Skills Network

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**

Note:- If you are working Locally using anaconda, please uncomment the following code and execute it.

```
#!pip install yfinance==0.2.38
#!pip install pandas==2.2.2
#!pip install nbformat
```

```
!pip install yfinance
!pip install bs4
!pip install nbformat
```

```
Requirement already satisfied: yfinance in /usr/local/lib/python3.10/dist-packages (0.2.41)
Requirement already satisfied: pandas>=1.3.0 in /usr/local/lib/python3.10/dist-packages (from yfinance) (2.1.4)
Requirement already satisfied: numpy>=1.16.5 in /usr/local/lib/python3.10/dist-packages (from yfinance) (1.26.4)
Requirement already satisfied: requests>=2.31 in /usr/local/lib/python3.10/dist-packages (from yfinance) (2.32.3)
Requirement already satisfied: multitasking>=0.0.7 in /usr/local/lib/python3.10/dist-packages (from yfinance) (0.0.11)
Requirement already satisfied: lxml>=4.9.1 in /usr/local/lib/python3.10/dist-packages (from yfinance) (4.9.4)
Requirement already satisfied: platformdirs>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from yfinance) (4.2.2)
Requirement already satisfied: pytz>=2022.5 in /usr/local/lib/python3.10/dist-packages (from yfinance) (2024.1)
Requirement already satisfied: frozendict>=2.3.4 in /usr/local/lib/python3.10/dist-packages (from yfinance) (2.4.4)
Requirement already satisfied: peewee>=3.16.2 in /usr/local/lib/python3.10/dist-packages (from yfinance) (3.17.6)
Requirement already satisfied: beautifulsoup4>=4.11.1 in /usr/local/lib/python3.10/dist-packages (from yfinance) (4.12.3)
Requirement already satisfied: html5lib>=1.1 in /usr/local/lib/python3.10/dist-packages (from yfinance) (1.1)
Requirement already satisfied: soupsieve>1.2 in /usr/local/lib/python3.10/dist-packages (from beautifulsoup4>=4.11.1->yfinance) (2.5)
Requirement already satisfied: six>=1.9 in /usr/local/lib/python3.10/dist-packages (from html5lib>=1.1->yfinance) (1.16.0)
Requirement already satisfied: webencodings in /usr/local/lib/python3.10/dist-packages (from html5lib>=1.1->yfinance) (0.5.1)
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.3.0->yfinance) (2.8.2)
Requirement already satisfied: tzdata>=2022.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.3.0->yfinance) (2024.1)
Requirement already satisfied: charset-normalizer<4,>=2 in /usr/local/lib/python3.10/dist-packages (from requests>=2.31->yfinance) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.31->yfinance) (3.7)
Requirement already satisfied: urllib3<3,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.31->yfinance) (2.0.7)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.31->yfinance) (2024.7.4)
Collecting bs4
  Downloading bs4-0.0.2-py2.py3-none-any.whl.metadata (411 bytes)
Requirement already satisfied: beautifulsoup4 in /usr/local/lib/python3.10/dist-packages (from bs4) (4.12.3)
Requirement already satisfied: soupsieve>1.2 in /usr/local/lib/python3.10/dist-packages (from beautifulsoup4->bs4) (2.5)
Downloading bs4-0.0.2-py2.py3-none-any.whl (1.2 kB)
Installing collected packages: bs4
Successfully installed bs4-0.0.2
Requirement already satisfied: nbformat in /usr/local/lib/python3.10/dist-packages (5.10.4)
Requirement already satisfied: fastjsonschema>=2.15 in /usr/local/lib/python3.10/dist-packages (from nbformat) (2.20.0)
Requirement already satisfied: jsonschema>=2.6 in /usr/local/lib/python3.10/dist-packages (from nbformat) (4.23.0)
Requirement already satisfied: jupyter-core!=5.0.*,>=4.12 in /usr/local/lib/python3.10/dist-packages (from nbformat) (5.7.2)
Requirement already satisfied: traitlets>=5.1 in /usr/local/lib/python3.10/dist-packages (from nbformat) (5.7.1)
Requirement already satisfied: attrs>=22.2.0 in /usr/local/lib/python3.10/dist-packages (from jsonschema>=2.6->nbformat) (24.2.0)
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in /usr/local/lib/python3.10/dist-packages (from jsonschema>=2.6->nbformat) (2023.12.1)
```

```
     Requirement already satisfied: referencing>=0.28.4 in /usr/local/lib/python3.10/dist-packages (from jsonschema>=2.6->nbformat) (0.35.1)
     Requirement already satisfied: rpds-py>=0.7.1 in /usr/local/lib/python3.10/dist-packages (from jsonschema>=2.6->nbformat) (0.20.0)
     Requirement already satisfied: platformdirs>=2.5 in /usr/local/lib/python3.10/dist-packages (from jupyter-core!=5.0.*,>=4.12->nbformat) (4.2.2)
```

```
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
```

In Python, you can ignore warnings using the warnings module. You can use the filterwarnings function to filter or ignore specific warning messages or categories.

```
import warnings
# Ignore all warnings
warnings.filterwarnings("ignore", category=FutureWarning)
```

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.**

```
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), 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), 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()
```

Use the make_graph function that we've already defined. You'll need to invoke it in questions 5 and 6 to display the graphs and create the dashboard.

> **Note: You don't need to redefine the function for plotting graphs anywhere else in this notebook; just use the existing function.**

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`.

```
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.

```
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.

```
tesla_data.reset_index(inplace=True)
tesla_data.head()
```

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2010-06-29 00:00:00-04:00	1.266667	1.666667	1.169333	1.592667	281494500	0.0	0.0
1	2010-06-30 00:00:00-04:00	1.719333	2.028000	1.553333	1.588667	257806500	0.0	0.0
2	2010-07-01 00:00:00-04:00	1.666667	1.728000	1.351333	1.464000	123282000	0.0	0.0
3	2010-07-02 00:00:00-04:00	1.533333	1.540000	1.247333	1.280000	77097000	0.0	0.0
4	2010-07-06 00:00:00-04:00	1.333333	1.333333	1.055333	1.074000	103003500	0.0	0.0

Next steps: Generate code with `tesla_data` View recommended plots New interactive sheet

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`.

```
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` using parser i.e `html5lib` or `html.parser`. Make sure to use the `html_data` with the content parameter as follow `html_data.content` .

```
beautiful_soup = BeautifulSoup(html_data, 'html.parser')
```

Using `BeautifulSoup` or the `read_html` function extract the table with `Tesla Revenue` and store it into a dataframe named `tesla_revenue`. The dataframe should have columns `Date` and `Revenue`.

▶ Step-by-step instructions

▶ Click here if you need help locating the table

```
tesla_revenue = pd.DataFrame(columns=["Date", "Revenue"])
for row in beautiful_soup.find("tbody").find_all("tr"):
    col = row.find_all("td")
    Date = col[0].text
    Revenue = col[1].text

    tesla_revenue = pd.concat([tesla_revenue, pd.DataFrame({"Date":[Date], "Revenue":[Revenue]})], ignore_index=True)
```

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

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

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

```
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.

```
tesla_revenue.tail()
```

	Date	Revenue
8	2013	2013
9	2012	413
10	2011	204
11	2010	117
12	2009	112

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`.

```
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.

```
gme_data = gme.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.

```
gme_data.reset_index(inplace=True)
gme_data.head()
```

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2002-02-13 00:00:00-05:00	1.620128	1.693349	1.603295	1.691666	76216000	0.0	0.0
1	2002-02-14 00:00:00-05:00	1.712707	1.716074	1.670626	1.683251	11021600	0.0	0.0
2	2002-02-15 00:00:00-05:00	1.683251	1.687459	1.658002	1.674834	8389600	0.0	0.0
3	2002-02-19 00:00:00-05:00	1.666418	1.666418	1.578047	1.607504	7410400	0.0	0.0
4	2002-02-20 00:00:00-05:00	1.615920	1.662210	1.603296	1.662210	6892800	0.0	0.0

Next steps: Generate code with `gme_data` View recommended plots New interactive sheet

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_2`.

```
url="https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html"
html_data_2  = requests.get(url).text
```

Parse the html data using `beautiful_soup` using parser i.e `html5lib` or `html.parser`.

```
beautiful_soup = BeautifulSoup(html_data_2, 'html.parser')
```

Using `BeautifulSoup` or the `read_html` function extract the table with `GameStop 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.

> **Note: Use the method similar to what you did in question 2.**

▶ Click here if you need help locating the table

```
gme_revenue = pd.DataFrame(columns=["Date", "Revenue"])
for row in beautiful_soup.find("tbody").find_all("tr"):
    col = row.find_all("td")
    Date = col[0].text
    Revenue = col[1].text

    gme_revenue = pd.concat([tesla_revenue, pd.DataFrame({"Date":[Date], "Revenue":[Revenue]})], ignore_index=True)

gme_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|\$',"", regex=True)
gme_revenue.dropna(inplace=True)

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

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

```
gme_revenue.tail()
```

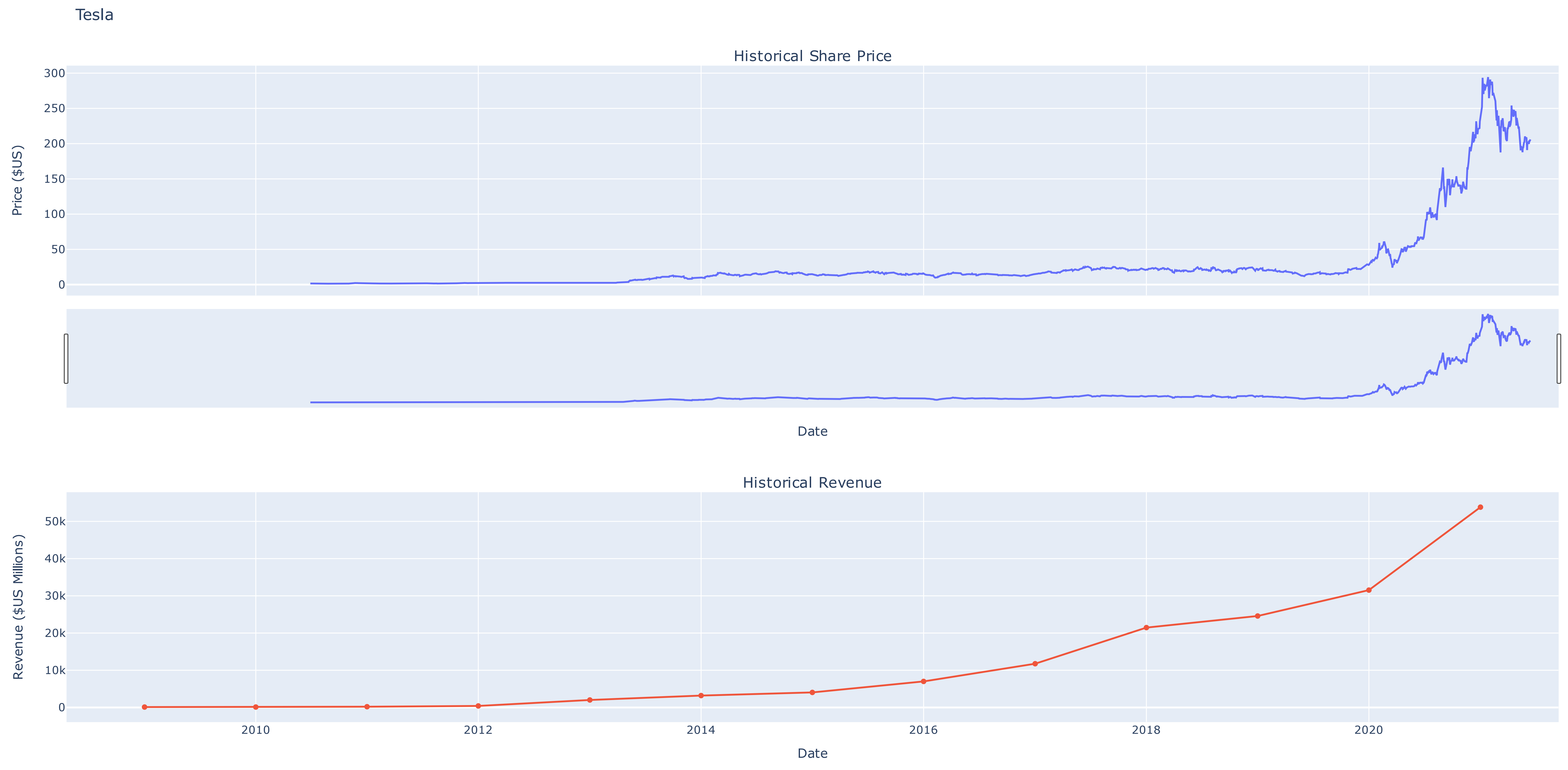
```
    Date  Revenue
8   2013     2013
9   2012      413
10  2011      204
11  2010      117
12  2009      112
```

```
## Question 5: Plot Tesla Stock Graph
```

Use the `make_graph` function to graph the Tesla Stock Data, also provide a title for the graph. Note the graph will only show data upto June 2021.

▶ Hint

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

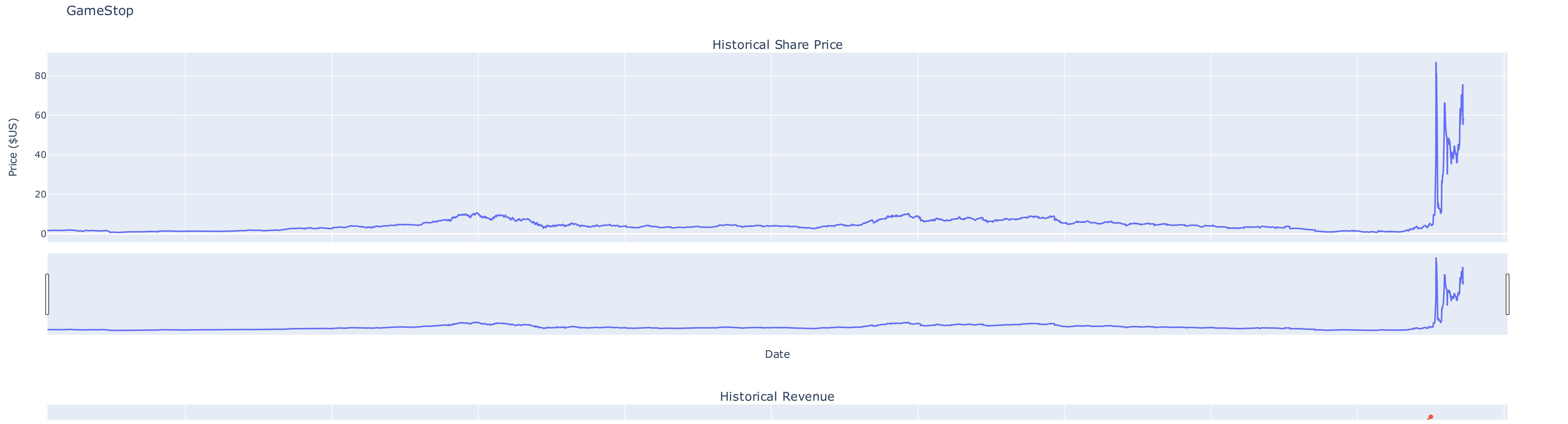


Question 6: Plot GameStop Stock Graph

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.

▶ Hint

```
make_graph(gme_data, gme_revenue, 'GameStop')
```


GameStop
Historical Share Price
Price ($US)
80
60
40
20
0
Date
Historical Revenue