In-class Exercise 1 : Australian All Ordinaries Data

(due Tue 2/4/2020)

Submit your code file (.R or .txt extension).

- You must submit the code file (.R or .txt extension) on Brightspace, then also submit **printout** of the file.

- The file name must be

TS-A1-FirstLastname.R (or .txt)

- The code file must have title, and visible separator for questions. Use the template posted on the website.

- Each block of the code must have brief comment of what it's doing.

- You are encouraged to collaborate with your classmate, but your submission must be your own work.

Here is the code to load the data from the web.

```
D  <- read.table("https://nmimoto.github.io/datasets/djao2.csv", header=T)
B1 <- ts(D$AO, start=c(1,1), freq=1)
B2 <- diff(log(B1))*100
```

Now your "B2" in R contains daily log-return of Australian All Ordinaries Stock Index. That is approximately how much (in %) Australian Stock market went up and down each day.

1. Plot the time series "B2". Does it look (weakly) stationary? State the definition of stationarity, then briefly explain what you see in the plot of B2 regarding the stationarity.

2. Plot the ACF of B2. Does it look like B2 is White Noise? Explain.

3. Obtain the numerical value of the blue dashed lines in ACF plot. What does the line represent?   Be precise. It is a CI of what?

4. What is the sample mean and sample standard deviation of B2?

5. Test if the true mean of B2 for significance, assuming that B2 is stationary and white noise. That is, test the null hypothesis that the true mean is zero, against the alternative that the true mean is not zero. Which Confidence Interval formula should you use? State numerical result with your statistical conclusion.

```
D  <- read.csv("https://nmimoto.github.io/datasets/lake.csv")
D1 <- ts(D, start=1875, freq=1)
plot(D1, type='o')
```

Now your "D1" contains level of lake Huron from 1875-1972.

6. Plot the time series "D1". Does it look (weakly) stationary? Briefly explain what you see in the plot of D1regarding the stationarity.

7. Plot the ACF of D1. Does it look like the series D1 is White Noise? Explain.

8. Obtain the numerical value of the blue dashed lines in ACF plot.

9. What is the sample mean and sample standard deviation of D1?

10. Test if the true mean of D1 for significance. Use appropriate method for testing based on your answer for (7). Which Confidence Interval formula should you use? State numerical result with your statistical conclusion.