Final Assignment

December 31, 2022

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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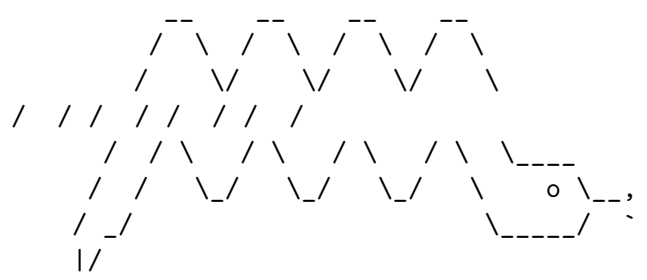
Estimated Time Needed: 30 min

[21]:
```
!pip install yfinance==0.1.67
!mamba install bs4==4.10.0 -y
!pip install nbformat==4.2.0
!pip install html5lib
```

```
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) (1.3.5)
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)
Requirement already satisfied: multitasking>=0.0.7 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
yfinance==0.1.67) (0.0.11)
```

```
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) (2022.12.7)
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)
```



```
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       [>                   ] (--:--) No change
pkgs/main/linux-64       [====================] (00m:00s) No change
pkgs/main/noarch         [>                   ] (--:--) No change
pkgs/main/noarch         [====================] (00m:00s) No change
pkgs/r/linux-64          [>                   ] (--:--) No change
pkgs/r/linux-64          [====================] (00m:00s) No change
pkgs/r/noarch            [>                   ] (--:--) No change
pkgs/r/noarch            [====================] (00m:00s) 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)
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: 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: 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)
Requirement already satisfied: html5lib in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (1.1)
Requirement already satisfied: webencodings in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from html5lib)
(0.5.1)
Requirement already satisfied: six>=1.9 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from html5lib)
(1.16.0)
```

[22]:
```
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.

[23]:
```
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`.

[24]:
```
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.

[25]:
```
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.

[26]:
```
tesla_data.reset_index(inplace =True)
tesla_data.head()
```

[26]:

	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

0.3 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`.

[27]:
```
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`.

[28]:
```
soup_1=BeautifulSoup(html_data,'html')
```

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
```

[29]:
```
tesla_revenue=pd.read_html(str(soup_1))[1]
tesla_revenue.rename(columns = {'Tesla Quarterly Revenue(Millions of US $)':
↪'Date','Tesla Quarterly Revenue(Millions of US $).1':'Revenue'}, inplace =␣
↪True)
tesla_revenue
```

[29]:

	Date	Revenue
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
5	2021-06-30	$11,958
6	2021-03-31	$10,389
7	2020-12-31	$10,744
8	2020-09-30	$8,771
9	2020-06-30	$6,036
10	2020-03-31	$5,985
11	2019-12-31	$7,384
12	2019-09-30	$6,303
13	2019-06-30	$6,350
14	2019-03-31	$4,541
15	2018-12-31	$7,226
16	2018-09-30	$6,824
17	2018-06-30	$4,002
18	2018-03-31	$3,409
19	2017-12-31	$3,288

20	2017-09-30	$2,985
21	2017-06-30	$2,790
22	2017-03-31	$2,696
23	2016-12-31	$2,285
24	2016-09-30	$2,298
25	2016-06-30	$1,270
26	2016-03-31	$1,147
27	2015-12-31	$1,214
28	2015-09-30	$937
29	2015-06-30	$955
30	2015-03-31	$940
31	2014-12-31	$957
32	2014-09-30	$852
33	2014-06-30	$769
34	2014-03-31	$621
35	2013-12-31	$615
36	2013-09-30	$431
37	2013-06-30	$405
38	2013-03-31	$562
39	2012-12-31	$306
40	2012-09-30	$50
41	2012-06-30	$27
42	2012-03-31	$30
43	2011-12-31	$39
44	2011-09-30	$58
45	2011-06-30	$58
46	2011-03-31	$49
47	2010-12-31	$36
48	2010-09-30	$31
49	2010-06-30	$28
50	2010-03-31	$21
51	2009-12-31	NaN
52	2009-09-30	$46
53	2009-06-30	$27

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

[30]:
```
tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|\$',"")
tesla_revenue
```

```
/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.
  """Entry point for launching an IPython kernel.
```

[30]:

	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
5	2021-06-30	11958
6	2021-03-31	10389
7	2020-12-31	10744
8	2020-09-30	8771
9	2020-06-30	6036
10	2020-03-31	5985
11	2019-12-31	7384
12	2019-09-30	6303
13	2019-06-30	6350
14	2019-03-31	4541
15	2018-12-31	7226
16	2018-09-30	6824
17	2018-06-30	4002
18	2018-03-31	3409
19	2017-12-31	3288
20	2017-09-30	2985
21	2017-06-30	2790
22	2017-03-31	2696
23	2016-12-31	2285
24	2016-09-30	2298
25	2016-06-30	1270
26	2016-03-31	1147
27	2015-12-31	1214
28	2015-09-30	937
29	2015-06-30	955
30	2015-03-31	940
31	2014-12-31	957
32	2014-09-30	852
33	2014-06-30	769
34	2014-03-31	621
35	2013-12-31	615
36	2013-09-30	431
37	2013-06-30	405
38	2013-03-31	562
39	2012-12-31	306
40	2012-09-30	50
41	2012-06-30	27
42	2012-03-31	30
43	2011-12-31	39
44	2011-09-30	58
45	2011-06-30	58
46	2011-03-31	49
47	2010-12-31	36

```
48  2010-09-30      31
49  2010-06-30      28
50  2010-03-31      21
51  2009-12-31     NaN
52  2009-09-30      46
53  2009-06-30      27
```

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

[31]:
```
tesla_revenue.dropna(inplace=True)

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

[31]:
```
          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
5   2021-06-30   11958
6   2021-03-31   10389
7   2020-12-31   10744
8   2020-09-30    8771
9   2020-06-30    6036
10  2020-03-31    5985
11  2019-12-31    7384
12  2019-09-30    6303
13  2019-06-30    6350
14  2019-03-31    4541
15  2018-12-31    7226
16  2018-09-30    6824
17  2018-06-30    4002
18  2018-03-31    3409
19  2017-12-31    3288
20  2017-09-30    2985
21  2017-06-30    2790
22  2017-03-31    2696
23  2016-12-31    2285
24  2016-09-30    2298
25  2016-06-30    1270
26  2016-03-31    1147
27  2015-12-31    1214
28  2015-09-30     937
29  2015-06-30     955
30  2015-03-31     940
31  2014-12-31     957
```

32	2014-09-30	852
33	2014-06-30	769
34	2014-03-31	621
35	2013-12-31	615
36	2013-09-30	431
37	2013-06-30	405
38	2013-03-31	562
39	2012-12-31	306
40	2012-09-30	50
41	2012-06-30	27
42	2012-03-31	30
43	2011-12-31	39
44	2011-09-30	58
45	2011-06-30	58
46	2011-03-31	49
47	2010-12-31	36
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

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

[32]:
```
tesla_revenue.tail(5)
```

[32]:

	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`.

[33]:
```
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.

[10]:
```
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.

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

[11]:

	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	1.683250	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	1.615921	1.662210	1.603296	1.662210	6892800	0.0	0.0

0.4 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`.

[35]:
```
url1 = 'https://web.archive.org/web/20200814131437/https://www.macrotrends.net/
  ↪stocks/charts/GME/gamestop/revenue'
pages=requests.get(url1)
html_data = pages.text
```

Parse the html data using `beautiful_soup`.

[36]:
```
soup1 = BeautifulSoup(html_data, 'html')
```

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
```

[37]:
```
gme_revenue = pd.DataFrame(columns = ['Date', 'Revenue'])
gme_body = soup1.find_all('table', class_ = 'historical_data_table table')[1]
for row in gme_body.find_all("tr")[1:]:
    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)
```

[37]:

	Date	Revenue
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

[38]:
```
gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',|\$',"")
gme_revenue.head()
```

```
/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.
```

[38]:

	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.

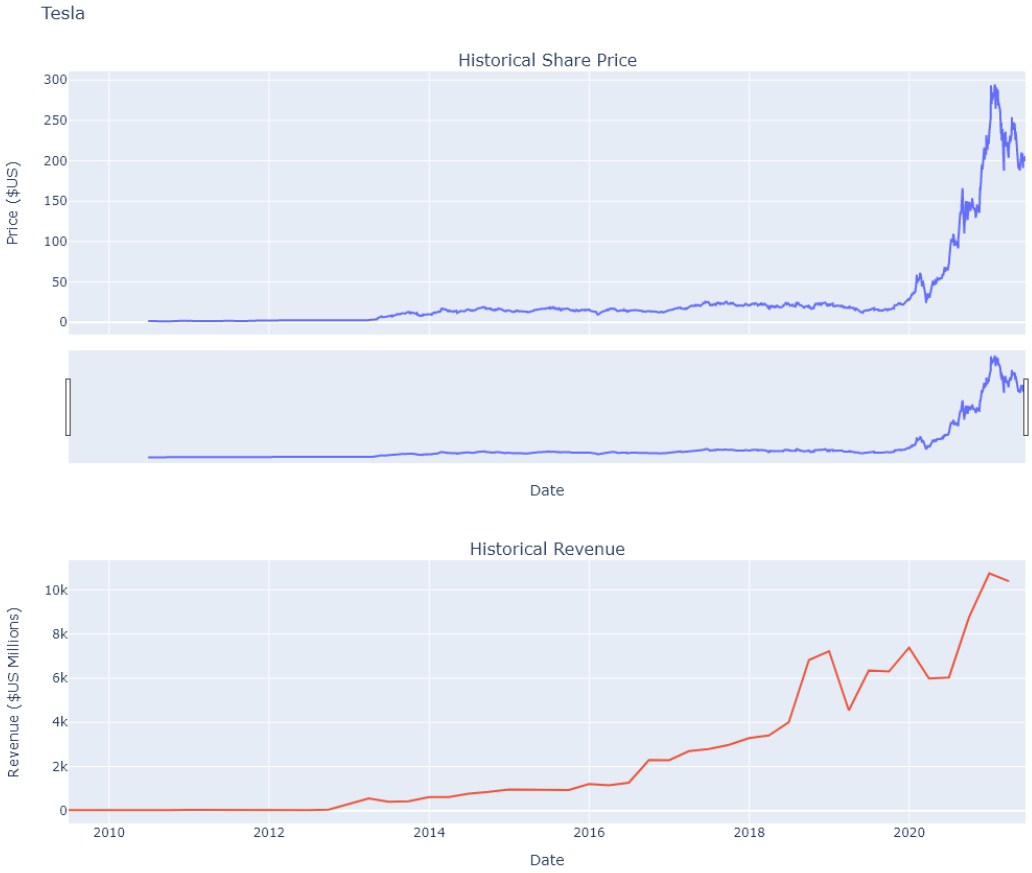
[1]:
```
#gme_revenue = gme_revenue[gme_revenue['Revenue'] != ""]
#gme_revenue.tail(5)
```

Question 5: Plot Tesla Stock Graph

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.

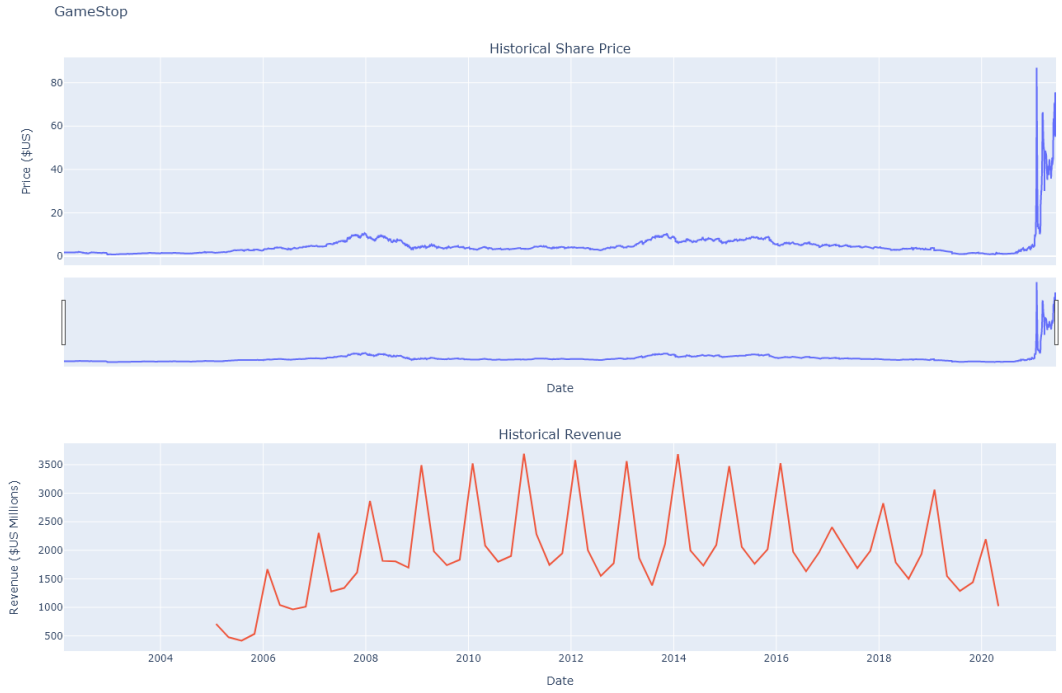
[34]:
```
make_graph(tesla_data, tesla_revenue, 'Tesla')
```



0.5 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.

[40]:
```
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

0.6 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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