

## Activity – Time Series

### Learning outcomes: Time Series

After completing this exercise, you should be able to understand and perform below tasks.

1. Preprocessing the raw data to prepare the time series data.
2. Stationarize the data.
3. Plot the ACF and PACF plots and identify the p,d,q values.
4. Building different time series models.
5. Analyzing the performance of various time series models.

## Assignment – Time Series

### Problem Statement

GE Power Stock data is shared in the “BSE-BOM532309.csv” file. Build time series models to forecast the monthly closing price of the GE Power stock for future 3 months’ time period using different time series algorithms and evaluating each of the algorithms.

#### Perform following Steps on the data:

1. Import the data into R
2. Understand the data.
3. Subset the data by considering only Date and Close price columns.
4. Apply the necessary preprocessing
  - Analyze whether there is any missing data.
  - Apply the necessary preprocessing by imputing the data if there are missing data.
  - Prepare the monthly data by aggregating the closing price of stock based at month level.
5. Prepare the time series object.
6. Plot the graphs of time series data.
7. Plot the acf and pacf plots.
8. Stationarize the data.
9. Plot the acf and pacf plots and Identify the p,d,q values.
10. Run the following models
  - SMA
  - WMA
  - EMA
  - HoltsWinters
  - ARIMA – By identifying the p,d,q values based on acf and pacf plots
  - Build auto.arima models.
11. Identify the appropriate error metrics.
12. Based on the errors metrics identify the best model.