



# 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**

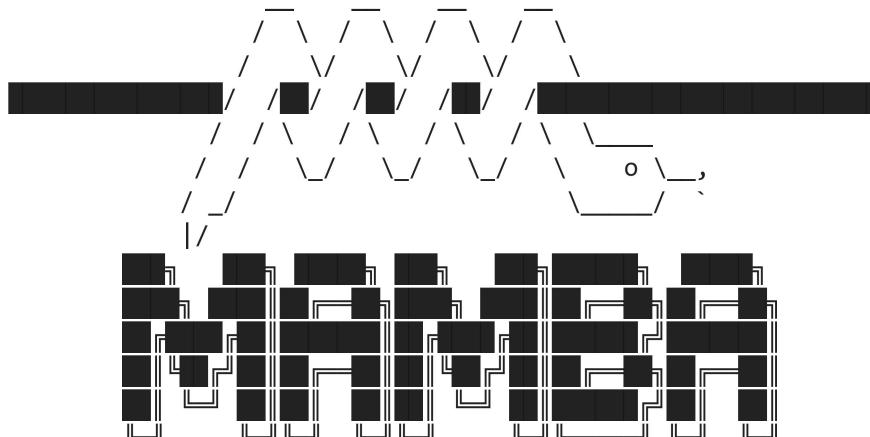
---

**\*Note\*:-** If you are working in IBM Cloud Watson Studio, please replace the command for installing nbformat from `!pip install nbformat==4.2.0` to simply `!pip install nbformat`

In [193...]

```
!pip install yfinance==0.1.67
!mamba install bs4==4.10.0 -y
!pip install nbformat==4.2.0
```

```
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: 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)
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: 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)
```



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']

[+] 0.0s  
[+] 0.1s

pkgs/main/linux-64		0.0 B / ???.?MB @ ???.?MB/s 0.1s
pkgs/main/noarch		0.0 B / ???.?MB @ ???.?MB/s 0.1s
pkgs/r/linux-64		0.0 B / ???.?MB @ ???.?MB/s 0.1s
pkgs/r/noarch		0.0 B / ???.?MB @ ???.?MB/s 0.1s
s/r/linux-64		No change
pkgs/main/linux-64		No change
pkgs/main/noarch		No change
pkgs/r/noarch		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: 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) (4.1.4)  
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)

```
In [194...]:  
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 [195...]:  
  
def make_graph(stock_data, revenue_data, stock):  
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles=("Historical Stock Data", "Revenue Data"))  
    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, name="Stock 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, name="Revenue ($US Millions)"), row=2, col=1)  
    fig.update_xaxes(title_text="Date", row=1, col=1)  
    fig.update_xaxes(title_text="Date", row=2, col=1)  
    fig.update_yaxes(title_text="Price ($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 [196...]:  
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.

```
In [197...]:  
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.

```
In [198]: tesla_data.reset_index(inplace=True)
```

## 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/IBMDriverSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm> Save the text of the response as a variable named `html_data`.

```
In [199]: url = "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDriverSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm"
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

```
In [200]: beautiful_soup = BeautifulSoup(html_data, "html")
title_content = beautiful_soup.title.text
```

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`.

► Click here if you need help locating the table

```
In [201]: read_html_pandas_data = pd.read_html(url)
tesla_revenue = read_html_pandas_data[1]
tesla_revenue.head()
```

	Tesla Quarterly Revenue(Millions of US \$)	Tesla Quarterly Revenue(Millions of US \$).1
<b>0</b>	2022-09-30	\$21,454
<b>1</b>	2022-06-30	\$16,934
<b>2</b>	2022-03-31	\$18,756
<b>3</b>	2021-12-31	\$17,719
<b>4</b>	2021-09-30	\$13,757

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

```
In [202]: #tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',', '$', '')
tesla_revenue['Tesla Quarterly Revenue(Millions of US $).1'] = tesla_revenue['Tesla
```

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

```
In [203]: tesla_revenue.dropna(inplace=True)
```

```
tesla_revenue = tesla_revenue[tesla_revenue['Tesla Quarterly Revenue(Millions of US $)'] > 0]
```

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

```
In [204...]: last_5_rows = tesla_revenue.tail(5)
print(last_5_rows)
```

	Tesla Quarterly Revenue(Millions of US \$)
48	2010-09-30
49	2010-06-30
50	2010-03-31
52	2009-09-30
53	2009-06-30

	Tesla Quarterly Revenue(Millions of US \$).1
48	31
49	28
50	21
52	46
53	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 [205...]: 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.

```
In [206...]: 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.

```
In [207...]: gme_data.reset_index(inplace=True)
```

## 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/IBMDriverSkillsNetwork-PY0220EN->

<SkillsNetwork/labs/project/stock.html>. Save the text of the response as a variable named `html_data`.

```
In [208...]  
url = "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDevelo  
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

```
In [209...]  
beautiful_soup = BeautifulSoup(html_data, "html")  
title_content = beautiful_soup.title.text
```

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.

► Click here if you need help locating the table

```
In [210...]  
read_html_pandas_data = pd.read_html(url)  
gme_revenue = read_html_pandas_data[1]
```

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

```
In [211...]  
last_5_rows = gme_revenue.tail(5)  
print(last_5_rows)
```

	GameStop Quarterly Revenue(Millions of US \$)
57	2006-01-31
58	2005-10-31
59	2005-07-31
60	2005-04-30
61	2005-01-31
	GameStop Quarterly Revenue(Millions of US \$.1)
57	\$1,667
58	\$534
59	\$416
60	\$475
61	\$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')`. Note the graph will only show data upto June 2021.

```
In [212...]  
make_graph(tesla_data, tesla_revenue, 'Tesla')
```

```
-----  
AttributeError                                                 Traceback (most recent call last)  
/tmp/ipykernel_83/851608974.py in <module>  
----> 1 make_graph(tesla_data, tesla_revenue, 'Tesla')  
  
/tmp/ipykernel_83/2068038883.py in make_graph(stock_data, revenue_data, stock)  
      2     fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles=  
      ("Historical Share Price", "Historical Revenue"), vertical_spacing = .3)  
      3     stock_data_specific = stock_data[stock_data.Date <= '2021--06-14']  
----> 4     revenue_data_specific = revenue_data[revenue_data.Date <= '2021-04-30']  
      5     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)  
      6     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)  
  
~/conda/envs/python/lib/python3.7/site-packages/pandas/core/generic.py in __getattr__  
(self, name)  
  5485         ):  
  5486             return self[name]  
-> 5487         return object.__getattribute__(self, name)  
  5488  
  5489     def __setattr__(self, name: str, value) -> None:  
  
AttributeError: 'DataFrame' object has no attribute 'Date'
```

## 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.

In [213...]: `make_graph(gme_data, gme_revenue, 'GameStop')`

```

-----
AttributeError                                 Traceback (most recent call last)
/tmp/ipykernel_83/1051334688.py in <module>
----> 1 make_graph(gme_data, gme_revenue, 'GameStop')

/tmp/ipykernel_83/2068038883.py in make_graph(stock_data, revenue_data, stock)
      2     fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles=
("Historical Share Price", "Historical Revenue"), vertical_spacing = .3)
      3     stock_data_specific = stock_data[stock_data.Date <= '2021--06-14']
----> 4     revenue_data_specific = revenue_data[revenue_data.Date <= '2021-04-30']
      5     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)
      6     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)

~/conda/envs/python/lib/python3.7/site-packages/pandas/core/generic.py in __getattr__(self, name)
  5485         ):
  5486             return self[name]
-> 5487         return object.__getattribute__(self, name)
  5488
  5489     def __setattr__(self, name: str, value) -> None:

AttributeError: 'DataFrame' object has no attribute 'Date'

```

## 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
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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