```
import numpy as np
import pandas as pd
from sklearn import metrics
%matplotlib inline
import matplotlib.pyplot as plt
import seaborn as sns
```

```
data=pd.read_csv('/content/NSE-TATAGLOBAL11[1].csv')
```

```
data.head()
```

	Date	Open	High	Low	Last	Close	Total Trade Quantity	Turnover (Lacs)
0	2018-10-08	208.00	222.25	206.85	216.00	215.15	4642146.0	10062.83
1	2018-10-05	217.00	218.60	205.90	210.25	209.20	3519515.0	7407.06
2	2018-10-04	223.50	227.80	216.15	217.25	218.20	1728786.0	3815.79
3	2018-10-03	230.00	237.50	225.75	226.45	227.60	1708590.0	3960.27
4	2018-10-01	234.55	234.60	221.05	230.30	230.90	1534749.0	3486.05

```
data['Date']=pd.to_datetime(data.Date)
```

```
data.shape
```

```
(1235, 8)
```

```
data.isnull().sum()
```

```
Date                 0
Open                 0
High                 0
```

```
Low                   0
Last                  0
Close                 0
Total Trade Quantity  0
Turnover (Lacs)       0
dtype: int64
```

```
data.isna().any()
```

```
Date                  False
Open                  False
High                  False
Low                   False
Last                  False
Close                 False
Total Trade Quantity  False
Turnover (Lacs)       False
dtype: bool
```

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1235 entries, 0 to 1234
Data columns (total 8 columns):
 #   Column                Non-Null Count  Dtype         
---  ------                --------------  -----         
 0   Date                  1235 non-null   datetime64[ns]
 1   Open                  1235 non-null   float64       
 2   High                  1235 non-null   float64       
 3   Low                   1235 non-null   float64       
 4   Last                  1235 non-null   float64       
 5   Close                 1235 non-null   float64       
 6   Total Trade Quantity  1235 non-null   float64       
 7   Turnover (Lacs)       1235 non-null   float64       
dtypes: datetime64[ns](1), float64(7)
memory usage: 77.3 KB
```

```
data.describe()
```

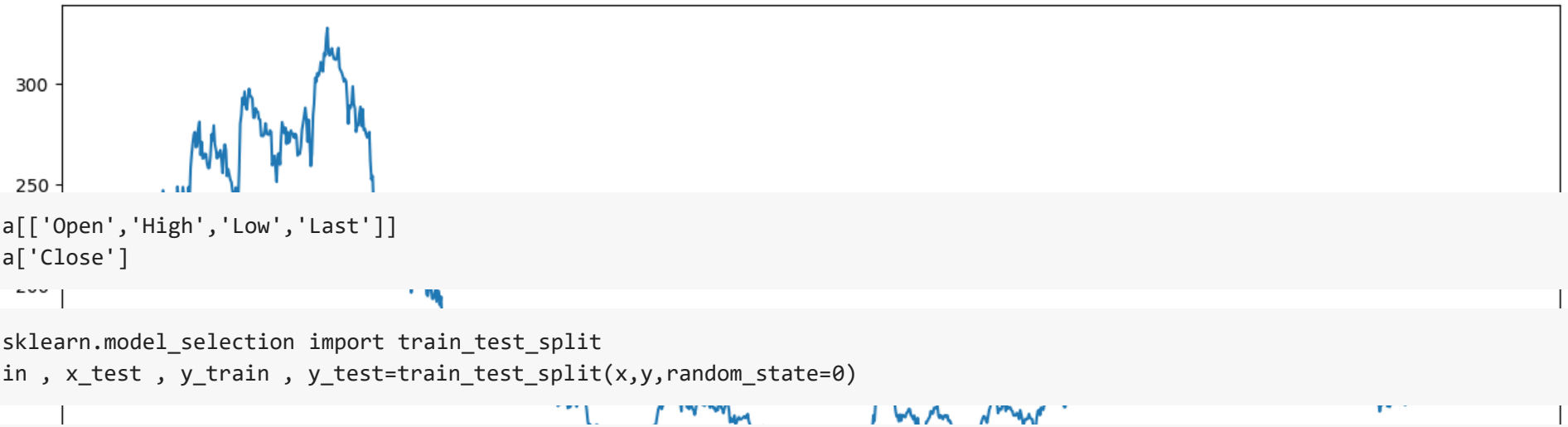
	Open	High	Low	Last	Close	Total Trade Quantity	Turnover (Lacs)
count	1235.000000	1235.000000	1235.000000	1235.000000	1235.000000	1.235000e+03	1235.000000
mean	168.954858	171.429069	166.402308	168.736356	168.731053	2.604151e+06	4843.166502
std	51.499145	52.436761	50.542919	51.587384	51.544928	2.277028e+06	5348.919832
min	103.000000	104.600000	100.000000	102.600000	102.650000	1.001800e+05	128.040000
25%	137.550000	138.925000	135.250000	137.175000	137.225000	1.284482e+06	1801.035000
50%	151.500000	153.250000	149.500000	151.200000	151.100000	1.964885e+06	3068.510000
75%	169.000000	172.325000	166.700000	169.100000	169.500000	3.095788e+06	5852.600000
max	327.700000	328.750000	321.650000	325.950000	325.750000	2.919102e+07	55755.080000

```
print(len(data))
```

```
1235
```

```
data['Open'].plot(figsize=(15,5))
```

```
<Axes: >
```




```
x=data[['Open','High','Low','Last']]
y=data['Close']
```

```
from sklearn.model_selection import train_test_split
x_train , x_test , y_train , y_test=train_test_split(x,y,random_state=0)
```

```
x_train.shape
```

```
(926, 4)
```

```
x_test.shape
```

```
(309, 4)
```

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import confusion_matrix, accuracy_score
regressor=LinearRegression()
```

```
regressor.fit(x_train,y_train)
```

```
▾ LinearRegression
LinearRegression()
```

```
print(regressor.coef_)
```

```
[-0.06299618  0.09073469  0.08672877  0.88451674]
```

```
print(regressor.intercept_)
```

```
0.1401341854183329
```

```
predicted=regressor.predict(x_test)
```

```
print(x_test)
```

```
        Open    High     Low    Last
1083  152.95  154.85  151.05  153.35
18    221.00  224.50  219.10  223.15
1099  156.50  157.00  151.85  153.00
818   132.95  133.90  132.30  133.20
184   314.65  319.20  312.20  317.45
...      ...     ...     ...     ...
907   154.40  154.70  151.55  153.00
801   134.90  137.80  134.25  136.80
1089  145.80  146.70  144.15  144.65
435   125.00  126.05  123.80  124.10
833   149.40  150.30  143.00  144.60

[309 rows x 4 columns]
```

```
predicted.shape
```

```
(309,)
```

```
dframe=pd.DataFrame({'Actual Price':y_test,'PredictedPrice':predicted})
```

```
print(dframe)
```

```
      Actual Price  PredictedPrice
1083        153.45      153.296158
```

```
18          222.95      222.970100
1099        152.95      153.027403
818         132.60      133.206013
184         317.60      317.147460
...            ...             ...
907         152.40      152.924987
801         136.80      136.790417
1089        144.55      144.713369
435         124.45      124.208268
833         144.90      144.669263

[309 rows x 2 columns]
```

```
dframe.head(25)
```

	Actual Price	PredictedPrice
1083	153.45	153.296158
18	222.95	222.970100
1099	152.95	153.027403
818	132.60	133.206013
184	317.60	317.147460
608	122.40	122.511089
1213	160.35	161.661581
717	128.00	127.727919
1137	141.20	141.178114
1009	162.20	163.373307
1068	174.85	173.933181
621	118.25	118.293977

```
from sklearn.metrics import confusion_matrix, accuracy_score
```

```
regressor.score(x_test,y_test)
```

```
0.9999281448580609
```

472	118.05	119.699251

```
import math
```

194	302.75	302.799137

```
print('Mean Absolute Error:',metrics.mean_absolute_error(y_test,predicted))
```

```
Mean Absolute Error: 0.29103838136150123
```

```
print('Mean Squared Error:',metrics.mean_squared_error(y_test,predicted))
```

```
Mean Squared Error: 0.1608032139897181
```

```
print('Root Mean Squared Error:',math.sqrt(metrics.mean_squared_error(y_test,predicted)))
```

```
Root Mean Squared Error: 0.4010027605761812
```

```
graph=dframe.head(20)
```

```
graph.plot(kind='bar')
```

```
<Axes: >
```

```
#Calculate the daily returns
returns=data['Close'].pct_change()
returns
```

```
0           NaN
1     -0.027655
2      0.043021
3      0.043080
4      0.014499
          ...
1230   0.008858
1231   0.003763
1232   0.000625
1233  -0.028723
1234   0.001607
Name: Close, Length: 1235, dtype: float64
```

```
#Calculate the moving averages
ma_10=data['Close'].rolling(window=10).mean()
ma_50=data['Close'].rolling(window=50).mean()
ma_10
ma_50
```

```
0          NaN
1          NaN
2          NaN
3          NaN
4          NaN
         ...
1230   153.301
1231   153.357
1232   153.466
1233   153.515
1234   153.681
Name: Close, Length: 1235, dtype: float64
```

```
#Calculate the standard deviation
std=data['Close'].rolling(window=10).std()
```

```
std
```

```
0            NaN
1            NaN
2            NaN
3            NaN
4            NaN
           ...
1230    2.558586
1231    2.535553
1232    2.392053
1233    2.373587
1234    2.701975
Name: Close, Length: 1235, dtype: float64
```

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