In [41]:
```
import numpy as np
import pandas as pd

#For data viz
import seaborn as sns
import matplotlib.pyplot as plt

#For creating LSTM model
#from tensorflow.keras.models import Sequential
#from tensorflow.keras.layers import Dense
#from tensorflow.keras.layers import LSTM

#import tensorflow as tf
```

In [40]:
```
df=pd.read_csv(r'C:\Tesla.csv - Tesla.csv.csv')
df.head()
```

Out[40]:

	Date	Open	High	Low	Close	Volume	Adj Close
0	6/29/2010	19.000000	25.00	17.540001	23.889999	18766300	23.889999
1	6/30/2010	25.790001	30.42	23.299999	23.830000	17187100	23.830000
2	7/1/2010	25.000000	25.92	20.270000	21.959999	8218800	21.959999
3	7/2/2010	23.000000	23.10	18.709999	19.200001	5139800	19.200001
4	7/6/2010	20.000000	20.00	15.830000	16.110001	6866900	16.110001

In [21]:
```
df.isnull().sum()
```

Out[21]:
```
Date         0
Open         0
High         0
Low          0
Close        0
Volume       0
Adj Close    0
dtype: int64
```

In [22]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1692 entries, 0 to 1691
Data columns (total 7 columns):
 #   Column     Non-Null Count  Dtype  
---  ------     --------------  -----  
 0   Date       1692 non-null   object 
 1   Open       1692 non-null   float64
 2   High       1692 non-null   float64
 3   Low        1692 non-null   float64
 4   Close      1692 non-null   float64
 5   Volume     1692 non-null   int64  
 6   Adj Close  1692 non-null   float64
dtypes: float64(5), int64(1), object(1)
memory usage: 92.7+ KB
```

In [24]:
```
df1=df.reset_index()['Close']
df.Date=pd.to_datetime(df.Date)
```

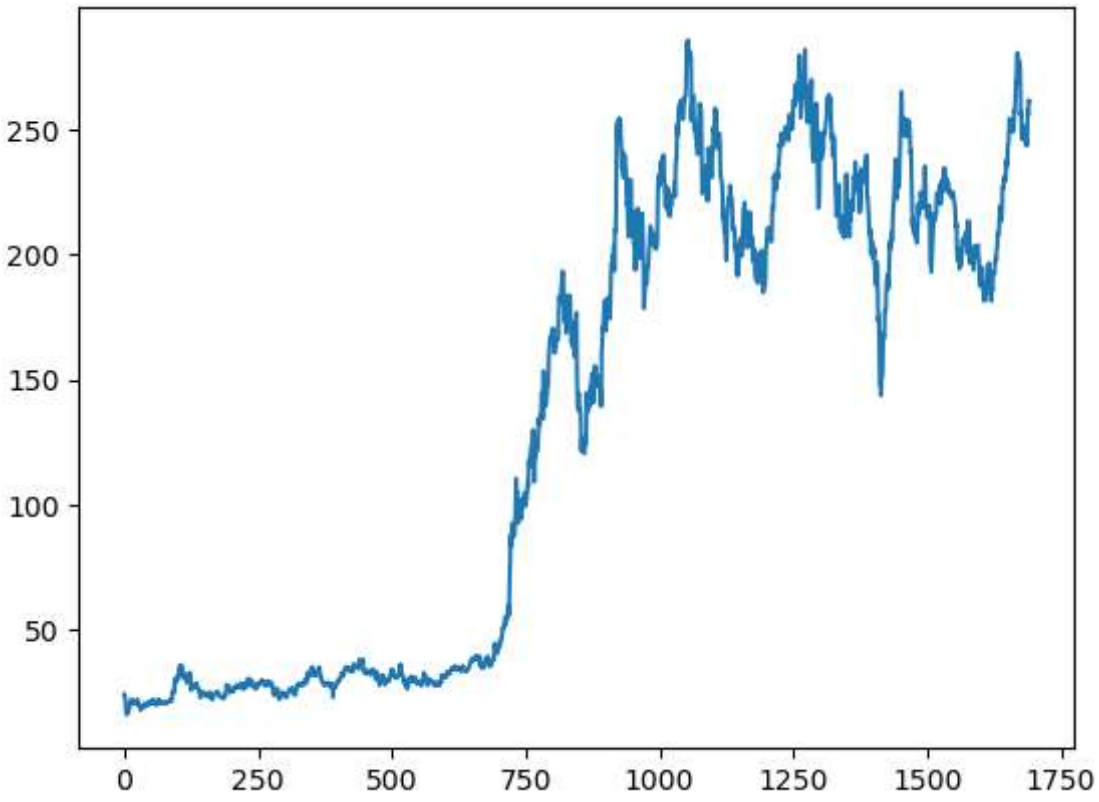
In [25]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1692 entries, 0 to 1691
Data columns (total 7 columns):
 #   Column     Non-Null Count  Dtype
---  ------     --------------  -----
 0   Date       1692 non-null   datetime64[ns]
 1   Open       1692 non-null   float64
 2   High       1692 non-null   float64
 3   Low        1692 non-null   float64
 4   Close      1692 non-null   float64
 5   Volume     1692 non-null   int64
 6   Adj Close  1692 non-null   float64
dtypes: datetime64[ns](1), float64(5), int64(1)
memory usage: 92.7 KB
```

In [26]:
```
df1=df.reset_index()['Close']
```

In [27]:
```
plt.plot(df1)
```

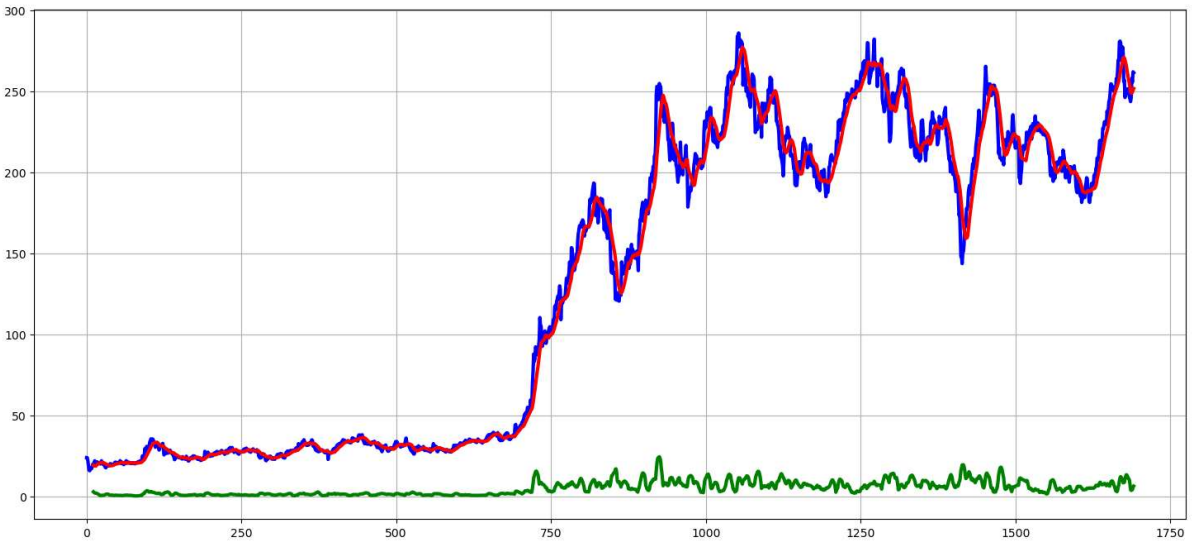
Out[27]:
```
[<matplotlib.lines.Line2D at 0x175ce00c550>]
```



In [28]:
```
from statsmodels.tsa.stattools import adfuller
```

In [29]:
```
def test_stationary(timeseries):
    rolemean=timeseries.rolling(12).mean()
    rolestd=timeseries.rolling(12).std()
    plt.figure(figsize=(18,8))
    plt.grid('both')
    plt.plot(timeseries,color='blue',label='Orginal',linewidth=3)
    plt.plot(rolemean,color='red',label='Rolling Mean',linewidth=3)
    plt.plot(rolestd,color='green',label='Rolling Std',linewidth=3)
    plt.show()
    adft=adfuller(timeseries,autolag='AIC')
    output=pd.Series(adft[0:4],index=['Test Statistics','p-value','No of lags','No
    for key,values in adft[4].items():
        output['critical value (%s)'%key]=values
```

```
    print(output)
test_stationary(df1)
```




```
Test Statistics                -0.813733
p-value                         0.815055
No of lags                      0.000000
No of observation used       1691.000000
critical value (1%)            -3.434223
critical value (5%)            -2.863251
critical value (10%)           -2.567681
dtype: float64
```

In [30]:
```
from sklearn.preprocessing import MinMaxScaler
scaler=MinMaxScaler(feature_range=(0,1))
df1=scaler.fit_transform(np.array(df1).reshape(-1,1))#Since it contains the single
df1
```

Out[30]:
```
array([[0.02993635],
       [0.02971433],
       [0.02279455],
       ...,
       [0.88784039],
       [0.91122698],
       [0.9091918 ]])
```

In [31]:
```
from sklearn.preprocessing import MinMaxScaler
scaler=MinMaxScaler(feature_range=(0,1))
df1=scaler.fit_transform(np.array(df1).reshape(-1,1))#Since it contains the single
df1
```

Out[31]:
```
array([[0.02993635],
       [0.02971433],
       [0.02279455],
       ...,
       [0.88784039],
       [0.91122698],
       [0.9091918 ]])
```

In [32]:
```
df1.ndim
```

Out[32]:
```
2
```

In [33]:
```
df1.shape
```

Out[33]:
```
(1692, 1)
```

In [34]:
```
training_size=int(len(df)*0.70)
test_size=len(df)-training_size
train_data,test_data=df[0:training_size],df[training_size:len(df)]
```

In [35]:
```
train_data=df[0:training_size]
```

In [36]:
```
train_data
```

Out[36]:

	Date	Open	High	Low	Close	Volume	Adj Close
0	2010-06-29	19.000000	25.000000	17.540001	23.889999	18766300	23.889999
1	2010-06-30	25.790001	30.420000	23.299999	23.830000	17187100	23.830000
2	2010-07-01	25.000000	25.920000	20.270000	21.959999	8218800	21.959999
3	2010-07-02	23.000000	23.100000	18.709999	19.200001	5139800	19.200001
4	2010-07-06	20.000000	20.000000	15.830000	16.110001	6866900	16.110001
...	...	...	...	...	...	...	...
1179	2015-03-06	199.210007	200.750000	192.149994	193.880005	6712400	193.880005
1180	2015-03-09	194.389999	194.490005	188.250000	190.880005	6736700	190.880005
1181	2015-03-10	188.460007	193.500000	187.600006	190.320007	5579700	190.320007
1182	2015-03-11	191.149994	196.179993	191.009995	193.740005	4974900	193.740005
1183	2015-03-12	193.750000	194.449997	189.750000	191.070007	4149300	191.070007

1184 rows × 7 columns

In [37]:
```
training_size,test_size
```

Out[37]:
```
(1184, 508)
```