

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

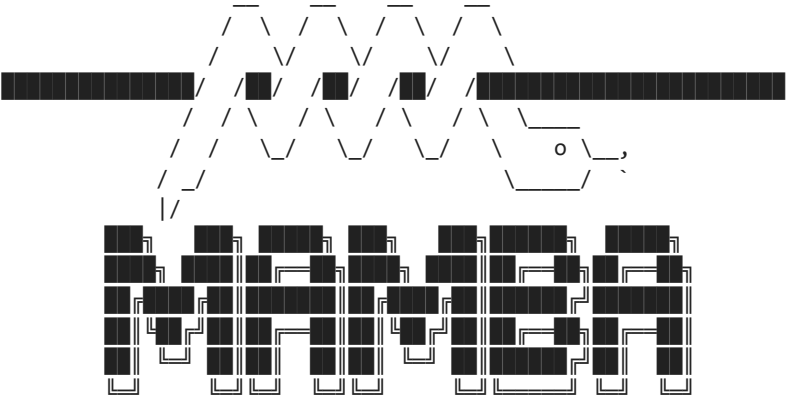
- Define a Function that Makes a Graph
- Question 1: Use yfinance to Extract Stock Data
- Question 2: Use Webscraping to Extract Tesla Revenue Data
- Question 3: Use yfinance to Extract Stock Data
- Question 4: Use Webscraping to Extract GME Revenue Data
- Question 5: Plot Tesla Stock Graph
- Question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

Estimated Time Needed: **30 min**

In [1]:

```
!pip install yfinance==0.1.67
!mamba install bs4==4.10.0 -y
!pip install nbformat==4.2.0
!mamba install html5lib==1.1 -y
```

Requirement already satisfied: yfinance==0.1.67 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (0.1.67)
Requirement already satisfied: pandas>=0.24 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (1.3.3)
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: requests>=2.20 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (2.26.0)
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Requirement already satisfied: lxml>=4.5.1 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from yfinance==0.1.67) (4.9.2)
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) (2023.3)
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) (1.26.15)
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) (2023.5.7)
Requirement already satisfied: charset-normalizer~=2.0.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.67) (2.0.12)
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)



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



Looking for: ['bs4==4.10.0']

[+] 0.0s			
pkgs/main/linux-64	<div><div></div><div></div></div>	0.0 B / ???.?MB @ ???.?MB/s	0.0s[+] 0.1s
pkgs/main/linux-64	<div><div></div><div></div></div>	0.0 B / ???.?MB @ ???.?MB/s	0.1s
pkgs/main/noarch	<div><div></div><div></div></div>	0.0 B / ???.?MB @ ???.?MB/s	0.1s
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pkgs/r/noarch	<div><div></div><div></div></div>	0.0 B / ???.?MB @ ???.?MB/s	0.1s
pkgs/r/linux-64	<div><div></div><div></div></div>	No change	No change
pkgs/main/linux-64	<div><div></div><div></div></div>	No change	No change
pkgs/main/noarch	<div><div></div><div></div></div>	No change	No change

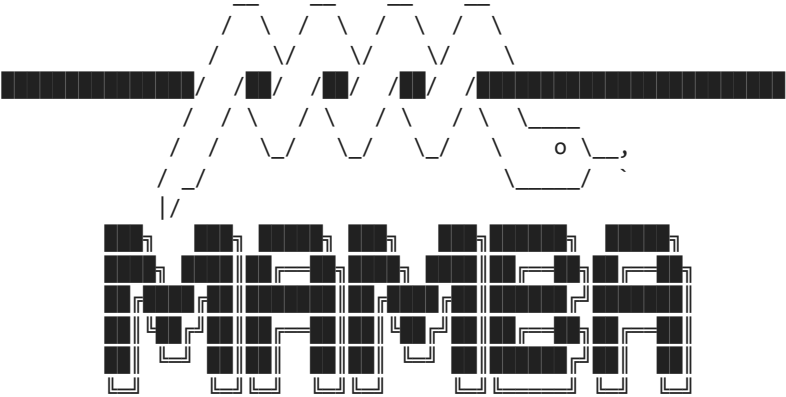
Pinned packages:
- python 3.7.*

Transaction

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

All requested packages already installed

Requirement already satisfied: nbformat==4.2.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (4.2.0)
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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: 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) (5.9.0)
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) (23.1.0)
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: 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) (5.12.0)
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: 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) (0.19.3)
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) (4.5.0)
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) (3.15.0)



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Twitter: <https://twitter.com/QuantStack>



Looking for: ['html5lib==1.1']

pkgs/main/linux-64Using cache

pkgs/main/noarchUsing cache

pkgs/r/linux-64Using cache

pkgs/r/noarchUsing cache

Pinned packages:

- python 3.7.*

Transaction

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

All requested packages already installed

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	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` .

In [7]:

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

#print(html_data)

Parse the html data using `beautiful_soup` .

In [8]:

beautiful_soup = BeautifulSoup(html_data, 'html5lib')

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]: #tables = beautiful_soup.find_all("table")
#for index,table in enumerate(tables):
#    if("Tesla Quarterly Revenue" in str(table)):
#        table_index=index
#tesla_revenue=pd.DataFrame(columns=["Date", "Revenue"])

#for row in tables[table_index].tbody.find_all('tr'):
#    col=row.find_all("td")
#    if(col!=[]):
#        date=col[0].text
#        revenue=col[1].text.strip().replace("$", "").replace(", ", "")
#        tesla_revenue=tesla_revenue.append({"Date":date, "Revenue":revenue}, ignore_index=True)
#tesla_revenue.head()

tesla_revenue=pd.read_html(url, match="Tesla Quarterly Revenue", flavor='bs4')[0]
tesla_revenue.head()
```

Out[9]:

	Tesla Quarterly Revenue(Millions of US \$)	Tesla Quarterly Revenue(Millions of US \$).1
0	2022-09-30	\$21,454
1	2022-06-30	\$16,934
2	2022-03-31	\$18,756
3	2021-12-31	\$17,719
4	2021-09-30	\$13,757

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(',',|\$', "")

tesla_revenue = tesla_revenue.rename(columns={"Tesla Quarterly Revenue(Millions of US $)": "Date", "Tesla Quarterly Revenue(Millions of US $).1": "Revenue"}) #Rename df columns to 'Date' and 'Revenue'
tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',',|\$', "")
tesla_revenue.head()
```

/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/ipykernel_launcher.py:4: FutureWarning: The default value of regex will change from True to False in a future version.
after removing the cwd from sys.path.

Out[10]:

	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.

```
In [11]: 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.

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

Out[12]:

	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`.

```
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	1.620128	1.693350	1.603296	1.691666	76216000	0.0	0.0
1	2002-02-14	1.712707	1.716074	1.670626	1.683251	11021600	0.0	0.0
2	2002-02-15	1.683250	1.687458	1.658002	1.674834	8389600	0.0	0.0
3	2002-02-19	1.666418	1.666418	1.578047	1.607504	7410400	0.0	0.0
4	2002-02-20	1.615920	1.662209	1.603295	1.662209	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/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'
```

Parse the html data using `beautiful_soup`.

In [17]:

```
html_data = requests.get(url).text
#print(html_data)
```

In [18]:

```
beautiful_soup = BeautifulSoup(html_data, 'html5lib')
```

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 [19]:

```
tables=beautiful_soup.find_all("table")
for index,table in enumerate(tables):
    if(str(table).__contains__("GameStop Quarterly Revenue")):
        table_index=index

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

for row in tables[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)
gme_revenue.head()
```

Out[19]:

	Date	Revenue
0	2020-04-30	1021
1	2020-01-31	2194
2	2019-10-31	1439
3	2019-07-31	1286
4	2019-04-30	1548

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

In [20]:

```
gme_revenue.tail()
```

Out[20]:

	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.

In [21]:

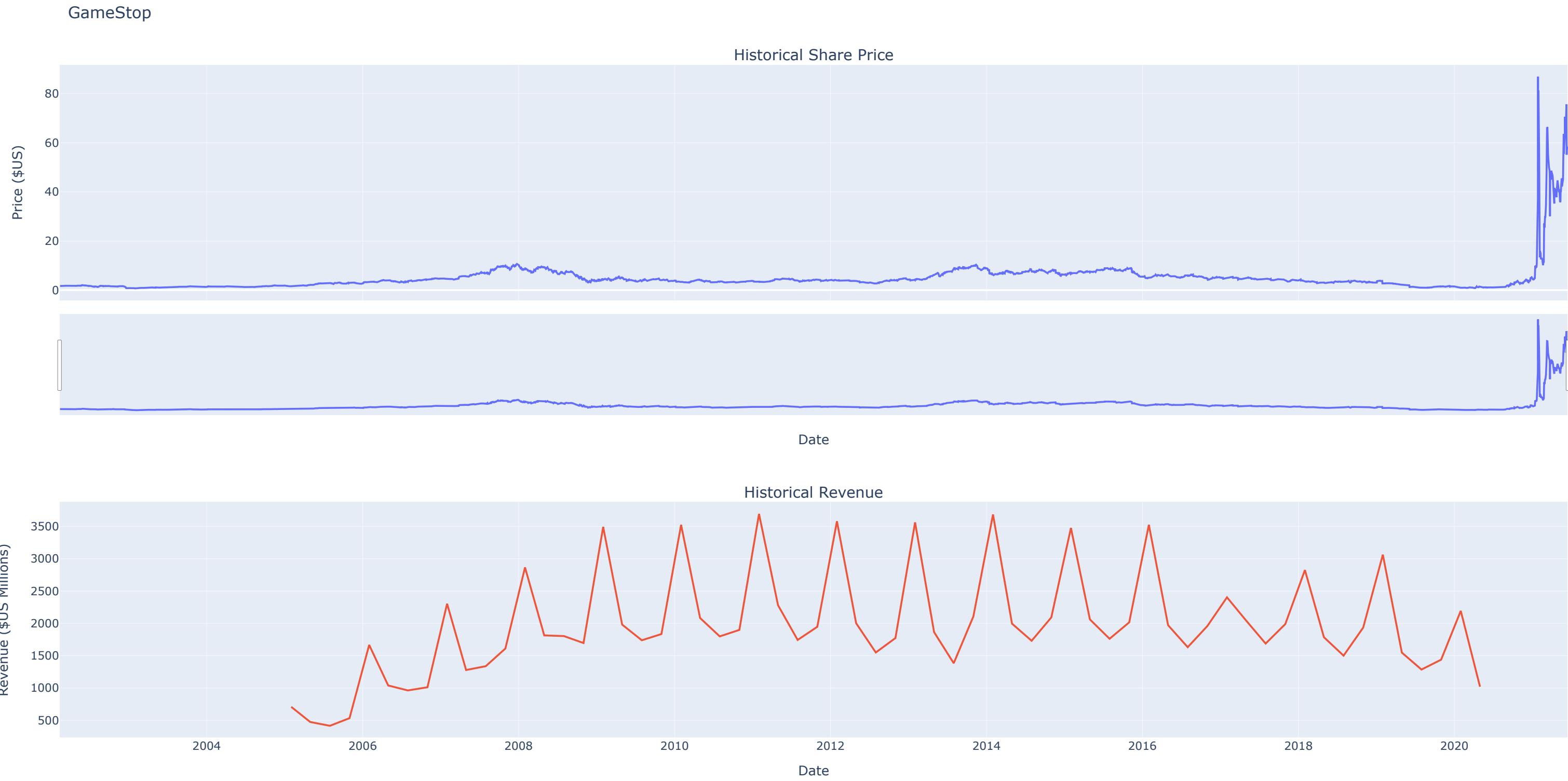
```
make_graph(tesla_data, tesla_revenue, 'Tesla')
```



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.

```
In [22]: 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