In [4]:
```
###  keras and tensorflow>2.0
```

In [5]:
```
#data collection
import pandas_datareader as pdr
import matplotlib.pyplot as plt
```

In [ ]:
```
df=pdr.get_data_tiingo('NFLX.csv', api_key=key)
```

In [ ]:
```
df.to_csv('NFLX.csv')
```

In [ ]:
```
import pandas as pd
```

In [12]:
```
df = pd.read_csv('NFLX.csv')
```

In [13]:
```
df.head()
```

Out[13]:

	Unnamed: 0.9	Unnamed: 0.8	Unnamed: 0.7	Unnamed: 0.6	Unnamed: 0.5	Unnamed: 0.4	Unnamed: 0.3	Unnamed: 0.2	Unnamed: 0.1	Unnamed: 0	Date	Open	High	Low	Close	Adj Close	Volume
0	0	0	0	0	0	0	0	0	0	0	2002-05-23	1.156429	1.242857	1.145714	1.196429	1.196429	104790000
1	1	1	1	1	1	1	1	1	1	1	2002-05-24	1.214286	1.225000	1.197143	1.210000	1.210000	11104800
2	2	2	2	2	2	2	2	2	2	2	2002-05-28	1.213571	1.232143	1.157143	1.157143	1.157143	6609400
3	3	3	3	3	3	3	3	3	3	3	2002-05-29	1.164286	1.164286	1.085714	1.103571	1.103571	6757800
4	4	4	4	4	4	4	4	4	4	4	2002-05-30	1.107857	1.107857	1.071429	1.071429	1.071429	10154200

In [14]:
```
df1 = df.reset_index()['Close']
```

In [15]:
```
df1.shape
```

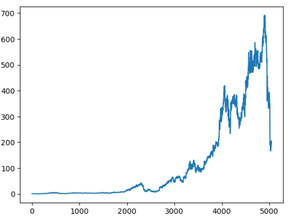
Out[15]:
```
(5044,)
```

In [16]:
```
df1
```

Out[16]:
```
0         1.196429
1         1.210000
2         1.157143
3         1.103571
4         1.071429
           ...
5039    195.190002
5040    197.440002
5041    192.910004
5042    205.089996
5043    198.979996
Name: Close, Length: 5044, dtype: float64
```

In [17]:
```
import matplotlib.pyplot as plt
plt.plot(df1)
```

Out[17]:
```
[<matplotlib.lines.Line2D at 0x2ac56f482e0>]
```



In [18]:
```
###LSTM is sensitive to the scale of  data so we apply MinMmax scaler
```

In [19]:
```
import numpy as np
```

In [20]:
```
from sklearn.preprocessing import MinMaxScaler
Scaler = MinMaxScaler(feature_range=(0,1))
df1 = Scaler.fit_transform(np.array(df1).reshape(-1,1))
```

In [21]:
```
df1.shape
```

Out[21]:
```
(5044, 1)
```

In [22]:
```
print(df1)
```

```
[[0.00119131]
 [0.00121094]
 [0.00113448]
 ...
 [0.2785077 ]
 [0.29612623]
 [0.28728803]]
```

In [23]:
```
###splitting dataset into test and train split
training_size = int(len(df1)*0.65)
test_size = len(df1)-training_size
train_data,test_data = df1[0:training_size,:],df1[ training_size:len(df1),:1]
```

In [24]:
```
training_size, test_size
```

Out[24]:
```
(3278, 1766)
```

In [25]:
```
import numpy
#convert  an array of values into a dataset matrix
def create_dataset(dataset, time_step = 1):
    dataX, dataY = [],[]
    for i in range (len(dataset)-time_step-1):
        a = dataset[i:(i+time_step), 0 ]
        dataX.append(a)
        dataY.append(dataset[i +time_step, 0])
    return numpy.array(dataX),numpy.array(dataY)
```

In [26]:
```
##reshape into x=t,t+1,t+2,t+3 and Y=t+4
time_step = 100
X_train, y_train = create_dataset(train_data, time_step)
X_test, y_test = create_dataset(test_data,  time_step)
```

In [27]:
```
print(X_train.shape),print(y_train.shape)
```

Out[27]:
```
(3177, 100)
(3177,)
(None, None)
```

In [28]:
```
print(X_test.shape),print(y_test.shape)
```

Out[28]:
```
(1665, 100)
(1665,)
(None, None)
```

In [29]:
```
#reshape input to be timesteps , features ] which is required for lstm
X_train=X_train.reshape(X_train.shape[0],X_train.shape[1],1)
X_test=X_test.reshape(X_test.shape[0],X_test.shape[1],1)
```

In [30]:
```
###recreate stacked lstm model
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
from tensorflow.keras.layers import LSTM
```

In [34]:
```
model=Sequential()
model.add(LSTM(50,return_sequences=True,input_shape=(100,1)))
model.add(LSTM(50,return_sequences=True))
model.add(LSTM(50))
model.add(Dense(1))
model.compile(loss='mean_squared_error',optimizer='adam')
```

In [35]:
```
model.summary()
```

```
Model: "sequential_1"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 lstm_3 (LSTM)               (None, 100, 50)           10400

 lstm_4 (LSTM)               (None, 100, 50)           20200

 lstm_5 (LSTM)               (None, 50)                20200

 dense_1 (Dense)             (None, 1)                 51

=================================================================
Total params: 50,851
Trainable params: 50,851
Non-trainable params: 0
_________________________________________________________________
```

In [ ]:
```

```

In [ ]:
```
model.fit(X_train,y_train,validation_data=(X_test,y_test ),epochs=100,batch_size=64,verbose=1)
```

```
Epoch 1/100
50/50 [==============================] - 31s 400ms/step - loss: 1.6006e-04 - val_loss: 0.0042
Epoch 2/100
50/50 [==============================] - 17s 338ms/step - loss: 1.4181e-05 - val_loss: 0.0027
Epoch 3/100
50/50 [==============================] - 17s 333ms/step - loss: 1.2977e-05 - val_loss: 0.0024
Epoch 4/100
50/50 [==============================] - 17s 338ms/step - loss: 1.2196e-05 - val_loss: 0.0024
Epoch 5/100
50/50 [==============================] - 16s 329ms/step - loss: 1.1703e-05 - val_loss: 0.0020
Epoch 6/100
50/50 [==============================] - 17s 332ms/step - loss: 1.0052e-05 - val_loss: 0.0029
Epoch 7/100
50/50 [==============================] - 17s 346ms/step - loss: 1.1444e-05 - val_loss: 0.0024
Epoch 8/100
50/50 [==============================] - 17s 351ms/step - loss: 9.6316e-06 - val_loss: 0.0022
Epoch 9/100
50/50 [==============================] - 19s 387ms/step - loss: 9.6839e-06 - val_loss: 0.0022
Epoch 10/100
50/50 [==============================] - 19s 374ms/step - loss: 8.9749e-06 - val_loss: 0.0011
Epoch 11/100
50/50 [==============================] - 17s 333ms/step - loss: 8.4979e-06 - val_loss: 0.0019
Epoch 12/100
50/50 [==============================] - 18s 352ms/step - loss: 7.7608e-06 - val_loss: 0.0030
Epoch 13/100
50/50 [==============================] - 17s 334ms/step - loss: 7.8519e-06 - val_loss: 0.0022
Epoch 14/100
50/50 [==============================] - 17s 334ms/step - loss: 7.3015e-06 - val_loss: 0.0014
Epoch 15/100
39/50 [======================>.......] - ETA: 3s - loss: 8.1995e-06
```

In [ ]:
```
import tensorflow as tf
```

In [ ]:
```
tf.__version__
```

In [ ]:
```
###lets Do the pedictions and check performance matrix
train_predict=model.predict(x_train)
test_predict=model.predict(X_test)
```

In [ ]:
```
###transform back  to origina form
train_predict=scaler.inverse_transform(train_predict)
test_predict=scaler.inverse_transform(test_predict)
```

In [ ]:
```
###calculate RSME performance metrix
import math
from sklearn.metrics import mean_squared_error
math.sqrt( mean_squared_error(y_train,train_predict))
```

In [ ]:
```
###Test Data RSME
math.sqrt(mean_squared_error(y_test,test_predict))
```

In [ ]:
```
###plotting
#shift train predictionsfor plotting
import numpy as np
look_back = 100
trainpredictplot = numpy.empty_like(df1)
trainpredictplot[:,:] = np.nan
trainpredictplot[look_back:len(train_predict)+look_back, :]=train_predict
#shift test predictions for plotting
testpredictplot = numpy.empty_like(df1)
testpredictplot[:,:] = numpy.nan
testpredictplot[len(train_predict)+(look*2)+1:len(df1)-1,:]=test_predict
#plot baseline and predictions
plt.plot(scaler.inverse_transform(df1))
plt.plot(trainpredictplot)
plt.plot(testpredictplot)
plt.show()
```

In [ ]:
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