Extracting and Visualizing Stock Data

Description

Extracting essential data from a dataset and displaying it is a necessary part of data science; therefore individuals can make correct decisions based on the data. In this assignment, you will extract some stock data, you will then display this data in a graph.

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Estimated Time Needed: **30 min**

In [1]:
```
!pip install yfinance==0.1.67
#!pip install pandas==1.3.3
#!pip install requests==2.26.0
!mamba install bs4==4.10.0 -y
!pip install lxml==4.6.4
#!pip install plotly==5.3.1
```

```
Collecting yfinance==0.1.67
  Downloading yfinance-0.1.67-py2.py3-none-any.whl (25 kB)
Requirement already satisfied: pandas>=0.24 in /home/jupyterlab/conda/envs/py
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Requirement already satisfied: requests>=2.20 in /home/jupyterlab/conda/envs/
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67) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in /home/jupyterlab/conda/envs/py
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1)
Requirement already satisfied: charset-normalizer<3,>=2 in /home/jupyterlab/c
onda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==
0.1.67) (2.1.0)
Requirement already satisfied: certifi>=2017.4.17 in /home/jupyterlab/conda/e
nvs/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.6
7) (2022.6.15)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /home/jupyterlab/cond
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1.67) (1.26.9)
Requirement already satisfied: idna<4,>=2.5 in /home/jupyterlab/conda/envs/py
thon/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.67) (3.
3)
Requirement already satisfied: six>=1.5 in /home/jupyterlab/conda/envs/pytho
n/lib/python3.7/site-packages (from python-dateutil>=2.7.3->pandas>=0.24->yfi
nance==0.1.67) (1.16.0)
Installing collected packages: multitasking, yfinance
Successfully installed multitasking-0.0.11 yfinance-0.1.67
```

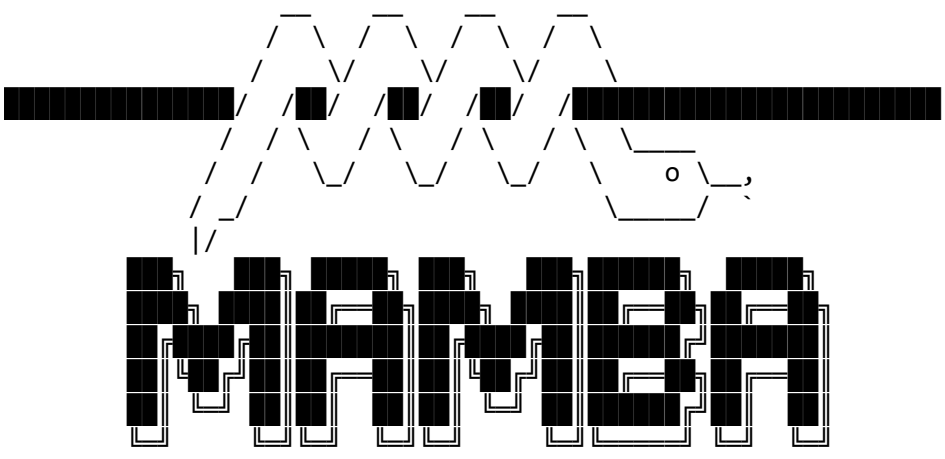

```
        mamba (0.15.3) supported by @QuantStack

        GitHub:  https://github.com/mamba-org/mamba
        Twitter: https://twitter.com/QuantStack
```

```
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Pinned packages:
  - python 3.7.*


Transaction

  Prefix: /home/jupyterlab/conda/envs/python

  Updating specs:

   - bs4==4.10.0
   - ca-certificates
   - certifi
   - openssl


  Package             Version  Build           Channel                   Size
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  Install:
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  + bs4                4.10.0  hd3eb1b0_0      pkgs/main/noarch        10 KB

  Change:
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  - certifi         2022.6.15  py37h89c1867_0  installed
  + certifi         2022.6.15  py37h06a4308_0  pkgs/main/linux-64     153 KB

  Upgrade:
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  - openssl            1.1.1p  h166bdaf_0      installed
  + openssl            1.1.1q  h7f8727e_0      pkgs/main/linux-64       3 MB

  Downgrade:
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  - beautifulsoup4     4.11.1  pyha770c72_0    installed
  + beautifulsoup4     4.10.0  pyh06a4308_0    pkgs/main/noarch        85 KB

  Summary:

  Install: 1 packages
  Change: 1 packages
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  Upgrade: 1 packages
  Downgrade: 1 packages

  Total download: 3 MB

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Preparing transaction: done
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Executing transaction: done
Collecting lxml==4.6.4
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Installing collected packages: lxml
  Attempting uninstall: lxml
```

```
    Found existing installation: lxml 4.9.1
    Uninstalling lxml-4.9.1:
      Successfully uninstalled lxml-4.9.1
Successfully installed lxml-4.6.4
```

In [2]:
```
import yfinance as yf
import pandas as pd
import requests
from bs4 import BeautifulSoup
import plotly.graph_objects as go
from plotly.subplots import make_subplots
```

Define Graphing Function

In this section, we define the function `make_graph`. You don't have to know how the function works, you should only care about the inputs. It takes a dataframe with stock data (dataframe must contain Date and Close columns), a dataframe with revenue data (dataframe must contain Date and Revenue columns), and the name of the stock.

In [3]:
```
def make_graph(stock_data, revenue_data, stock):
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles=("Historical Share Price", "Historical Revenue"), vertical_spacing = .3)
    stock_data_specific = stock_data[stock_data.Date <= '2021--06-14']
    revenue_data_specific = revenue_data[revenue_data.Date <= '2021-04-30']
    fig.add_trace(go.Scatter(x=pd.to_datetime(stock_data_specific.Date, infer_datetime_format=True), y=stock_data_specific.Close.astype("float"), name="Share Price"), row=1, col=1)
    fig.add_trace(go.Scatter(x=pd.to_datetime(revenue_data_specific.Date, infer_datetime_format=True), y=revenue_data_specific.Revenue.astype("float"), name="Revenue"), row=2, col=1)
    fig.update_xaxes(title_text="Date", row=1, col=1)
    fig.update_xaxes(title_text="Date", row=2, col=1)
    fig.update_yaxes(title_text="Price ($US)", row=1, col=1)
    fig.update_yaxes(title_text="Revenue ($US Millions)", row=2, col=1)
    fig.update_layout(showlegend=False,
    height=900,
    title=stock,
    xaxis_rangeslider_visible=True)
    fig.show()
```

Question 1: Use yfinance to Extract Stock Data

Using the `Ticker` function enter the ticker symbol of the stock we want to extract data on to create a ticker object. The stock is Tesla and its ticker symbol is `TSLA`.

In [4]:
```
tesla = yf.Ticker("TSLA")
```

Using the ticker object and the function `history` extract stock information and save it in a dataframe named `tesla_data`. Set the `period` parameter to `max` so we get information for the maximum amount of time.

In [5]:
```
tesla_data = tesla.history(period="max")
```

Reset the index using the `reset_index(inplace=True)` function on the tesla_data DataFrame and display the first five rows of the `tesla_data` dataframe using the `head` function. Take a screenshot of the results and code from the beginning of Question 1 to the results below.

In [6]:
```
tesla_data.reset_index(inplace=True)
tesla_data.head()
```

Out[6]:

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2010-06-29	3.800	5.000	3.508	4.778	93831500	0	0.0
1	2010-06-30	5.158	6.084	4.660	4.766	85935500	0	0.0
2	2010-07-01	5.000	5.184	4.054	4.392	41094000	0	0.0
3	2010-07-02	4.600	4.620	3.742	3.840	25699000	0	0.0
4	2010-07-06	4.000	4.000	3.166	3.222	34334500	0	0.0

Question 2: Use Webscraping to Extract Tesla Revenue Data

Use the `requests` library to download the webpage https://www.macrotrends.net/stocks/charts/TSLA/tesla/revenue (https://www.macrotrends.net/stocks/charts/TSLA/tesla/revenue?utm_medium=Exinfluencer&utm_source=Exinfluencer&utm_content=000026UJ&utm_term=10006555&utm_id=NA-SkillsNetwork-Channel-SkillsNetworkCoursesIBMDeveloperSkillsNetworkPY0220ENSkillsNetwork23455606-2022-01-01). Save the text of the response as a variable named `html_data`.

In [7]:
```
url = "https://www.macrotrends.net/stocks/charts/TSLA/tesla/revenue"
html_data  = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

In [8]:
```
soup = BeautifulSoup(html_data)
```

Using `BeautifulSoup` or the `read_html` function extract the table with `Tesla Quarterly Revenue` and store it into a dataframe named `tesla_revenue`. The dataframe should have columns `Date` and `Revenue`.

Click here if you need help locating the table

In [9]:
```
read_html_pandas_data = pd.read_html(url)
tesla_revenue_dataframe = read_html_pandas_data[1]
tesla_revenue_dataframe.head()
```

Out[9]:

	Tesla Quarterly Revenue(Millions of US $)	Tesla Quarterly Revenue(Millions of US $).1
0	2022-03-31	$18,756
1	2021-12-31	$17,719
2	2021-09-30	$13,757
3	2021-06-30	$11,958
4	2021-03-31	$10,389

Execute the following line to remove the comma and dollar sign from the `Revenue` column.

In [10]:
```
tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|\$',"")
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_68/349343550.py in <module>
----> 1 tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|
\$',"")

NameError: name 'tesla_revenue' is not defined
```

Execute the following lines to remove an null or empty strings in the Revenue column.

In [11]:
```
tesla_revenue.dropna(inplace=True)

tesla_revenue = tesla_revenue[tesla_revenue['Revenue'] != ""]
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_68/2273276853.py in <module>
----> 1 tesla_revenue.dropna(inplace=True)
      2
      3 tesla_revenue = tesla_revenue[tesla_revenue['Revenue'] != ""]

NameError: name 'tesla_revenue' is not defined
```

Display the last 5 row of the `tesla_revenue` dataframe using the `tail` function. Take a screenshot of the results.

In [12]:
```
tesla_revenue_dataframe.tail()
```

Out[12]:

	Tesla Quarterly Revenue(Millions of US $)	Tesla Quarterly Revenue(Millions of US $).1
47	2010-06-30	$28
48	2010-03-31	$21
49	2009-12-31	NaN
50	2009-09-30	$46
51	2009-06-30	$27

Question 3: Use yfinance to Extract Stock Data

Using the `Ticker` function enter the ticker symbol of the stock we want to extract data on to create a ticker object. The stock is GameStop and its ticker symbol is `GME` .

In [13]:
```
gamestop = yf.Ticker("GME")
```

Using the ticker object and the function `history` extract stock information and save it in a dataframe named `gme_data` . Set the `period` parameter to `max` so we get information for the maximum amount of time.

In [14]:
```
gme_data = gamestop.history(period="max")
```

Reset the index using the `reset_index(inplace=True)` function on the gme_data DataFrame and display the first five rows of the `gme_data` dataframe using the `head` function. Take a screenshot of the results and code from the beginning of Question 3 to the results below.

In [15]:
```
gme_data.reset_index(inplace=True)
gme_data.head()
```

Out[15]:

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2002-02-13	6.480513	6.770033	6.430016	6.766666	19054000	0.0	0.0
1	2002-02-14	6.850829	6.850829	6.699336	6.733001	2801400	0.0	0.0
2	2002-02-15	6.733000	6.749832	6.632005	6.699335	2097400	0.0	0.0
3	2002-02-19	6.665672	6.665672	6.312189	6.430017	1852600	0.0	0.0
4	2002-02-20	6.463682	6.648839	6.413184	6.648839	1683200	0.0	0.0

Question 4: Use Webscraping to Extract GME Revenue Data

Use the `requests` library to download the webpage https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html (https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html). Save the text of the response as a variable named `html_data`.

In [16]:
```
url = "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html"
html_data  = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

In [17]:
```
soup = BeautifulSoup(html_data)
```

Using `BeautifulSoup` or the `read_html` function extract the table with `GameStop Quarterly Revenue` and store it into a dataframe named `gme_revenue`. The dataframe should have columns `Date` and `Revenue`. Make sure the comma and dollar sign is removed from the `Revenue` column using a method similar to what you did in Question 2.

Click here if you need help locating the table

In [18]:
```
read_html_pandas_data = pd.read_html(url)
gme_revenue_dataframe = read_html_pandas_data[1]
gme_revenue_dataframe.head()
```

Out[18]:

	GameStop Quarterly Revenue(Millions of US $)	GameStop Quarterly Revenue(Millions of US $).1
0	2020-04-30	$1,021
1	2020-01-31	$2,194
2	2019-10-31	$1,439
3	2019-07-31	$1,286
4	2019-04-30	$1,548

In [19]:
```
gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',|\$',"")
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_68/401512746.py in <module>
----> 1 gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',|\$',""
)

NameError: name 'gme_revenue' is not defined
```

In [20]:
```
gme_revenue.dropna(inplace=True)

gme_revenue = gme_revenue[gme_revenue['Revenue'] != ""]
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_68/3324871488.py in <module>
----> 1 gme_revenue.dropna(inplace=True)
      2
      3 gme_revenue = gme_revenue[gme_revenue['Revenue'] != ""]

NameError: name 'gme_revenue' is not defined
```

Display the last five rows of the `gme_revenue` dataframe using the `tail` function. Take a screenshot of the results.

In [21]:
```
gme_revenue_dataframe.tail()
```

Out[21]:

	GameStop Quarterly Revenue(Millions of US $)	GameStop Quarterly Revenue(Millions of US $).1
57	2006-01-31	$1,667
58	2005-10-31	$534
59	2005-07-31	$416
60	2005-04-30	$475
61	2005-01-31	$709

Question 5: Plot Tesla Stock Graph

Use the `make_graph` function to graph the Tesla Stock Data, also provide a title for the graph. The structure to call the `make_graph` function is `make_graph(tesla_data, tesla_revenue, 'Tesla')` . Note the graph will only show data upto June 2021.

In [24]:
```
def make_graph(tesla_data, tesla_revenue, Tesla):
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles=("Historical Share Price", "Historical Revenue"), vertical_spacing = .3)
    tesla_data_specific = tesla_data[tesla_data.Date <= '2021--06-14']
    tesla_revenue_specific = tesla_revenue[tesla_revenue.Date <= '2021-04-30']
    fig.add_trace(go.Scatter(x=pd.to_datetime(stock_data_specific.Date, infer_datetime_format=True), y=tesla_data_specific.Close.astype("float"), name="Share Price"), row=1, col=1)
    fig.add_trace(go.Scatter(x=pd.to_datetime(tesla_revenue_specific.Date, infer_datetime_format=True), y=tesla_revenue_specific.Revenue.astype("float"), name="Revenue"), row=2, col=1)
    fig.update_xaxes(title_text="Date", row=1, col=1)
    fig.update_xaxes(title_text="Date", row=2, col=1)
    fig.update_yaxes(title_text="Price ($US)", row=1, col=1)
    fig.update_yaxes(title_text="Revenue ($US Millions)", row=2, col=1)
    fig.update_layout(showlegend=False,
    height=900,
    title=Tesla,
    xaxis_rangeslider_visible=True)
    fig.show()
```

Question 6: Plot GameStop Stock Graph

Use the `make_graph` function to graph the GameStop Stock Data, also provide a title for the graph. The structure to call the `make_graph` function is `make_graph(gme_data, gme_revenue, 'GameStop')` . Note the graph will only show data upto June 2021.

In [25]:
```
def make_graph(gme_data, gme_revenue, GameStop):
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles=("Historical Share Price", "Historical Revenue"), vertical_spacing = .3)
    gme_data_specific = gme_data[gme_data.Date <= '2021--06-14']
    gme_revenue_specific = gme_revenue[gme_rvenue.Date <= '2021-04-30']
    fig.add_trace(go.Scatter(x=pd.to_datetime(gme_data_specific.Date, infer_datetime_format=True), y=gme_data_specific.Close.astype("float"), name="Share Price"), row=1, col=1)
    fig.add_trace(go.Scatter(x=pd.to_datetime(gme_revenue_specific.Date, infer_datetime_format=True), y=gme_revenue_specific.Revenue.astype("float"), name="Revenue"), row=2, col=1)
    fig.update_xaxes(title_text="Date", row=1, col=1)
    fig.update_xaxes(title_text="Date", row=2, col=1)
    fig.update_yaxes(title_text="Price ($US)", row=1, col=1)
    fig.update_yaxes(title_text="Revenue ($US Millions)", row=2, col=1)
    fig.update_layout(showlegend=False,
    height=900,
    title=GameStop,
    xaxis_rangeslider_visible=True)
    fig.show()
```

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Joseph Santarcangelo (https://www.linkedin.com/in/joseph-s-50398b136/?utm_medium=Exinfluencer&utm_source=Exinfluencer&utm_content=000026UJ&utm_term=10006555&utm_id=NA-SkillsNetwork-Channel-SkillsNetworkCoursesIBMDeveloperSkillsNetworkPY0220ENSkillsNetwork23455606-2022-01-01) has a PhD in Electrical Engineering, his research focused on using machine learning, signal processing, and computer vision to determine how videos impact human cognition. Joseph has been working for IBM since he completed his PhD.

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Change Log

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2022-02-28	1.2	Lakshmi Holla	Changed the URL of GameStop
2020-11-10	1.1	Malika Singla	Deleted the Optional part
2020-08-27	1.0	Malika Singla	Added lab to GitLab