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## The Subtotal Button for Summarizing Data in an Excel Database

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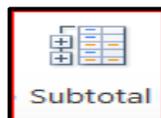
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*The subtotal feature in Excel allows you to generate summary information, such as subtotals, averages, record counts, and maximum and minimum values for groups of records in a database. When you generate the summary information, Excel adds summary and grand total rows to the worksheet, labels each row, and outlines the records in each group. By clicking on the outline minus and plus symbols, you can quickly hide and show the details for each summarized group of data. The subtotal feature also allows you to remove and replace summary information.*

**Keywords:** *Filter a database, Inserting summary information, Multiple sets of summary information, Replace current subtotals, Remove and replace summary information, Sort a database, Subtotal button, Subtotal feature, Subtotaling a subset of the database, Summary information*

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Excel's Subtotal feature provides a quick and easy way to summarize data in an Excel list or database and to outline a database. You do not need to enter formulas to summarize the data in the worksheet. Instead, the Subtotal button in the Outline group of the Data tab's Ribbon enables you to automatically calculate summary information, such as subtotals and grand totals, for groups of data that you previously sorted and, optionally, filtered.



However, before you access the Subtotal button, your data must be organized in the form of a list or a database with named fields and must be grouped according to the values in one of those fields. For example, the database in the Employee.xlsx workbook file includes named fields, such as LAST NAME, FIRST NAME, and DEPARTMENT, as shown in Figure 1. Moreover, you can sort the records (i.e., group records) in ascending or descending order according to the values in a field, such as DEPARTMENT.

The Subtotal feature provides a great deal of flexibility in how you can summarize data in a list or database. When you click on the Subtotal button, you choose:

- The groups of records for which you want subtotals, such as those grouped by department name in the DEPARTMENT field.
- The summary function, such as Sum, Count, Average, Max, Min, etc., to use in generating the summary information.
- The field or fields to be summarized for each group of records, such as the values in the SALARIES field. Excel inserts the summary information in a summary row for each group and a grand total row and places the information in the same field or fields (i.e., columns) it summarizes.

For the Subtotal button to work, you first must sort, and optionally filter, your database. If you sort the database on multiple keys, the first sort key must be the field on which you intend to group the records (i.e., the groups for which you want Excel to calculate summary information). For example, sort the records in the employee database in ascending order according to values in the DEPARTMENT field. After sorting the database, the records ought to be in ascending order by department.

Once you have sorted the database, you can generate summary information for each group (i.e., Accounting, Executive, etc.) and grand totals for all records in the database. If the database is filtered, then the summary information will be generated only for those records that are not hidden. To generate the summary information, complete the steps below:

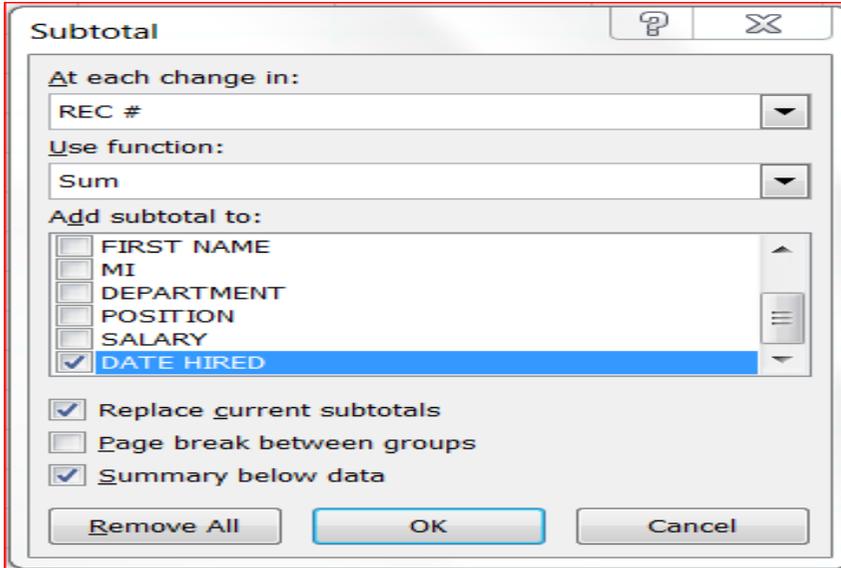
1. Select any cell in the database (if necessary).
2. Click on the Subtotal button in the Outline group of the Data tab's Ribbon. Excel displays the Subtotal dialog box (see Figure 2).

REF	LAST	FIRST	DEPART	DATE				
#	SSN	NAME	NAME	MI	MENT	POSITION	SALARY	HIRE D
2	1 703-22-3333	Hart	Jack	O.	Executive	Chairman - CEO	\$ 255,000	5/18/1999
3	2 718-59-3777	McDonald	Sandra	D.	Executive	President	\$ 180,000	5/18/1999
4	3 637-01-6788	Marx	Roberta	Y.	Executive	Exec Assistant	\$ 56,500	6/7/1999
5	4 647-09-4487	Goreman	Vicky	J.	Sales	District Mgr	\$ 67,500	6/9/1999
6	5 931-35-5555	Egan	Michelle	P.	Sales	Salesperson	\$ 40,000	7/3/2000
7	6 899-22-3333	Carter	John	F.	Sales	District Mgr	\$ 67,500	7/25/2000
8	7 971-45-6503	Newman	Robert	J.	Sales	District Mgr	\$ 67,500	10/29/2001
9	8 651-11-7773	Graves	Mary	J.	Production	Secretary	\$ 26,500	12/5/2001
10	9 741-69-3333	Gregory	Doris	H.	Accounting	Acct Clerk II	\$ 26,500	4/23/2002
11	10 978-49-4444	Zambini	Rick	J.	Executive	Vice President	\$ 125,000	5/21/2002
12	11 751-79-5203	Brown	Willie	A.	Production	Production Mgr	\$ 80,000	11/12/2002
13	12 661-21-3333	Siegfried	Nicole	J.	Personnel	Personnel Mgr	\$ 72,500	1/16/2003
14	13 891-25-3333	DeBello	Todd	S.	Sales	Salesperson	\$ 37,500	3/12/2003
15	14 771-89-3333	Herman	Peter	F.	Sales	Salesperson	\$ 44,500	10/21/2003
16	15 881-19-3333	Humphrey	Ephraim	H.	Accounting	Acct Clerk I	\$ 24,500	2/3/2004
17	16 701-39-9992	Long	Chuck	E.	Sales	Salesperson	\$ 40,000	5/10/2004
18	17 861-15-3983	Hahn	Donna	W.	Executive	Secretary	\$ 29,500	9/28/2004
19	18 677-29-3333	Gleason	Hope	E.	Accounting	Controller	\$ 63,750	1/10/2005
20	19 823-05-3333	Hamby	Mary	C.	Sales	Salesperson	\$ 40,000	9/27/2005
21	20 656-19-3333	Collins	Sara	H.	Sales	Salesperson	\$ 40,000	12/12/2005
22	21 698-31-9805	Dickerson	Lori	E.	Sales	Salesperson	\$ 40,000	3/1/2006
23	22 899-39-6336	Bicksby	Hank	F.	Sales	Salesperson	\$ 40,000	10/16/2006
24	23 991-55-3333	Butler	Judy	E.	Production	Clerk I	\$ 24,500	5/14/2007
25	24 753-81-3333	Adams	Nathan	K.	Sales	Salesperson	\$ 40,000	11/6/2007
26	25 711-51-2222	Sanders	Kathy	O.	Sales	District Mgr	\$ 67,500	4/23/2008
27	26 728-61-3777	Anderson	Debbie	I.	Executive	Clerk I	\$ 24,500	7/21/2008
28	27 705-49-3333	Cochrane	James	A.	Production	Foreman	\$ 51,500	8/4/2009
29	28 841-09-3373	Campbell	Linda	H.	Sales	Salesperson	\$ 40,000	11/9/2009
30	29 711-22-5555	Carter	Bobbie Jean	P.	Sales	Marketing Mgr	\$ 72,500	4/14/2010
31	30 821-99-3777	Rashad	Jeremy	E.	Accounting	Chief Acct	\$ 48,500	9/15/2010

Figure 1: Dept & Salary Database in Employee Workbook

- When you first click on the Subtotal button, the “At each change in” box automatically displays the name of the left-most field name in the database, as shown in Figure 2. To select a different field on which to group the records, click on the arrow at the right-end of the At each change in: drop-down list box and then select another field name. The field name you select should represent the groups for which you want to generate summary information. Moreover, this field name should be the same as the first sort key on which you sorted the database. Since you sorted the database with the

field DEPARTMENT as the first sort key, select the DEPARTMENT field name by clicking on it in the list box.

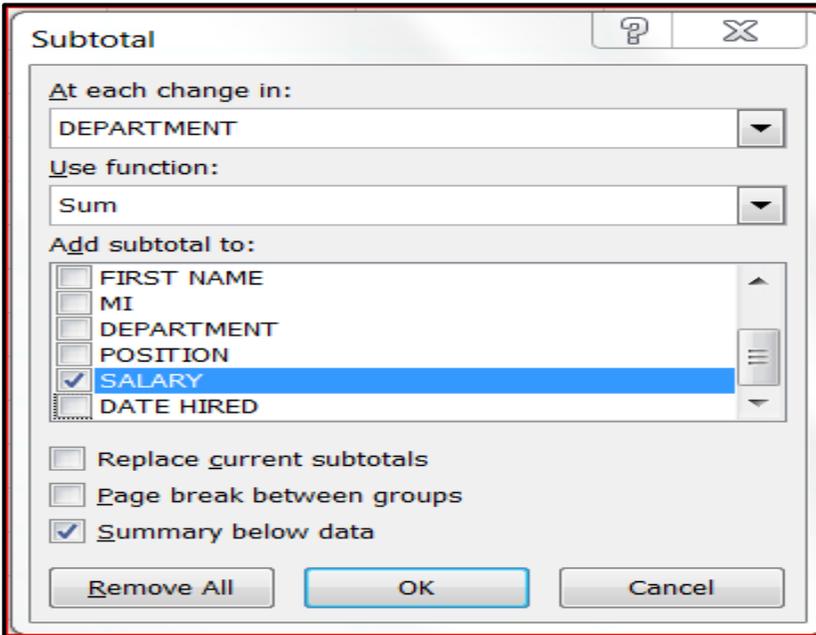


**Figure 2:** Subtotal Dialog Box

4. In the Use function: drop-down list box, select the function you want to use in summarizing the records in the database. A number of functions are available, including Sum, Count, Average, Max (maximum value), Min (minimum value), Var (variance), StdDev (standard deviation), etc. You select a function by clicking on the arrow at the end of the box to display the drop-down list of functions and then clicking on the function. For the department groups, select the Sum function (if necessary).
5. In the Add subtotal to: list box, check the boxes of the field or fields that contain the values or items you want to summarize and clear all other check boxes. When you first click on the Subtotal button in the Outline group of the Data tab's Ribbon, Excel displays up to six names in the list box and automatically checks the box of the

last numeric or date field. Because SALARY is the only field for which you want to generate subtotals, check its box and then clear all other check boxes in the list box.

6. When the Replace current subtotals box is checked, Excel replaces any previous summary and grand total rows with the summary and grand total rows it inserts when you choose OK. When the box is clear, Excel inserts the summary rows between the last record in each group and any summary rows that may have been previously inserted. Excel also inserts the most recent grand total row above any previous grand total rows. By placing the next set of summary and grand total rows above the previous set(s), you can develop a great deal of summary information for the records in the database. For example, you might develop summary information that includes subtotals, averages, maximum values, minimum values, record counts, etc. Because you will generate several different kinds of summary information in this section, clear the check in the Replace current subtotals box.
7. The Summary below data check box allows you to decide whether to place each summary row below (if checked) or above (if clear) the group of records to which it applies. In this example, the box should be checked.
8. If the Subtotal dialog box on your screen matches that shown in Figure 3, click on OK. Otherwise, make the necessary changes before clicking on OK.



**Figure 3:** Selecting Fields, Summary Function, and Other Options in the Subtotal Dialog Box

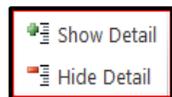
As soon as you clicked on OK in the Subtotal dialog box, Excel automatically inserted the subtotals in the form of summary rows beneath the departmental groups, as shown in Figure 4. Excel also inserted a grand total row after the last group of records. In addition, Excel labeled each summary row with a row title, consisting of the group's value in the "group by" field and a word describing the type of summary information. For example, Excel created the row title Accounting Total for the accounting group of records. Similarly, Excel created the row title Grand Total for the grand total row.

REC #	SSN	LAST NAME	FIRST NAME	DEPARTMENT	POSITION	SALARY	DATE HIRED
2	9 741-69-3333	Gregory	Doris	H. Accounting	Acct Clerk II	\$ 26,500	4/23/2002
3	15 881-19-3333	Humphrey	Ephraim	H. Accounting	Acct Clerk I	\$ 24,500	2/3/2004
4	18 677-29-3333	Glesson	Hope	E. Accounting	Controller	\$ 63,750	1/10/2005
5	30 821-99-3777	Rashad	Jeremy	E. Accounting	Chief Acct.	\$ 48,500	9/15/2010
<b>Accounting Total</b>						\$ 163,250	
7	1 703-22-3333	Hart	Jack	O. Executive	Chairman - CEO	\$ 255,000	5/18/1999
8	2 718-59-3777	McDonald	Sandra	D. Executive	President	\$ 180,000	5/18/1999
9	3 637-01-6288	Marx	Roberta	Y. Executive	Exec Assistant	\$ 56,500	6/7/1999
10	10 978-49-4444	Zambini	Rick	J. Executive	Vice President	\$ 125,000	5/11/2002
11	17 861-15-3983	Hahn	Donna	W. Executive	Secretary	\$ 29,500	9/28/2004
12	26 728-61-3777	Anderson	Debbie	I. Executive	Clerk I	\$ 24,500	7/21/2008
13	33 745-71-3555	Rose	Dallas	G. Executive	Secretary	\$ 29,500	3/8/2012
<b>Executive Total</b>						\$ 700,000	
15	12 661-21-3333	Siegfried	Nicole	J. Personnel	Personnel Mgr	\$ 72,500	1/16/2003
16	32 961-39-5553	Lowelace	Phyllis	L. Personnel	Secretary	\$ 26,500	10/5/2011
<b>Personnel Total</b>						\$ 99,000	
18	8 651-11-7773	Graves	Mary	J. Production	Secretary	\$ 26,500	12/5/2001
19	11 751-79-5203	Brown	Wille	A. Production	Production Mgr	\$ 80,000	11/12/2002
20	23 991-55-3333	Butler	Judy	E. Production	Clerk I	\$ 24,500	5/14/2007
21	27 705-49-3333	Cochrane	James	A. Production	Foreman	\$ 51,500	8/4/2009
<b>Production Total</b>						\$ 182,500	
23	4 647-09-4487	Goreman	Vicky	J. Sales	District Mgr	\$ 67,500	6/9/1999
24	5 931-35-5555	Egan	Michelle	P. Sales	Salesperson	\$ 40,000	7/3/2000
25	6 899-22-3333	Carter	John	F. Sales	District Mgr	\$ 67,500	7/25/2000
26	7 971-45-6503	Newman	Robert	J. Sales	District Mgr	\$ 67,500	10/29/2001
27	13 891-25-3333	DeBello	Todd	S. Sales	Salesperson	\$ 37,500	3/12/2003
28	14 771-89-3333	Herman	Peter	F. Sales	Salesperson	\$ 44,500	10/21/2003
29	16 701-39-9992	Long	Chuck	E. Sales	Salesperson	\$ 40,000	5/10/2004
30	19 823-05-3333	Hamby	Mary	C. Sales	Salesperson	\$ 40,000	9/27/2005
31	20 856-19-3333	Collins	Sara	H. Sales	Salesperson	\$ 40,000	12/12/2005

**Figure 4:** Summary Information in the Form of Salary Subtotals for the Department Groups

Also, as you can see in Figure 4, Excel outlined the data to the left of the worksheet. The inner brackets outline each group of records; the outer bracket outlines all records in the database so that you can show or hide as much detail as you need. At the bottom of each bracket is a minus sign.

Clicking on the minus sign for a group of records hides the records in the group, but not the summary information, and replaces the bracket and minus sign with a plus sign. Clicking on the plus sign redisplay the records in the group and replaces the plus sign with the bracket and minus sign. Alternatively, you can click on the Plus and Minus buttons that are located to the immediate right of the Subtotal button. Thus, the plus and minus symbols in the outline and the Plus and Minus buttons in the Outline group of the Data tab's Ribbon allow you to quickly hide and show the details for each



summarized group of data. For example, if you want to display and print only the summary information, then click on each minus sign to hide all records and leave only the summary information displayed in the worksheet. Optionally, click on the minus sign at the left of the first grand total row to hide all but the grand total summary information.

## Creating Multiple Sets of Summary Information

If you want to develop additional summary information for the department groups, you again click on the Subtotal button in the Data tab's Ribbon and follow the steps outlined above. However, you must be sure that the Replace current subtotals check box is clear before you click on the OK button. Otherwise, Excel will replace the previous summary and grand total rows with the new summary information it inserts. For example, insert summary information using the Average, Max, Min, and Count functions, respectively. After you have inserted the summary information with the Count function, your worksheet should match that shown in Figure

5.

Note: When you click on the Subtotal button to create more than one set of summary information, Excel inserts the most recent summary rows between the last record in each group and any previous summary rows. Excel also inserts the most recent grand total row immediately above any previous grand total rows. Subtotal button to create more than one set of summary information, Excel inserts the most recent summary rows between the last record in each group and any previous summary rows. Excel also inserts the most recent grand total row immediately above any previous grand total rows.

ID	SSN	LAST NAME	FIRST NAME	DEPARTMENT	POSITION	SALARY	DATE HIRED
9	741-69-3333	Gregory	Doris	H. Accounting	Acct Clerk II	\$ 26,500	4/23/2002
15	881-19-3333	Humphrey	Ephraim	H. Accounting	Acct Clerk I	\$ 24,500	2/3/2004
18	677-29-3333	Gleason	Hope	E. Accounting	Controller	\$ 63,750	1/10/2005
30	821-99-3777	Rashad	Jeremy	E. Accounting	Chief Acct	\$ 48,500	9/15/2010
Accounting Count						4	
Accounting Min						\$ 24,500	
Accounting Max						\$ 63,750	
Accounting Average						\$ 40,813	
Accounting Total						\$ 163,250	
1	703-22-3333	Hart	Jack	O. Executive	Chairman - CEO	\$ 255,000	5/18/1999
2	718-59-3777	McDonald	Sandra	D. Executive	President	\$ 180,000	5/18/1999
3	637-01-6788	Marx	Roberta	Y. Executive	Exec Assistant	\$ 56,500	6/7/1999
10	978-49-4444	Zambini	Rick	J. Executive	Vice President	\$ 125,000	5/21/2002
17	861-15-3983	Hahn	Donna	W. Executive	Secretary	\$ 29,500	9/28/2004
26	728-61-3777	Anderson	Debbie	I. Executive	Clerk I	\$ 24,500	7/21/2008
33	745-71-3555	Rose	Dallas	G. Executive	Secretary	\$ 29,500	3/8/2012
Executive Count						7	
Executive Min						\$ 24,500	
Executive Max						\$ 255,000	
Executive Average						\$ 100,000	
Executive Total						\$ 700,000	
12	661-21-3333	Siegfried	Nicole	J. Personnel	Personnel Mgr	\$ 72,500	1/16/2003
32	961-39-5553	Lovelace	Phyllis	L. Personnel	Secretary	\$ 26,500	10/5/2011
Personnel Count						2	
Personnel Min						\$ 26,500	
Personnel Max						\$ 72,500	
Personnel Average						\$ 49,500	
Personnel Total						\$ 99,000	

Figure 5: Multiple Sets of Summary Information for the Department Groups

### Subtotaling a Subset of a Database

To subtotal only a subset of records, you should filter your database first. Filtering hides all records except those that meet criteria you choose. When you insert subtotals in a filtered database, Excel summarizes only the visible records. As with an unfiltered database, group (i.e., sort) the records before you click on the Subtotal button.

### Removing and Replacing Summary Information

The following ways enable you to remove subtotal summary information that you inserted with the Subtotal button:

- To remove summary rows and the grand total row immediately after inserting them, click on the Undo button on the Quick Access Toolbar.
- To remove all summary and grand total rows from the database, click on the Subtotal button in the Outline group of the Data tab's Ribbon to display the Subtotal dialog box and then click on the Remove All button.



If you want to replace existing summary and grand total rows with updated summary information, click on the Subtotal button in the Outline group of the Data tab's Ribbon, check the Replace current subtotals box in the Subtotal dialog box, select the appropriate field names and other options, and then click on the OK button.

## Summary

The subtotal feature in Excel allows you to generate summary information, such as subtotals, averages, record counts, and maximum and minimum values for groups of records in a database. However, before you generate summary information, you must sort the database according to the field on which you want to summarize. When you generate the summary information, Excel adds summary and grand total rows to the worksheet, labels each row, and outlines the records in each group. By clicking on the outline minus and plus symbols, you can quickly hide and show the details for each summarized group of data. The subtotal feature also allows you to remove and replace summary information for the summarized group of data.