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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.

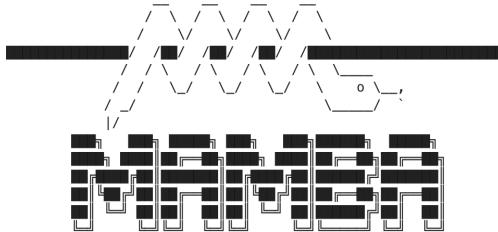
Table of Contents

- Define a Function that Makes a Graph
- Question 1: Use yfinance to Extract Stock Data
- Question 2: Use Webscraping to Extract Tesla Revenue Data
- Question 3: Use yfinance to Extract Stock Data
- Question 4: Use Webscraping to Extract GME Revenue Data
- Question 5: Plot Tesla Stock Graph
- Question 6: Plot GameStop Stock Graph

Estimated Time Needed: 30 min

```
[6]: !pip install yfinance==0.1.67
!mamba install bs4==4.10.0 -y
!pip install nbformat==4.2.0

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/python3.7/site-packages (from yfinance==0.1.67) (1.3.5)
Requirement already satisfied: requests>=2.20 in /home/jupyterlab/conda/envs/python3.7/site-packages (from yfinance==0.1.67) (2.28.1)
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Collecting multitasking>=0.0.7
  Downloading multitasking-0.0.11-py3-none-any.whl (8.5 kB)
Requirement already satisfied: numpy>=1.15 in /home/jupyterlab/conda/envs/python3.7/site-packages (from yfinance==0.1.67) (1.21.6)
Requirement already satisfied: python-dateutil>=2.7.3 in /home/jupyterlab/conda/envs/python3.7/site-packages (from pandas>=0.24>yfinance==0.1.67) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in /home/jupyterlab/conda/envs/python3.7/site-packages (from pandas>=0.24>yfinance==0.1.67) (2022.6)
Requirement already satisfied: charset-normalizer<3,>=2 in /home/jupyterlab/conda/envs/python3.7/site-packages (from requests>=2.20>yfinance==0.1.67) (2.1.1)
Requirement already satisfied: certifi>=2017.4.17 in /home/jupyterlab/conda/envs/python3.7/site-packages (from requests>=2.20>yfinance==0.1.67) (2022.9.24)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /home/jupyterlab/conda/envs/python3.7/site-packages (from requests>=2.20>yfinance==0.1.67) (1.26.13)
Requirement already satisfied: idna<4,>=2.5 in /home/jupyterlab/conda/envs/python3.7/site-packages (from requests>=2.20>yfinance==0.1.67) (3.4)
Requirement already satisfied: six>=1.5 in /home/jupyterlab/conda/envs/python3.7/site-packages (from python-dateutil>=2.7.3>pandas>=0.24>yfinance==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>

```
Looking for: ['bs4==4.10.0']

pkgs/main/linux-64      [=>] (00m:00s)
pkgs/main/linux-64      [=>] (00m:00s) 498 B / ?? (3.19 KB/s)
pkgs/main/linux-64      [=>] (00m:00s) 498 B / ?? (3.19 KB/s)
pkgs/main/linux-64      [<=>] (00m:00s) 792 KB / ?? (2.56 MB/s)
pkgs/main/linux-64      [<=>] (00m:00s) 792 KB / ?? (2.56 MB/s)
pkgs/main/noarch        [<=>]
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okas/r/linux-64         [=>] (00m:00s) 712 KB / ?? (2.30 MB/s)
```

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
Install:				
+ bs4	4.10.0	hd3eb1b0_0	pkgs/main/noarch	10 KB
Change:				
- openssl	1.1.1s	h0b41bf4_1	installed	
+ openssl	1.1.1s	h7f8727e_0	pkgs/main/linux-64	4 MB
Upgrade:				
- ca-certificates	2022.9.24	ha878542_0	installed	
+ ca-certificates	2023.01.10	h06a4308_0	pkgs/main/linux-64	120 KB
- certifi	2022.9.24	pyhd8edlab_0	installed	
+ certifi	2022.12.7	py37h06a4308_0	pkgs/main/linux-64	150 KB
Downgrade:				
- beautifulsoup4	4.11.1	pyha770c72_0	installed	
+ beautifulsoup4	4.10.0	pvh06a4308_0	pkgs/main/noarch	85 KB

Summary:

```
Install: 1 packages
Change: 1 packages
Upgrade: 2 packages
Downgrade: 1 package
```

Total download: 4 MB

```
Downloading  [>] (00m:00s)  83.67 KB/s
Extracting  [>] (---:---)
Downloading  [>] (00m:00s)  83.67 KB/s
Extracting  [>] (---:---)
Downloading  [>] (00m:00s)  556.09 KB/s
Extracting  [>] (---:---)
Finished beautifulsoup4 (00m:00s)  85 KB 555 KB/s
```

```

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Extracting [=====> ] (00m:00s) 5 / 5
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
Collecting nbformat==4.2.0
  Downloading nbformat-4.2.0-py2.py3-none-any.whl (153 kB)
    153.3/153.3 kB 16.5 MB/s eta 0:00:00
Requirement already satisfied: jupyter-core in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (4.12.0)
Requirement already satisfied: traitlets>=4.1 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (5.6.0)
Requirement already satisfied: jsonschema!=2.5.0,>=2.4 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (4.17.3)
Requirement already satisfied: ipython-genutils in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (0.2.0)
Requirement already satisfied: pkgutil-resolve-name>=1.3.10 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (1.3.10)
Requirement already satisfied: importlib-resources>=1.4.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (5.10.1)
Requirement already satisfied: attrs>=17.4.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (22.1.0)
Requirement already satisfied: typing-extensions in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (4.4.0)
Requirement already satisfied: importlib-metadata in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (4.11.4)
Requirement already satisfied: pyrsistent!=0.17.0,!0.17.1,!0.17.2,>=0.14.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (0.19.2)
Requirement already satisfied: zipp>=3.1.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from importlib-resources>=1.4.0->jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (3.11.0)
Installing collected packages: nbformat
  Attempting uninstall: nbformat
    Found existing installation: nbformat 5.7.0
    Uninstalling nbformat-5.7.0:
      Successfully uninstalled nbformat-5.7.0
ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is the source of the following dependency conflicts.
nbconvert 7.2.6 requires nbformat>=5.1, but you have nbformat 4.2.0 which is incompatible.
nbclient 0.7.2 requires nbformat>=5.1, but you have nbformat 4.2.0 which is incompatible.
jupyter-server 1.23.3 requires nbformat>=5.2.0, but you have nbformat 4.2.0 which is incompatible.
Successfully installed nbformat-4.2.0

```

```
[7]: 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.

```
[8]: 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
```

```

fig.add_trace(go.Scatter(x=pd.to_datetime(revenue_data_specific.Date, infer_datetime_format=True), y=revenue_data_specific.Revenue))
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`.

```
[9]: 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.

```
[10]: 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.

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

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2010-06-29	1.266667	1.666667	1.169333	1.592667	281494500	0	0.0
1	2010-06-30	1.719333	2.028000	1.553333	1.588667	257806500	0	0.0
2	2010-07-01	1.666667	1.728000	1.351333	1.464000	123282000	0	0.0
3	2010-07-02	1.533333	1.540000	1.247333	1.280000	77097000	0	0.0
4	2010-07-06	1.333333	1.333333	1.055333	1.074000	103003500	0	0.0

Question 2: Use Webscraping to Extract Tesla 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/revenue.htm> Save the text of the response as a variable named `html_data`.

```
[12]: url = 'https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm'
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

```
[13]: soup = BeautifulSoup(html_data,"html.parser")
```

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

```
[14]: tesla_tables = soup.find_all('table')
for index,table in enumerate(tesla_tables):
    if ("Tesla Quarterly Revenue" in str(table)):
        tesla_table_index = index
tesla_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in tesla_tables[tesla_table_index].tbody.find_all("tr"):
    col = row.find_all("td")
    if (col !=[]):
        date = col[0].text
        revenue = col[1].text.replace("$", "").replace(",","")
        tesla_revenue = tesla_revenue.append({"Date": date, "Revenue": revenue}, ignore_index=True)
```

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

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

tesla_revenue.head()
```

	Date	Revenue
0	2022-09-30	21454
1	2022-06-30	16934
2	2022-03-31	18756
3	2021-12-31	17719
4	2021-09-30	13757

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

```
[89]: tesla_revenue.dropna(inplace=True)
tesla_revenue = tesla_revenue[tesla_revenue['Revenue'] != ""]
```

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

```
[90]: tesla_revenue.tail()
```

	Date	Revenue
48	2010-09-30	31
49	2010-06-30	28
50	2010-03-31	21
52	2009-09-30	46
53	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`.

```
[53]: 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.

```
[54]: 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.

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

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2002-02-13	1.620128	1.693350	1.603296	1.691667	76216000	0.0	0.0
1	2002-02-14	1.712707	1.716074	1.670626	1.683250	11021600	0.0	0.0
2	2002-02-15	1.683251	1.687459	1.658002	1.674834	8389600	0.0	0.0
3	2002-02-19	1.666417	1.666417	1.578047	1.607504	7410400	0.0	0.0
4	2002-02-20	1.615921	1.662210	1.603296	1.662210	6892800	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/IBMDveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html>. Save the text of the response as a variable named `html_data`.

```
[56]: url = "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/pro
response = requests.get(url)
html_data = response.text
```

Parse the html data using `beautiful_soup`.

```
[73]: soup = BeautifulSoup(html_data, 'html.parser')
tables = pd.read_html(str(soup), header=0)
```

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

```
[80]: gme_tables = soup.find_all('table')
for index,table in enumerate(gme_tables):
    if ("GameStop Quarterly Revenue" in str(table)):
        gme_table_index = index
-----
gme_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in gme_tables[gme_table_index].tbody.find_all("tr"):
    col = row.find_all("td")
    if (col != []):
        date = col[0].text
        revenue = col[1].text.replace("$", "").replace(",", "")
        gme_revenue = gme_revenue.append({"Date": date, "Revenue": revenue}, ignore_index=True)
```

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

```
[77]: gme_revenue.tail()
```

	Date	Revenue
57	2006-01-31	1667
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.

```
[16]: make_graph(tesla_data, tesla_revenue, 'Tesla')
```

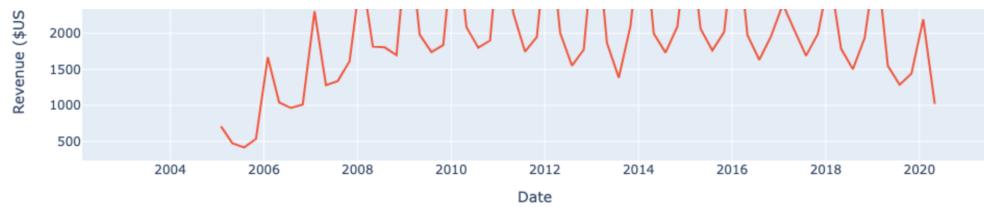


Question 6: Plot GameStop Stock Graph

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.

```
[81]: make_graph(gme_data, gme_revenue, 'gamestop')
```





About the Authors:

[Joseph Santarcangelo](#) 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.

Azim Hirjani

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

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