

Informatics

Spreadsheet calculator - II



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Petr Suchánek

Informatics

Outline of the lecture



- **Filters**
 - **autofilter**
 - **advanced filter**
 - **Groups**
 - **Subtotals**
 - **Pivot table**
 - **Sensitivity analysis**
-

Filtering data



- If your worksheet contains a lot of content, it can be difficult to find information quickly.*
- Filters can be used to narrow down the data in your worksheet, allowing you to view only the information you need.*
- In order for filtering to work correctly, your worksheet should include a header row, which is used to identify the name of each column.*

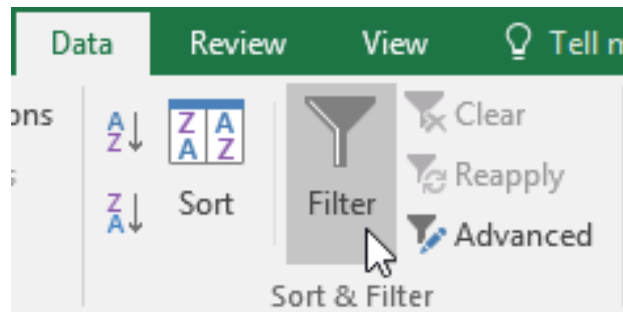
	A	B	C	D	E	F
1	ID #	Type	Equipment Detail	Checked Out	Checked In	Checked Out By
2	3000	Camera	Saris Lumina Digital Camera	12-May-15	15-May-15	Shannon Nguyen
3	3005	Camera	Saris Zoom Z-60 Digital Camera	27-Jul-15	06-Aug-15	Sela Shepard
4	1021	Laptop	15" EDI SmartPad L200-3 Laptop	15-Sep-15	01-Oct-15	Sofie Ragnar
5	1022	Laptop	15" EDI SmartPad L200-3 Laptop	14-Aug-15	16-Aug-15	Hank Sorenson
6	1023	Laptop	15" EDI SmartPad L200-3 Laptop	08-Aug-15	15-Aug-15	Jennifer Weiss
7	3070	Camera	Omega PixL Digital Camcorder	06-Oct-15		Min Seung
8	1025	Laptop	15" EDI SmartPad L200-4X	26-Sep-15	04-Oct-15	Min Seung
9	1031	Laptop	17" Saris X-10 Laptop	04-Oct-15		Nick Ortiz
10	1032	Laptop	17" Saris X-10 Laptop	19-Sep-15		Stanley Geyer
11	1033	Laptop	17" Saris X-10 Laptop	24-Sep-15	26-Sep-15	George D'Agosta

*<https://edu.gcfglobal.org/en/excel2016/filtering-data/1/>

Filtering data



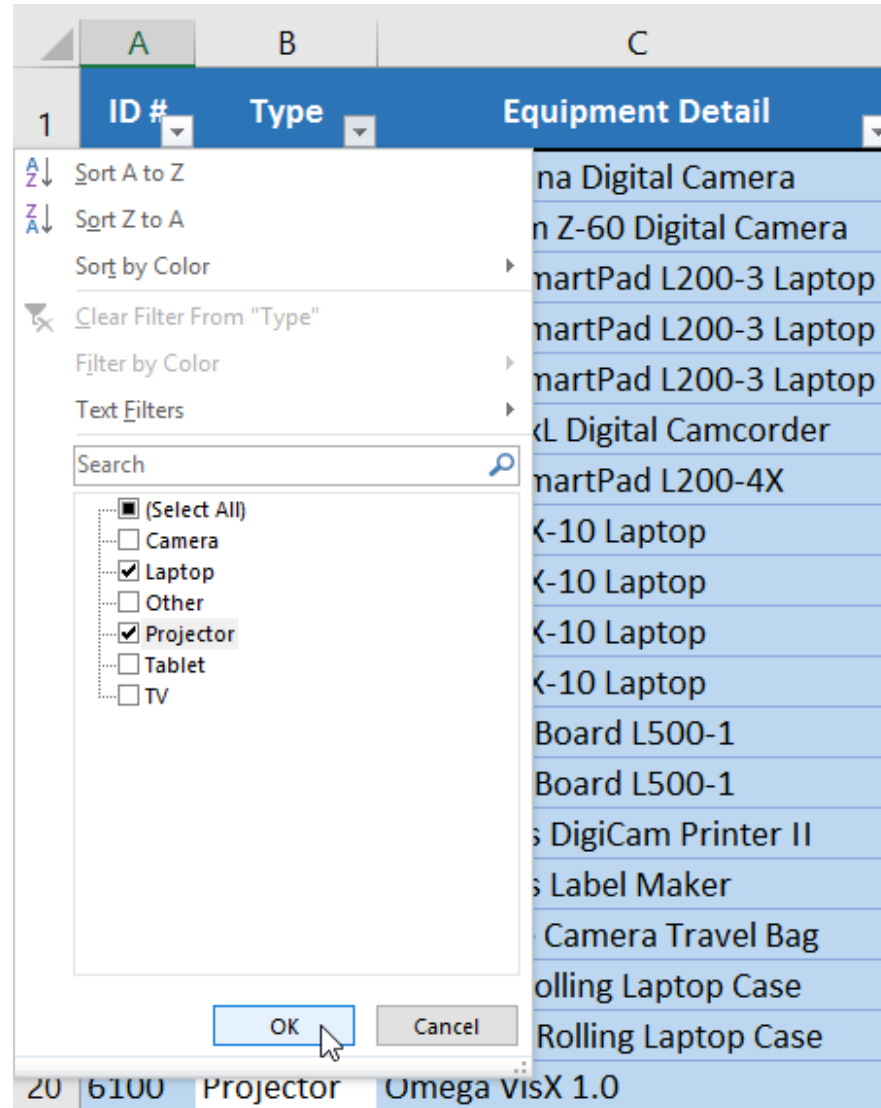
- Select the Data tab, then click the Filter command.*
- A drop-down arrow will appear in the header cell for each column.*
- Click the drop-down arrow for the column you want to filter. In our example, we will filter column B to view only certain types of equipment.*



	A	B	C
1	ID #	Type	Equipment Detail
2	3000	Camera	Canon Lumina Digital Camera
3	3005	Camera	Canon PowerShot Z-60 Digital Camera
4	1021	Laptop	15" EDI SmartPad L200-3
5	1022	Laptop	15" EDI SmartPad L200-3
6	1023	Laptop	15" EDI SmartPad L200-3

Filtering data

- Uncheck the box next to Select All to quickly deselect all data.*
- Check the boxes next to the data you want to filter, then click OK.*
- In this example, we will check Laptop and Projector to view only these types of equipment.*



	A	B	C
1	ID #	Type	Equipment Detail
			na Digital Camera
			n Z-60 Digital Camera
			martPad L200-3 Laptop
			martPad L200-3 Laptop
			martPad L200-3 Laptop
			kL Digital Camcorder
			martPad L200-4X
			<-10 Laptop
			<-10 Laptop
			<-10 Laptop
			<-10 Laptop
			Board L500-1
			Board L500-1
			s DigiCam Printer II
			s Label Maker
			Camera Travel Bag
			olling Laptop Case
			Rolling Laptop Case
20	6100	Projector	Omega VisX 1.0

Filtering data



- Filters are cumulative, which means you can apply multiple filters to help narrow down your results.*

	A	B	C	D	E	F
1	ID #	Type	Equipment Detail	Checked Out	Checked In	Checked Out By
4	1021	Laptop	15" EDI SmartPad L200-3 Laptop	15-Sep-15	01-Oct-15	Sofie Ragnar
5	1022	Laptop	15" EDI SmartPad L200-3 Laptop	14-Aug-15	15	Hank Sorenson
6	1023	Laptop	15" EDI SmartPad L200-3 Laptop	08-Aug-15	15-Aug-15	Jennifer Weiss
8	1025	Laptop	15" EDI SmartPad L200-4X	26-Sep-15	04-Oct-15	Min Seung
9	1031	Laptop	17" Saris X-10 Laptop	04-Oct-15		Nick Ortiz
10	1032	Laptop	17" Saris X-10 Laptop	19-Sep-15		Stanley Geyer
11	1033	Laptop	17" Saris X-10 Laptop	24-Sep-15	26-Sep-15	George D'Agosta
12	1034	Laptop	17" Saris X-10 Laptop	25-Aug-15	27-Aug-15	Jay Peralta
20	6100	Projector	Omega VisX 1.0	28-Sep-15	01-Oct-15	Win Armitage
21	6101	Projector	Omega VisX 1.0	26-Sep-15	27-Sep-15	Michael Earley
22	6102	Projector	Omega VisX 1.0	22-Aug-15	23-Aug-15	Jamila Kyle
23	6200	Projector	Saris Lux T-80	01-Sep-15	04-Sep-15	Jolie Chaturvedi
24	6301	Projector	Saris Lux T-81 Lite	10-Sep-15		Marques Herndon
25	6302	Projector	Saris Lux T-81 Lite	08-Sep-15	15-Sep-15	Dean Sorenson
31						
32						

*<https://edu.gcfglobal.org/en/excel2016/filtering-data/1/>

Filtering data – advanced filter



- Compared to the basic AutoFilter tool, Advanced Filter works differently in a couple of important ways.*
- Excel AutoFilter is a built-in capability that is applied in a single button click. Just hit the Filter button on the ribbon, and your Excel filter is ready to go.*
- Advanced Filter cannot be applied automatically since it has no pre-defined setup, it requires configuring the list range and criteria range manually.*

*<https://www.ablebits.com/office-addins-blog/2016/09/07/excel-advanced-filter/>

Filtering data – advanced filter



- AutoFilter allows filtering data with a maximum of 2 criteria, and those conditions are specified directly in the Custom AutoFilter dialog box.*
- Using Advanced Filter, you can find rows that meet multiple criteria in multiple columns, and the advanced criteria need to be entered in a separate range on your worksheet.*
- Below you will find the detailed guidance on how to use Advanced Filter in Excel as well as some useful examples of advanced filters for text and numeric values.*

Filtering data – advanced filter



- In addition to manual data filtering Excel enables fully automated filtering based on data from the specified range of cells. Before you can use the advanced filtering feature, you must set up a criteria range. A criteria range is a designated range on a worksheet that conforms to certain requirements.*
- The criteria range holds the information that Excel uses to filter the list. It must conform to the following specifications:*
- It consists of at least two rows, and the first row must contain some or all field names from the list. An exception to this is when you use computed criteria. Computed criteria can use an empty header row.*
- The other rows consist of your filtering criteria.*

Filtering data – advanced filter



- Create a Criteria range (blue border below for illustration only) above your data set. Use the same column headers. Be sure there's at least one blank row between your Criteria range and data set.*
- To display the sales in the USA and in Qtr 4, execute the following steps.*
- 1. Enter the criteria shown below on the worksheet.*

	A	B	C	D	E
1	Last Name	Sales	Country	Quarter	
2			USA	Qtr 4	
3					
4					
5	Last Name	Sales	Country	Quarter	
6	Smith	\$16,753.00	UK	Qtr 3	
7	Johnson	\$14,808.00	USA	Qtr 4	
8	Williams	\$10,644.00	UK	Qtr 2	
9	Jones	\$1,390.00	USA	Qtr 3	
10	Brown	\$4,865.00	USA	Qtr 4	
11	Williams	\$12,438.00	UK	Qtr 1	
12	Johnson	\$9,339.00	UK	Qtr 2	
13	Smith	\$18,919.00	USA	Qtr 3	
14	Jones	\$9,213.00	USA	Qtr 4	
15	Jones	\$7,433.00	UK	Qtr 1	
16	Brown	\$3,255.00	USA	Qtr 2	
17	Williams	\$14,867.00	USA	Qtr 3	
18	Williams	\$19,302.00	UK	Qtr 4	
19	Smith	\$9,698.00	USA	Qtr 1	
20					

Filtering data – advanced filter

- 2. Click any single cell inside the data set.*
- 3. On the Data tab, in the Sort & Filter group, click Advanced.*
- 4. Click in the Criteria range box and select the range A1:D2 (blue).*
- 5. Click OK.*



Advanced Filter

Action

Filter the list, in-place

Copy to another location

List range:

Criteria range:

Copy to:

Unique records only

OK Cancel

	A	B	C	D	E
1	Last Name	Sales	Country	Quarter	
2			USA	Qtr 4	
3					
4					
5	Last Name	Sales	Country	Quarter	
7	Johnson	\$14,808.00	USA	Qtr 4	
10	Brown	\$4,865.00	USA	Qtr 4	
14	Jones	\$9,213.00	USA	Qtr 4	
20					

Filtering data – advanced filter



- To display the sales in the USA in Qtr 4 or in the UK in Qtr 1.*

Advanced Filter

Action

Filter the list, in-place

Copy to another location

List range:

Criteria range:

Copy to:

Unique records only

OK Cancel

	A	B	C	D	E
1	Last Name	Sales	Country	Quarter	
2			USA	Qtr 4	
3			UK	Qtr 1	
4					
5	Last Name	Sales	Country	Quarter	
7	Johnson	\$14,808.00	USA	Qtr 4	
10	Brown	\$4,865.00	USA	Qtr 4	
11	Williams	\$12,438.00	UK	Qtr 1	
14	Jones	\$9,213.00	USA	Qtr 4	
15	Jones	\$7,433.00	UK	Qtr 1	
20					

Filtering data



- <https://edu.gcfglobal.org/en/excel2016/filtering-data/1/>
 - <https://www.ablebits.com/office-addins-blog/2016/09/07/excel-advanced-filter/>
 - <https://www.excel-easy.com/data-analysis/filter.html>
 - <https://spreadsheeto.com/filters/>
 - <https://www.youtube.com/watch?v=dD0QQsdgSr4>
 - https://www.officetooltips.com/excel_2016/tips/using_advanced_filtering.html
-

Filtering data – groups



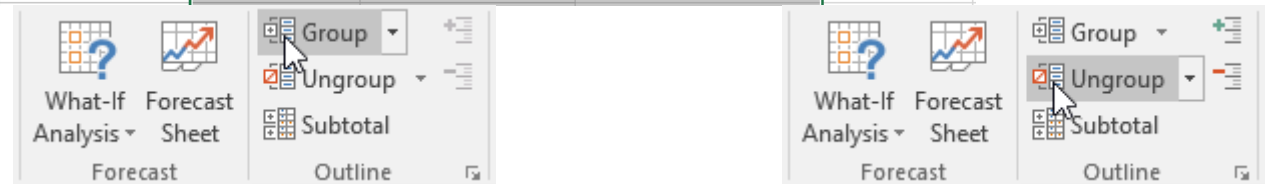
- Worksheets with a lot of content can sometimes feel overwhelming and even become difficult to read.*
- Fortunately, Excel can organize data into groups, allowing you to easily show and hide different sections of your worksheet.*
- You can also summarize different groups using the Subtotal command and create an outline for your worksheet.*

Filtering data – groups



- Select the rows or columns you want to group. In this example, we'll select columns B, C, and D.*
- Select the Data tab on the Ribbon, then click the Group command.*
- The selected rows or columns will be grouped. In our example, columns B, C, and D are grouped.*

	A	B	C	D	E
1	Homeroom #	First Name	Last Name	Payment Method	T-Shirt Size
2	105	Melissa	White	Debit Card	Small
3	105	Esther	Yaron	Pending	Small
4	135	Anisa	Naser	Check Bounced	Small
5	220-A	Brigid	Ellison	Cash	Small
6	220-A	Christopher	Peyton-Gomez	Check	Small
7	220-B	Michael	Lazar	Cash	Small
8	220-B	Malik	Reynolds	Cash	Small
9	220-B	Wendy	Shaw	Cash	Small
10	105	Nathan	Albee	Check	Medium



	A	B	C	D	E
1	Homeroom #	First Name	Last Name	Payment Method	T-Shirt Size
2	105	Melissa	White	Debit Card	Small
3	105	Esther	Yaron	Pending	Small
4	135	Anisa	Naser	Check Bounced	Small
5	220-A	Brigid	Ellison	Cash	Small
6	220-A	Christopher	Peyton-Gomez	Check	Small
7	220-B	Michael	Lazar	Cash	Small
8	220-B	Malik	Reynolds	Cash	Small
9	220-B	Wendy	Shaw	Cash	Small
10	105	Nathan	Albee	Check	Medium

Filtering data – subtotals



- The Subtotal command allows you to automatically create groups and use common functions like SUM, COUNT, and AVERAGE to help summarize your data.*
- For example, the Subtotal command could help to calculate the cost of office supplies by type from a large inventory order.*
- It will create a hierarchy of groups, known as an outline, to help organize your worksheet.*
- In our example, we'll use the Subtotal command with a T-shirt order form to determine how many T-shirts were ordered in each size (Small, Medium, Large, and X-Large). This will create an outline for our worksheet with a group for each T-shirt size and then count the total number of shirts in each group.*

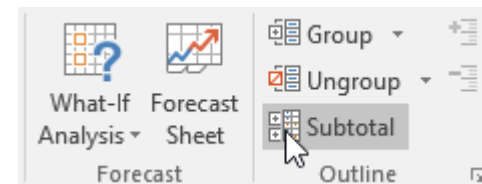
*<https://edu.gcfglobal.org/en/excel2016/groups-and-subtotals/1/>

Filtering data – subtotals



- First, sort your worksheet by the data you want to subtotal. In this example, we'll create a subtotal for each T-shirt size, so our worksheet has been sorted by T-shirt size from smallest to largest.*
- Select the Data tab, then click the Subtotal command.*

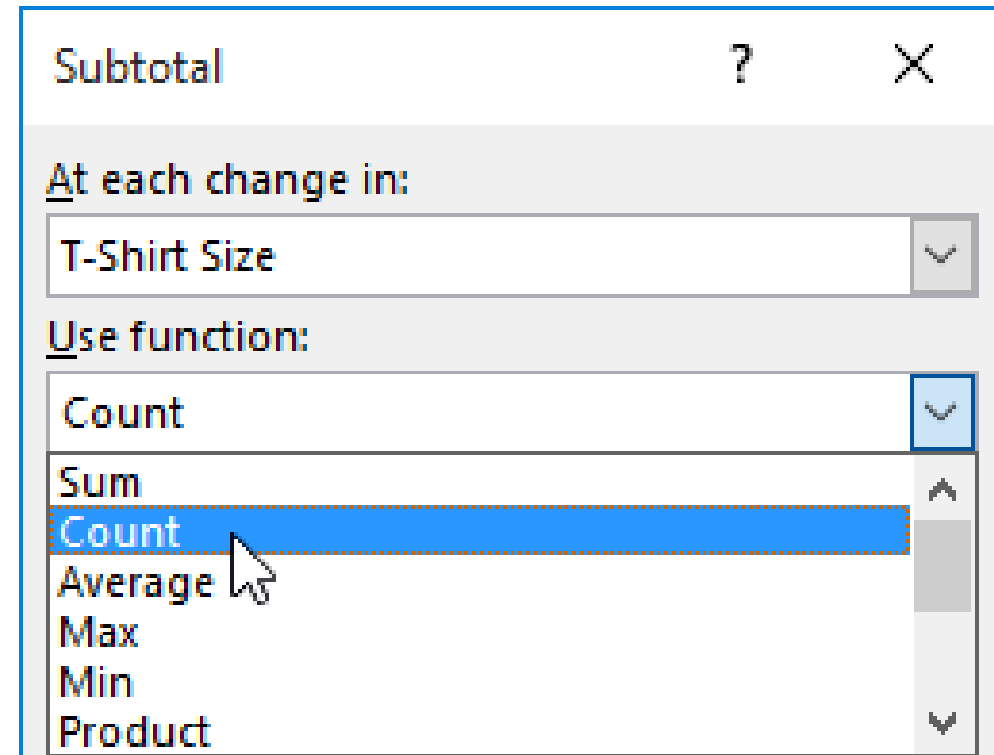
	A	B	C	D	E
1	Homerom #	First Name	Last Name	Payment Method	T-Shirt Size
2	105	Melissa	White	Debit Card	Small
3	105	Esther	Yaron	Pending	Small
4	135	Anisa	Naser	Check Bounced	Small
5	220-A	Brigid	Ellison	Cash	Small
6	220-A	Christopher	Peyton-Gomez	Check	Small
7	220-B	Michael	Lazar	Cash	Small
8	220-B	Malik	Reynolds	Cash	Small
9	220-B	Wendy	Shaw	Cash	Small
10	105	Nathan	Albee	Check	Medium
11	105	Christiana	Chen	Check Bounced	Medium
12	105	Sidney	Kelly	Check	Medium
13	110	Matt	Benson	Money Order	Medium
14	110	Gabriel	Del Toro	Cash	Medium



Filtering data – subtotals



- The Subtotal dialog box will appear. Click the drop-down arrow for the At each change in: field to select the column you want to subtotal. In our example, we'll select T-Shirt Size.*
- Click the drop-down arrow for the Use function: field to select the function you want to use. In our example, we'll select COUNT to count the number of shirts ordered in each size.*



Filtering data – subtotals



- In the Add subtotal to: field, select the column where you want the calculated subtotal to appear.*
- In our example, we'll select T-Shirt Size. When you're satisfied with your selections, click OK.*

The screenshot shows the 'Subtotal' dialog box in Microsoft Excel. The title bar reads 'Subtotal' with a help icon and a close icon. The dialog is divided into several sections:

- At each change in:** A dropdown menu showing 'T-Shirt Size'.
- Use function:** A dropdown menu showing 'Count'.
- Add subtotal to:** A list box containing several columns: 'Homeroom #', 'First Name', 'Last Name', 'Payment Method', and 'T-Shirt Size'. The 'T-Shirt Size' option is selected and highlighted in blue.
- Options:** Three checkboxes are present: 'Replace current subtotals' (checked), 'Page break between groups' (unchecked), and 'Summary below data' (checked).
- Buttons:** At the bottom, there are three buttons: 'Remove All', 'OK' (highlighted with a blue border), and 'Cancel'.

Filtering data – subtotals



- The worksheet will be outlined into groups, and the subtotal will be listed below each group.*
- In our example, the data is now grouped by T-shirt size, and the number of shirts ordered in that size appears below each group.*

	A	B	C	D	E
1	Homeroom #	First Name	Last Name	Payment Method	T-Shirt Size
2	105	Melissa	White	Debit Card	Small
3	105	Esther	Yaron	Pending	Small
4	135	Anisa	Naser	Check Bounced	Small
5	220-A	Brigid	Ellison	Cash	Small
6	220-A	Christopher	Peyton-Gomez	Check	Small
7	220-B	Michael	Lazar	Cash	Small
8	220-B	Malik	Reynolds	Cash	Small
9	220-B	Wendy	Shaw	Cash	Small
10				Small Count	8
11	105	Nathan	Albee	Check	Medium
12	105	Christiana	Chen	Check Bounced	Medium
13	105	Sidney	Kelly	Check	Medium
14	110	Matt	Benson	Money Order	Medium
15	110	Gabriel	Del Toro	Cash	Medium
16	135	James	Panarello	Check	Medium
17	135	Chantal	Weller	Debit Card	Medium
18	220-A	Chevonne	Means	Money Order	Medium
19	220-B	Samantha	Bell	Check	Medium
20	220-B	Avery	Kelly	Debit Card	Medium
21				Medium Count	10

Filtering data – subtotals



- When you create subtotals, your worksheet it is divided into different levels.*
- You can switch between these levels to quickly control how much information is displayed in the worksheet by clicking the Level buttons to the left of the worksheet. In our example, we'll switch between all three levels in our outline.*
- While this example contains only three levels, Excel can accommodate up to eight.*

*<https://edu.gcfglobal.org/en/excel2016/groups-and-subtotals/1/>

Filtering data – subtotals



- Click the lowest level to display the least detail. In our example, we'll select level 1, which contains only the grand count, or total number of T-shirts ordered.*
- Click the next level to expand the detail. In our example, we'll select level 2, which contains each subtotal row but hides all other data from the worksheet.*

	A	B	C	D	E
1	Homeroom #	First Name	Last Name	Payment Method	T-Shirt Size
33				Grand Count	27
34					
35					

	A	B	C	D	E
1	Homeroom #	First Name	Last Name	Payment Method	T-Shirt Size
10				Small Count	8
21				Medium Count	10
27				Large Count	5
32				X-Large Count	4
33				Grand Count	27

Filtering data – subtotals



	A	B	C	D	E
1	Homeroom #	First Name	Last Name	Payment Method	T-Shirt Size
2	105	Melissa	White	Debit Card	Small
3	105	Esther	Yaron	Pending	Small
4	135	Anisa	Naser	Check Bounced	Small
5	220-A	Brigid	Ellison	Cash	Small
6	220-A	Christopher	Peyton-Gomez	Check	Small
7	220-B	Michael	Lazar	Cash	Small
8	220-B	Malik	Reynolds	Cash	Small
9	220-B	Wendy	Shaw	Cash	Small
10				Small Count	8
11	105	Nathan	Albee	Check	Medium
12	105	Christiana	Chen	Check Bounced	Medium
13	105	Sidney	Kelly	Check	Medium

Filtering data – groups and subtotals



- <https://edu.gcfglobal.org/en/excel2016/groups-and-subtotals/1/>
 - https://www.officetooltips.com/excel_2016/tips/creating_subtotals.html
 - <https://support.office.com/en-us/article/why-can-t-i-add-subtotals-in-an-excel-table-excel-for-mac-1df3b78d-8508-486b-95d8-d970dff1bb05>
 - <https://support.office.com/en-us/article/insert-subtotals-in-a-list-of-data-in-a-worksheet-7881d256-b4fa-4f81-b71e-b0a3d4a52b3a>
 - <https://www.ablebits.com/office-addins-log/2011/11/17/multiple-excel-subtotals/>
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Filtering data – pivot table



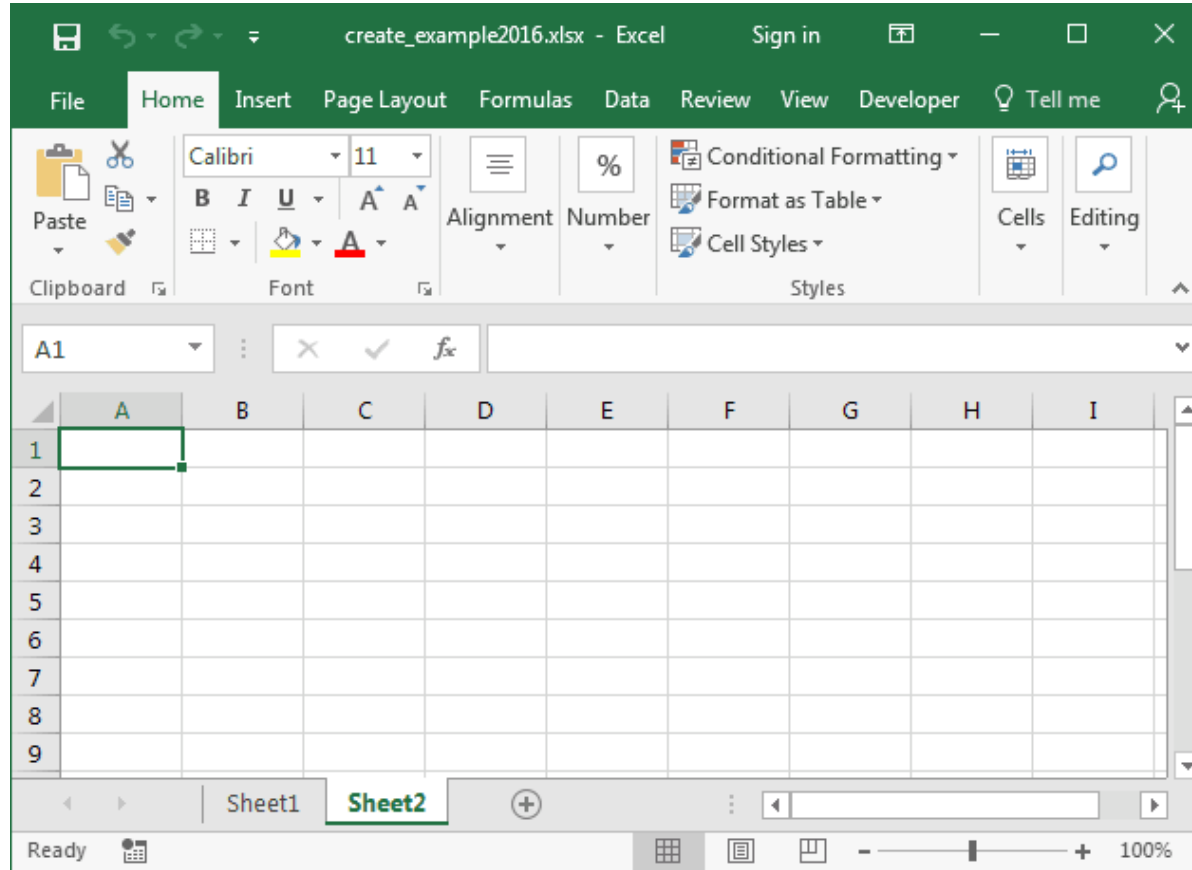
- Before we get started, we first want to show you the data for the pivot table. In this example, the data is found on Sheet1.*

Order ID	Product	Unit Price	Quantity	Cost	Discount
10248	Celery	\$14.00	8	\$112.00	0.00%
10248	Dried Apples	\$42.40	35	\$1,484.00	0.00%
10248	Tofu	\$18.60	5	\$93.00	0.00%
10248	Spaghetti	\$9.80	10	\$98.00	0.00%
10248	Marmalade	\$64.80	11	\$712.80	0.00%
10249	Mozzarella	\$34.80	26	\$904.80	5.00%
10249	Tofu	\$18.60	9	\$167.40	5.00%
10249	Dried Apples	\$42.40	24	\$1,017.60	5.00%

Filtering data – pivot table

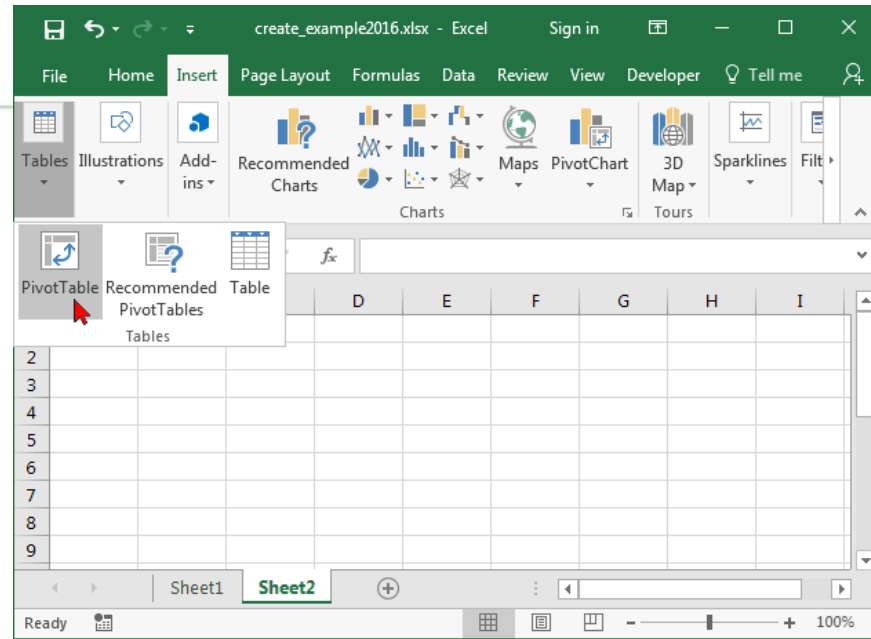


- Highlight the cell where you'd like to create the pivot table. In this example, we've selected cell A1 on Sheet2.*

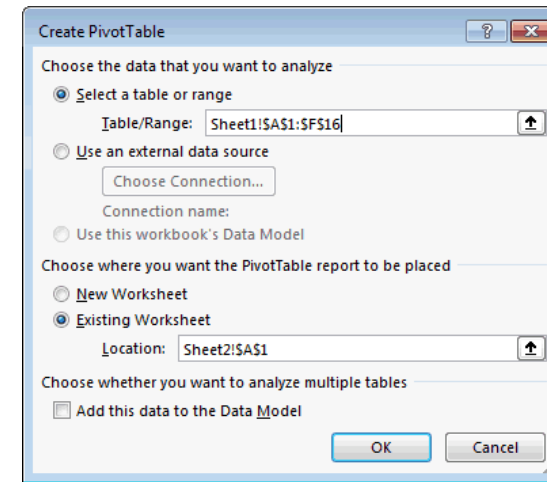


Filtering data – pivot table

- Next, select the Insert tab from the toolbar at the top of the screen. In the Tables group, click on the Tables button and select PivotTable from the popup menu.*
- A Create PivotTable window should appear. Select the range of data for the pivot table and click on the OK button. In this example, we've chosen cells A1 to F16 in Sheet1 as indicated by Sheet1!\$A\$1:\$F\$16.*



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Filtering data – pivot table



The screenshot displays the Microsoft Excel interface with the 'Analyze' tab selected. The 'PivotTable Fields' task pane is open on the right, showing a list of fields to be added to the report: Order ID, Product, and Unit Price. Below this list are four categories for organizing the data: Filters, Columns, Rows, and Values. The spreadsheet itself shows a PivotTable1 in cell A2 with a message: 'To build a report, choose fields from the PivotTable Field List'. The ribbon at the top shows the 'Analyze' tab selected, with sub-tasks like 'Filter', 'Data', 'Actions', 'Calculations', 'Tools', and 'Show' visible.

Filtering data – pivot table



- Next, choose the fields to add to the report. In this example, we've selected the checkboxes next to the Order ID and Quantity fields.*

The screenshot shows the Microsoft Excel interface with a PivotTable and the PivotTable Fields task pane. The PivotTable is located in the range A1:B2 and has the following data:

	Sum of Order ID	Sum of Quantity
1	153741	269

The PivotTable Fields task pane on the right shows the following configuration:

- Choose fields to add to report: Order ID (checked), Product (unchecked), Unit Price (unchecked), Quantity (checked).
- Drag fields between areas below:
 - Filters: (empty)
 - Columns: Σ Values
 - Rows: (empty)
 - Σ Values: Sum of Order ID, Sum of Quantity
- Defer Layout Update: (unchecked)

Filtering data – pivot table



- Next in the Values section, click on the "Sum of Order ID" and drag it to the Rows section.*

The screenshot shows the Microsoft Excel interface with a PivotTable and the PivotTable Fields task pane. The PivotTable is located in the range A1:E6 and has the following data:

Row Labels	Sum of Quantity
10248	69
10249	59
10250	60
10251	81
Grand Total	269

The PivotTable Fields task pane on the right shows the following configuration:

- Choose fields to add to report: Order ID, Product, Unit Price, Quantity
- Drag fields between areas below:
 - Filters: (empty)
 - Columns: (empty)
 - Rows: Order ID
 - Values: Sum of Quantity
- Defer Layout Update: (unchecked)

Filtering data – pivot table



- Finally, we want the title in cell A1 to show as "Order ID" instead of "Row Labels". To do this, select cell A1 and type Order ID.*
- Your pivot table should now display the total quantity for each Order ID as follows:*

The screenshot shows the Microsoft Excel interface with a PivotTable. The PivotTable is located in cells A1:B6. The PivotTable Fields task pane is open on the right, showing that 'Order ID' is in the Filters area and 'Sum of Quantity' is in the Values area. The PivotTable data is as follows:

Order ID	Sum of Quantity
10248	69
10249	59
10250	60
10251	81
Grand Total	269

*<https://www.techonthenet.com/excel/pivottbls/create2016.php>

Filtering data – pivot table



- <https://www.techonthenet.com/excel/pivottbls/create2016.php>
 - <https://support.office.com/en-us/article/create-a-pivortable-to-analyze-worksheet-data-a9a84538-bfe9-40a9-a8e9-f99134456576>
 - <https://edu.gcfglobal.org/en/excel2016/intro-to-pivottables/1/>
 - <https://www.groovypost.com/howto/create-pivot-tables-microsoft-excel-2016/>
 - <https://www.excel-easy.com/data-analysis/pivot-tables.html>
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Filtering data – sensitivity analysis



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- Sensitivity analysis in excel helps us study the uncertainty in the output of the model with the changes in the input variables.*
- It primarily does stress testing of our modeled assumptions and leads to value-added insights.*
- In the context of DCF valuation, Sensitivity Analysis in excel is especially useful in finance for modeling share price or valuation sensitivity to assumptions like growth rates or cost of capital.*

*<https://www.wallstreetmojo.com/sensitivity-analysis-in-excel/>

Filtering data – sensitivity analysis



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- <https://www.youtube.com/watch?v=N924D6tGOG8>
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The end



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Thank you for your attention!
Any questions?
