Name:_____ STA 3123L
Panther ID:_____ Date:_____

Lab Assignment 1

Directions: Below there are two example problems solved and explained. After the examples there are exercises that need to be completed using SPSS. For each problem make sure that you print out and label your SPSS output. You may cut and paste the output into a word document if you prefer, but make sure that every question answered includes the relevant SPSS output.

Before we begin the examples, we should open SPSS.
Open SPSS by going to:
Start → *all programs* → *SPSS for Windows* → *SPSS 17.0 for Windows*. After opening SPSS you will see a pop up box which will ask you, "What would you like to do?" Click Cancel.
At the bottom of the screen, you will see two tabs: Data View and Variable View.
Click the 'Variable View' Tab
Congratulations! You are now ready to begin using SPSS.

Example 1: Our first example will demonstrate how to create a confidence interval to estimate the mean using the t-distribution.

Dr. Steven Wasserman, Dr. Philip Mackowiak, and Dr. Myron Levine of the University of Maryland conducted research on the body temperatures of healthy human adults. Fifty of the body temperatures taken from randomly selected subjects are provided below. Use SPSS to form a 98% confidence interval for the true average body temperature for all healthy adults.

98.6	98.6	98.0	97.3	97.2
98.6	98.8	98.3	97.6	98.4
98.0	98.6	98.5	98.2	98.6
98.0	97.0	97.3	99.6	98.2
99.0	97.0	98.7	98.7	98.0
98.4	98.8	97.4	99.4	97.8
98.4	97.6	98.9	98.2	98.0
98.4	97.7	98.6	98.0	98.4
98.4	98.8	99.5	98.6	98.6
98.6	98.0	97.5	98.6	98.6

Step 1: Under the 'Variable View' tab in SPSS, using the first box in the first row, enter a name for your variable. We will use "BodyTemp."

Step 2: Press the tab key. In this new box select 'Numeric' (since our data is numerical in nature).

Step 3: By hitting tab again you have the option of selecting the width of your data values (If you have very long numbers you may need to increase the width). If you press tab again, you can specify the number of decimal places in your data values.

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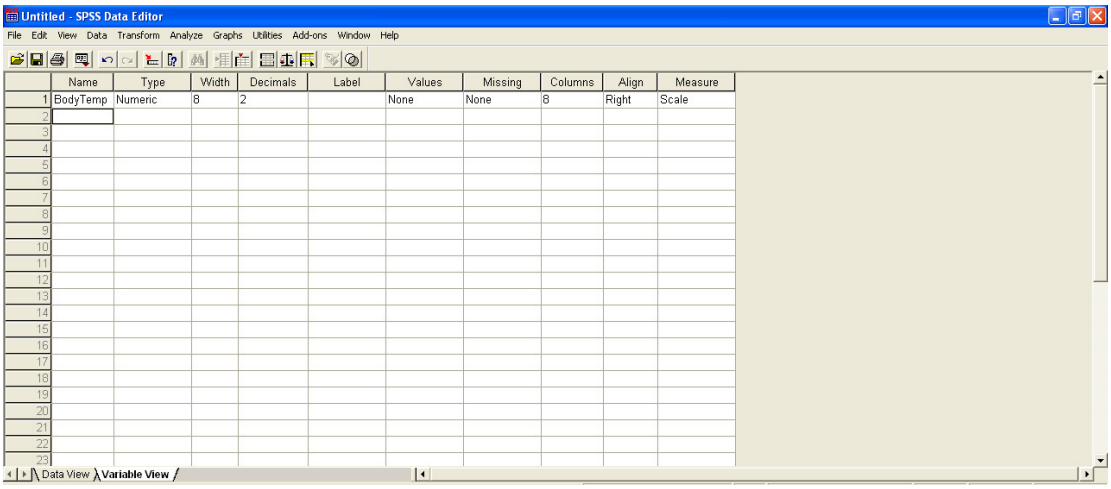
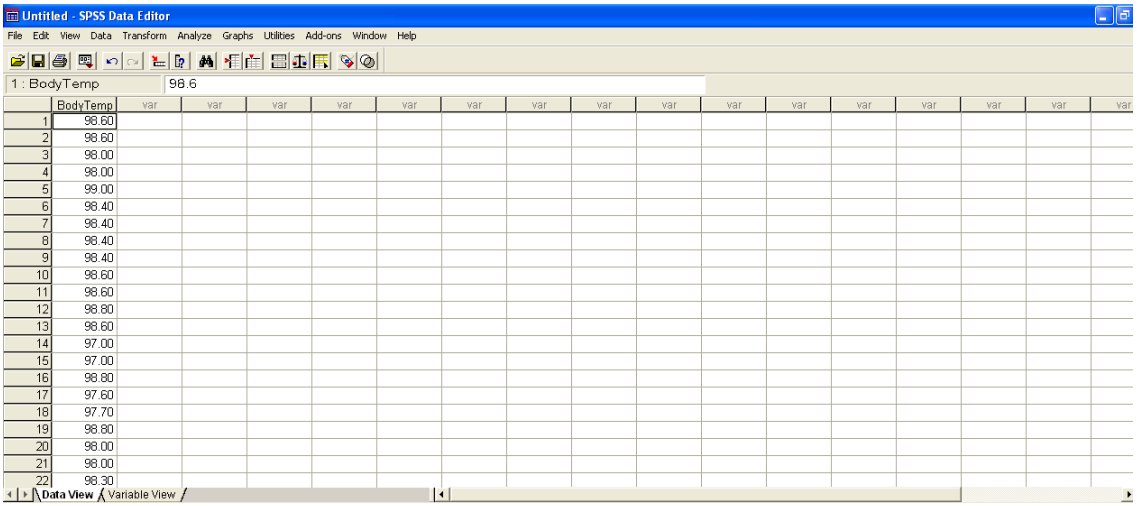
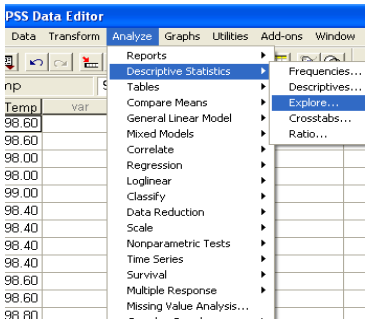


Step 4: Click the 'Data View' tab. The first column should be labeled "BodyTemp."

Step 5: Begin to enter your data in the column labeled "BodyTemp" by clicking the first box in the column and typing in the first value. After entering the first value press Enter on your keyboard. Repeat this approach for each value in the data set. Another (much faster) method is to 'cut and paste' the values from above into the 'BodyTemp' column. You can do this one column at a time from the table above.



Step 6: At the top of the 'Data View' screen click Analyze → Descriptive Statistics → Explore



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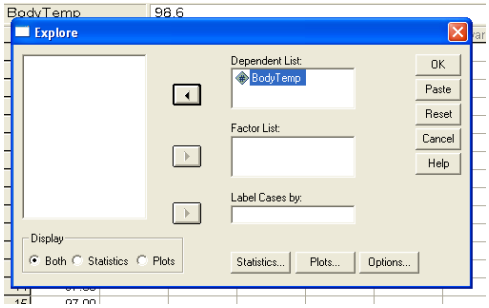
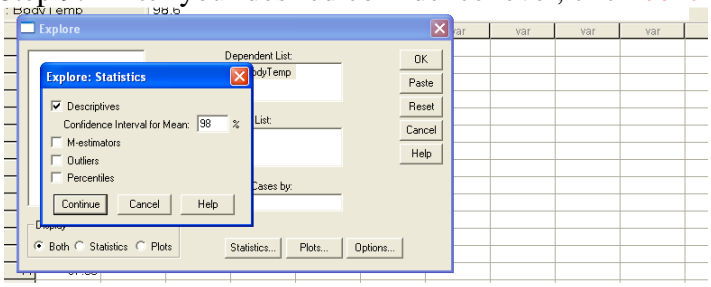
Step 7: After clicking Explore from step 6 above, a box appears. Move your variable 'BodyTemp' to the 'dependent' box.



Step 8: Click 'Statistics'

Step 9: Enter your desired confidence level, click continue →click ok



Step 10: View and Interpret your output.

Descriptives

			Statistic	Std. Error
BodyTemp	Mean		98.2800	.08480
	98% Confidence Interval for Mean	Lower Bound	98.0761	
		Upper Bound	98.4839	
	5% Trimmed Mean		98.2800	
	Median		98.4000	
	Variance		.360	
	Std. Deviation		.59966	
	Minimum		97.00	
	Maximum		99.60	
	Range		2.60	
	Interquartile Range		.60	
	Skewness		-.246	.337
	Kurtosis		-.013	.662

Question: Interpret the interval found above.
Solution: We are 98% confident that the true average body temperature for healthy adults is between 98.076 and 98.484.

Question: Most people believe that the true body temperature for healthy adults is 98.6. Does the interval you calculated above support this belief?
Solution: Since the interval does not include 98.6, it does not seem to be a valid belief.

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Example 2: Old Faithful is a Geyser in the United States located in Yellow Stone National Park. A website reports the average height of the geyser eruptions to be 130 ft. A random selection of 40 observed eruptions produced the following list of eruption heights. At the 1% significance level, test the claim that the average height of an eruption is 130 ft (the website can be found at: www.yellowstone-natl-park.com/oldfaithful.htm).

140	120	130	125
140	120	115	130
148	150	136	130
130	140	130	110
125	136	138	110
110	120	120	125
136	148	120	150
125	130	120	130
115	130	95	120
120	136	140	95

Step 1: Under the 'Variable View' tab in SPSS, using the first box in the first row, enter a name for your variable. We will use "Height."

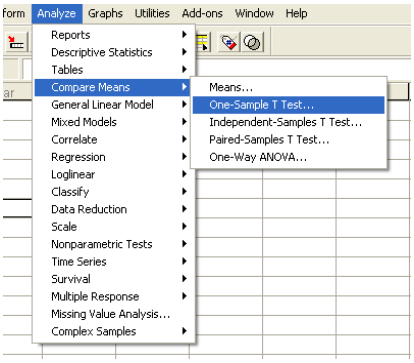
Step 2: Press the tab key. In this new box select 'Numeric' (since our data is numerical in nature).

Step 3: By hitting tab again you have the option of selecting the width of your data values (If you have very long numbers you may need to increase the width). If you press tab again, you can specify the number of decimal places in your data values.

Step 4: Click the 'Data View' tab. The first column should be labeled "Height."

Step 5: Begin to enter your data in the column labeled "Height" by clicking the first box in the column and typing in the first value. After entering the first value press Enter on your keyboard. Repeat this approach for each value in the data set. Again, another (much faster) method is to 'cut and paste' the values from above into the 'Height' column. You can do this one column at a time from the table above.

Step 6: At the top of the 'Data View' screen click Analyze → Compare Means →One-Sample t Test



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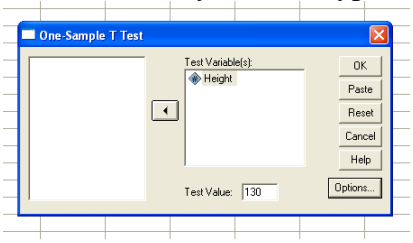
Step 7: A box will pop up after completing step 6. Move your variable "Height" into the test variable box, and enter the number from your null hypothesis.



Step 8: Click Ok

Step 9: Interpret output

One-Sample Test

	Test Value = 130					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Height	-1.347	39	.186	-2.80000	-7.0051	1.4051

Question: Is this a one-tailed or two-tailed test?
Solution: 2-tailed test
***Note: Here is a description of how to convert a two-tailed p-value into a one-tailed p-value.*

$$if \begin{cases} H_a \text{uses} > \text{and z} > 0 \\ H_a \text{uses} < \text{and z} < 0 \end{cases} \text{ then } p = \frac{\text{Reported p-value}}{2}$$

$$if \begin{cases} H_a \text{uses} > \text{and z} < 0 \\ H_a \text{uses} < \text{and z} > 0 \end{cases} \text{ then } p = 1 - \frac{\text{Reported p-value}}{2}$$

Question: How does alpha compare to our p-value for this test?
Solution: $\alpha < p - value$

Question: What is your conclusion?
Solution: There is insufficient evidence to reject the claim that the average height of eruptions is 130 ft.

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Exercise 1: Use the following data from 40 randomly chosen eruptions of the Old Faithful geyser to form a 95% confidence interval to estimate the true average amount of time between eruptions.

Interval	In minutes		
98	98	105	81
92	94	92	69
95	93	89	94
87	93	93	92
96	96	112	106
90	89	95	93
65	93	105	108
92	89	94	87
95	86	90	97
93	69	98	102

Question: If the same web site from the example problem above claims that the average interval of time between eruptions is 94 minutes, does your confidence interval support the claim or contradict the claim?

Question: What is the margin of error for your interval?

Exercise 2: Use the following data from 40 randomly chosen eruptions of the Old Faithful geyser along with a 5% significance level to test the claim that the average length of an eruption of Old Faithful is greater than 235 seconds. Please show all the 7 steps covered in class.

Duration	In Seconds		
240	234	252	255
237	213	254	280
250	255	273	270
243	235	266	241
255	250	284	272
120	110	252	294
260	245	269	220
178	269	250	253
259	251	261	245
245	234	253	274

Question: What is the p-value for the test?

Question: How does alpha compare to our p-value for this test?

Question: What would the test conclude if instead of using "greater than" we used "equal to" for the above original claim?