STA457H1: Time Series Analysis
Assignment 3 - Question 11 Due data December 2, 2022

Student Name.....ID number.....

Instructions: *Show your answers in details.*

Q11 (7 points): Let S_t represent the monthly sales data in *sales* ($n = 150$), and let L_t be the leading indicator in lead.

1. Fit an ARIMA model to S_t, the monthly sales data. Discuss your model fitting in a step-by-step fashion, presenting your

   A. initial examination of the data,

   B. transformations, if necessary,

   C. initial identification of the dependence orders and degree of differencing,

   D. parameter estimation,

   E. residual diagnostics and model choice.

2. Use the cross-correlation function (CCF) and lag plots between ∇S_t and ∇L_t to argue that a regression of ∇S_t on ∇L_{t-3} is reasonable. [Note that in lag2.plot(), the first named series is the one that gets lagged.]

3. Fit the regression model $\nabla S_t = \beta_0 + \beta_1 \nabla L_{t-3} + x_t$, where x_t is an ARMA process (explain how you decided on your model for x_t). Discuss your results.