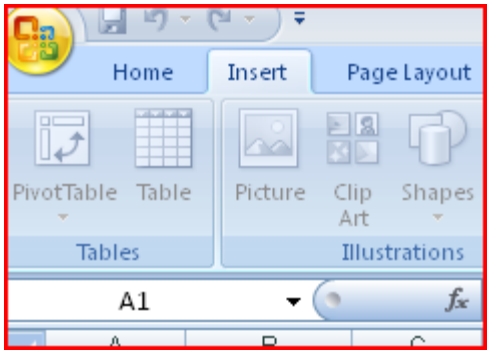
In this tutorial, you will learn to utilize the Pivot Table tool built into Excel. This tool allows you to create crosstabulations and to dig into a data file very deeply, grouping the data as you wish, and even analyzing with statistical options and graphs.

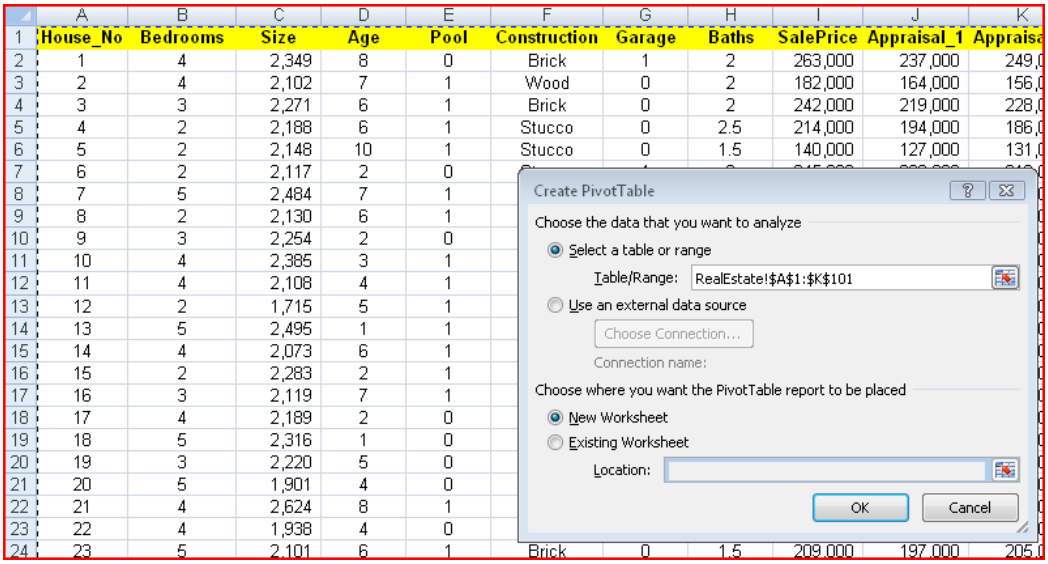
We will use the Real Estate data from the course, which consists of 100 homes. First, open the file and select the data with your mouse (to row 101). It is imperative that the variable names be in the first row.

	A	B	C	D	E	F	G	H	I	J	K
1	House_No	Bedrooms	Size	Age	Pool	Construction	Garage	Baths	SalePrice	Appraisal_1	Appraisal_2
2	1	4	2,349	8	0	Brick	1	2	263,000	237,000	249,000
3	2	4	2,102	7	1	Wood	0	2	182,000	164,000	156,000
4	3	3	2,271	6	1	Brick	0	2	242,000	219,000	228,000
5	4	2	2,188	6	1	Stucco	0	2.5	214,000	194,000	186,000
6	5	2	2,148	10	1	Stucco	0	1.5	140,000	127,000	131,000
7	6	2	2,117	2	0	Stucco	1	2	245,000	223,000	216,000
8	7	5	2,484	7	1	Brick	1	2	300,000	298,000	304,000
9	8	2	2,130	6	1	Stucco	1	2.5	272,000	249,000	244,000
10	9	3	2,254	2	0	Stucco	0	1.5	221,000	202,000	204,000
11	10	4	2,385	3	1	Wood	1	2	267,000	245,000	243,000
12	11	4	2,108	4	1	Brick	1	2	292,000	269,000	282,000
13	12	2	1,715	5	1	Wood	1	1.5	209,000	193,000	183,000
14	13	5	2,495	1	1	Wood	1	2	271,000	250,000	260,000
15	14	4	2,073	6	1	Brick	1	2	246,000	228,000	219,000
16	15	2	2,283	2	1	Brick	0	2	194,000	180,000	185,000
17	16	3	2,119	7	1	Stucco	1	2	281,000	261,000	253,000
18	17	4	2,189	2	0	Brick	0	2	173,000	161,000	164,000
19	18	5	2,316	1	0	Wood	0	2.5	207,000	193,000	189,000
20	19	3	2,220	5	0	Wood	1	2	199,000	186,000	188,000
21	20	5	1,901	4	0	Wood	1	2	209,000	196,000	194,000
22	21	4	2,624	8	1	Wood	1	2	252,000	237,000	249,000
23	22	4	1,938	4	0	Stucco	1	2.5	193,000	182,000	173,000
24	23	5	2,101	6	1	Brick	0	1.5	209,000	197,000	205,000
25	24	5	2,141	9	1	Brick	1	3	320,000	309,000	318,000

Under the INSERT menu, choose the PIVOT TABLE icon. You will then see an option for PIVOT TABLE and PIVOT CHART – choose the PIVOT TABLE.

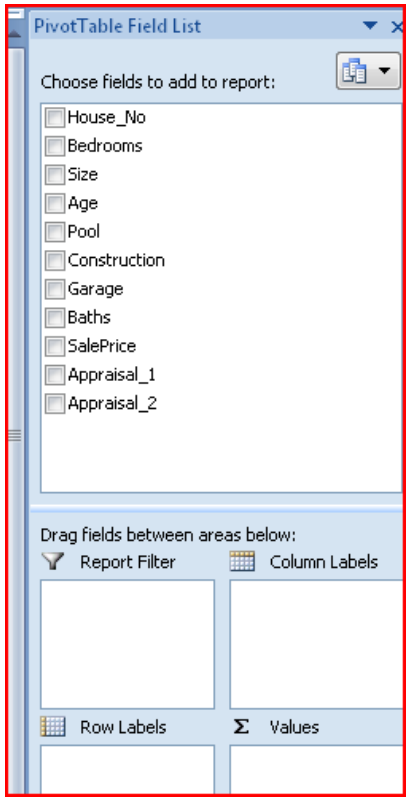


The CREATE PIVOT TABLE box pops up with the range already entered (if you highlighted the data first). It is also defaulted to create a new worksheet. Click OK.

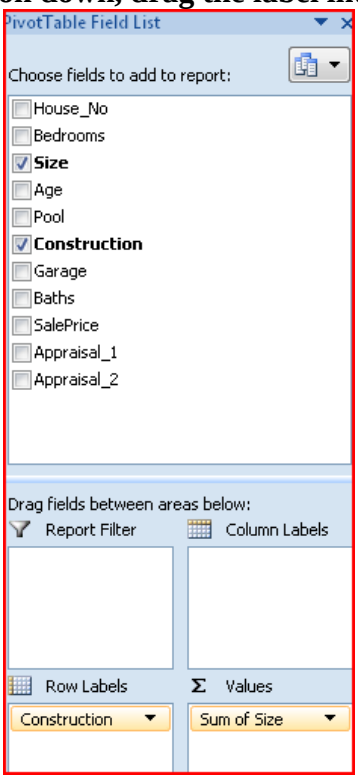


	A	B	C	D	E	F	G	H	I	J	K
1	House_No	Bedrooms	Size	Age	Pool	Construction	Garage	Baths	SalePrice	Appraisal_1	Appraisa
2	1	4	2,349	8	0	Brick	1	2	263,000	237,000	249,0
3	2	4	2,102	7	1	Wood	0	2	182,000	164,000	156,0
4	3	3	2,271	6	1	Brick	0	2	242,000	219,000	228,0
5	4	2	2,188	6	1	Stucco	0	2.5	214,000	194,000	186,0
6	5	2	2,148	10	1	Stucco	0	1.5	140,000	127,000	131,0
7	6	2	2,117	2	0						
8	7	5	2,484	7	1						
9	8	2	2,130	6	1						
10	9	3	2,254	2	0						
11	10	4	2,385	3	1						
12	11	4	2,108	4	1						
13	12	2	1,715	5	1						
14	13	5	2,495	1	1						
15	14	4	2,073	6	1						
16	15	2	2,283	2	1						
17	16	3	2,119	7	1						
18	17	4	2,189	2	0						
19	18	5	2,316	1	0						
20	19	3	2,220	5	0						
21	20	5	1,901	4	0						
22	21	4	2,624	8	1						
23	22	4	1,938	4	0						
24	23	5	2,101	6	1	Brick	0	1.5	209,000	197,000	205,0

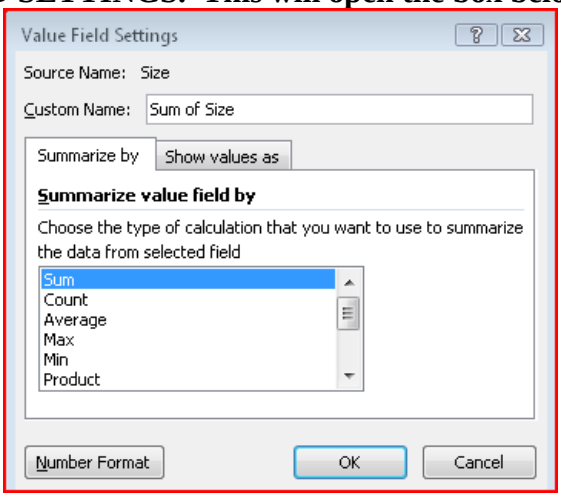
You will now see a grid on the left where you can drop the row, column and data items. On the right, you will see a PIVOT TABLE FIELD LIST based on the variables in your data file.



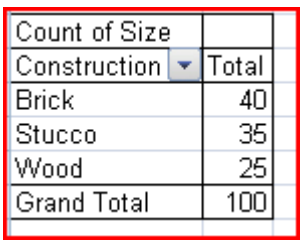
Click on CONSTRUCTION and it will automatically populate the ROW LABELS box. Now click on SIZE and while holding the mouse button down, drag the label into the VALUES box.



You will now that it shows SUM OF SIZE. This means that it adds up the sizes, which we do not want. This is a default with numerical data and is easily changed. Click on the arrow next to SUM OF SIZE and then choose VALUE FIELD SETTINGS. This will open the box below.



Change to COUNT and click OK.



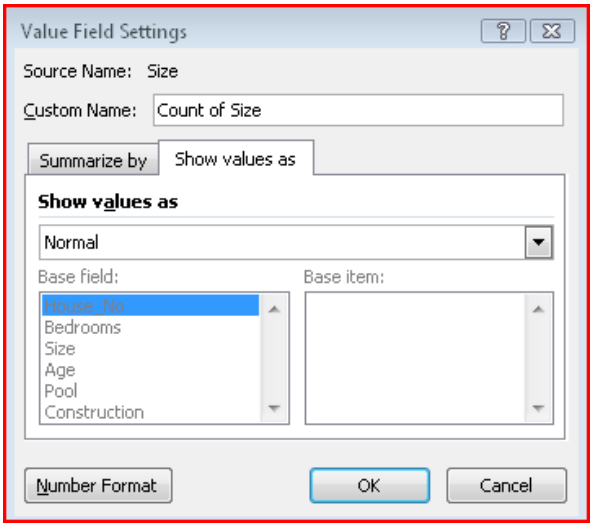
Count of Size	
Construction	Total
Brick	40
Stucco	35
Wood	25
Grand Total	100

Truthfully it doesn't matter what variable you used for values when you are just doing a COUNT as long as it is a variable that doesn't have missing values. You now see a table showing that of the 100 homes, 40 were made of Brick, 35 of Stucco and 25 of Wood.

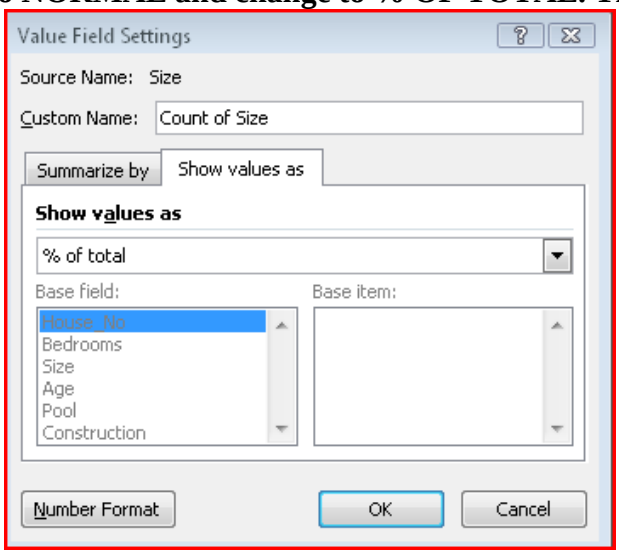
Here's something interesting that you should see and can use at any time in any pivot table. Double click on cell B7 which shows a 25 in it. Instantaneously you get a new spreadsheet showing all variables for those 25 Wood homes. It is on its own worksheet, so you can save it separately if you wish. For now let's go back to the Pivot Table.

	A	B	C	D	E	F	G	H	I	J	K
1	House_No	Bedrooms	Size	Age	Pool	Construction	Garage	Baths	SalePrice	Appraisal_1	Appraisal_2
2	99	4	2132	3	1	Wood	1	2	174000	192000	184000
3	2	4	2102	7	1	Wood	0	2	182000	164000	156000
4	96	3	2442	2	1	Wood	1	2	179000	197000	207000
5	92	4	2886	10	1	Wood	1	2	227000	247000	240000
6	91	5	2091	1	0	Wood	1	2	188000	205000	211000
7	90	3	2442	6	0	Wood	1	2	179000	194000	186000
8	89	5	2548	1	0	Wood	0	2.5	187000	203000	211000
9	84	2	1887	4	1	Wood	1	1.5	188000	202000	206000
10	82	4	2624	2	1	Wood	1	2	240000	256000	264000
11	10	4	2385	3	1	Wood	1	2	267000	245000	243000
12	74	4	2312	3	1	Wood	0	2	164000	173000	176000
13	12	2	1715	5	1	Wood	1	1.5	209000	193000	183000
14	13	5	2495	1	1	Wood	1	2	271000	250000	260000
15	72	2	1871	8	1	Wood	0	1.5	125000	131000	135000
16	61	5	2170	4	0	Wood	1	2.5	270000	276000	287000
17	48	3	2014	8	0	Wood	0	2	172000	171000	173000
18	44	4	2262	5	0	Wood	1	2	176000	174000	179000
19	18	5	2316	1	0	Wood	0	2.5	207000	193000	189000
20	19	3	2220	5	0	Wood	1	2	199000	186000	188000
21	20	5	1901	4	0	Wood	1	2	209000	196000	194000
22	21	4	2624	8	1	Wood	1	2	252000	237000	249000
23	43	3	2012	3	0	Wood	0	2	205000	202000	194000
24	35	4	2023	5	0	Wood	0	2.5	183000	178000	173000
25	27	2	2117	7	1	Wood	1	2	257000	245000	240000
26	26	2	1912	5	1	Wood	0	2	187000	178000	182000

Click on the arrow next to COUNT OF SIZE and then choose VALUE FIELD SETTINGS. This time when the box pops up, go to the tab labeled SHOW VALUES AS.



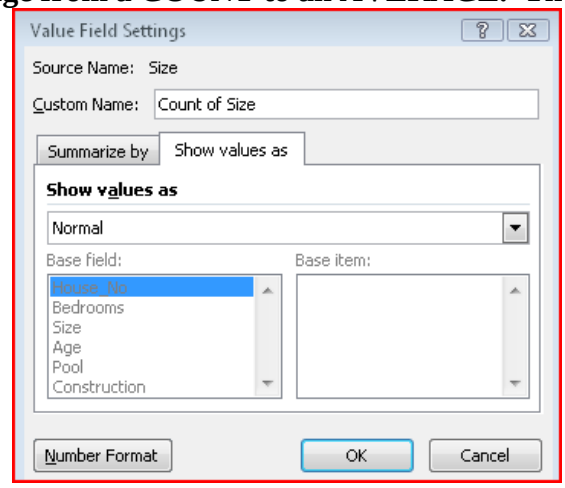
Now click on the arrow next to NORMAL and change to % OF TOTAL. Then click OK.

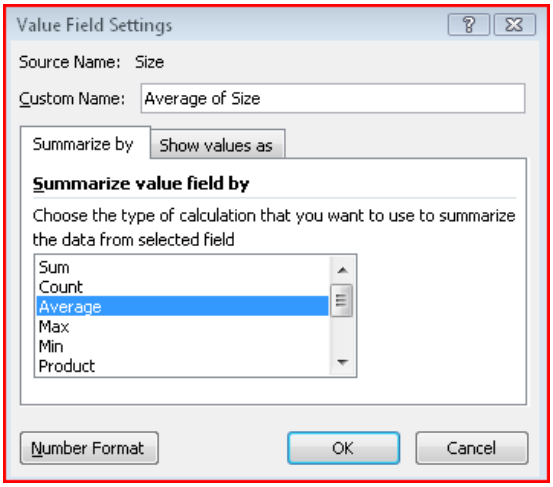


Note that the Pivot Table now shows the totals in percents. So we see that 40% of the homes are made of Brick, 35% Stucco and 25% Wood.

Count of Size	
Construction	Total
Brick	40.00%
Stucco	35.00%
Wood	25.00%
Grand Total	100.00%

Let's go back to the VALUE FIELD SETTINGS but this time show the data as NORMAL again and change from a COUNT to an AVERAGE. Then click OK.





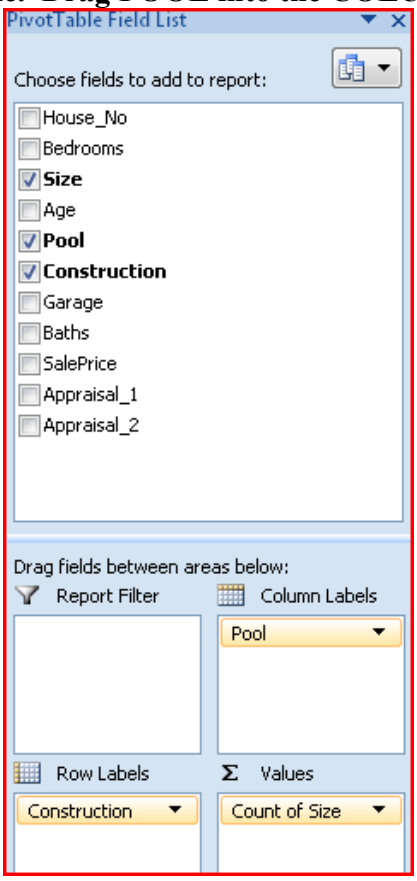
Now you can see the average Size for the different constructions. A Brick home has an average size of 2239.65 square feet, for instance.

Average of Size	
Construction	Total
Brick	2239.65
Stucco	2173.171429
Wood	2220.12
Grand Total	2211.5

Now let's reset it back to a COUNT using the VALUE FIELD SETTINGS.

Count of Size	
Construction	Total
Brick	40
Stucco	35
Wood	25
Grand Total	100

Let's add another variable to the table. Drag POOL into the COLUMN LABELS.



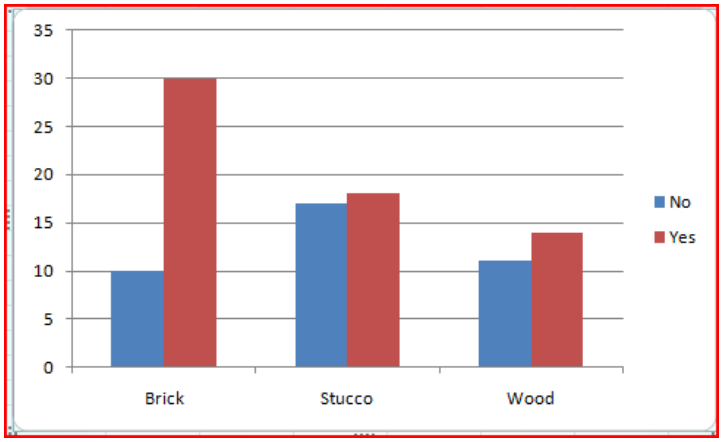
We now have a two-dimensional crosstabulation. Note that 0 means NO POOL and 1 means POOL. You can actually type right over the 0 and 1 to change these labels (as shown below).

Count of Size	Pool		
Construction	0	1	Grand Total
Brick	10	30	40
Stucco	17	18	35
Wood	11	14	25
Grand Total	38	62	100

Count of Size	Pool		
Construction	No	Yes	Grand Total
Brick	10	30	40
Stucco	17	18	35
Wood	11	14	25
Grand Total	38	62	100

Here we see that 10 of the Brick homes did not have a pool while 30 did. And the Stucco homes were almost evenly split on having or not having a pool. At this point you can go back to displaying percentages if you wish, and even choose to show the percents by row, by column or by the overall total (e.g., if shown by row, you would see 25% of the Brick homes did not have a pool and 75% did).

Now click on any of the numbers in the Pivot Table. Then click on the COLUMN option on the toolbar (under INSERT in the CHARTS section). For now just choose the chart in the top row on the left side (under 2-D Charts).



You can instantly convert your Pivot Table into a useful graph. If you wish to edit it further, you need only click on the graph. For now, click on the outer frame of the chart and hit the DELETE key.

While we needn't do it here, click on the arrow next to CONSTRUCTION. Notice the check boxes. If you unchecked Stucco, you would then only be displaying the Brick and Wood homes. And if you remove the CONSTRUCTION variable from the Pivot Table and put it back later, Stucco would still be omitted until you restore it.

Now for one last but important tool → grouping. Often we have a situation where we want to recode data into groups for various reasons and rather than altering the data file, we can do it so easily in a Pivot Table. A common example is to take survey responses and recode (group) Strongly Agree and Agree responses into a category titled POSITIVE, and other responses into a category titled NEGATIVE. Since our data set doesn't have such variables, let's use the SALES PRICE.

Under COLUMN LABELS and ROW LABELS (leave the COUNT OF SIZE alone), click on the arrows next to each line and choose REMOVE FIELD. This will blank out your Pivot Table. You could have also grabbed the variable from the table and dragged it out.

Count of Size	Total
Total	100

Now click on SALEPRICE and drag it into the ROW LABELS.

Count of Size	
SalePrice	Total
125,000	1
126,000	1
140,000	1
147,000	1
154,000	1
155,000	1
164,000	1
166,000	2
172,000	2
173,000	2
174,000	2
175,000	1
176,000	3
177,000	1
179,000	2
180,000	1
182,000	1
183,000	1
187,000	2
188,000	5
189,000	1
191,000	1
192,000	1

There are 74 different prices in the 100 homes. Such a display is not very helpful since it is mostly 1's with a few 2's. But we can turn this scale data into an ordinal variable by putting the data into ranges.

First highlight cells A5 through A31, capturing the 125000 to the 199000. Then right click your mouse and choose the GROUP option.

Count of Size		
SalePrice2	SalePrice	Total
Group1	125,000	1
	126,000	1
	140,000	1
	147,000	1
	154,000	1
	155,000	1
	164,000	1
	166,000	2
	172,000	2
	173,000	2
	174,000	2
	175,000	1
	176,000	3
	177,000	1
	179,000	2
	180,000	1
	182,000	1
	183,000	1
	187,000	2
	188,000	5
	189,000	1
	191,000	1
	192,000	1
	193,000	2
	194,000	1
	198,000	1
	199,000	2

A new variable was created (SALEPRICE2) with a value of Group1 under it. If you click on the Group1, you can rename it (change it to <200k).

Count of Size		
SalePrice2	SalePrice	Total
< 200k	125,000	1
	126,000	1
	140,000	1
	147,000	1
	154,000	1
	155,000	1
	164,000	1

Now the 200000 through the 248000 and click on the GROUP option again. And repeat this for the rest of the data, from 251000 to 320000. Now rename Group2 to 200-250k, and rename Group3 to >250k.

And then drag SALEPRICE out of the table (or click on the arrow next to the variable name and choose REMOVE FIELD). You now have a table with a new variable, which actually appears in the variable list on the right of the screen. From the table you can see that 41 of the homes sold for less than $200,000 and 23 sold for over $250,000.

Count of Size	
SalePrice2	Total
< 200k	41
200-250k	36
>250k	23
Grand Total	100

We can go on further, as this is not the depth of Pivot Tables, but it covers the basics and even some advanced stuff. By playing with it further, you will likely discover even more, but most of what you would do with this wonderful tool has been addressed here. With little effort you will see that this tool is fun to use and quite amazing.