Time seried in epidemiology: Lab Exercises

After loading the `Kericho.csv` data in R. Please provide an answer to the following questions.

Exercise 1

1. Explore the association between maximum temperature (`maxT`), minimum temperature (`minT`) and rainfall (`Rain`) with the log-transformed number of reported malaria cases (`Cases`). What relationships do your observe and how strong are these?
2. Consider the rainfall variable `Rain`. Create 4 time lagged variables that for a given month, give the rainfall amount of 1 month, 2 months, 3 months ago and 4 months ago. Plot the log-transformed number of cases against each of these variables. What do you observe?
3. Fit a linear model for the log-transformed number of cases for each of the 4 lagged rainfall variables created in the previous point. Based on the fitted models, which lag has a stronger relationship with the reported malaria cases?

Exercise 2

1. Plot the minimum temperature variable (`minT`) against time. What patterns do you observe?
2. Write down the equation of a linear regression model that accounts for the trend observed in the previous point.
3. Fit the model defined in the previous point and add the curve of predicted values to the plot generate in the first point.
4. Use the autocorrelogram from the previous point to check if the residuals show any evidence of residual temporal correlation.