

We begin by first starting Minitab. You may choose to either

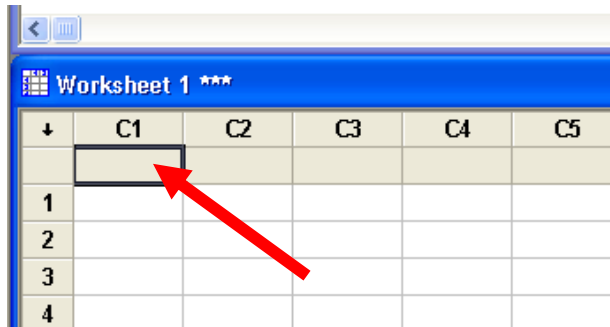
1. click on the Minitab icon in the corner of your screen
2. go to the lower left and hit **Start**, then from **All Programs**, then **Minitab 16 Statistical Software**
3. A new spreadsheet should appear on the screen.

Below is a sample data set that we will be using for today's exercise. It lists the heights & weights for 10 men and 12 women.

Male		Female	
Height	Weight	Height	Weight
69	192	65	110
70	148	61	105
65	140	67	136
72	190	65	135
76	248	70	187
70	197	62	125
70	170	63	147
66	137	60	118
68	160	66	128
73	185	66	175
		65	147
		64	120

Entering the data

We begin by entering the data. The first task, after opening up Minitab, is to name the columns that we will be using. We do this by double clicking the gray bars under the heading labeling the columns as C1, C2, ..., Cn.



We can now enter the heading names "height", "weight" & "gender" into the columns.

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We are now ready to enter our data. For each of the 22 data points we have a height, weight and a gender. These data will be entered into the spreadsheet so that we will have 3 columns of data, each with 22 rows. A row will correspond to one individual (or experimental unit). The height column will consist of the raw heights for the subjects, the weight column will consist of the raw weights and the gender will consist M for males and F for females.

	C1	C2	C3-T	C4
	Height	Weight	Gender	
1	69	192	M	
2	70	148	M	
3	65	140	M	
4	72	190	M	
5	76	248	M	
6	70	197	M	
7	70	170	M	
8	66	137	M	
9	68	160	M	
10	73	185	M	

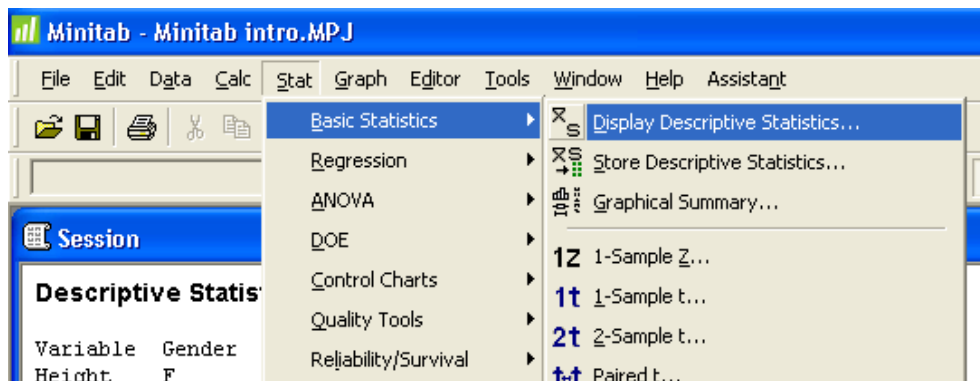
Saving the data

To Save your data: (with the spreadsheet showing on the screen)

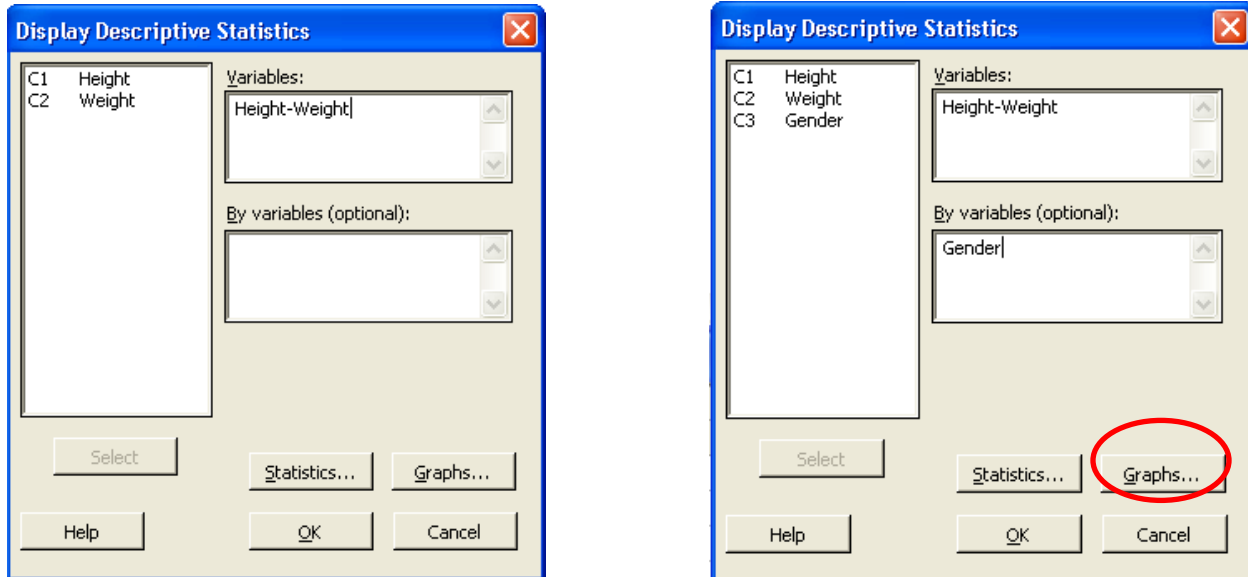
Click on **File** and **Save Project As...** and locate your home directory. Type in the “filename” (pick a name that means something to you about the data). Click on **OK**

Descriptive Statistics and Graphical Analysis

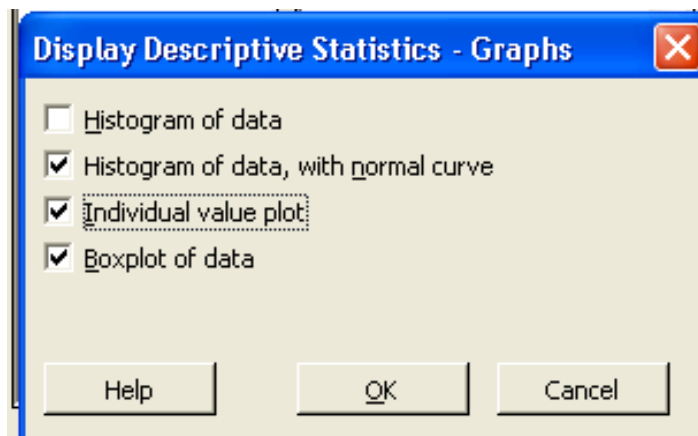
We begin our analysis of the data by calculating summary statistics, such as means and variances, and by creating several basic plots. This step can be completed by clicking on **Stat** and then the first option listed, which is **Basic Statistics**. Next select **Display Descriptive Statistics**.



This will take you to the **Explore** window. We need to place “height and weight” in the dependent field as it is our response. “Gender” is not available to be placed in the **Variables** because it should be placed in the **By Variables (optional)** field since it is our independent variable/factor in this data. Once clicking in the **By Variables (optional)** field, gender automatically becomes a choice to select. To place the variables into the field needed, just place your cursor in the selected field and then double-click the desired variables.



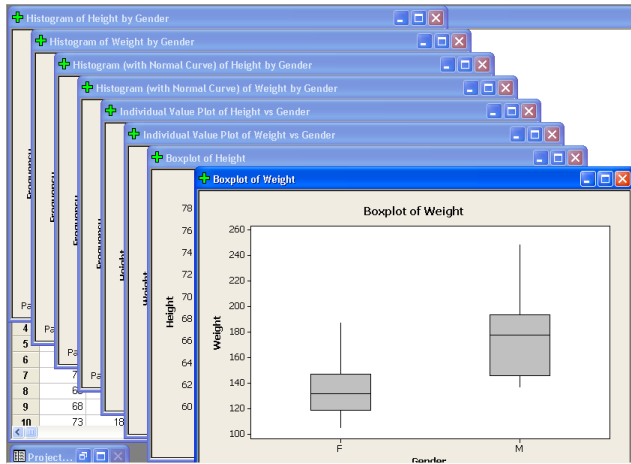
Having defined our dependent/response variable and our independent/factor variable we can now set up our plots. By pushing on the **Graphs** button, found on the image above, we move into the **Display Descriptive Statistics - Graphs** window.



We can see what each graph does by selecting all 4 boxes and then we can hit **OK**. This returns us to the **Display Descriptive Statistics** window where we click on the **OK** button and review the output from the analysis.

Output

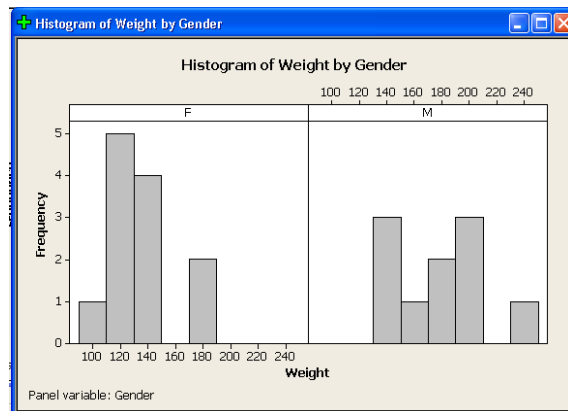
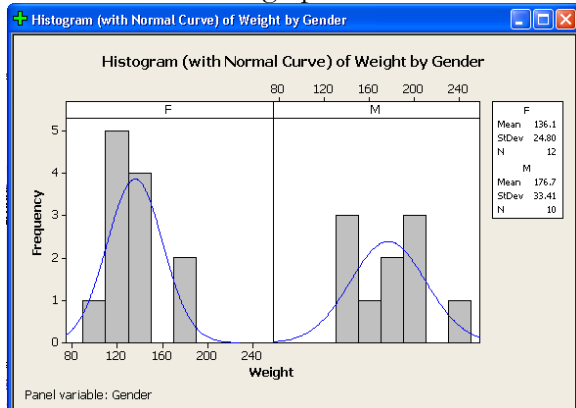
The graphs should automatically pop up on your screen in a line as seen below.

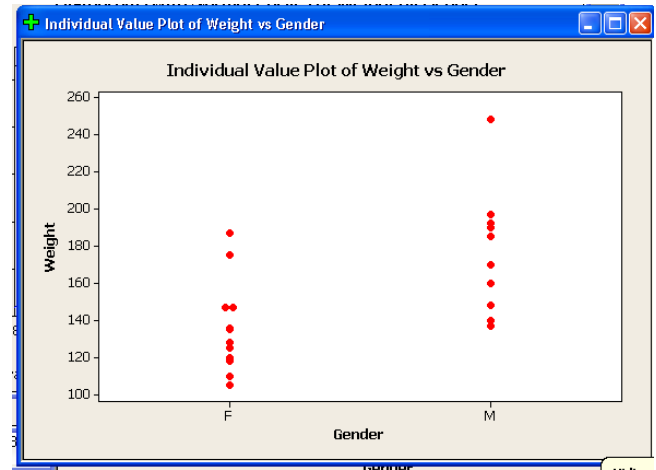
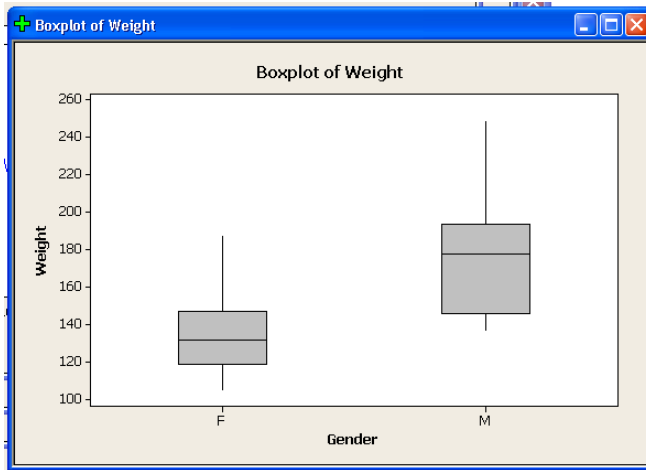


In the back at the top behind all of the graphs is the **session window** which documents your actions and shows the results of your evaluations. If you scroll up on this window the descriptive statistics will be listed such as the frequency, mean, standard deviation, and median.

Session									
Variable	Gender	N	N*	Mean	SE Mean	StDev	Minimum	Q1	Median
Height	F	12	0	64.500	0.793	2.747	60.000	62.250	65.000
	M	10	0	69.90	1.03	3.25	65.00	67.50	70.00
Weight	F	12	0	136.08	7.16	24.80	105.00	118.50	131.50
	M	10	0	176.7	10.6	33.4	137.0	146.0	177.5
Variable		Gender	Q3	Maximum					
Height	F		66.000	70.000					
	M		72.25	76.00					
Weight	F		147.00	187.00					
	M		193.3	248.0					

Some of the various graphs we have created are shown below.





All of these outputs can be edited to make them more readable. You can double click on any of the outputs to bring up an editor window that will allow you to edit the image. For most graphs you are able to change colors, symbols, line types, titles, or even rotate axes. For tables it is possible to remove unwanted lines in the output and even add additional text that wasn't originally included in the table. [note - next last section contains information on editing histograms].

Printing

When printing, I find it to be the easiest to just copy and paste what needs to be printed into a Word Document. On the graphs, you can just right click on the window and click **copy graph** and then click **paste**. To copy information from the Session window, just highlight the information that is needed and then copy and paste it into the Word Document.

The other way to print is to click on **File**, then **Print (The selected screen)**. Only the screen that is selected on the window can be printed which mean that you would simply just click the various windows that need to be printed and print them individually. I find that this takes a lot of extra paper and time.

Editing a Histogram

To modify this histogram, double-click on the graph, wait for the editor window to appear, and follow the directions below.

To change the Number of Intervals:

- Double-click on the numbers below the horizontal axis.
- Under the Binning tab, the number of intervals can be changed by clicking Number of Intervals and then typing in the desired number
- The Scale can also be changed by selecting the Scale tab
- Here, the Minimum and Maximum numbers of the scale can be changed and the position of the ticks

To change the vertical Scale:

- Double-click the numbers to the left of the vertical axis.

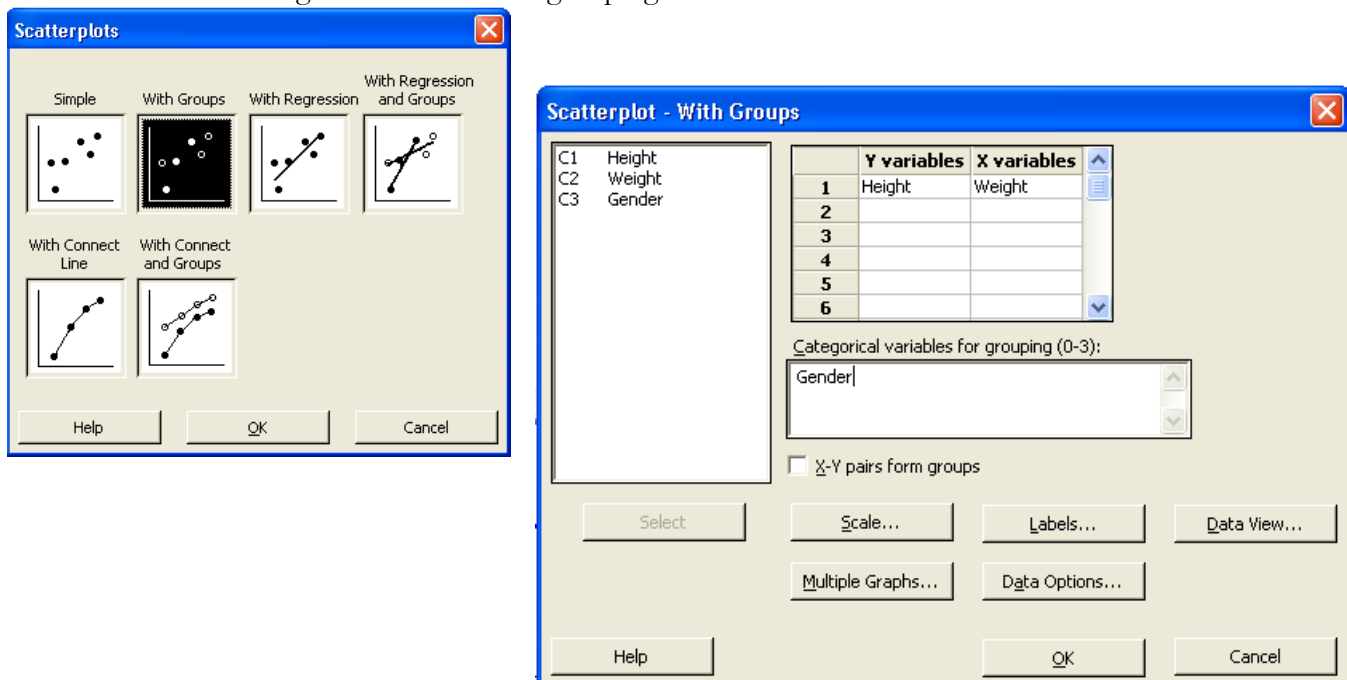
- In the window that comes up, you can change the number of tick marks on the vertical axis, among other things.

As was mention earlier, there are lots of other parts of the graph you can change, like the titles, axis labels, etc. Double-clicking on each part of the graph will usually bring up the appropriate menu. When you have the histogram edited the way you like it, close the editor, and you'll be back at the graph output window.

Creating a scatterplot

If we want to compare the heights and weights for the sample in a quick and easy way to summarize the data is to present it in graphical format. By clicking on the **graph** and **scatterplot** button, the scatterplot window will be opened. Choose **With Groups** and **OK**.

This will bring up another screen where we can define our Y variables and X variables and place Gender under our Categorical variables for grouping.



The symbols on the graph can also be changed by double clicking on the dots and selecting **Custom** under the **Attributes** tab. Changing the color and shape of the dots may help us to tell the difference between our two groups.

