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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- Define a Function that Makes a Graph
- Question 1: Use yfinance to Extract Stock Data
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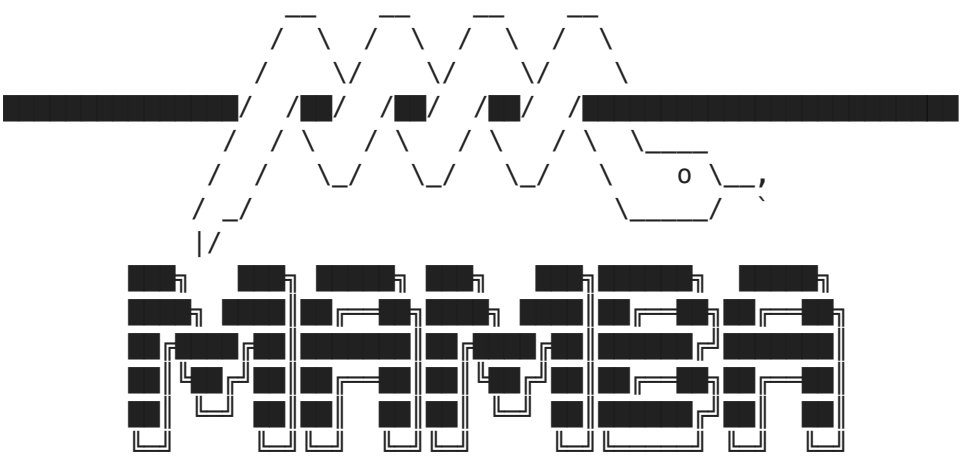
- Question 5: Plot Tesla Stock Graph
- Question 6: Plot GameStop Stock Graph

Estimated Time Needed: **30 min**

In [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/env
s/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/en
vs/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/env
s/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/jupyterla
b/conda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfin
ance==0.1.67) (3.1.0)
Requirement already satisfied: idna<4,>=2.5 in /home/jupyterlab/conda/env
s/python/lib/python3.7/site-packages (from requests>=2.20->yfinance==0.1.6
7) (3.4)
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /home/jupyterlab/c
onda/envs/python/lib/python3.7/site-packages (from requests>=2.20->yfinanc
e==0.1.67) (1.26.15)
Requirement already satisfied: certifi>=2017.4.17 in /home/jupyterlab/cond
a/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/pyt
hon/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']
```

```
[+] 0.0s
[+] 0.1s
pkgs/main/linux-64 ━━━━━━━━━━━━━━━━━━━━━━━━   0.0 B /  ??.?MB @  ??.?MB/s
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pkgs/r/linux-64                                      @   3.5MB/s  0.5s
pkgs/main/noarch                                     @   1.8MB/s  0.5s
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1.4spkgs/main/linux-64                               @   4.5MB/s  1.5s

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                 Siz
e
─────────────────────────────────────────────────────────────────────────────
──
  Install:
─────────────────────────────────────────────────────────────────────────────
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  + bs4                 4.10.0  hd3eb1b0_0    pkgs/main/noarch        10k
B

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

  - ca-certificates    2023.5.7  hbcca054_0    conda-forge
  + ca-certificates  2023.05.30  h06a4308_0    pkgs/main/linux-64     123k
B
  - openssl              1.1.1t  h0b41bf4_0    conda-forge
  + openssl              1.1.1u  h7f8727e_0    pkgs/main/linux-64       4M
B

  Downgrade:
─────────────────────────────────────────────────────────────────────────────
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  - beautifulsoup4       4.11.1  pyha770c72_0  conda-forge
  + beautifulsoup4       4.10.0  pyh06a4308_0  pkgs/main/noarch        87k
B

  Summary:

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

  Total download: 4MB

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ca-certificates                                             122.6kB @ 851.5kB/s  0.
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0.0sopenssl                                                          3.9MB @  18.9MB/s
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2.1s
Downloading and Extracting Packages

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)
     ──────────────────────────────────────── 153.3/153.3 kB 20.7 MB/s eta
0:00:00
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/jupyterla
b/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/env
s/python/lib/python3.7/site-packages (from nbformat==4.2.0) (4.12.0)
Requirement already satisfied: traitlets>=4.1 in /home/jupyterlab/conda/en
vs/python/lib/python3.7/site-packages (from nbformat==4.2.0) (5.9.0)
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```
Requirement already satisfied: attrs>=17.4.0 in /home/jupyterlab/conda/env
s/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->nbform
at==4.2.0) (23.1.0)
Requirement already satisfied: importlib-metadata in /home/jupyterlab/cond
a/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->n
bformat==4.2.0) (4.11.4)
Requirement already satisfied: importlib-resources>=1.4.0 in /home/jupyter
lab/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/jupyt
erlab/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,>=0.1
4.0 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (fro
m jsonschema!=2.5.0,>=2.4->nbformat==4.2.0) (0.19.3)
Requirement already satisfied: typing-extensions in /home/jupyterlab/cond
a/envs/python/lib/python3.7/site-packages (from jsonschema!=2.5.0,>=2.4->n
bformat==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->jsons
chema!=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 follo
wing 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 i
s 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
```

In [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
```

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 [30]:
```
def make_graph(stock_data, revenue_data, stock):
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles
    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, i
```

```
    fig.add_trace(go.Scatter(x=pd.to_datetime(revenue_data_specific.Date,
    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 [3]:
```
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 [4]:
```
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 [5]:
```
tesla_data.reset_index(inplace=True)
tesla_data.head()
```

Out[5]:

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

In [6]:
```
url =  "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.clou
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

In [9]:
```
soup = BeautifulSoup(html_data, 'html.parser')
```

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

In [13]:
```
tables = soup.find_all('table')
for index, table in enumerate(tables):
    if('Tesla Quarterly Revenue' in str(table)):
        table_index = index

tesla_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in tables[1].tbody.find_all('tr'):
    col = row.find_all("td")
    if (col != []):
        date = col[0].text
        revenue = col[1].text
        tesla_revenue = tesla_revenue.append({"Date":date, "Revenue":reve

tesla_revenue
```

Out[13]:

	Date	Revenue
0	2022-09-30	$21,454
1	2022-06-30	$16,934
2	2022-03-31	$18,756
3	2021-12-31	$17,719
4	2021-09-30	$13,757
5	2021-06-30	$11,958
6	2021-03-31	$10,389
7	2020-12-31	$10,744
8	2020-09-30	$8,771
9	2020-06-30	$6,036
10	2020-03-31	$5,985
11	2019-12-31	$7,384
12	2019-09-30	$6,303
13	2019-06-30	$6,350
14	2019-03-31	$4,541
15	2018-12-31	$7,226
16	2018-09-30	$6,824
17	2018-06-30	$4,002
18	2018-03-31	$3,409
19	2017-12-31	$3,288
20	2017-09-30	$2,985
21	2017-06-30	$2,790
22	2017-03-31	$2,696
23	2016-12-31	$2,285
24	2016-09-30	$2,298
25	2016-06-30	$1,270
26	2016-03-31	$1,147
27	2015-12-31	$1,214
28	2015-09-30	$937
29	2015-06-30	$955
30	2015-03-31	$940
31	2014-12-31	$957
32	2014-09-30	$852
33	2014-06-30	$769

	Date	Revenue
34	2014-03-31	$621
35	2013-12-31	$615
36	2013-09-30	$431
37	2013-06-30	$405
38	2013-03-31	$562
39	2012-12-31	$306
40	2012-09-30	$50
41	2012-06-30	$27
42	2012-03-31	$30
43	2011-12-31	$39
44	2011-09-30	$58
45	2011-06-30	$58
46	2011-03-31	$49
47	2010-12-31	$36
48	2010-09-30	$31
49	2010-06-30	$28
50	2010-03-31	$21
51	2009-12-31	
52	2009-09-30	$46
53	2009-06-30	$27

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

In [14]:
```
tesla_revenue["Revenue"] = tesla_revenue['Revenue'].str.replace(',|\$',""
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/ipykernel_l
auncher.py:1: FutureWarning: The default value of regex will change from T
rue 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.

In [16]:
```
tesla_revenue.dropna(inplace=True)

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

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/pandas/uti
l/_decorators.py:311: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  return func(*args, **kwargs)
```

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

In [17]:
```
tesla_revenue.tail()
```

Out[17]:

	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`.

In [18]:
```
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 [19]:
```
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 [20]:
```
gme_data.reset_index(inplace=True)
gme_data.head()
```

Out[20]:

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
0	2002-02-13	1.620128	1.693350	1.603296	1.691666	76216000	0.0	0.0
1	2002-02-14	1.712707	1.716073	1.670626	1.683250	11021600	0.0	0.0
2	2002-02-15	1.683250	1.687458	1.658001	1.674834	8389600	0.0	0.0
3	2002-02-19	1.666418	1.666418	1.578047	1.607504	7410400	0.0	0.0
4	2002-02-20	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/IBMDeveloperSkillsNetwork-PY0220EN-SkillsNetwork/labs/project/stock.html. Save the text of the response as a variable named `html_data`.

In [21]:
```
url = "https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud
html_data = requests.get(url).text
```

Parse the html data using `beautiful_soup`.

In [22]:
```
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

In [25]:
```
tables = soup.find_all('table')

gme_revenue = pd.DataFrame(columns=["Date", "Revenue"])

for row in tables[1].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}, ig
    gme_revenue["Revenue"] = gme_revenue['Revenue'].str.replace(',|\$',""
```

```
gme_revenue
```

```
/home/jupyterlab/conda/envs/python/lib/python3.7/site-packages/ipykernel_l
auncher.py:11: FutureWarning: The default value of regex will change from
True to False in a future version.
  # This is added back by InteractiveShellApp.init_path()
```

Out[25]:

	Date	Revenue
0	2020-04-30	1021
1	2020-01-31	2194
2	2019-10-31	1439
3	2019-07-31	1286
4	2019-04-30	1548
...	...	...
57	2006-01-31	1667
58	2005-10-31	534
59	2005-07-31	416
60	2005-04-30	475
61	2005-01-31	709

62 rows × 2 columns

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

In [26]:
```
gme_revenue.tail()
```

Out[26]:

	Date	Revenue
57	2006-01-31	1667
58	2005-10-31	534
59	2005-07-31	416
60	2005-04-30	475
61	2005-01-31	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 [27]:
```
def make_graph(stock_data, revenue_data, stock):
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles
```

```
    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, i
    fig.add_trace(go.Scatter(x=pd.to_datetime(revenue_data_specific.Date,
    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()

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.

In [28]:
```
def make_graph(stock_data, revenue_data, stock):
    fig = make_subplots(rows=2, cols=1, shared_xaxes=True, subplot_titles
    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, i
    fig.add_trace(go.Scatter(x=pd.to_datetime(revenue_data_specific.Date,
    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()

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

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