CAP4830 HW3

Instructions:
All the needed R code for this homework can be found in Module 14.

Important: Do not copy someone's code. You may be randomly selected to explain your code. If you cannot explain your code, you will get a zero for the homework grade. If you are stuck please ask me. I will gladly help you. Remember the goal is to learn. ☺

Due Date: If you email me this homework, I will not except it. Do not wait until 11:58pm to upload it. If you are late and you email it to me stating, there was issues with canvas uploading it. I will not except it. Own your work and problems.

Please complete the following steps:

0) Copy this header with your information filled-in on the top of your r-script.

```
#================================================================================
# PROGRAMMER: Your name
# PANTHER ID: Your panther ID
#
# CLASS: COP2210
# SECTION: Your class section: example U01
# SEMESTER: The current semester: example Spring 2021
# CLASSTIME: Your CAP4830 course meeting time :example T/TH 9:00-10:15 am

# CERTIFICATION: I understand FIU's academic policies, and I certify that this
#                work is my own and that none of it is the work of any other person.
#================================================================================
```

1) Create a data frame named **inputs** with the following column names (q1, q2, p, s) and each column has 2000 rows with the following data:

- q1 -> 2000 random variables that have a triangle distribution with A = 0, B = 1500 , C = 1200
- q2 -> 2000 random variables that have a triangle distribution with A = 0, B = 3500 , C = 1000
- p -> 2000 random variables that have a triangle distribution with A = 10, B = 17.50 , C = 12.50
- s -> 2000 random variables that have an exponential distribution with λ =10

2) Plot the histogram in a single window of each column of the **inputs** data frame. Hint use par(mfrow=c(4, 1))

3) Create a data frame named **outputs** with a column name **value** that stores the output of the following model:

$$f(q1, q2, p, s) = (2700 – q1- q2) *p – (s*p)$$

4) Run a Monte Carlo Simulation 1000 times of the model shown in #3, and store the results in the **value** column of the data frame **outputs**

5) Plot the histogram of outputs$value

6) Create the empirical CDF of outputs$value and plot this CDF

7) Calculate the P0, P10, P20, P30, … P90, P100 and output these values on the R-Console

8) Find the P20 to P80 interval values from the empirical CDF.

9) Create a matrix named **storage** that stores 100 samples of the Monte Carlo simulation of the model in #3. Each Monte Carlo simulation will have 250 realizations.

10) Convert the **storage** matrix into a data frame named **storage.**

11) Create a data frame named **cltData** that stores all the means of each column of the **storage** data frame.

12) Plot the histograms of the data within **cltData**

13) Check if the data within **cltData** is normally distributed. Hint use a normal test for this.

14) State in your code using a comment if the data in cltData is normal distributed or not and why.

15) Calculate the 80% confidence internal and output the lower and upper bounds of this interval on the R-console

16) Upload you r-script using the canvas assignment link. You are done ☺.