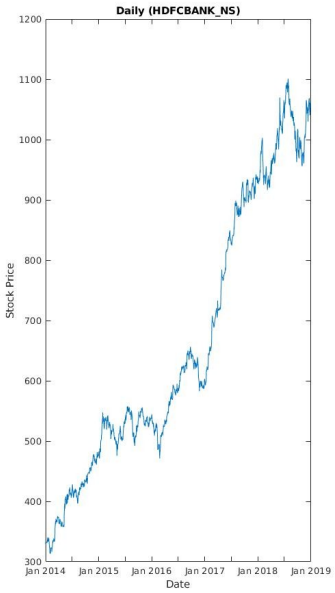
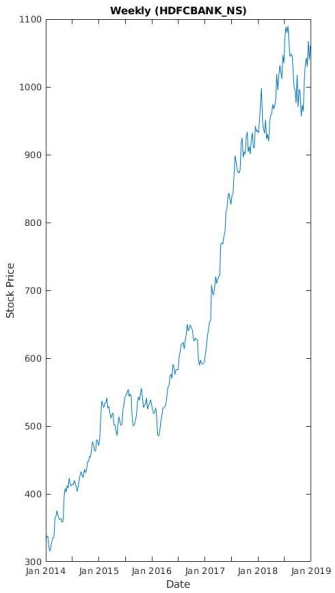
Financial Engineering Lab-6

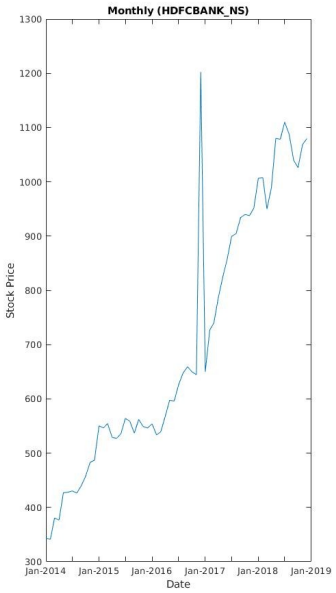
*Only some representative plots included here. All plots stored in “plots” folder question-wise in pdf files.

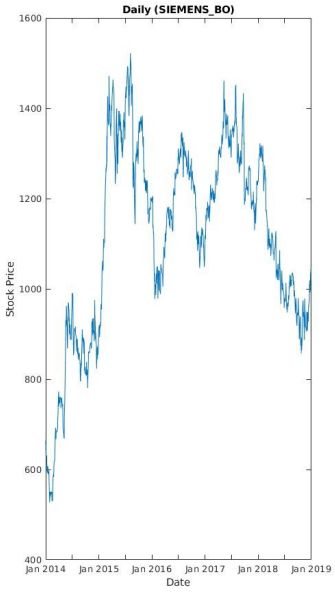
Stock Tickers Used -
Included in the index - BHARTIARTL, HDFCBANK, HINDUNILVR, ITC, KOTAKBANK, MARUTI, NESTLEIND, RELIANCE, SBIN, TCS
Not Included in the Index- AMBUJACEM, ASHOKLEY, BHEL, BOSCHLTD, MRF, PETRONET, PIDILITE, SIEMENS, TATAGLOBAL, TVSMOTOR
I have Used stocks which are both present in SENSEX and NIFTY 50 and the stocks not included are not present in both indices.

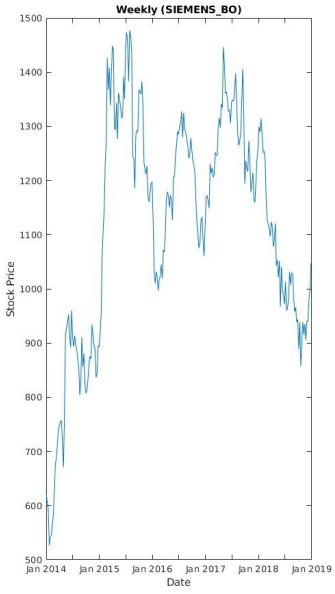
Question 1

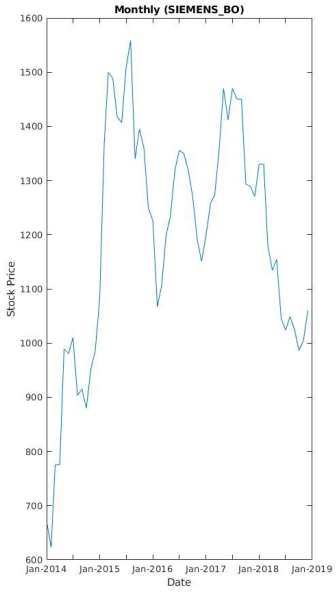


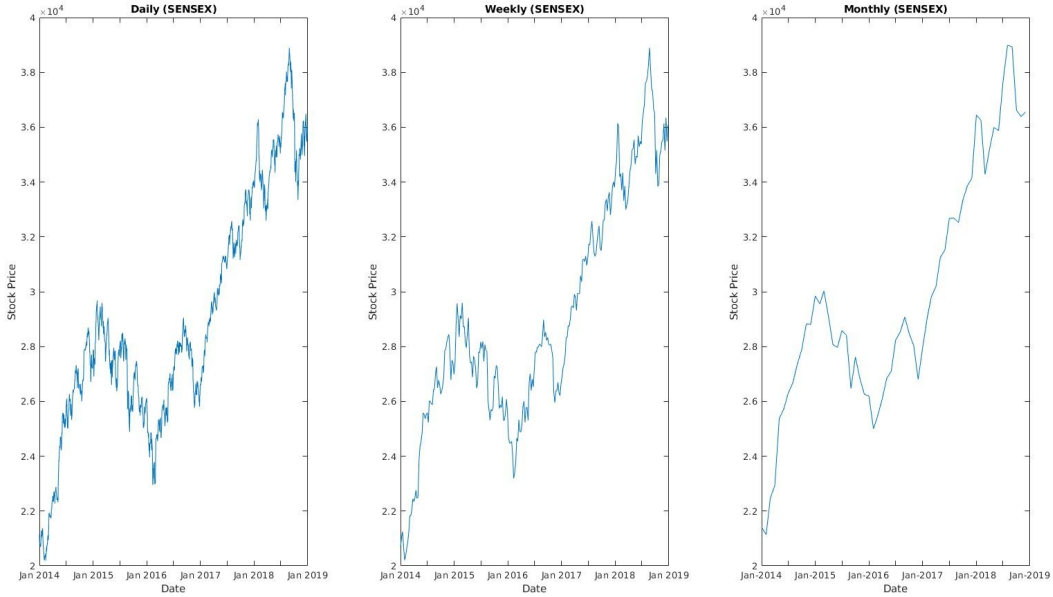




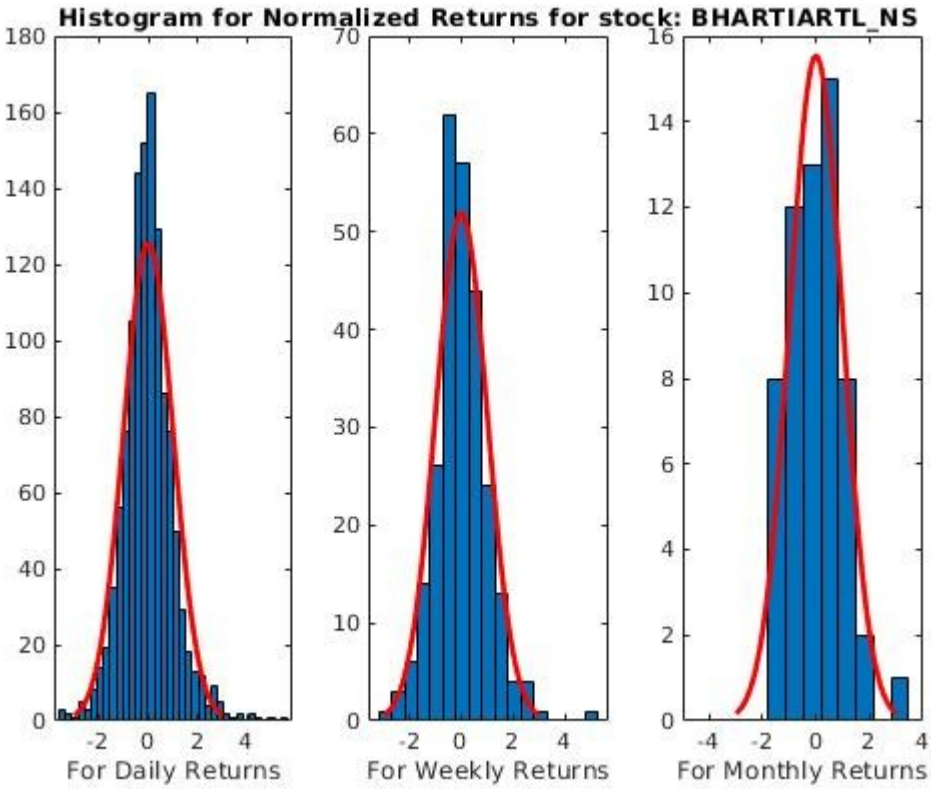


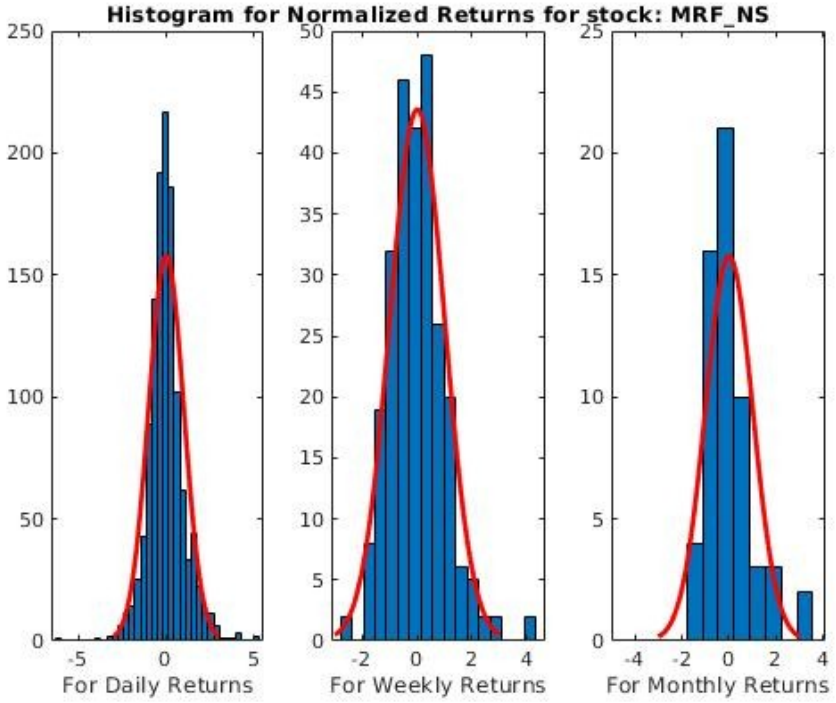


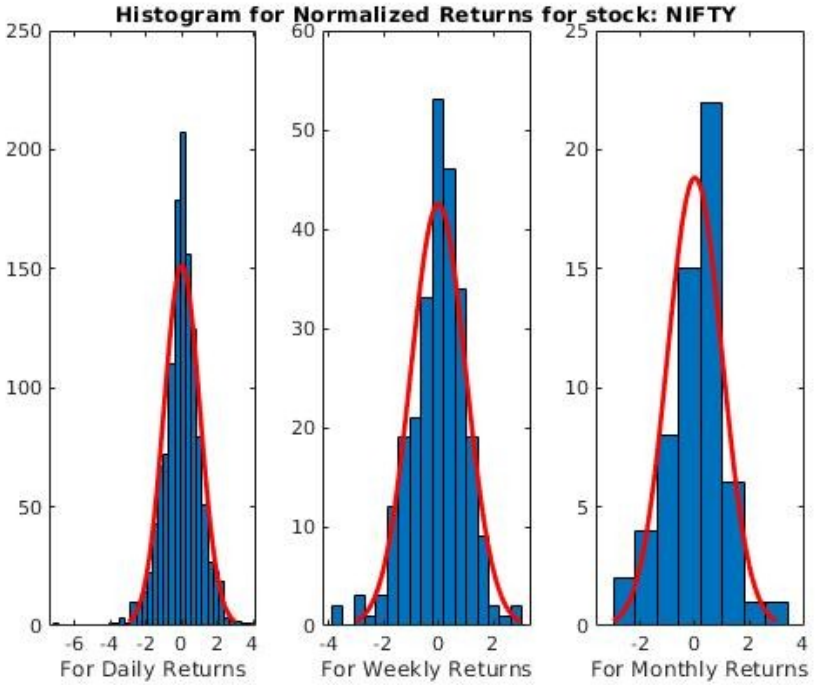



Daily (SENSEX)
Weekly (SENSEX)
Monthly (SENSEX)
Stock Price
Date
Jan 2014
Jan 2015
Jan 2016
Jan 2017
Jan 2018
Jan 2019

Question 2

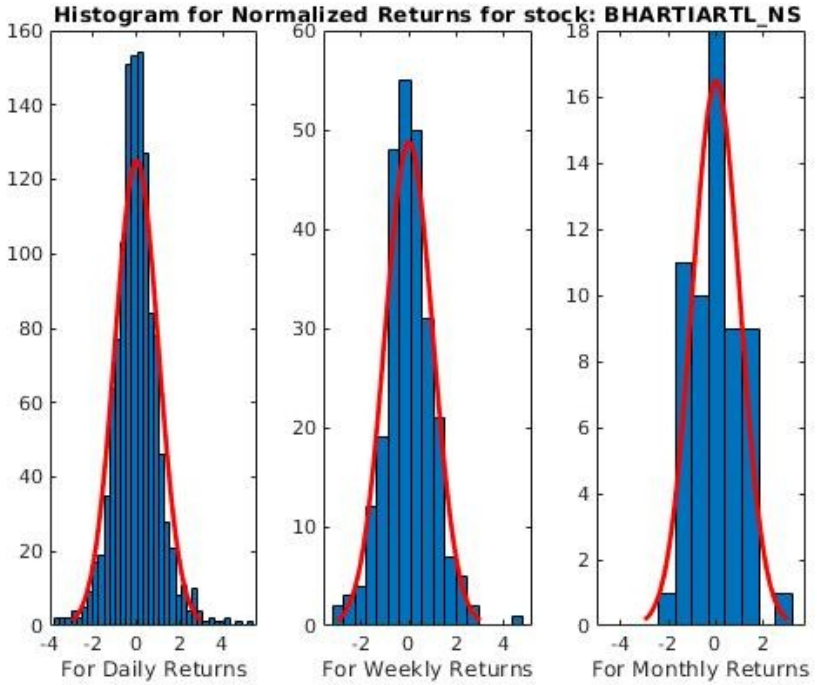

Histogram for Normalized Returns for stock: BHARTIARTL_NS
For Daily Returns
For Weekly Returns
For Monthly Returns

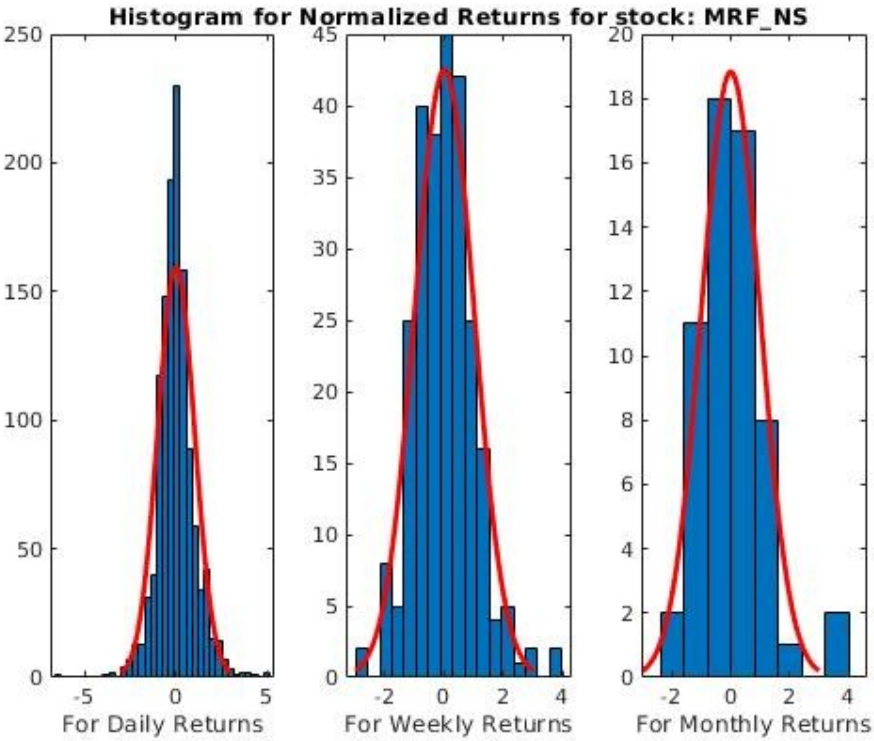


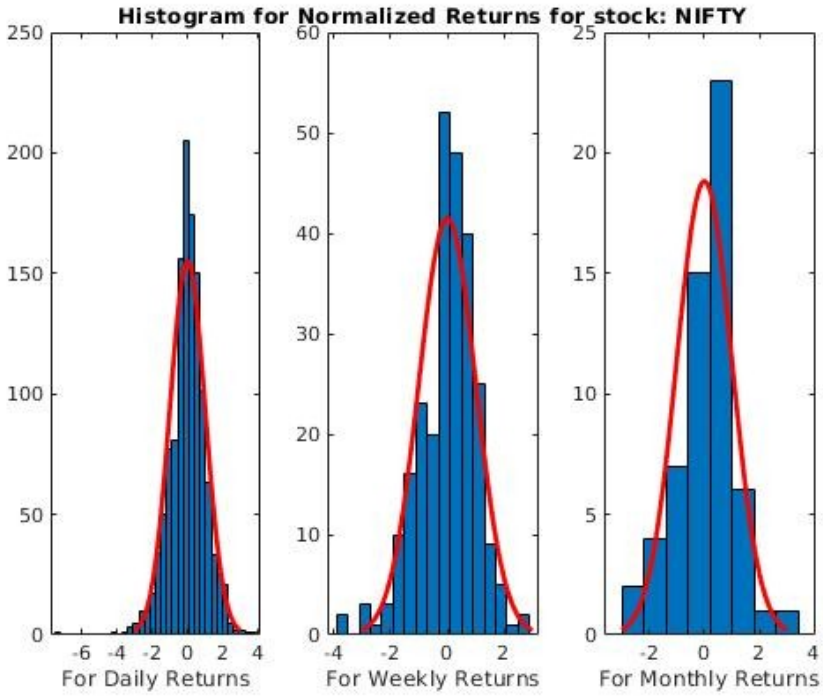


After observing the plots, we see that some of the plots are tail heavy and deviate from the assumption that stock returns follow normal distribution. The cause for this deviation could be fluctuations in the market which can't be incorporated in the distribution.

Question 3


Histogram for Normalized Returns for stock: BHARTIARTL_NS
For Daily Returns
For Weekly Returns
For Monthly Returns


Histogram for Normalized Returns for stock: MRF_NS
For Daily Returns
For Weekly Returns
For Monthly Returns



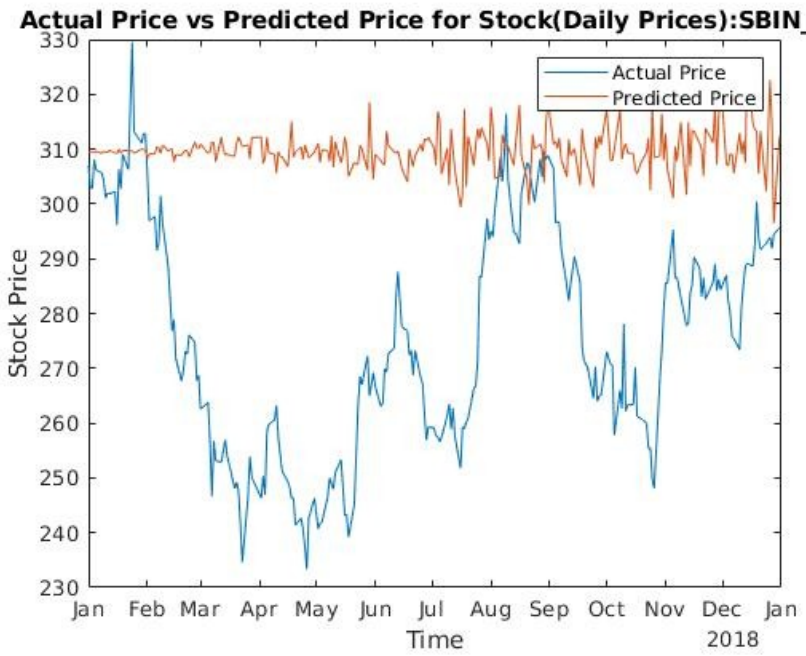
Question 4

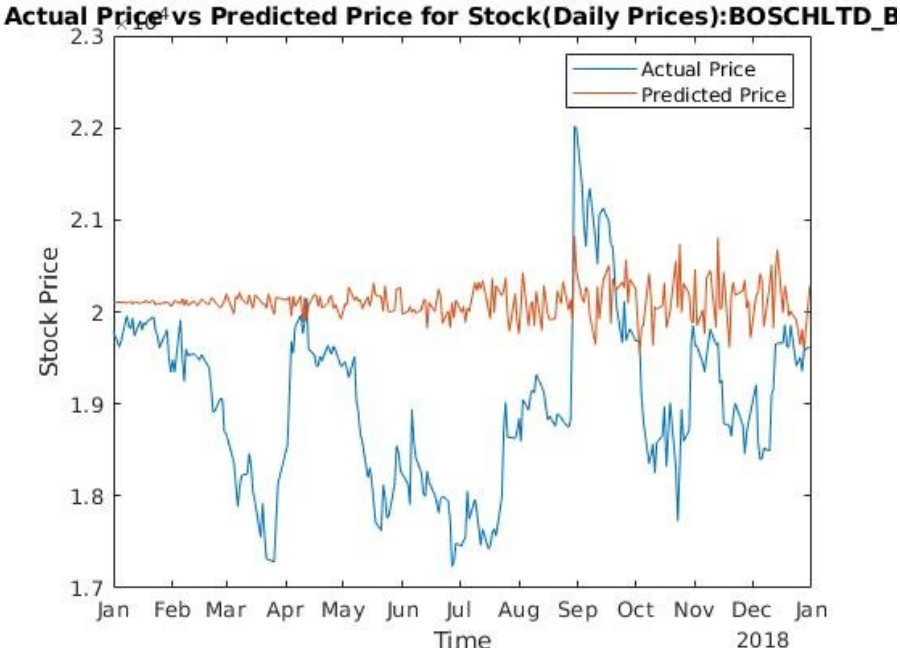
Assuming that the stock will follow a Geometric Brownian Motion, we generate stock prices for 2018 using the μ and σ from 2014-2017 data .
$S(t) = S(0)*\exp\{\sigma*W(t) + (\mu - \sigma^2/2)*t\}$
where W(t) is a brownian Motion. Therefore $W(t) \sim N(0,t)$.

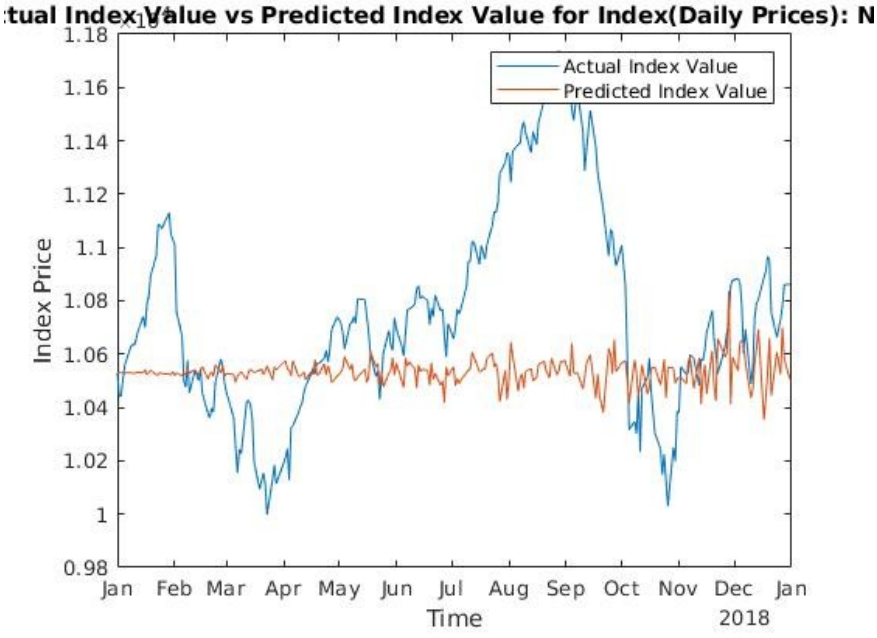
t =1/246,2/246..... (for daily prices)

t=t =1/52,2/52..... (for weekly prices)

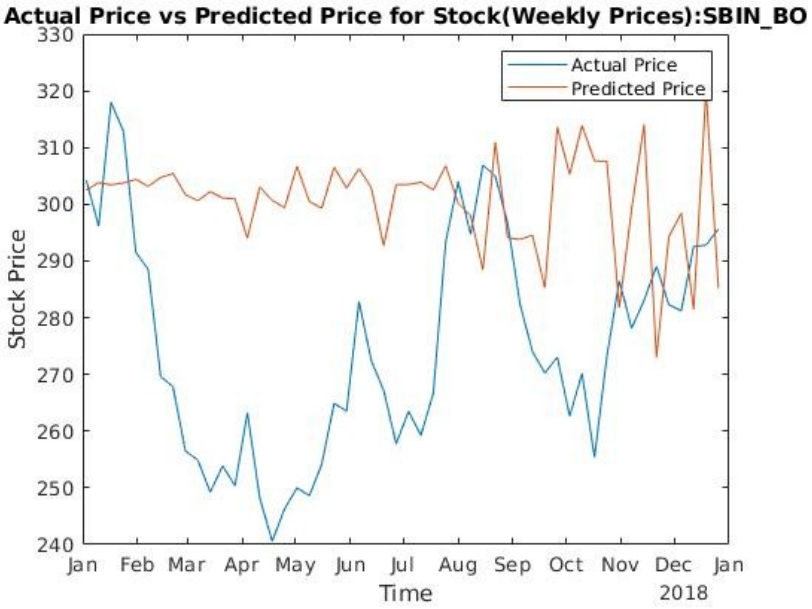
t =1/12,2/12..... (for Monthly prices)

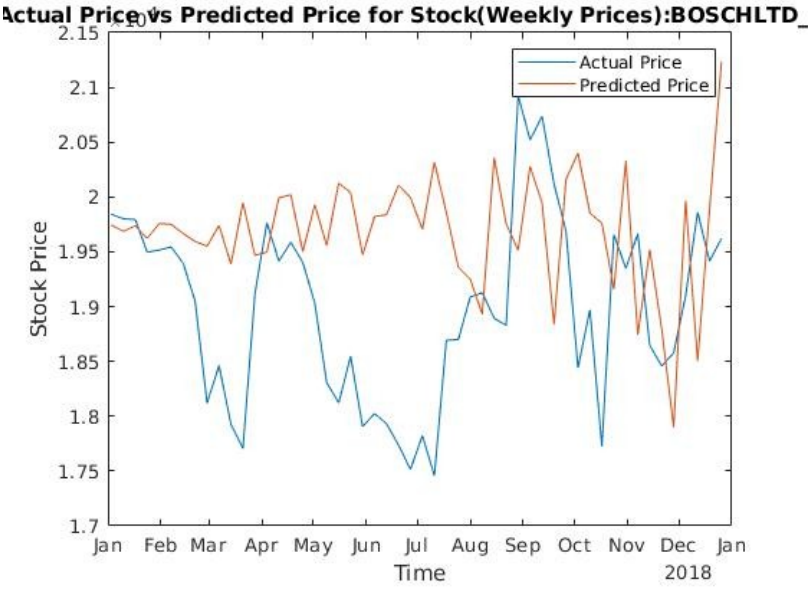

Actual Price vs Predicted Price for Stock(Daily Prices):SBIN_BO
Actual Price
Predicted Price
Stock Price
330
320
310
300
290
280
270
260
250
240
230
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
Time
2018

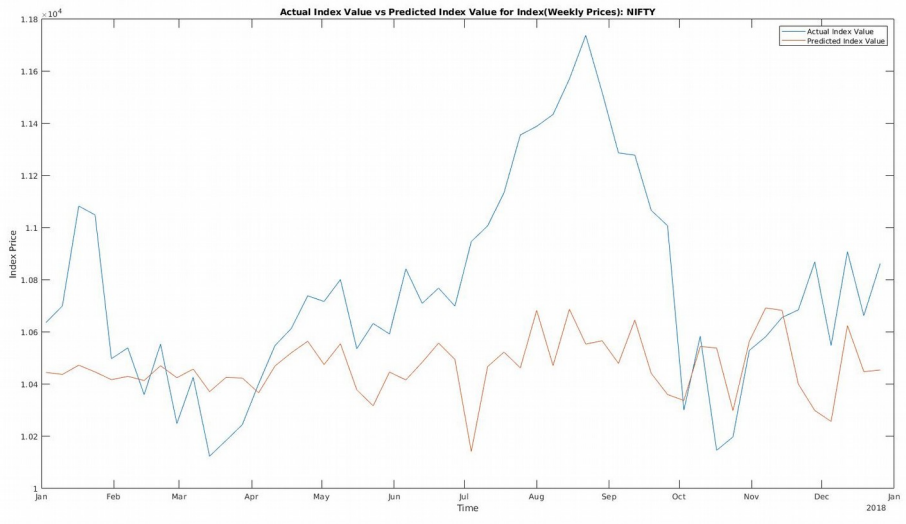

Actual Price vs Predicted Price for Stock(Daily Prices):BOSCHLTD_B
Actual Price
Predicted Price
Stock Price
2.3
2.2
2.1
2
1.9
1.8
1.7
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
Time
2018


tual Index Value vs Predicted Index Value for Index(Daily Prices): N
Actual Index Value
Predicted Index Value
Index Price
1.18
1.16
1.14
1.12
1.1
1.08
1.06
1.04
1.02
1
0.98
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
Time
2018

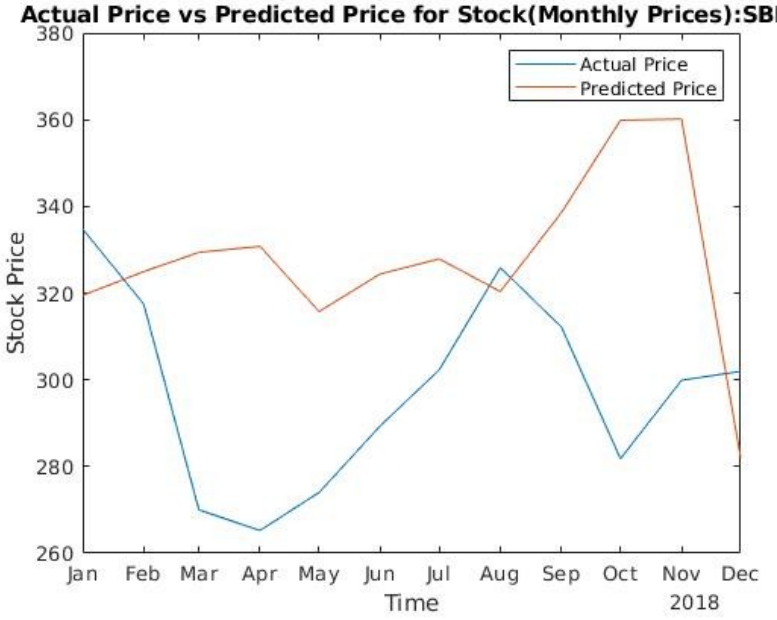
Question 5


Actual Price vs Predicted Price for Stock(Weekly Prices):SBIN_BO
Actual Price
Predicted Price
Stock Price
Time
2018
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
240 250 260 270 280 290 300 310 320 330

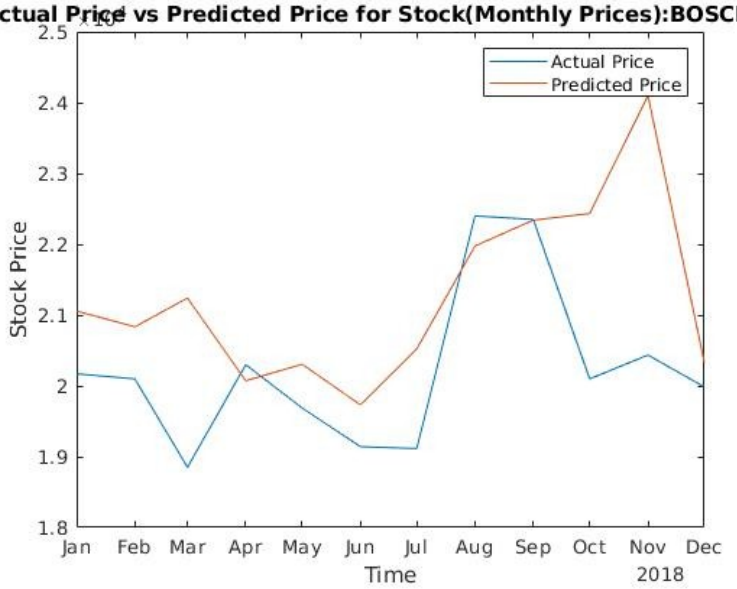

Actual Price vs Predicted Price for Stock(Weekly Prices):BOSCHLTD_
Actual Price
Predicted Price
Stock Price
Time
2018
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
1.7 1.75 1.8 1.85 1.9 1.95 2 2.05 2.1 2.15

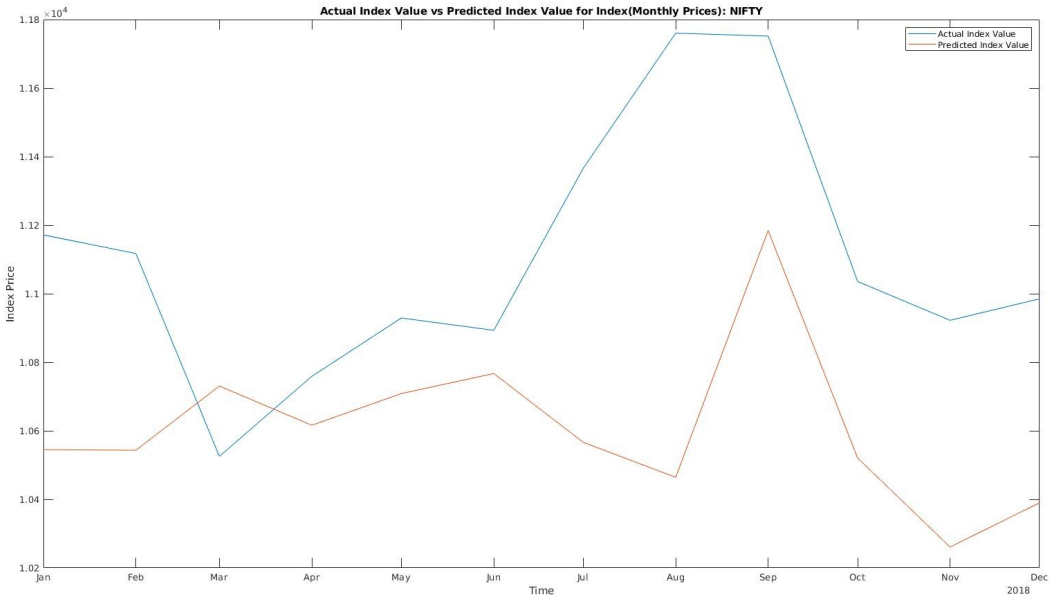

Actual Index Value vs Predicted Index Value for Index(Weekly Prices): NIFTY
Actual Index Value
Predicted Index Value
Index Price
Time
2018
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan
1 1.02 1.04 1.06 1.08 1.1 1.12 1.14 1.16 1.18

Actual Price vs Predicted Price for Stock(Monthly Prices):SBIN



Actual Price vs Predicted Price for Stock(Monthly Prices):BOSCHLT




Actual Index Value vs Predicted Index Value for Index(Monthly Prices): NIFTY
×10^4
1.18
1.16
1.14
1.12
1.1
1.08
1.06
1.04
1.02
Index Price
Actual Index Value
Predicted Index Value
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2018
Time