Experiment No 5

Aim- Implementation of ARIMA model in R Programming.

Objective- To Understand use of Auto-Regression Integrated Moving Average Time Series Model

Theory-

In R programming, data analysis and visualization is so easy to learn the behavior of the data. Moreover, the R language is used mostly in the data science field after Python. Time series analysis is a type of analysis of data used to check the behavior of data over a period of time. The data is collected over time sequentially by the **ts()** function along with some parameters. It helps in analyzing the pattern of the data over a graph. There are many techniques used to forecast the time series object over the plot graph but the **ARIMA model** is the most widely used approach out of them.

Time Series Forecasting

Time series forecasting is a process of predicting future values with the help of some statistical tools and methods used on a data set with historical data. Some of the applications of time series forecasting are:

- Predicting stock prices
- Forecast weather
- Forecast the sales of a product

ARIMA model

ARIMA stands for AutoRegressive Integrated Moving Average and is specified by three order parameters: *(p, d, q)*.

- **AR(p) Autoregression:** A regression model that utilizes the dependent relationship between a current observation and observations over a previous period.An auto regressive *(AR(p))* component refers to the use of past values in the regression equation for the time series.
- **I(d) Integration:** Uses differencing of observations (subtracting an observation from