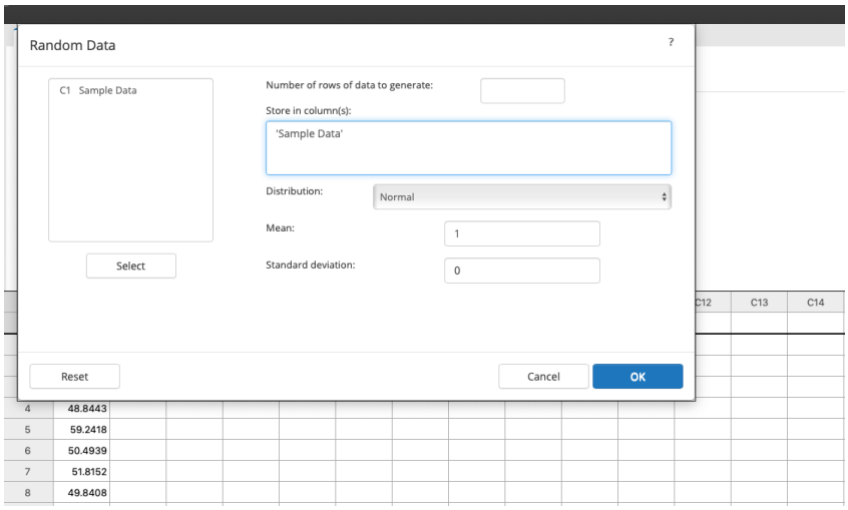
ISE 390; Minitab Assignment 2; **(100 points)**

1.a. **(2.5 pts)**

Calculate>Random Data



Let the number of data points be 30.

Minitab won't pick up the column automatically, so you'll have to manually type in 'c1' under 'Store in Column(s)'. Later rename that column as 'Sample Data'.

Select 'Normal' because we want our sample data to be normally distributed.

Enter the value of the Mean and Standard Deviation from Minitab Assignment 1. This will let each of you create data sets sampled from different normal distributions. None of you will have the same normal distribution.

1.b. **(2.5 pts)**

In order to do this, you will first need the values for Q1, Q2 and Q3 from your normally distributed sample data set.

Stat> Basic Statistics> Display descriptive Statistics

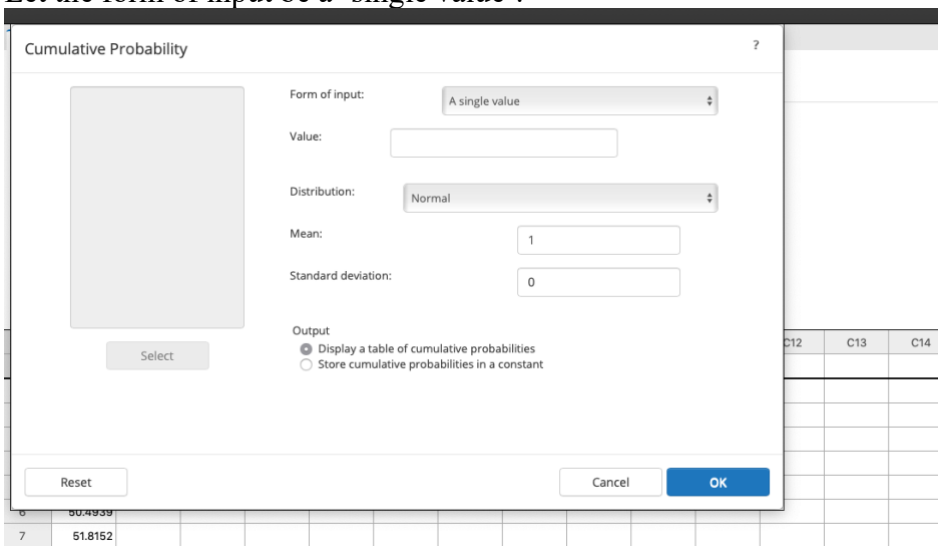
Select your 'sample data'.

Click on 'Statistics' and untick all boxes except First Quartile, Median and Third Quartile. This will give you the three quartiles you need for this question.

Calculate >Probability Distribution > Cumulative Probability Distribution (CDF)

Remember to enter the same mean and standard deviation as you used in 1a.

Let the form of input be a 'single value'.



Calculate the following probabilities
P (X<= First Quartile, Q1)
P (X<=Second Quartile, Q2)
P (X<= Third Quartile, Q3)
Enter these values of Q1, Q2 and Q3 sequentially under 'value' to find each of the three probabilities associated with Q1, Q2 and Q3.
Ideally these probabilities should come out to be 0.25, 0.50 and 0.75 which is not the case here. **In a single line comment why the probabilities you calculated are not 0.25, 0.50 and 0.75.**

1.c**.(10 pts)**
Graph> Probability Distribution Plot>View probability
Let the distribution be 'normal' because we have a normally distributed sample data set.
Enter the same sample mean and standard deviation as you used in 1a.
Under 'Options' select 'Specified X value' and 'left tail'. Remember cumulative probabilities are always left tailed.
Enter the values of Q1, Q2 and Q3 sequentially under 'X value' to find the cumulative probabilities associated with Q1, Q2 and Q3.

1.d. **(15 pts)**
Confidence interval on the mean
Stat>Basic Statistics> 1 sample T test/1 sample Z test
In a single line comment why a T test or a Z test is more appropriate here and why?
(If a Z test is more appropriate, then use a 1 Sample Z test and if a T test is more appropriate, then use of 1 sample T test).
Select your 'sample data'.
Click on 'Options'. Let the confidence interval be '95%' and then calculate the confidence interval on the mean.
Now change the confidence interval to '85%' and recompute the confidence interval on the mean.
Did the length of the confidence interval change? **In a single line comment on 'why' it has increased or decreased.**

1.e. **(20 pts)**
Normality Test
Graph>probability plot >simple
Select your sample data set which you want to test for normality. Under 'options' menu let the confidence interval be '95%'. Your criteria for accepting normality is 5% (0.05).
If the P value **given in the graph** is greater than 5% (0.05) then your data is normally distributed.
In a single line comment whether the data is normally distributed or not.

2.a **(2.5 pts)**
Generate a sample data set of **50** points from a uniform distribution whose endpoints are same as given to you in Minitab Assignment 1. Re arrange the sample data from Minitab assignment 1 to find your endpoints.

2.b **(2.5 pts)**
Calculate the following probabilities
P (X<= First Quartile, Q1)
P (X<=Second Quartile, Q2)
P (X<= Third Quartile, Q3)
Ideally these probabilities should come out to be 0.25, 0.50 and 0.75 which is not the case here. **In a single line comment why the probabilities you calculated are not 0.25, 0.50 and 0.75.**

2.c **(5 pts)**
Graphically representation of cumulative probabilities.
Follow the same process as in 1.c but use uniform distribution instead of the normal.

2.d **(15 points**)
Confidence interval on the mean.
Stat>Basic Statistics> 1 sample T test/1 sample Z test
In a single line comment why a T test or a Z test is more appropriate here and why?
(If a Z test is more appropriate, then use a 1 Sample Z test and if a T test is more appropriate, then use of 1 sample T test).
Construct and contrast a 95% and 99% confidence interval on the mean. Did the length of the confidence interval change? **In a single line comment on 'why' it has increased or decreased.**
Comment in a single line on why your method to construct confidence interval for this sample data set is wrong.

2.e **(25 pts)**
Normality Test
Check your sample data for normality at 95% confidence interval.
In a single line comment whether the data is normally distributed or not.

Make sure you comment where the question says, 'in a single line comment'. I would be specifically looking for that comment. In general, your answers should be specific and to the point. Make sure you attach all relevant graphs. **Compile all of this in a pdf file not more than 3 pages in length.**

Please label your data set and graphs appropriately, corresponding to whatever question you are doing. I will be looking at this as well.
Best of luck!
For any questions please use canvas discussion forum so that everyone can read your questions or else email me at ih0008@uah.edu.