# Test 3

## Test Details/Instructions

Worth: 33.3%

Due Date: June 23rd, 2022 @ 11:59pm

### Submissions:

1. Your python notebook with all the codes to all the questions
2. Explanation of your results written as text in your python notebook
3. Submit your python notebook as: ***firstname\_lastname\_Test1***

### Questions:

1. Souvenir Sales. The file SouvenirSales.csv contains monthly sales for a souvenir shop at a beach resort town in Queensland, Australia, between 1995 and 2001. [Source: Hyndman and Yang (2018).] Back in 2001, the store wanted to use the data to forecast sales for the next 12 months (year 2002). They hired an analyst to generate forecasts. The analyst first partitioned the data into training and validation sets, with the validation set containing the last 12 months of data (year 2001). She then fit a regression model to sales, using the training set.
   1. Create a well-formatted time plot of the data.
   2. Change the scale on the x-axis, or on the y-axis, or on both to log-scale in order to achieve a linear relationship. Select the time plot that seems most linear.
   3. Comparing the two time plots, what can be said about the type of trend in the data?
   4. Why were the data partitioned? Partition the data into the training and validation set as explained above.
2. Analysis of Canadian Manufacturing Workers Workhours. The average annual number of weekly hours spent by Canadian manufacturing workers (data are available in CanadianWorkHours.csv, data courtesy of Ken Black).
   1. Which of the following regression models would fit the series best? (Choose one.)
      1. Linear trend model
      2. Linear trend model with seasonality
      3. Quadratic trend model Quadratic trend model with seasonality
   2. If we computed the autocorrelation of this series, would the lag-1 autocorrelation exhibit negative, positive, or no autocorrelation? How can you see this from the plot?
   3. Compute the autocorrelation of the series and produce an ACF plot. Verify your answer to the previous question.