ARIMA MODEL

IMPORTED REQUIRED LIBRARIES

```
install.packages('forecast')
library(forecast)
install.packages('aTSA')
library(aTSA)
```

IMPORTED UNIVARIENT TIMESERIES DATASET

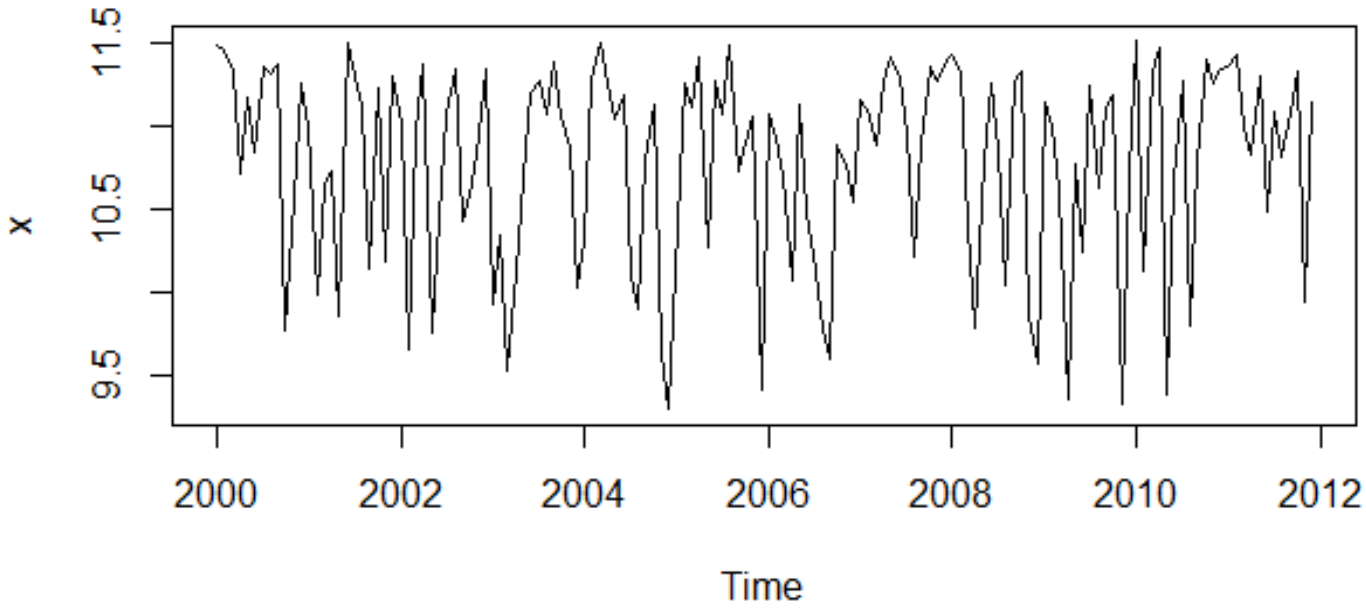
```
dt<-read.csv(file.choose())
head(dt)
```

CONVERT UNIVARIENT DATASET INTO TIMESERIES DATASET

```
t<-ts(dt,start = 2000/1,frequency = 12)
t
```

APPLIED LOG TRANSFORMATION

```
l<-log(t)
plot(l)
```



STATIONARTY TEST

adf.test(l)

```
Augmented Dickey-Fuller Test
alternative: stationary

Type 1: no drift no trend
     lag    ADF p.value
[1,]   0 -0.475   0.507
[2,]   1 -0.399   0.529
[3,]   2 -0.319   0.552
[4,]   3 -0.224   0.579
[5,]   4 -0.224   0.579
Type 2: with drift no trend
     lag    ADF p.value
[1,]   0 -10.60    0.01
[2,]   1  -9.19    0.01
[3,]   2  -6.51    0.01
[4,]   3  -5.50    0.01
[5,]   4  -5.41    0.01
Type 3: with drift and trend
     lag    ADF p.value
[1,]   0 -10.57    0.01
[2,]   1  -9.17    0.01
[3,]   2  -6.51    0.01
[4,]   3  -5.50    0.01
[5,]   4  -5.43    0.01
----
Note: in fact, p.value = 0.01 means p.value <= 0.01
```

#Null hypothesis : data is not stationary.

#Alter hypothesis : data is stationary.

#Data is statitonary as p values is less than 0.05 proceed for arima model

GOT P,D,Q VALUE USING AUTO.ARIMA

auto.arima(l)

```
Series: l
ARIMA(0,0,2) with non-zero mean

Coefficients:
         ma1      ma2     mean
      0.1541  -0.1286  10.7761
s.e.  0.0820   0.0761   0.0498

sigma^2 = 0.346:  log likelihood = -126.44
AIC=260.87   AICc=261.16   BIC=272.75
```

BULIDING ARIMA MODEL

a<-arima(l,order=c(0,0,2))

FORECASTED THE SALES FOR NEXT 12 MONTHS

f<-forecast(a,12)

```
f
          Point Forecast     Lo 80    Hi 80    Lo 95    Hi 95
Jan 2012       10.97140 10.225423 11.71738 9.830527 12.11227
Feb 2012       10.70517  9.950391 11.45995 9.550834 11.85951
Mar 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Apr 2012       10.77608 10.015231 11.53693 9.612462 11.93970
May 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Jun 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Jul 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Aug 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Sep 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Oct 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Nov 2012       10.77608 10.015231 11.53693 9.612462 11.93970
Dec 2012       10.77608 10.015231 11.53693 9.612462 11.93970
```

plot(f)