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
#!pip install pandas
#!pip install requests
!pip install bs4
#!pip install plotly
```

```
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages/secretstorage/dhcrypto.py:16: Crypto
graphyDeprecationWarning: int_from_bytes is deprecated, use int.from_bytes instead
  from cryptography.utils import int_from_bytes
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages/secretstorage/util.py:25: Cryptograph
yDeprecationWarning: int_from_bytes is deprecated, use int.from_bytes instead
  from cryptography.utils import int_from_bytes
Collecting yfinance
  Downloading yfinance-0.1.59.tar.gz (25 kB)
Requirement already satisfied: pandas>=0.24 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site
-packages (from yfinance) (1.0.5)
Requirement already satisfied: numpy>=1.15 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-
packages (from yfinance) (1.18.5)
Requirement already satisfied: requests>=2.20 in /opt/conda/envs/Python-3.7-main/lib/python3.7/si
te-packages (from yfinance) (2.24.0)
Collecting multitasking>=0.0.7
  Downloading multitasking-0.0.9.tar.gz (8.1 kB)
Requirement already satisfied: lxml>=4.5.1 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-
packages (from yfinance) (4.5.1)
Requirement already satisfied: python-dateutil>=2.6.1 in /opt/conda/envs/Python-3.7-main/lib/pyth
on3.7/site-packages (from pandas>=0.24->yfinance) (2.8.1)
Requirement already satisfied: pytz>=2017.2 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site
-packages (from pandas>=0.24->yfinance) (2020.1)
Requirement already satisfied: idna<3,>=2.5 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site
-packages (from requests>=2.20->yfinance) (2.9)
Requirement already satisfied: urllib3!=1.25.0,!=1.25.1,<1.26,>=1.21.1 in /opt/conda/envs/Python-
3.7-main/lib/python3.7/site-packages (from requests>=2.20->yfinance) (1.25.9)
Requirement already satisfied: chardet<4,>=3.0.2 in /opt/conda/envs/Python-3.7-main/lib/python3.7
/site-packages (from requests>=2.20->yfinance) (3.0.4)
Requirement already satisfied: certifi>=2017.4.17 in /opt/conda/envs/Python-3.7-main/lib/python3.
7/site-packages (from requests>=2.20->yfinance) (2020.12.5)
Requirement already satisfied: six>=1.5 in /opt/conda/envs/Python-3.7-main/lib/python3.7/site-pac
kages (from python-dateutil>=2.6.1->pandas>=0.24->yfinance) (1.15.0)
Building wheels for collected packages: yfinance, multitasking
  Building wheel for yfinance (setup.py) ... done
  Created wheel for yfinance: filename=yfinance-0.1.59-py2.py3-none-any.whl size=23442 sha256=f63
1617ff91d763204349c7e64e3ae6df422746e4066d9dbc7864f9cc40cc079
```

```
  Stored in directory: /tmp/wsuser/.cache/pip/wheels/26/af/8b/fac1b47dffef567f945641cdc9b67bb25fa
e5725d462a8cf81
  Building wheel for multitasking (setup.py) ... done
  Created wheel for multitasking: filename=multitasking-0.0.9-py3-none-any.whl size=8366 sha256=f
7bc11b9bd8970c26e1cf6d2746656ff1a36258f1951c0e27d497a8f31599552
  Stored in directory: /tmp/wsuser/.cache/pip/wheels/ae/25/47/4d68431a7ec1b6c4b5233365934b74c1d4e
665bf5f968d363a
Successfully built yfinance multitasking
Installing collected packages: multitasking, yfinance
Successfully installed multitasking-0.0.9 yfinance-0.1.59
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages/secretstorage/dhcrypto.py:16: Cryptog
raphyDeprecationWarning: int_from_bytes is deprecated, use int.from_bytes instead
  from cryptography.utils import int_from_bytes
/opt/conda/envs/Python-3.7-main/lib/python3.7/site-packages/secretstorage/util.py:25: Cryptograph
yDeprecationWarning: int_from_bytes is deprecated, use int.from_bytes instead
  from cryptography.utils import int_from_bytes
Collecting bs4
  Downloading bs4-0.0.1.tar.gz (1.1 kB)
Requirement already satisfied: beautifulsoup4 in /opt/conda/envs/Python-3.7-main/lib/python3.7/si
te-packages (from bs4) (4.9.1)
Requirement already satisfied: soupsieve>1.2 in /opt/conda/envs/Python-3.7-main/lib/python3.7/sit
e-packages (from beautifulsoup4->bs4) (2.0.1)
Building wheels for collected packages: bs4
  Building wheel for bs4 (setup.py) ... done
  Created wheel for bs4: filename=bs4-0.0.1-py3-none-any.whl size=1272 sha256=ec1a7c9f8270af429e3
0d00f8d9ee50506cb4ca0d7d497cab7b48998c2b0eccc
  Stored in directory: /tmp/wsuser/.cache/pip/wheels/0a/9e/ba/20e5bbc1afef3a491f0b3bb74d508f99403
aabe76eda2167ca
Successfully built bs4
Installing collected packages: bs4
Successfully installed bs4-0.0.1
```

In [2]:
```python
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]:
```python
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)
    fig.add_trace(go.Scatter(x=pd.to_datetime(stock_data.Date, infer_datetime_format=True), y=stock_data.Close.astype("float"), name="Share Price"), row=1, col=1)
    fig.add_trace(go.Scatter(x=pd.to_datetime(revenue_data.Date, infer_datetime_format=True), y=revenue_data.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]:
```
TSLA=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=TSLA.history(period="max")
```

Reset the index, save, 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. 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,"html5lib")
tables=soup.find_all('table')
```

Using beautiful soup extract the table with `Tesla Quarterly Revenue` and store it into a dataframe named `tesla_revenue`. The dataframe should have columns Date and Revenue. Make sure the comma and dollar sign is removed from the `Revenue` column.

In [9]:
```python
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.replace("$",'').replace(",",'')

        tesla_revenue= tesla_revenue.append({"Date":Date,"Revenue":Revenue},ignore_index=True)
tesla_revenue
```

Out[9]:

	Date	Revenue
0	2020-12-31	10744
1	2020-09-30	8771
2	2020-06-30	6036
3	2020-03-31	5985
4	2019-12-31	7384
5	2019-09-30	6303
6	2019-06-30	6350
7	2019-03-31	4541
8	2018-12-31	7226
9	2018-09-30	6824
10	2018-06-30	4002
11	2018-03-31	3409
12	2017-12-31	3288
13	2017-09-30	2985
14	2017-06-30	2790
15	2017-03-31	2696
16	2016-12-31	2285
17	2016-09-30	2298
18	2016-06-30	1270
19	2016-03-31	1147
20	2015-12-31	1214

21	2015-09-30	937
22	2015-06-30	955
23	2015-03-31	940
24	2014-12-31	957
25	2014-09-30	852
26	2014-06-30	769
27	2014-03-31	621
28	2013-12-31	615
29	2013-09-30	431
30	2013-06-30	405
31	2013-03-31	562
32	2012-12-31	306
33	2012-09-30	50
34	2012-06-30	27
35	2012-03-31	30
36	2011-12-31	39
37	2011-09-30	58
38	2011-06-30	58
39	2011-03-31	49
40	2010-12-31	36
41	2010-09-30	31
42	2010-06-30	28
43	2010-03-31	21
44	2009-12-31	
45	2009-09-30	46
46	2009-06-30	27
47	2008-12-31	

Remove the rows in the dataframe that are missing data or are NaN in the Revenue column

```
In [10]: tesla_revenue=tesla_revenue[~tesla_revenue['Revenue'].isin([''])]
         tesla_revenue
```

Out[10]:

	Date	Revenue
0	2020-12-31	10744
1	2020-09-30	8771
2	2020-06-30	6036
3	2020-03-31	5985
4	2019-12-31	7384
5	2019-09-30	6303
6	2019-06-30	6350
7	2019-03-31	4541
8	2018-12-31	7226
9	2018-09-30	6824
10	2018-06-30	4002
11	2018-03-31	3409
12	2017-12-31	3288
13	2017-09-30	2985
14	2017-06-30	2790
15	2017-03-31	2696
16	2016-12-31	2285
17	2016-09-30	2298
18	2016-06-30	1270
19	2016-03-31	1147
20	2015-12-31	1214
21	2015-09-30	937
22	2015-06-30	955
23	2015-03-31	940
24	2014-12-31	957

25	2014-09-30	852
26	2014-06-30	769
27	2014-03-31	621
28	2013-12-31	615
29	2013-09-30	431
30	2013-06-30	405
31	2013-03-31	562
32	2012-12-31	306
33	2012-09-30	50
34	2012-06-30	27
35	2012-03-31	30
36	2011-12-31	39
37	2011-09-30	58
38	2011-06-30	58
39	2011-03-31	49
40	2010-12-31	36
41	2010-09-30	31
42	2010-06-30	28
43	2010-03-31	21
45	2009-09-30	46
46	2009-06-30	27

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

```
In [11]: tesla_revenue.tail()
```

Out[11]:

	Date	Revenue
41	2010-09-30	31
42	2010-06-30	28
43	2010-03-31	21
45	2009-09-30	46
46	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 [12]:
```
GME=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 [13]:
```
gme_data=GME.history(period="max")
gme_data
```

Out[13]:

	Open	High	Low	Close	Volume	Dividends	Stock Splits
Date							
2002-02-13	6.480513	6.773399	6.413183	6.766666	19054000	0.0	0.0
2002-02-14	6.850831	6.864296	6.682506	6.733003	2755400	0.0	0.0
2002-02-15	6.733001	6.749833	6.632006	6.699336	2097400	0.0	0.0
2002-02-19	6.665671	6.665671	6.312189	6.430017	1852600	0.0	0.0
2002-02-20	6.463681	6.648838	6.413183	6.648838	1723200	0.0	0.0
...	...	...	...	...	...	...	...
2021-03-29	180.750000	193.919998	173.509995	181.300003	10042200	0.0	0.0
2021-03-30	187.500000	204.300003	182.000000	194.460007	17094900	0.0	0.0
2021-03-31	197.500000	199.460007	187.110001	189.820007	8393800	0.0	0.0
2021-04-01	193.360001	196.970001	183.600006	191.449997	9334300	0.0	0.0
2021-04-05	171.000000	195.000000	164.809998	186.949997	14034300	0.0	0.0

4818 rows × 7 columns

Reset the index, save, 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 [14]:
```
gme_data.reset_index(inplace=True)
gme_data.head()
```

Out[14]:

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2002-02-13	6.480513	6.773399	6.413183	6.766666	19054000	0.0	0.0
1	2002-02-14	6.850831	6.864296	6.682506	6.733003	2755400	0.0	0.0
2	2002-02-15	6.733001	6.749833	6.632006	6.699336	2097400	0.0	0.0
3	2002-02-19	6.665671	6.665671	6.312189	6.430017	1852600	0.0	0.0
4	2002-02-20	6.463681	6.648838	6.413183	6.648838	1723200	0.0	0.0

Question 4: Use Webscraping to Extract GME Revenue Data

Use the `requests` library to download the webpage https://www.macrotrends.net/stocks/charts/GME/gamestop/revenue. Save the text of the response as a variable named `html_data`.

In [15]:
```
url="https://www.macrotrends.net/stocks/charts/GME/gamestop/revenue"
html_data=requests.get(url).text
```

Parse the html data using `beautiful_soup`.

In [16]:
```
soup=BeautifulSoup(html_data,"html5lib")
tables=soup.find_all('table')
for index, table in enumerate (tables):
    if ('GameStop Quarterly Revenue'in str(table)):
        table_index=index
```

Using beautiful soup 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.

In [17]:
```
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
```

Out[17]:

	Date	Revenue
0	2020-10-31	1005
1	2020-07-31	942
2	2020-04-30	1021
3	2020-01-31	2194
4	2019-10-31	1439
...	...	...
59	2006-01-31	1667
60	2005-10-31	534
61	2005-07-31	416
62	2005-04-30	475
63	2005-01-31	709

64 rows × 2 columns

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

```
In [18]: gme_revenue.tail()
```

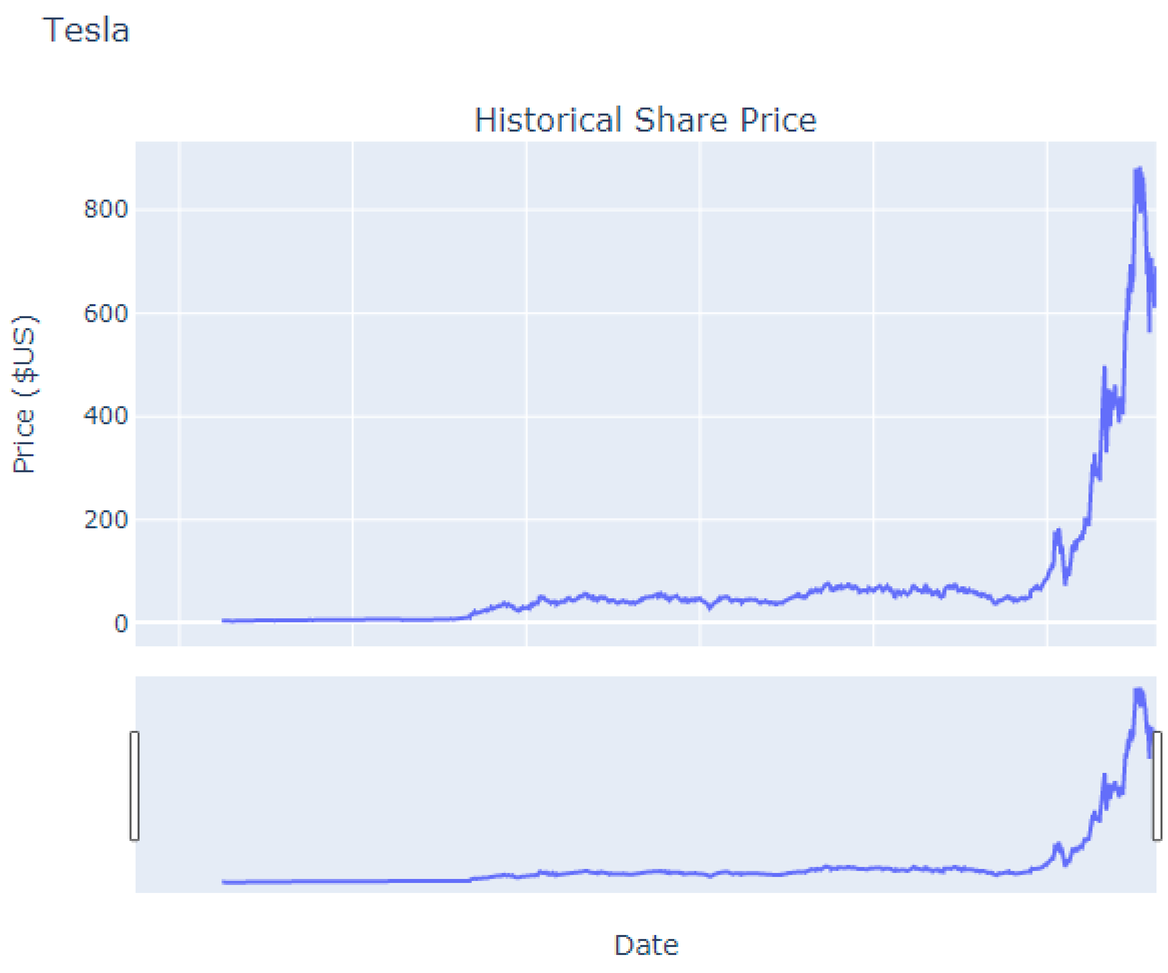
```
Out[18]:
```

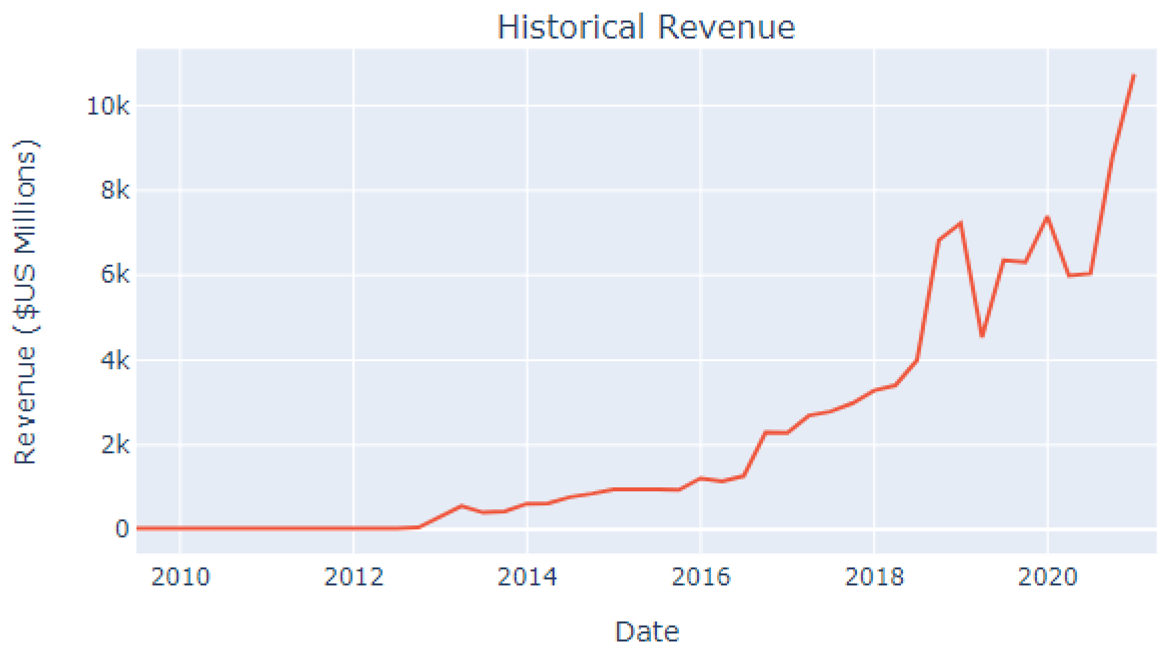
	Date	Revenue
59	2006-01-31	1667
60	2005-10-31	534
61	2005-07-31	416
62	2005-04-30	475
63	2005-01-31	709

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')`

```
In [19]: make_graph(tesla_data,tesla_revenue,"Tesla")
```

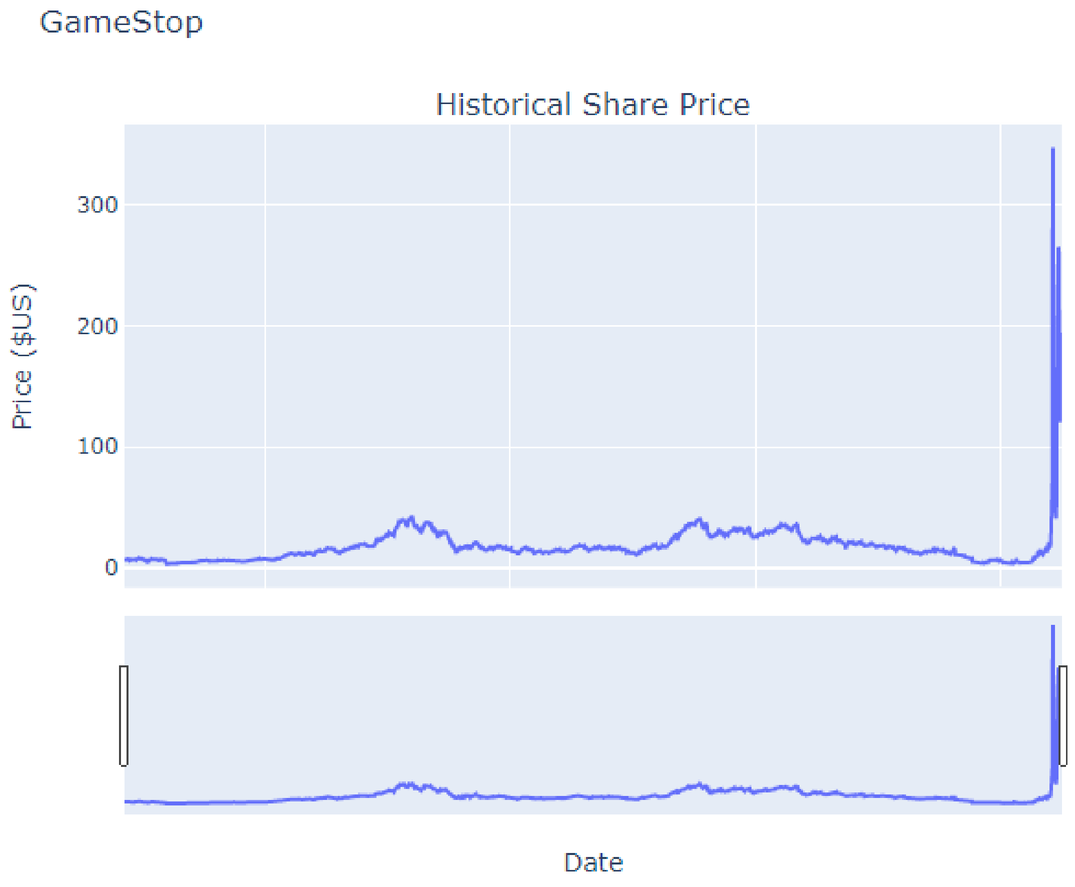


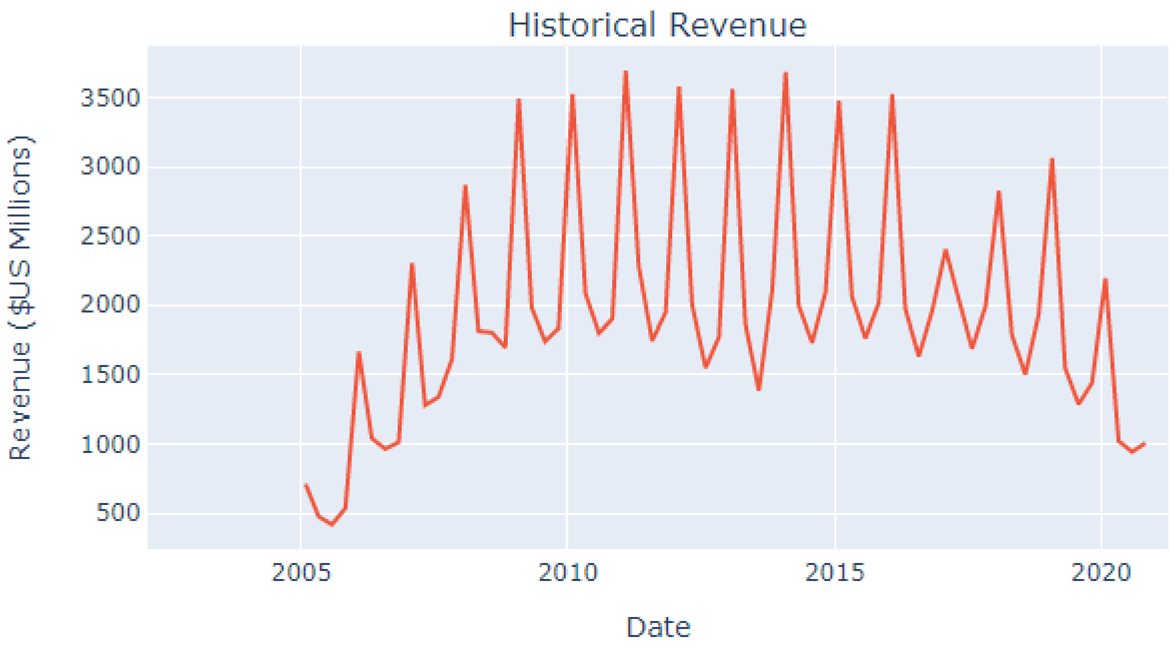


Question 6: Plot GameStop Stock Graph

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')`.

```
In [20]: 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
2020-11-10	1.1	Malika Singla	Deleted the Optional part
2020-08-27	1.0	Malika Singla	Added lab to GitLab