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.

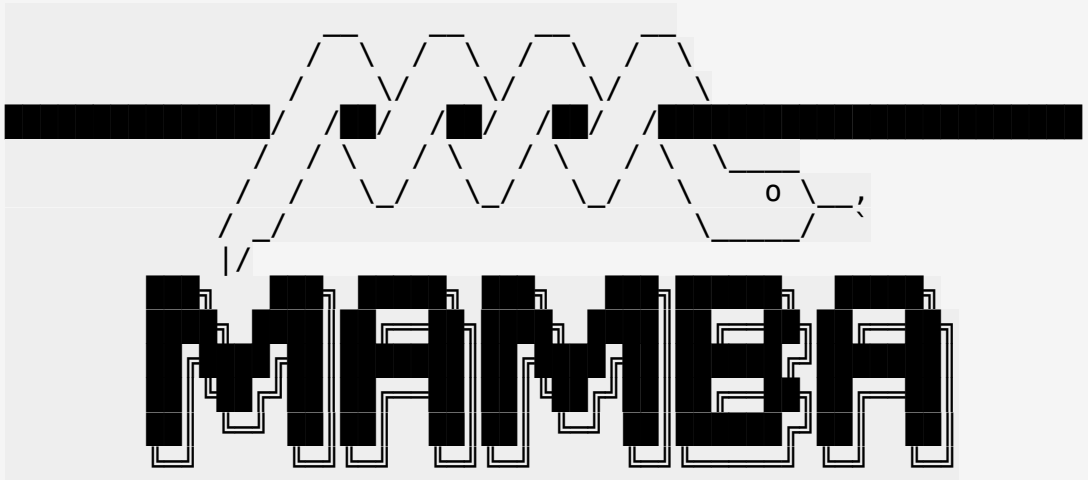
Note:- If you are working Locally using anaconda, please uncomment the following code and execute it.

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

!pip install yfinance==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: 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) (2.29.0)
Collecting multitasking>=0.0.7 (from yfinance==0.1.67)
  Downloading multitasking-0.0.11-py3-none-any.whl (8.5 kB)
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: charset-normalizer<4,>=2 in
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from
requests>=2.20->yfinance==0.1.67) (3.1.0)
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: 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: 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
```



```
        mamba (1.4.2) supported by @QuantStack

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

Looking for: ['bs4==4.10.0']

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1.5MB/s  0.3s
pkgs/r/linux-64    ━━━━━━━━━━━━━━━━━━━━━━ 417.8kB /  ??.?MB @
```

```
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@   4.1MB/s  1.8s
e/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
10kB

  Upgrade:
──────────────────────────────────────────────────────────────────────────────
──────

  - ca-certificates   2023.5.7  hbcca054_0    conda-forge

  + ca-certificates  2024.3.11  h06a4308_0    pkgs/main/linux-64
130kB
  - openssl              1.1.1t  h0b41bf4_0    conda-forge

  + openssl              1.1.1w  h7f8727e_0    pkgs/main/linux-64
4MB

  Downgrade:
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  - beautifulsoup4      4.11.1  pyha770c72_0  conda-forge

  + beautifulsoup4      4.10.0  pyh06a4308_0  pkgs/main/noarch
87kB

  Summary:

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

  Total download: 4MB

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Extracting       ━━━━━━━━━━━━━━━━━━━━━━━━       0
0.0s━   4.1MB bs4                           0.1s
Extracting   (3) ━━━ ━━━━━━━━━━━━━━━━ ━━━       0 beautifulsoup4
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```

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3 openssl                     0.5sat==4.2.0
  Downloading nbformat-4.2.0-py2.py3-none-any.whl (153 kB)
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ent 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: 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: 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) (0.19.3)
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)
Installing collected packages: nbformat
  Attempting uninstall: nbformat
    Found existing installation: nbformat 5.8.0
    Uninstalling nbformat-5.8.0:
      Successfully uninstalled nbformat-5.8.0
ERROR: pip's dependency resolver does not currently take into account
all the packages that are installed. This behaviour is the source of
the following dependency conflicts.
```

```
jupyter-server 1.24.0 requires nbformat>=5.2.0, but you have nbformat
4.2.0 which is incompatible.
nbclient 0.7.4 requires nbformat>=5.1, but you have nbformat 4.2.0
which is incompatible.
nbconvert 7.4.0 requires nbformat>=5.1, but you have nbformat 4.2.0
which is incompatible.
Successfully installed nbformat-4.2.0
```

```
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,
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`.

```
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  \
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
```

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`.

```
html_data = requests.get("https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm").text
```

Parse the html data using `beautiful_soup`.

```
soup = BeautifulSoup(html_data, "lxml")
```

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`.

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

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

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

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(5)
```

	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`.

```
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(5)
```

```
   level_0  index       Date      Open      High       Low
Close  \
0        0      0 2002-02-13  1.620128  1.693350  1.603296  1.691666

1        1      1 2002-02-14  1.712707  1.716074  1.670626  1.683250

2        2      2 2002-02-15  1.683251  1.687459  1.658002  1.674834

3        3      3 2002-02-19  1.666417  1.666417  1.578047  1.607504

4        4      4 2002-02-20  1.615920  1.662210  1.603296  1.662210


     Volume  Dividends  Stock Splits
0  76216000        0.0           0.0
1  11021600        0.0           0.0
2   8389600        0.0           0.0
3   7410400        0.0           0.0
4   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`.

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

Parse the html data using `beautiful_soup`.

```
soup = BeautifulSoup(html_data, 'lxml')
```

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 using a method similar to what you did in Question 2.

```
gme_revenue = pd.DataFrame(pd.read_html(str(soup))[1])
gme_revenue.rename(columns={'GameStop Quarterly Revenue(Millions of US $)': 'Date', 'GameStop Quarterly Revenue(Millions of US $).1': 'Revenue'}, inplace=True)
```

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

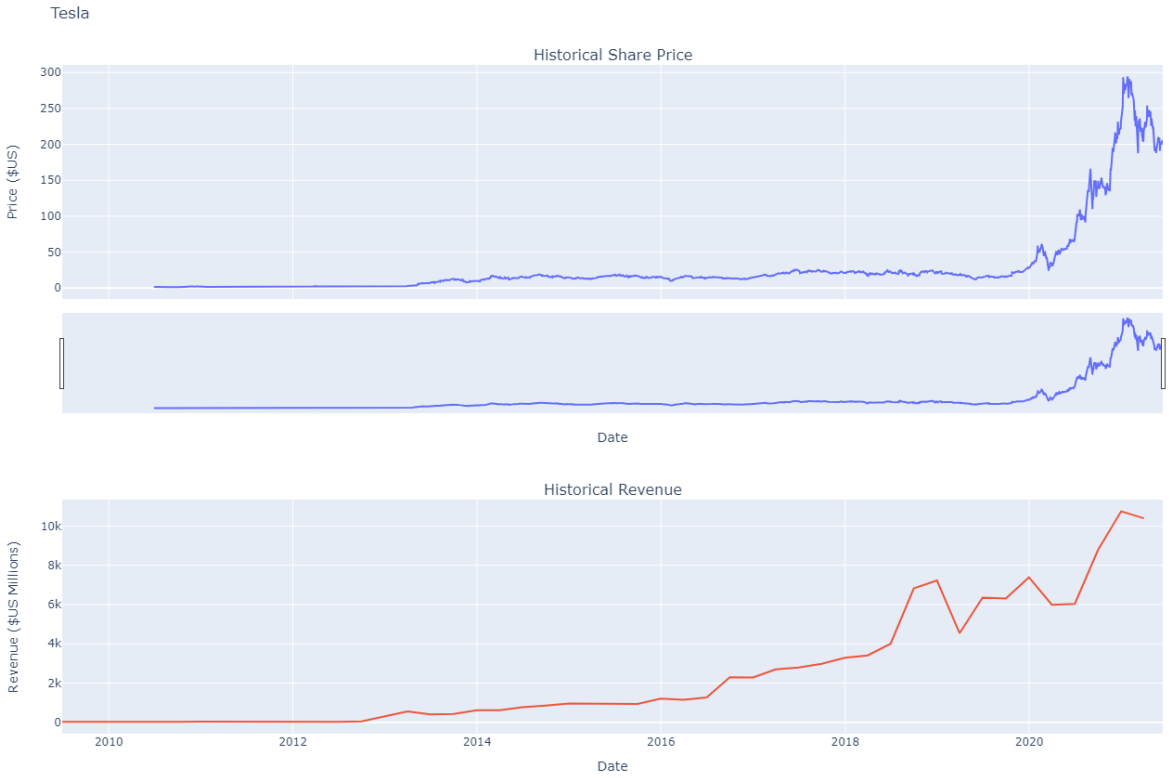
```
gme_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|\$',"")
gme_revenue.tail(5)
```

```
          Date Revenue
57  2006-01-31     NaN
58  2005-10-31     NaN
59  2005-07-31     NaN
60  2005-04-30     NaN
61  2005-01-31     NaN
```

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.

```
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.

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

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.

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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