Final Assignment

November 24, 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

```
[1]: !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
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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) (4.9.1)
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  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
```
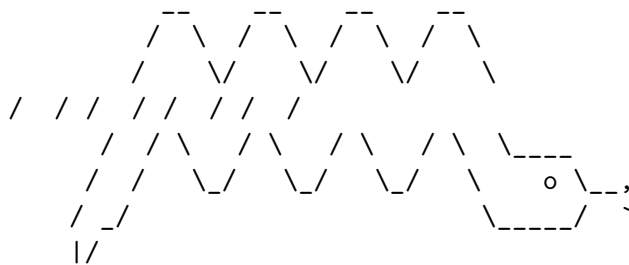
```
yfinance==0.1.67) (1.21.6)
Requirement already satisfied: python-dateutil>=2.7.3 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
pandas>=0.24->yfinance==0.1.67) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (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) (1.26.11)
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


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       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      [<=>                    ] (00m:00s)
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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

  Install:


  + bs4                   4.10.0   hd3eb1b0_0       pkgs/main/noarch
10 KB

  Change:
```

4

```
    - certifi          2022.9.24  pyhd8ed1ab_0   installed
    + certifi          2022.9.24  py37h06a4308_0 pkgs/main/linux-64
154 KB
    - openssl             1.1.1s  h166bdaf_0     installed
    + openssl             1.1.1s  h7f8727e_0     pkgs/main/linux-64
4 MB

  Upgrade:



    - ca-certificates  2022.9.24  ha878542_0     installed
    + ca-certificates  2022.10.11 h06a4308_0     pkgs/main/linux-64
124 KB

  Downgrade:



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

  Summary:

  Install: 1 packages
  Change: 2 packages
  Upgrade: 1 packages
  Downgrade: 1 packages

  Total download: 4 MB



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Extracting   [>                                              ] (--:--)
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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)
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Requirement already satisfied: jupyter-core in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
nbformat==4.2.0) (4.11.1)
Requirement already satisfied: traitlets>=4.1 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
nbformat==4.2.0) (5.5.0)
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) (4.17.0)
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) (5.10.0)
Requirement already satisfied: attrs>=17.4.0 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
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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: 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) (3.10.0)
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
```

```python
[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
```

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.

```python
[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()
```

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`.

```
[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.

```
[6]: 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.

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

```
[7]:         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 Webscraping to Extract Tesla Revenue Data

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

```
[8]: url = "https://www.macrotrends.net/stocks/charts/TSLA/tesla/revenue"
     html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

```
[10]: 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
```

```
[34]: 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)
          tesla_revenue.head()
```

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

```
[35]: 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.
  """Entry point for launching an IPython kernel.
```

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

```
[36]: 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.

```
[37]: tesla_revenue.head()
```

```
[37]:    Date Revenue
      0  2021   53823
      1  2020   31536
      2  2019   24578
      3  2018   21461
```

```
4  2017    11759
```

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`.

```
[38]: 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.

```
[39]: 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.

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

```
[40]:       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  1.683251  1.687459  1.658002  1.674834   8389600        0.0
      3 2002-02-19  1.666418  1.666418  1.578047  1.607504   7410400        0.0
      4 2002-02-20  1.615921  1.662210  1.603296  1.662210   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`.

```
[41]: 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`.

```
[42]: 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

```
[43]: 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(',|\$',"")
          gme_revenue.dropna(inplace=True)
          gme_revenue = gme_revenue[gme_revenue['Revenue'] != ""]
```

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

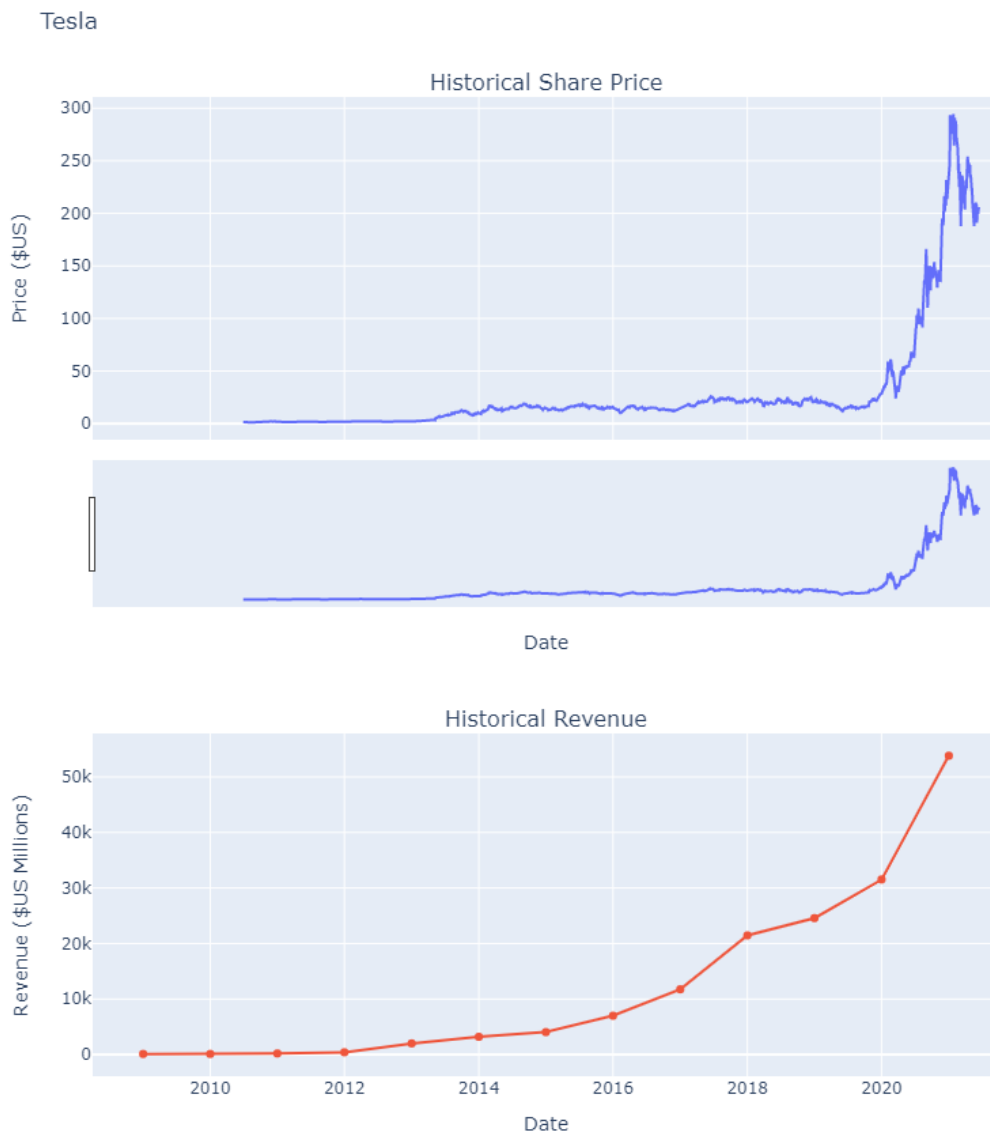Display the last five rows of the `gme_revenue` dataframe using the `tail` function. Take a screenshot of the results.

```
[44]: gme_revenue.head()
```

```
[44]:    Date Revenue
      0  2020    6466
      1  2019    8285
      2  2018    8547
      3  2017    7965
      4  2016    9364
```

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.

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

Tesla

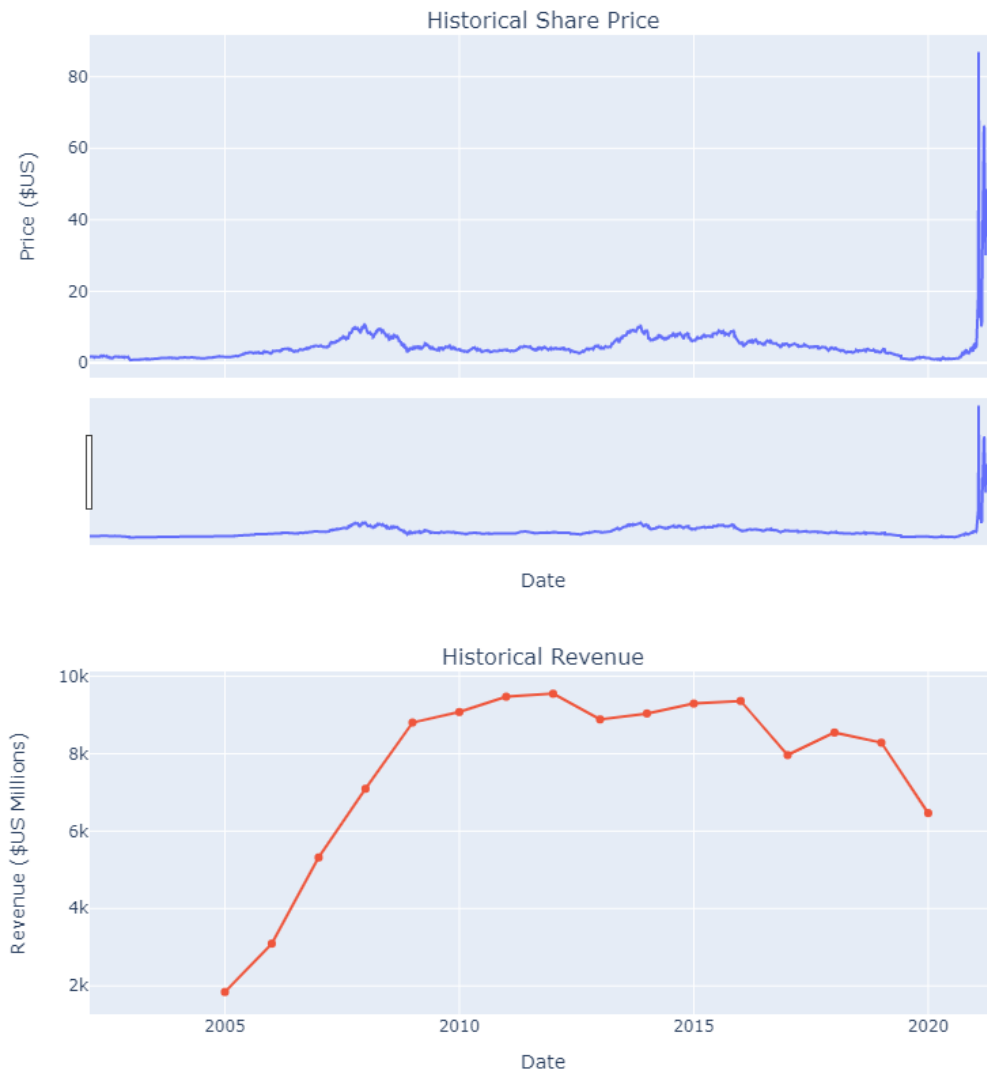### Historical Share Price

Historical Revenue

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.

[46]: `make_graph(gme_data, gme_revenue, 'GameStop')`

GameStop

Historical Share Price

Historical Revenue

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

##