

- 1) Explain components of time series data with your own example
- 2) Plot ACF for any stock data part from TESLA and check if it is stationary or not.

In [1]:

```

'''
#1) Explain components of time series data with your own example

Components for Time Series Analysis

Trend
Seasonal Variations
Cyclic Variations
Random or Irregular movements

Trend
Increase in prices,
Increase in pollution,
an increase in the need for wheat,
an increase in literacy rate

Seasonal Variations
the cost of various types of fruits and vegetables,
clothes,
unemployment figures, average daily rainfall,
increase in the sale of tea in winter, increase in the sale of ice cream in summer, etc.,
all show seasonal variations

Cyclic Variations
economic data affected by business cycles with a period varying between about 5 and 7 years
In weekly or monthly data, the cyclical component may describe any regular variation (fluctuations) in time series data.
The cyclical variation is periodic in nature and repeats itself like a business cycle,
which has four phases
(i) Peak/Prosperity
(ii) Recession
(iii) Trough/Depression
(iv) Expansion

Random or Irregular movements
a rise in prices of steel due to strike in the factory,
accident due to failure of the break,
flood,
earth quake,
and war, etc.
'''

```

Out[1]:

```

'\n#1) Explain components of time series data with your own example\n\nComponents for Time Series Analysis\n\nTrend\nSeasonal Variations\nCyclic Variations\nRandom or Irregular movements\n\nTrend\nIncrease in prices,\nIncrease in pollution,\nan increase in the need for wheat,\nan increase in literacy rate\n\nSeasonal Variations\nthe cost of various types of fruits and vegetables, \nclothes, \nunemployment figures, average daily rainfall, \nincrease in the sale of tea in winter, increase in the sale of ice cream in summer, etc., \nall show seasonal variations\n\nCyclic Variations\neconomic data affected by business cycles with a period varying between about 5 and 7 years.\nIn weekly or monthly data, the cyclical component may describe any regular variation (fluctuations) in time series data. \nThe cyclical variation is periodic in nature and repeats itself like a business cycle, \nwhich has four phases \n(i) Peak/Prosperity \n(ii) Recession \n(iii) Trough/Depression \n(iv) Expansion\n\nRandom or Irregular movements\na rise in prices of steel due to strike in the factory, \naccident due to failure of the break, \nflood, \nearthquake, \nand war, etc.\n'

```

In [2]:

```
#2) Plot ACF for any stock data part from TESLA and check if it is stationary or not.
```

```
! pip install yfinance
```

```
Requirement already satisfied: yfinance in c:\users\swapn\anaconda3\lib\site-packages (0.1.63)
Requirement already satisfied: requests>=2.20 in c:\users\swapn\anaconda3\lib\site-packages (from yfinance) (2.24.0)
Requirement already satisfied: numpy>=1.15 in c:\users\swapn\anaconda3\lib\site-packages (from yfinance) (1.19.5)
Requirement already satisfied: pandas>=0.24 in c:\users\swapn\anaconda3\lib\site-packages (from yfinance) (1.0.5)
Requirement already satisfied: multitasking>=0.0.7 in c:\users\swapn\anaconda3\lib\site-packages (from yfinance) (0.0.9)
Requirement already satisfied: lxml>=4.5.1 in c:\users\swapn\anaconda3\lib\site-packages (from yfinance) (4.5.2)
Requirement already satisfied: chardet<4,>=3.0.2 in c:\users\swapn\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (3.0.4)
Requirement already satisfied: idna<3,>=2.5 in c:\users\swapn\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (2.10)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\swapn\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (2020.6.20)
Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in c:\users\swapn\anaconda3\lib\site-packages (from requests>=2.20->yfinance) (1.25.9)
Requirement already satisfied: python-dateutil>=2.6.1 in c:\users\swapn\anaconda3\lib\site-packages (from pandas>=0.24->yfinance) (2.8.1)
Requirement already satisfied: pytz>=2017.2 in c:\users\swapn\anaconda3\lib\site-packages (from pandas>=0.24->yfinance) (2020.1)
Requirement already satisfied: six>=1.5 in c:\users\swapn\anaconda3\lib\site-packages (from python-dateutil>=2.6.1->pandas>=0.24->yfinance) (1.15.0)
```

In [3]:

```
from statsmodels.graphics.tsaplots import plot_acf
import yfinance as yf
import pandas as pd
import matplotlib.pyplot as plt
from statsmodels.tsa.seasonal import seasonal_decompose
```

Amazon Data

In [8]:

```
amazon = yf.download('AMZN', '2019-01-27', '2020-02-11')
amazon.head()
```

[*****100%*****] 1 of 1 completed

Out[8]:

	Open	High	Low	Close	Adj Close	Volume
Date						
2019-01-28	1643.589966	1645.000000	1614.089966	1637.890015	1637.890015	4837700
2019-01-29	1631.270020	1632.380005	1590.719971	1593.880005	1593.880005	4632800
2019-01-30	1623.000000	1676.949951	1619.680054	1670.430054	1670.430054	5783800
2019-01-31	1692.849976	1736.410034	1679.079956	1718.729980	1718.729980	10910300
2019-02-01	1638.880005	1673.060059	1622.010010	1626.229980	1626.229980	11506200

In [21]:

```
plt.rcParams.update({'figure.figsize': (7,5)})
plt.plot(amazon["Open"])
```

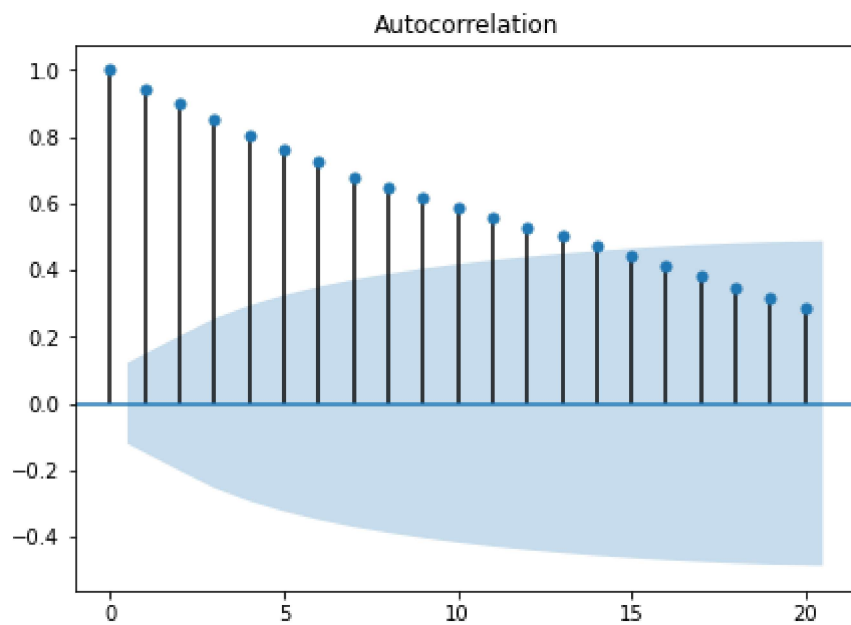
Out[21]:

[<matplotlib.lines.Line2D at 0x23df8badd90>]



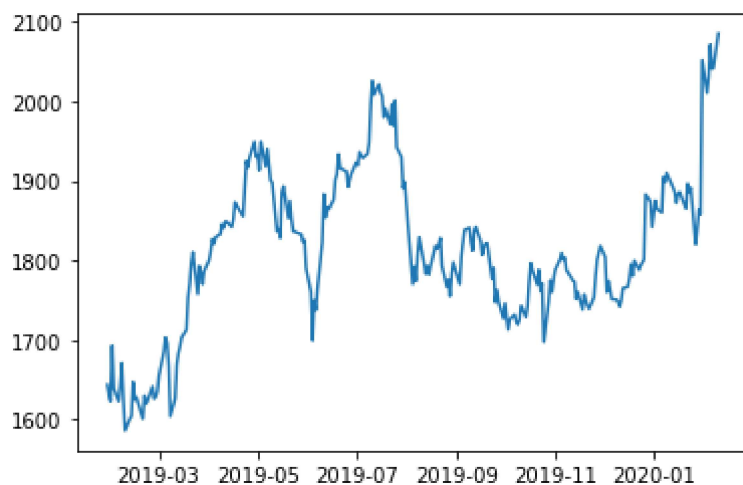
In [22]:

```
plot_acf(amazon['Open'], lags=20)  
plt.show()
```



In [23]:

```
plt.figure(figsize=(6,4))  
plt.plot(amazon["Open"])  
plt.show()
```

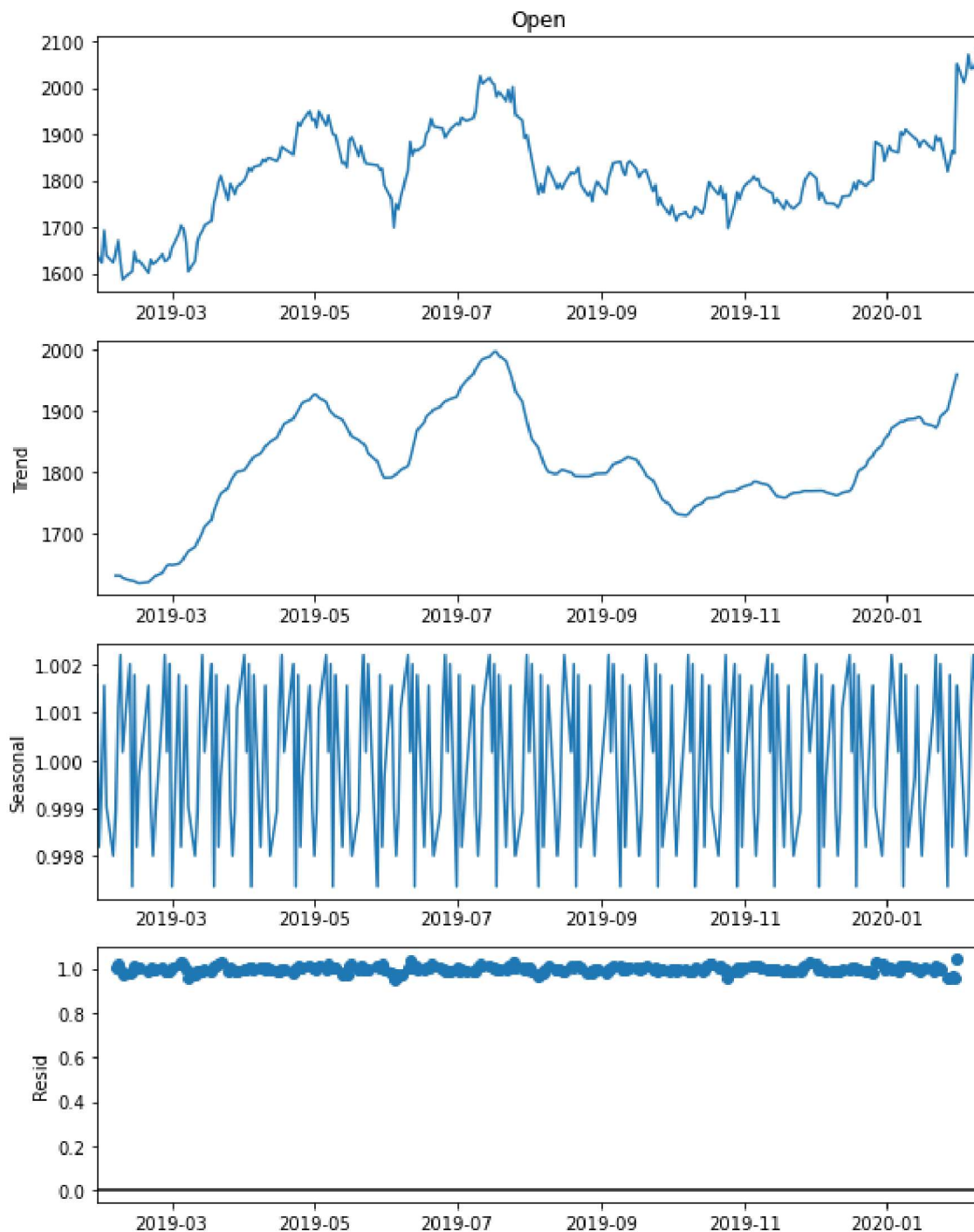


In [24]:

```
result = seasonal_decompose(amazon["Open"], model = "multiplicative", period=12)
```

In [25]:

```
plt.rcParams.update({'figure.figsize': (8,10)})  
result.plot()  
plt.show()
```



In []:

