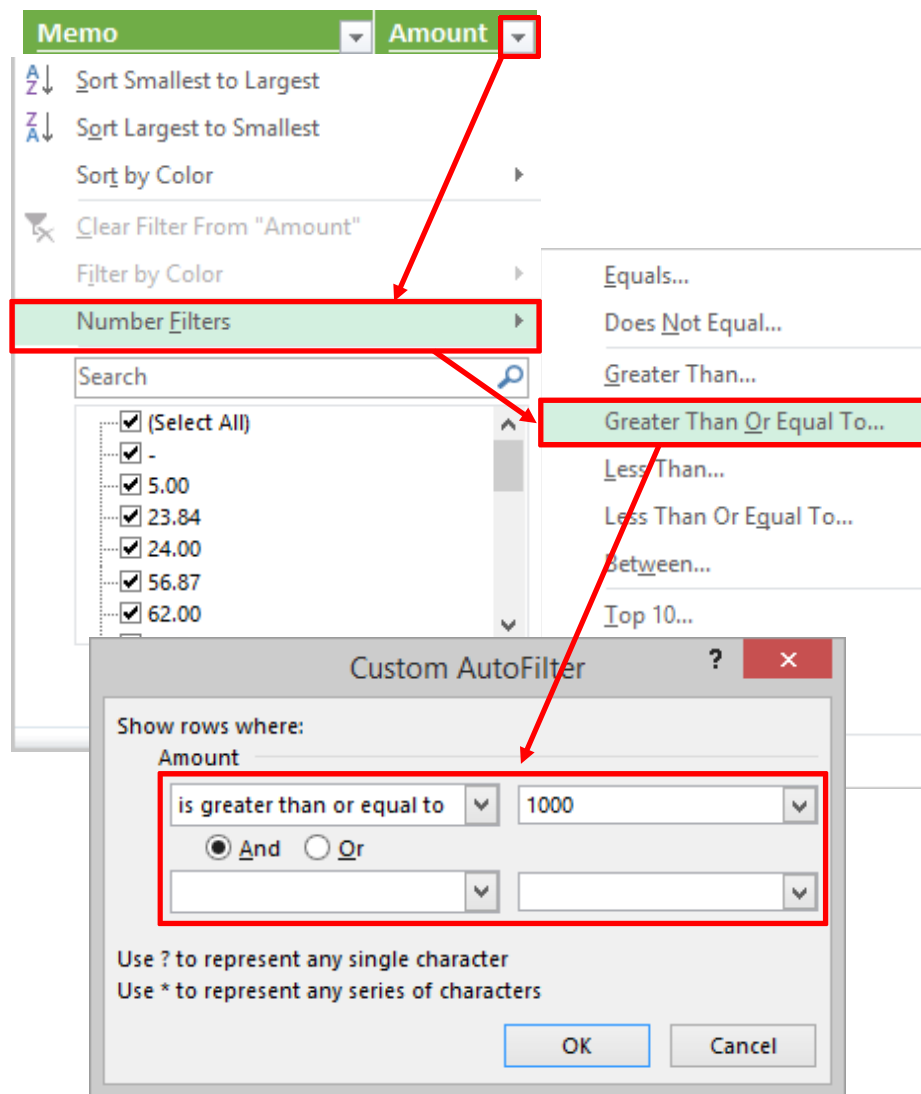


Figure 8 - Setting a Filter on Numerical Data

Sort the data so that the desired information is presented more clearly. Click on the filter button in the **Amount** field. Select **Sort Largest to Smallest** so that the largest check amounts are at the top of the list. Next, do another simple sort so that the name of the payee is in alphabetical order. Click on the filter button in the **Name** field. Select **Sort A to Z** so that the list is in ascending order. Note that when a sort is active, the filter button at the top of a sorted column has a small arrow pointing up or down to indicate the direction of sort.

Excel now allows sorts on up to sixty-four columns at the same time, which is more of a theoretical limit than a practical one for most users. Click on the filter button in the **Name** field. Select **Sort by Color**, **Custom Sort** to display the **Sort** dialog box shown in **Figure 9**.

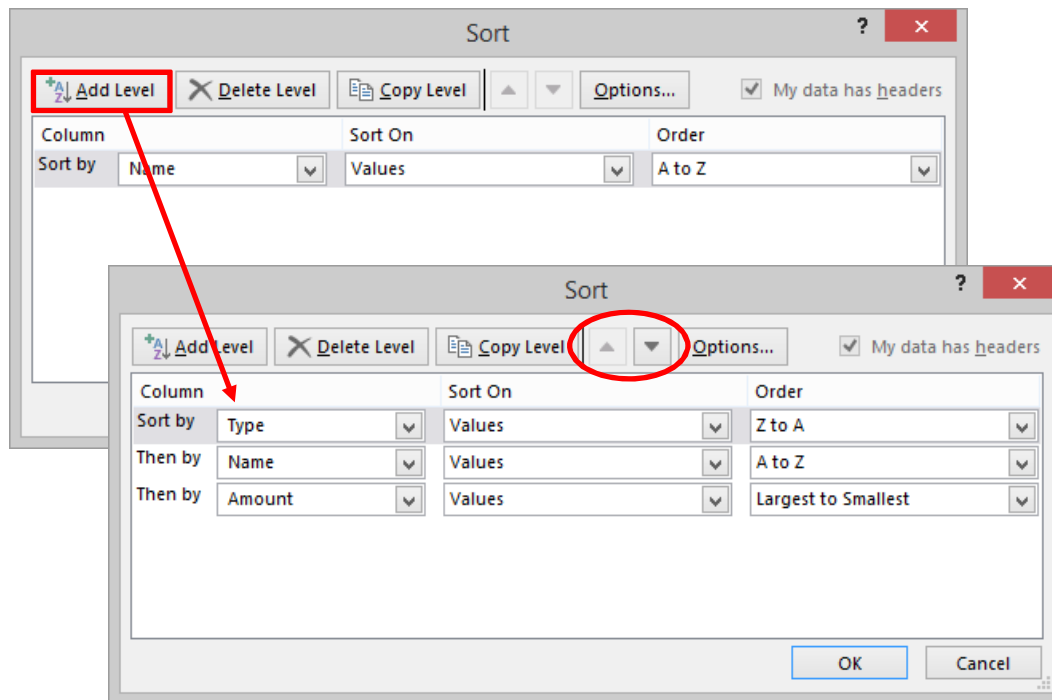


Figure 9 – Specifying a Sort Order in the Custom Sort Dialog Box

Click **Add Level** to add another sort criterion. In the **Then by** box, select **Type**. In the **Sort On** box, choose **Values**. Note that a column can be sorted on values, cell color, font color, or cell icon (from an icon set). In the **Order** box, select **Z to A**. Again, click **Add Level** to add yet another sort criterion. In the **Then by** box, select **Amount**. In the **Sort On** box, choose **Values**. In the **Order** box, select **Largest to Smallest**. The owner would like to see his data sorted first on check Type, then Name, and then Amount. Click on the row identified as **Then by Type**. With the row highlighted, click the small gray arrow at the top of the dialog box to move **Type** to the top of the sort order as shown in **Figure 9**. Partial results of the custom sort are displayed in **Figure 10**.

Type	Date	Num	Name	Memo	Amount
Sales Tax Payment	11/3/2014	202	State Board of Equalization	ABCD 11-234567	1,911.91
Sales Tax Payment	12/10/2014	251	State Board of Equalization	ABCD 11-234567	1,469.30
Check	12/15/2014	265	Daigle Lighting		2,000.00
Check	6/1/2014	142	Davis Business Associates		2,100.00
Check	11/30/2014	235	Great Statewide Bank		1,304.45
Check	10/30/2014	194	Great Statewide Bank		1,294.52
Check	12/1/2014	236	Reyes Properties		1,200.00
Check	10/15/2014	182	Rod Hesson	October Draw	3,000.00
Check	11/15/2014	216	Rod Hesson	November Draw	3,000.00
Check	6/28/2014	146	Sergeant Insurance		1,786.00
Check	4/8/2014	125	Timberloft Lumber		1,080.73
Bill Pmt -Check	12/5/2014	240	C.U. Electric		1,500.00
Bill Pmt -Check	5/23/2014	138	Custom Kitchens of Bayshore		3,076.32
Bill Pmt -Check	6/27/2014	145	Custom Kitchens of Bayshore		3,076.32

Figure 10 - Table Sorted on Type, Name, and Amount

The owner would like you to re-sort the data by check Type, Amount, and then payee Name. To do so, re-visit the **Sort** dialog box and rearrange the sort order.



To perform a case-sensitive sort or to sort across columns, click on the **Options** button in the **Sort** dialog box. To clear all active sorts and filters, position the cursor in the table and select **Home, Sort & Filter, Clear**. This will reposition the data to its original order.

For the next example, clear the active sorts and filters. Position the cursor in the table and select **Sort & Filter, Clear** on the **Home** tab. Re-filter the table so that only checks written in 2014 are displayed. Position the cursor inside the Table and scroll down slowly to the bottom of the table. Watch as the table header row approaches the top edge of the worksheet grid, and then becomes embedded in the column headings, as shown in **Figure 11**. In the process, the column headings A, B, C, etc., become Type, Date, Num, etc. This innovation insures that table headings never scroll off the screen, eliminating the need for freezing panes.

	A	B	C	D	E	F
4						
5						
6	Type	Date	Num	Name	Memo	Amount
7	Bill Pmt -Check	1/3/2014	126	Sergeant Insurance	786-35	4,050.00
8	Bill Pmt -Check	1/13/2014	127	East Bayshore Auto Mall	Monthly Truck Payment	532.97
9	Bill Pmt -Check	1/17/2014	128	Sergeant Insurance	786-35	712.56
10	Bill Pmt -Check	1/31/2014	130	Thomas Kitchen & Bath	R 55-801	23.84
11	Bill Pr	Type	Date	Num	Name	Memo
12	Bill Pr 7	Bill Pmt -Check	1/3/2014	126	Sergeant Insurance	786-35
13	Bill Pr 8	Bill Pmt -Check	1/13/2014	127	East Bayshore Auto Mall	Monthly Truck Payment
14	Bill Pr 9	Bill Pmt -Check	1/17/2014	128	Sergeant Insurance	786-35
15	Bill Pr 10	Bill Pmt -Check	1/31/2014	130	Thomas Kitchen & Bath	R 55-801
16	Bill Pr 11	Bill Pmt -Check	2/3/2014	131	Cal Gas & Electric	560-82645-99C
	12	Bill Pmt -Check	2/10/2014	135	C.U. Electric	
	13	Bill Pmt -Check	2/10/2014	132	Cal Telephone	415-555-9876-8053
	14	Bill Pmt -Check	2/10/2014	133	East Bayshore Auto Mall	Monthly Truck Payment
	15	Bill Pmt -Check	2/10/2014	134	Timberloft Lumber	1890-76
	16	Bill Pmt -Check	2/14/2014	136	Timberloft Lumber	1890-76

Figure 11 - Table Headings Embedded in Worksheet Column Headings

Structured Referencing

Scrolling up to set filters and then down to see totals in a large table, such as a weekly sales table for a restaurant chain, is not effective practice. We can use formulas to put the totals at the top of the table, so that as we set filters, the results will be plainly visible. In the process, we will further investigate the innovation known called structured referencing. Position the cursor in cell **I4**. Type in the label **Total** and format the label with boldface, right justification, and accounting format. Move right to cell **J4** and type in the following formula.

=SUBTOTAL(9,WeeklySales[EOW Totals])

Alternatively, build the formula by pointing to the data column. Start the formula and then move the cursor slowly to the top edge of the table above the **EOW Totals** column to be selected. As the cursor crosses into the table, it will change from the standard Swiss cross to a **black mini arrow**, as shown in **Figure 12**. At that point, simply click to select the data column. Note that the process does not select the heading or total rows, even if the total row is displayed. A second click will select the entire column including the heading and total rows. A dashed border surrounds the range selected for visual confirmation. Individual rows can be selected using a similar process.

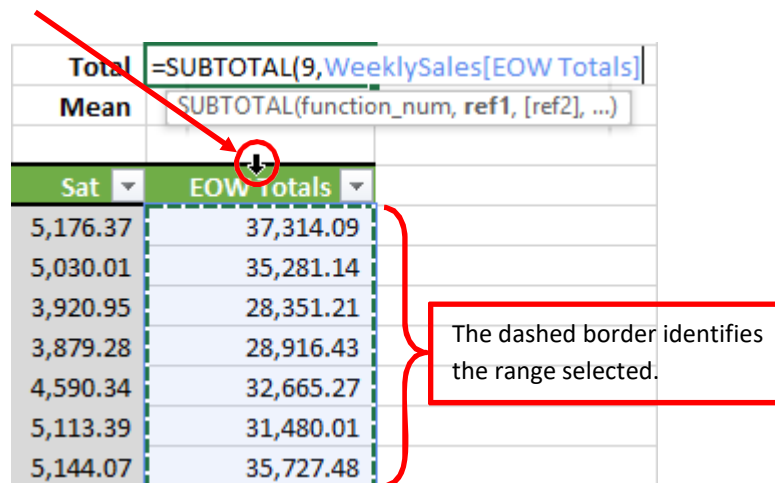


Figure 12 - Using the Mouse to Select a Table Column

The formula created sums all amounts displayed in the **EOW Totals** column of the **WeeklySales** table. As the filters are reset, the total displayed will change to reflect the sum of the records displayed. If filters are cleared, then the formula will reflect the sum of all weekly sales.



As a table is filtered, Excel hides from the user the rows that are not of interest. The **SUBTOTAL** function uses function numbers to determine whether the summary calculation includes hidden rows. Hidden rows are normally included in summary totals when using function numbers 1-11 except when the rows are hidden by active filters, in which case the hidden rows are not included in the totals. Hence, it is not necessary to use SUBTOTAL function 109 to sum filtered tables so that only displayed rows are included in the totals.

Copy the formula in cell **J4** to cell **J5** and then change the formula in cell **J5** to read as shown below.

=SUBTOTAL(1,WeeklySales[EOW Totals])

Filter the table so that the number of displayed rows varies in length. Note that the mean and total formulas displayed at the top of the table change to reflect the filters applied to the table, as shown in **Figure 13**.

Eat-a-Lot Fast Food LLC									
Weekly Sales by Store									
For the period 2012 through 2016									
									Total
									Mean
EOW	Location	Sun	Mon	Tue	Wed	Thu	Fri	Sat	EOW Totals
4/5/2014	Biloxi Store	4,542.59	4,732.62	5,802.52	4,638.71	4,544.77	4,450.80	4,498.87	33,210.88
4/12/2014	Biloxi Store	4,452.23	4,405.57	4,595.79	4,454.37	4,597.26	4,455.79	6,124.28	33,085.29
4/19/2014	Biloxi Store	4,503.92	4,504.64	4,742.48	4,553.51	4,411.92	4,554.97	4,698.06	31,969.50
4/26/2014	Biloxi Store	4,461.50	4,747.03	4,605.36	6,259.27	4,463.64	4,606.83	4,655.07	33,798.70
5/3/2014	Biloxi Store	4,655.81	4,704.07	4,467.20	4,562.98	4,753.86	4,564.43	4,660.27	32,368.62
5/10/2014	Biloxi Store	6,206.58	4,518.33	4,423.91	4,662.50	4,615.66	4,568.80	4,664.73	33,660.51
5/17/2014	Biloxi Store	4,617.87	4,570.99	4,714.58	4,667.71	6,153.68	4,763.72	4,478.61	33,967.16
5/24/2014	Biloxi Store	4,479.33	4,718.34	4,766.76	4,719.84	4,482.18	4,482.89	4,531.30	32,180.64
5/31/2014	Biloxi Store	4,436.61	6,289.27	4,437.32	4,581.19	4,438.73	4,439.43	4,535.63	33,158.18
6/7/2014	Biloxi Store	4,440.85	4,632.59	4,728.85	4,538.51	4,778.14	6,047.30	4,492.16	33,658.40
6/14/2014	Biloxi Store	4,636.27	4,493.59	4,589.93	4,686.29	4,639.21	4,448.61	4,449.31	31,943.21
6/21/2014	Biloxi Store	4,641.42	4,594.29	6,246.18	4,451.43	4,739.37	4,596.48	4,549.32	33,818.49
6/28/2014	Biloxi Store	4,454.25	4,550.76	4,551.48	4,552.20	4,696.70	4,601.58	6,256.08	33,663.05

Figure 13 - Creating Totals at the Top of a Table

Structured references are a means of working with table data, both inside and outside the table. Formulas built on structured referencing are *self-documenting* because they specify data elements within a table rather than cell references. Here's a formula using structured referencing to display the total the EOW Totals column in the WeeklySales table:

=WeeklySales[[#Totals], [EOW Totals]]

Filtering Duplicate Records

Accountants often face the task of identifying duplicate records – duplicate checks, invoices, bills, or purchase orders, etc. Instead of carefully reviewing a printed listing of the documents in question, users could employ Excel functionality to complete the task in seconds. In this example, we will use conditional formatting to find duplicate check numbers, as shown in **Figure 14**.

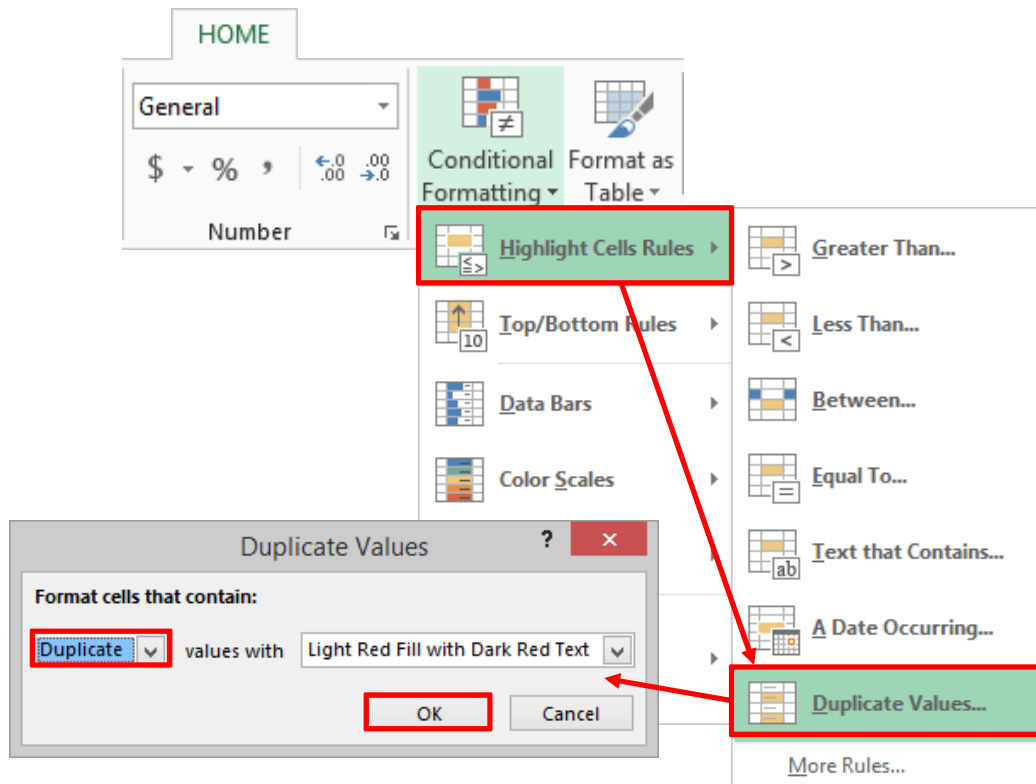


Figure 14 - Formatting Duplicate Values

To begin the process of finding duplicate checks, select the data in the **Num** column using the **black mini arrow** cursor. Then, select **Conditional Formatting, Highlight Cells Rules, Duplicate Values** from the **Home** tab of the ribbon. In the **Duplicate Values** dialog box, select **Duplicates** and accept the default color scheme as shown in Figure 17. Click **OK** to apply the conditional formatting.

Next, filter the **Num** column to display only the duplicate values. Click the filter box and select **Filter by Color**. Choose **Filter by Cell Color** and select the pink bar, as shown in **Figure 15**. If you have ever scrolled through a sorted list looking for duplicate check numbers, then you understand the effectiveness of the method demonstrated. If you need to look for duplicates across multiple columns, use the **CONCATENATE** function to combine the columns of interest into a new column, and then look for duplicates on the newly combined column.

The screenshot illustrates the process of filtering a column by font color. It shows a dropdown menu for the 'Num' column with options like 'Sort A to Z', 'Sort Z to A', and 'Filter by Color'. The 'Filter by Color' option is selected, leading to a sub-menu where 'Filter by Font Color' is chosen. Below this, a list of filters is shown, including 'No Fill' and 'Automatic'. The final result is a table where only the rows with the value '196' in the 'Num' column are displayed, as indicated by the red background color of the cells.

Type	Date	Num	Name	Memo	Amount
Bill Pmt -Check	10/31/2014	196	Low Plumbing	5-487	400.00
Bill Pmt -Check	11/7/2014	196	Low Plumbing	5-487	180.00

Figure 15 - Filtering a Column by Font Color