

Final Assignment

March 29, 2023

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

```
[2]: !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/python/lib/python3.7/site-packages (from yfinance==0.1.67) (1.3.5)

Requirement already satisfied: requests>=2.20 in

/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (2.28.1)

Requirement already satisfied: lxml>=4.5.1 in

/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (4.9.1)

Collecting multitasking>=0.0.7

Downloading multitasking-0.0.11-py3-none-any.whl (8.5 kB)

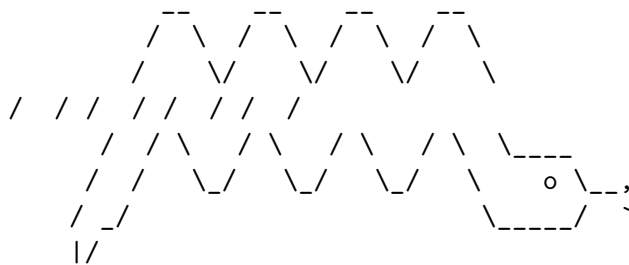
Requirement already satisfied: numpy>=1.15 in

/home/jupyterlab/conda/envs/python/lib/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/python/lib/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/python/lib/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/python/lib/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/python/lib/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/python/lib/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/python/lib/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/python/lib/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/noarch      [<=>          ] (00m:00s)
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pkgs/main/linux-64   [=====] (00m:01s) Done

```

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:

```

+ bs4                4.10.0  hd3eb1b0_0      pkgs/main/noarch
10 KB

```

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  pyhd8ed1ab_0    installed
+ certifi             2022.12.7   py37h06a4308_0  pkgs/main/linux-64
150 KB
- openssl             1.1.1s     h0b41bf4_1      installed
+ openssl             1.1.1t     h7f8727e_0      pkgs/main/linux-64
4 MB

```

Downgrade:

```

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

```

Summary:

```

Install: 1 packages
Upgrade: 3 packages
Downgrade: 1 packages

```

Total download: 4 MB

```

Downloading [=> ] (00m:00s) 897.13 KB/s
Extracting [> ] (--:-- )
Finished certifi (00m:00s) 150
KB 901 KB/s
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Finished bs4 (00m:00s) 10
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```

```

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Finished beautifulsoup4                                (00m:00s)      85
KB      444 KB/s
Downloading    [==>                                     ] (00m:00s)      1.26 MB/s
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Extracting      [=====>                               ] (00m:00s)      1 / 5
Downloading    [==>                                     ] (00m:00s)      1.85 MB/s
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Finished ca-certificates                              (00m:00s)     120
KB      624 KB/s
Downloading    [==>                                     ] (00m:00s)      1.85 MB/s
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Extracting      [=====>                             ] (00m:00s)      4 / 5
Downloading    [=====] (00m:00s)     16.18 MB/s
Extracting      [=====>                             ] (00m:00s)      4 / 5
Finished openssl                                      (00m:00s)      4
MB      15 MB/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
14.6 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: 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: 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-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: pyparsing!=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

```
[4]: 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
```

0.1 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.

```
[5]: 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()
```

0.2 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.

```
[16]: 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.

```
[17]: 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.

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

```
[18]:
```

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

	Stock Splits
0	0.0
1	0.0
2	0.0
3	0.0
4	0.0

0.3 Question 2: Use Web scraping 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`.

```
[19]: 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.

```
[20]: 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

Below is the code to isolate the table, you will now need to loop through the rows and columns

```
soup.find_all("tbody")[1]
```

If you want to use the `read_html` function the table is located at index 1

```
[21]: tesla_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in soup.find("tbody").find_all('tr'):
    col = row.find_all('td')
    date = col[0].text
    revenue = col[1].text

    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.

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

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-
packages/ipykernel_launcher.py:1: FutureWarning:
```

The default value of `regex` will change from `True` to `False` in a future version.

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

```
[23]: 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.

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

```
[24]:      Date Revenue
      8   2013    2013
      9   2012    413
     10   2011    204
     11   2010    117
     12   2009    112
```

0.4 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`.

```
[11]: 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.

```
[12]: 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.

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

```
[13]:      Date      Open      High      Low      Close      Volume  Dividends  \
0  2002-02-13  1.620128  1.693350  1.603296  1.691666  76216000      0.0
1  2002-02-14  1.712707  1.716074  1.670626  1.683250  11021600      0.0
2  2002-02-15  1.683250  1.687458  1.658001  1.674834   8389600      0.0
3  2002-02-19  1.666418  1.666418  1.578047  1.607504   7410400      0.0
4  2002-02-20  1.615920  1.662209  1.603295  1.662209   6892800      0.0
```

```
      Stock Splits
0           0.0
1           0.0
2           0.0
3           0.0
4           0.0
```

0.5 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>. Save the text of the response as a variable named `html_data`.

```
[6]: 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.

```
[7]: 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

Below is the code to isolate the table, you will now need to loop through the rows and columns

```
soup.find_all("tbody")[1]
```

If you want to use the read_html function the table is located at index 1

```
[8]: gme_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in soup.find("tbody").find_all('tr'):
    col = row.find_all('td')
    date = col[0].text
    revenue = col[1].text

    gme_revenue = gme_revenue.append({"Date":date, "Revenue":revenue},
    ↪ignore_index=True)

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

/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/ipykernel_launcher.py:10: FutureWarning: The default value of regex will change from True to False in a future version.

```
# Remove the CWD from sys.path while we load stuff.
```

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

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

```
[9]:   Date Revenue
11  2009    8806
12  2008    7094
13  2007    5319
14  2006    3092
```

0.6 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.

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



0.7 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.

```
[15]: 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

0.8 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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