



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.

Table of Contents

- Define a Function that Makes a Graph
- Question 1: Use yfinance to Extract Stock Data
- Question 2: Use Webscraping to Extract Tesla Revenue Data
- Question 3: Use yfinance to Extract Stock Data
- Question 4: Use Webscraping to Extract GME Revenue Data
- Question 5: Plot Tesla Stock Graph
- Question 6: Plot GameStop Stock Graph

Estimated Time Needed: **30 min**

Note: If you are working Locally using anaconda, please uncomment the following code and execute it. Use the version as per your python version.

```
[32]: !pip install yfinance
!pip install bs4
!pip install nbformat

Collecting yfinance
  Downloading yfinance-0.2.51-py2.py3-none-any.whl.metadata (5.5 kB)
Requirement already satisfied: pandas>=1.3.0 in /opt/conda/lib/python3.11/site-packages (from yfinance) (2.2.3)
Requirement already satisfied: numpy>=1.16.5 in /opt/conda/lib/python3.11/site-packages (from yfinance) (2.2.1)
Requirement already satisfied: requests>=2.31 in /opt/conda/lib/python3.11/site-packages (from yfinance) (2.31.0)
Collecting multitasking>0.0.7 (from yfinance)
  Downloading multitasking-0.0.11-py3-none-any.whl.metadata (5.5 kB)
Collecting lxml<4.9.1 (from yfinance)
  Downloading lxml-5.3.0-cp311-manylinux_2_28_x86_64.whl.metadata (3.8 kB)
Requirement already satisfied: platformdirs>=2.0.0 in /opt/conda/lib/python3.11/site-packages (from yfinance) (4.2.1)
Requirement already satisfied: pytz>=2022.5 in /opt/conda/lib/python3.11/site-packages (from yfinance) (2024.1)
Collecting frozendict>2.3.4 (from yfinance)
  Downloading frozendict-2.4.6-py311-none-any.whl.metadata (23 kB)
Collecting peewe>=3.16.2 (from yfinance)
  Downloading peewe-3.17.8.tar.gz (948 kB)
                                             948.2/948.2 kB 60.1 MB/s eta 0:00:00
Installing build dependencies ... done
Getting requirements to build wheel ... done
Preparing metadata (pyproject.toml) ... done
Requirement already satisfied: beautifulsoup4>=4.11.1 in /opt/conda/lib/python3.11/site-packages (from yfinance) (4.12.3)
Collecting html5lib>1.1 (from yfinance)
  Downloading html5lib-1.1-py2.py3-none-any.whl.metadata (16 kB)
Requirement already satisfied: soupsieve>1.2 in /opt/conda/lib/python3.11/site-packages (from beautifulsoup4>=4.11.1->yfinance) (2.5)
Requirement already satisfied: six>1.9 in /opt/conda/lib/python3.11/site-packages (from html5lib>1.1->yfinance) (1.16.0)
Requirement already satisfied: webencodings in /opt/conda/lib/python3.11/site-packages (from html5lib>1.1->yfinance) (0.5.1)
Requirement already satisfied: python-dateutil>=2.8.2 in /opt/conda/lib/python3.11/site-packages (from pandas>=1.3.0->yfinance) (2.9.0)
Requirement already satisfied: tzdata>=2022.7 in /opt/conda/lib/python3.11/site-packages (from pandas>=1.3.0->yfinance) (2024.2)
Requirement already satisfied: charset-normalizer>4.1 in /opt/conda/lib/python3.11/site-packages (from requests>=2.31->yfinance) (3.3.2)
Requirement already satisfied: idna>4,>=2.5 in /opt/conda/lib/python3.11/site-packages (from requests>=2.31->yfinance) (3.7)
Requirement already satisfied: urllib3>3,>=1.21.1 in /opt/conda/lib/python3.11/site-packages (from requests>=2.31->yfinance) (2.2.1)
Requirement already satisfied: certifi>=2017.4.17 in /opt/conda/lib/python3.11/site-packages (from requests>=2.31->yfinance) (2024.12.14)
Downloading yfinance-0.2.51-py2.py3-none-any.whl (194 kB)
                                             104.7/194.7 kB 15.0 MB/s eta 0:00:00
Downloading frozendict-2.4.6-py311-none-any.whl (16 kB)
Downloading html5lib-1.1-py2.py3-none-any.whl (112 kB)
                                             112.2/112.2 kB 18.1 MB/s eta 0:00:00
Downloading lxml-5.3.0-cp311-manylinux_2_28_x86_64.whl (5.0 MB)
                                             5.0/5.0 MB 119.3 MB/s eta 0:00:00:00:01
Downloading multitasking-0.0.11-py3-none-any.whl (8.5 kB)
Building wheels for collected packages: peewe
  Building wheel for peewe: pyproject.toml ... done
    Created wheel for peewe: filename=peewe-3.17.8-cp311-cp311-linux_x86_64.whl size=300750 sha256=3416d9ca2c4fb2beb48d23ba752e3e6a365f4dd1d6d5d1b6b99b6390
Seda30@Seda30:~/home/jupyterlab$ /home/jupyterlab/.cache/pip/wheels/ff/6c/15/506e25bc390de450a7fa53c155cd9b0fb1d3ad3e84a9abc1830
Stored in directory: /home/jupyterlab/.cache/pip/wheels/ff/6c/15/506e25bc390de450a7fa53c155cd9b0fb1d3ad3e84a9abc1830
Successfully built peewe
Installing collected packages: peewe, multitasking, lxml, html5lib, frozendict, yfinance
Successfully installed frozendict-2.4.6 html5lib-1.1 lxml-5.3.0 multitasking-0.0.11 peewe-3.17.8 yfinance-0.2.51
Collecting bs4
  Downloading bs4-0.0.2-py2.py3-none-any.whl.metadata (411 bytes)
Requirement already satisfied: beautifulsoup4 in /opt/conda/lib/python3.11/site-packages (from bs4) (4.12.3)
Requirement already satisfied: soupsieve>1.2 in /opt/conda/lib/python3.11/site-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 /opt/conda/lib/python3.11/site-packages (5.10.4)
Requirement already satisfied: fastjsonschema>2.15 in /opt/conda/lib/python3.11/site-packages (from nbformat) (2.19.1)
Requirement already satisfied: jsonschema>2.6 in /opt/conda/lib/python3.11/site-packages (from nbformat) (4.22.0)
Requirement already satisfied: jupyter-core>=5.0,>=4.12 in /opt/conda/lib/python3.11/site-packages (from nbformat) (5.7.2)
Requirement already satisfied: traitlets>5.1 in /opt/conda/lib/python3.11/site-packages (from nbformat) (5.14.3)
Requirement already satisfied: attrs>22.2.0 in /opt/conda/lib/python3.11/site-packages (from jsonschema>2.6->nbformat) (23.2.0)
Requirement already satisfied: jsonschema-specifications>=2023.03.6 in /opt/conda/lib/python3.11/site-packages (from jsonschema>2.6->nbformat) (2023.12.1)
Requirement already satisfied: referencing>=0.28.4 in /opt/conda/lib/python3.11/site-packages (from jsonschema>2.6->nbformat) (0.35.1)
Requirement already satisfied: rpdfs>py>=0.7.1 in /opt/conda/lib/python3.11/site-packages (from jsonschema>2.6->nbformat) (0.18.0)
Requirement already satisfied: platformdirs>2.5 in /opt/conda/lib/python3.11/site-packages (from jupyter-core>=5.0,>=4.12->nbformat) (4.2.1)

[33]: 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.

[34]: 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.

```
[70]: 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 <= '2021-06-30']
    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"))
    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"))
    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`.

```
[71]: 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.

```
[72]: tesla_data = Tesla.history(period = "max")
tesla_data
```

Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
2010-06-29 00:00:00-04:00	1.266667	1.666667	1.169333	1.592667	281494500	0.0	0.0
2010-06-30 00:00:00-04:00	1.719333	2.028000	1.553333	1.588667	257806500	0.0	0.0
2010-07-01 00:00:00-04:00	1.666667	1.728000	1.351333	1.464000	123282000	0.0	0.0
2010-07-02 00:00:00-04:00	1.533333	1.540000	1.247333	1.280000	77097000	0.0	0.0
2010-07-06 00:00:00-04:00	1.333333	1.333333	1.055333	1.074000	103003500	0.0	0.0
...
2025-01-02 00:00:00-05:00	390.100006	392.730011	373.040009	379.279999	109710700	0.0	0.0
2025-01-03 00:00:00-05:00	381.480011	411.880005	379.450012	410.440002	95423300	0.0	0.0
2025-01-06 00:00:00-05:00	423.200012	426.429993	401.700012	411.049988	85516500	0.0	0.0
2025-01-07 00:00:00-05:00	405.829987	414.329987	390.000000	394.359985	75473200	0.0	0.0
2025-01-08 00:00:00-05:00	393.049988	402.499908	391.410004	395.165009	31125548	0.0	0.0

3657 rows × 7 columns

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.

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

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

```
[74]: import requests
from bs4 import BeautifulSoup
url = 'https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/revenue.htm'
```

Parse the html data using `beautiful_soup` using parser ie `html5lib` or `html.parser`.

```
[75]: html_data = requests.get(url).text
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

```
[76]: !pip install pandas
```

```
Requirement already satisfied: pandas in /opt/conda/lib/python3.11/site-packages (2.2.3)
Requirement already satisfied: numpy>=1.23.2 in /opt/conda/lib/python3.11/site-packages (from pandas) (2.2.1)
Requirement already satisfied: python-dateutil>=2.8.2 in /opt/conda/lib/python3.11/site-packages (from pandas) (2.9.0)
Requirement already satisfied: pytz>=2020.1 in /opt/conda/lib/python3.11/site-packages (from pandas) (2024.1)
Requirement already satisfied: tzdata>=2022.7 in /opt/conda/lib/python3.11/site-packages (from pandas) (2024.2)
Requirement already satisfied: six>=1.5 in /opt/conda/lib/python3.11/site-packages (from python-dateutil>=2.8.2>pandas) (1.16.0)
```

```
[77]: import pandas as pd
tesla_revenue = pd.DataFrame(columns=['Date','Revenue'])
tesla_revenue
```

```
[77]: Date Revenue
[105]: for row in 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])
tesla_revenue.head()
```

	Date	Revenue
0	2021	53823
1	2020	31536
2	2019	24578
3	2018	21461
4	2017	11759

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

```
[106]: tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',', '$', "", regex=True)
tesla_revenue.head()
```

	Date	Revenue
0	2021	53823
1	2020	31536
2	2019	24578
3	2018	21461
4	2017	11759

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

```
[107]: 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.

```
[108]: tesla_revenue.tail()
```

	Date	Revenue
56	2009	8806
57	2008	7094
58	2007	5319
59	2006	3092
60	2005	1843

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`.

```
[82]: Data = 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.

```
[83]: gme_data = Data.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.

```
[84]: 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	1.693350	1.603296	1.691667	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	1.683250	1.687458	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

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/IBMDveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html>. Save the text of the response as a variable named `html_data_2`.

```
[85]: url = 'https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html'
```

Parse the html data using `beautiful_soup` using `parser=html5lib` or `html.parser`.

```
[86]: html_data_2 = requests.get(url).text
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

```
[87]: gme_revenue = pd.DataFrame(columns = ['Date','Revenue'])
gme_revenue
```

	Date	Revenue
--	------	---------

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

```
[88]: for row in soup.find("tbody").find_all('tr'):
    ...
```

```

col = row[1].text
date = col[0].text
revenue = col[1].text
gme_revenue = pd.concat([gme_revenue, pd.DataFrame({"Date": [date], "Revenue": [revenue]}), ignore_index=True])
gme_revenue.tail()

[88]:   Date Revenue
11  2009  $8,806
12  2008  $7,094
13  2007  $5,319
14  2006  $3,092
15  2005  $1,843

[111]: gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',', '$', regex=True)

```

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

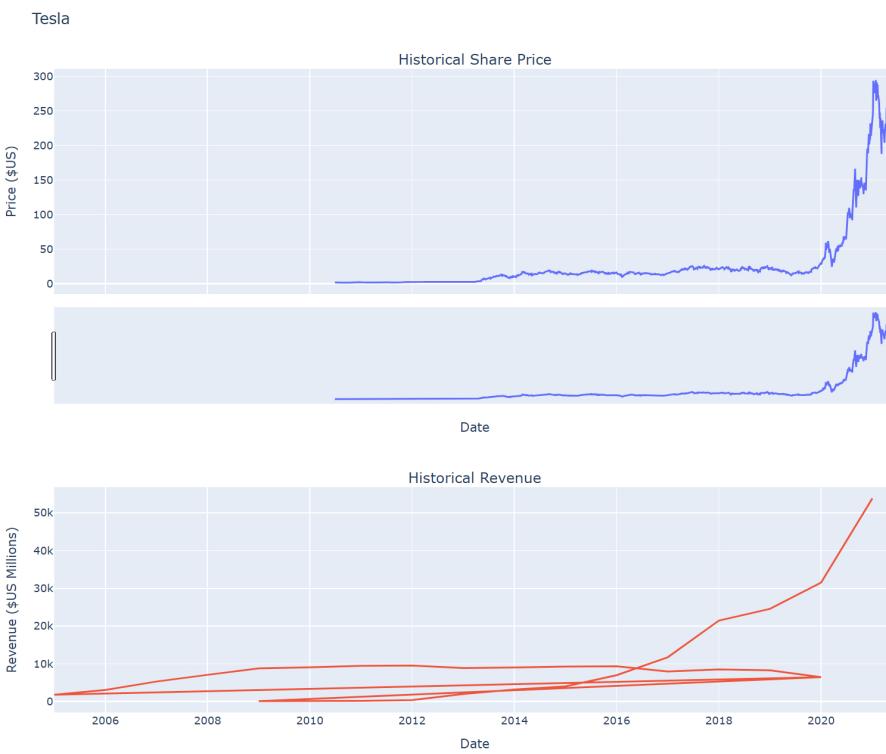
```

[113]: make_graph(tesla_data, tesla_revenue, 'Tesla')

/tmppipykernel_151/3316612210.py:5: UserWarning:
The argument 'infer_datetime_format' is deprecated and will be removed in a future version. A strict version of it is now the default, see https://pandas.p
ydata.org/pdeps/0004-consistent-to-datetime-parsing.html. You can safely remove this argument.

/tmppipykernel_151/3316612210.py:6: UserWarning:
The argument 'infer_datetime_format' is deprecated and will be removed in a future version. A strict version of it is now the default, see https://pandas.p
ydata.org/pdeps/0004-consistent-to-datetime-parsing.html. You can safely remove this argument.

```



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

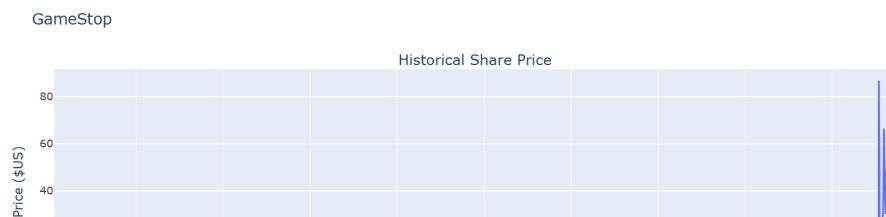
```

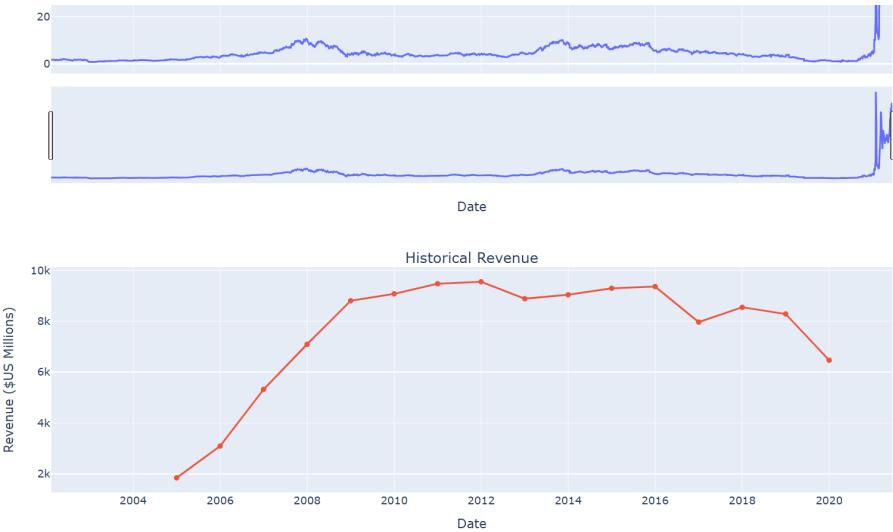
[114]: make_graph(gme_data, gme_revenue, 'GameStop')

/tmppipykernel_151/3316612210.py:5: UserWarning:
The argument 'infer_datetime_format' is deprecated and will be removed in a future version. A strict version of it is now the default, see https://pandas.p
ydata.org/pdeps/0004-consistent-to-datetime-parsing.html. You can safely remove this argument.

/tmppipykernel_151/3316612210.py:6: UserWarning:
The argument 'infer_datetime_format' is deprecated and will be removed in a future version. A strict version of it is now the default, see https://pandas.p
ydata.org/pdeps/0004-consistent-to-datetime-parsing.html. You can safely remove this argument.

```





>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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