```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline

import chart_studio.plotly as py
import plotly.graph_objs as go
from plotly.offline import plot

#for offline plotting
from plotly.offline import download_plotlyjs, init_notebook_mode,
plot, iplot
init_notebook_mode(connected=True)

tesla = pd.read_csv(r"E:\xlsx\tesla.csv")
tesla.head()
```

```
         Date       Open   High        Low      Close  Adj Close
Volume
0  29-06-2010  19.000000  25.00  17.540001  23.889999  23.889999
18766300
1  30-06-2010  25.790001  30.42  23.299999  23.830000  23.830000
17187100
2  01-07-2010  25.000000  25.92  20.270000  21.959999  21.959999
8218800
3  02-07-2010  23.000000  23.10  18.709999  19.200001  19.200001
5139800
4  06-07-2010  20.000000  20.00  15.830000  16.110001  16.110001
6866900
```

```
tesla.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2193 entries, 0 to 2192
Data columns (total 7 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   Date       2193 non-null   object
 1   Open       2193 non-null   float64
 2   High       2193 non-null   float64
 3   Low        2193 non-null   float64
 4   Close      2193 non-null   float64
 5   Adj Close  2193 non-null   float64
 6   Volume     2193 non-null   int64
dtypes: float64(5), int64(1), object(1)
memory usage: 120.1+ KB
```

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

```
C:\Users\DELL\AppData\Local\Temp\ipykernel_10276\3702129700.py:1:
UserWarning:
```

```
Parsing dates in %d-%m-%Y format when dayfirst=False (the default) was
specified. Pass `dayfirst=True` or specify a format to silence this
warning.
```

```
print(f'Dataframe contains stock prices between {tesla.Date.min()}
{tesla.Date.max()}')
print(f'Total days = {(tesla.Date.max()  - tesla.Date.min()).days}
days')
```

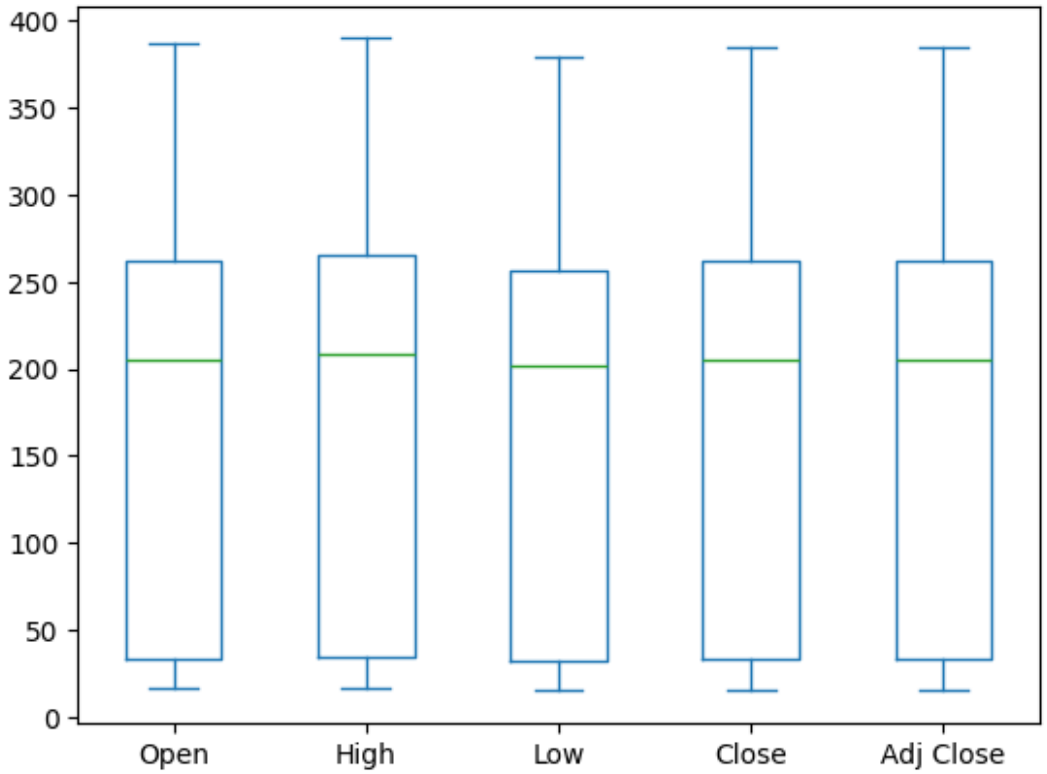
```
Dataframe contains stock prices between 2010-06-29 00:00:00 2019-03-15
00:00:00
Total days = 3181 days
```

```
tesla.describe()
```

```
                                Date         Open         High
Low  \
count                           2193  2193.000000  2193.000000
2193.000000
mean   2014-11-04 14:37:15.841313024   175.652882   178.710262
172.412075
min              2010-06-29 00:00:00    16.139999    16.629999
14.980000
25%              2012-08-29 00:00:00    33.110001    33.910000
32.459999
50%              2014-11-04 00:00:00   204.990005   208.160004
201.669998
75%              2017-01-09 00:00:00   262.000000   265.329987
256.209991
max              2019-03-15 00:00:00   386.690002   389.609985
379.350006
std                              NaN   115.580903   117.370092
113.654794

             Close    Adj Close        Volume
count  2193.000000  2193.000000  2.193000e+03
mean    175.648555   175.648555  5.077449e+06
min      15.800000    15.800000  1.185000e+05
25%      33.160000    33.160000  1.577800e+06
50%     204.990005   204.990005  4.171700e+06
75%     261.739990   261.739990  6.885600e+06
max     385.000000   385.000000  3.716390e+07
std     115.580771   115.580771  4.545398e+06
```

```
tesla[['Open','High','Low','Close','Adj Close']].plot(kind='box')
```

```
<Axes: >
```



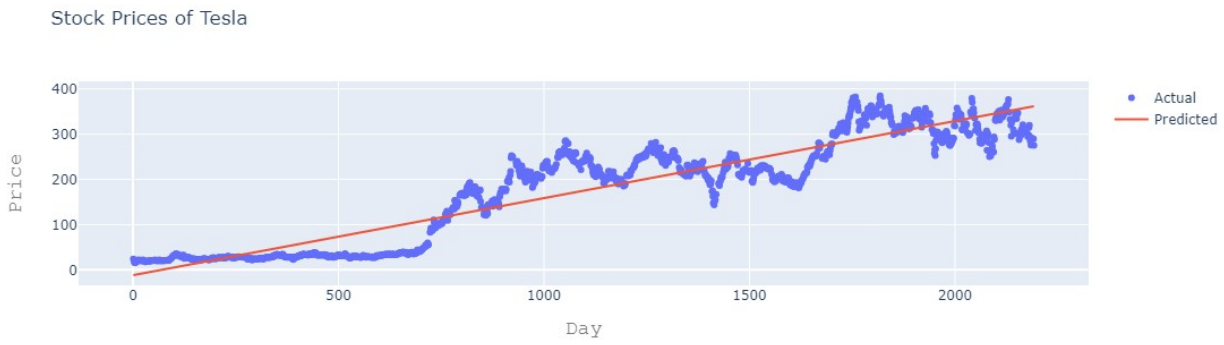

```
# Setting the layout for our plot
layout = go.Layout(
    title='Stock Prices of Tesla',
    xaxis=dict(
        title='Date',
        titlefont=dict(
            family='Courier New, monospace',
            size=18,
            color='#7f7f7f'
        )
    ),
    yaxis=dict(
        title='Price',
        titlefont=dict(
            family='Courier New, monospace',
            size=18,
            color='#7f7f7f'
        )
    )
)

tesla_data = [{'x':tesla['Date'], 'y':tesla['Close']}]
plot = go.Figure(data=tesla_data, layout=layout)

iplot(plot)
```


```
# Building the regression model
from sklearn.model_selection import train_test_split

#For preprocessing
from sklearn.preprocessing import MinMaxScaler
from sklearn.preprocessing import StandardScaler

#For model evaluation
from sklearn.metrics import mean_squared_error as mse
from sklearn.metrics import r2_score

#Split the data into train and test sets
X = np.array(tesla.index).reshape(-1,1)
Y = tesla['Close']
X_train, X_test, Y_train, Y_test = train_test_split(X, Y,
test_size=0.3, random_state=101)

# Feature scaling
scaler = StandardScaler().fit(X_train)

from sklearn.linear_model import LinearRegression

#Creating a linear model
lm = LinearRegression()
lm.fit(X_train, Y_train)
```

```
LinearRegression()
```

```
#Plot actual and predicted values for train dataset
trace0 = go.Scatter(
    x = X_train.T[0],
    y = Y_train,
    mode = 'markers',
    name = 'Actual'
)
trace1 = go.Scatter(
    x = X_train.T[0],
    y = lm.predict(X_train).T,
```

```
    mode = 'lines',
    name = 'Predicted'
)
tesla_data = [trace0,trace1]
layout.xaxis.title.text = 'Day'
plot2 = go.Figure(data=tesla_data, layout=layout)

iplot(plot2)
```




```
#Calculate scores for model evaluation
scores = f'''
{'Metric'.ljust(10)}{'Train'.center(20)}{'Test'.center(20)}
{'r2_score'.ljust(10)}{r2_score(Y_train, lm.predict(X_train))}\
t{r2_score(Y_test, lm.predict(X_test))}
{'MSE'.ljust(10)}{mse(Y_train, lm.predict(X_train))}\t{mse(Y_test,
lm.predict(X_test))}
'''
print(scores)
```

```
Metric           Train                Test
r2_score  0.8658871776828707     0.8610649253244574
MSE       1821.3833862936174     1780.987539418845
```