

# BULL STOCKS



cc Bull Logo #1640766 1, from <http://clipart-library.com/clipart/5cRipByEl.htm>

## Software User Manual and Report

# Introduction

## Software Overview

Bull Stocks is a stock quote application designed and developed in Ireland. The application is aimed at business analysts who can search specific stocks query specified time ranges, along with associated analysis. The application allows users to view company information, view different prices for the time ranges specified, and plot the prices against time. Users can also view the statistical summary of the prices and also view and compute the different averages such as Simple Moving Average, Exponential Moving Average, Cumulative Moving Average etc. Users can also specify a modeling period and predicted date for predicting and plotting the closing prices for a future date. Bull Stocks is divided into two distinct parts. It consists of a Graphical Use Interface and a Command Line Interface. The reason for having this design is that users have the flexibility to use the application in both the interface modes. However, the command line functionality is limited by the prediction function and excel download functions.

## Installation Guidelines

Python 3.8 must be installed into your system. The following modules and packages must be pip installed from command line terminal, if not already installed, in order for the application to run as intended.

tkinter	sys	ttkthemes
tkinter.ttk	threading	sklearn.model_selection
time	csv	sklearn.linear_model
datetime	speech_recognition	sklearn.svm
dateutil.relativedelta	pydub	bokeh.io
ttkthemes	pydub.playback	bokeh.layouts
pandas	pyttsx3	bokeh.plotting
functools	tkcalendar	bokeh.models
math	matplotlib.pyplot	bokeh.themes
pandastable	matplotlib.figure	bokeh.io
requests	pyaudio	

Or use



# 1. Quickstart Guide for Stock Analysts

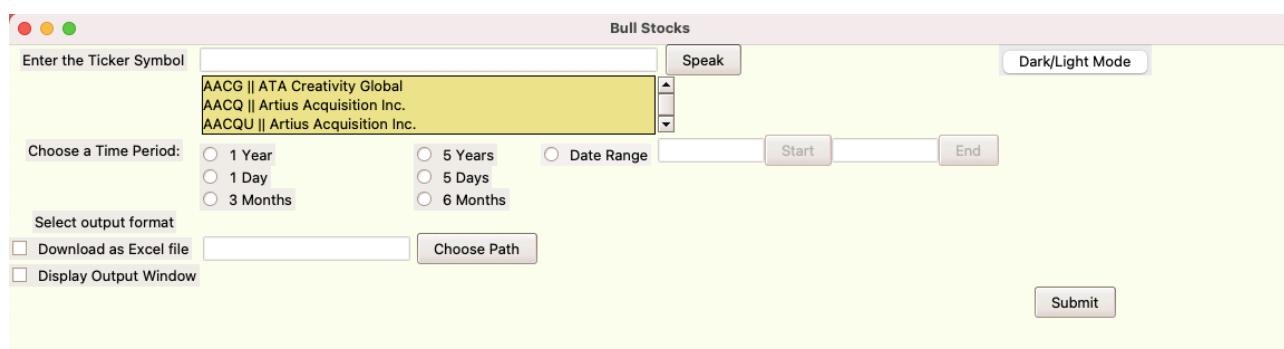
Navigate to the directory and change directory in command line to the one where genesis.py file exists. From the command line run python genesis.py

You are presented with the following choices for the type of interface to use.

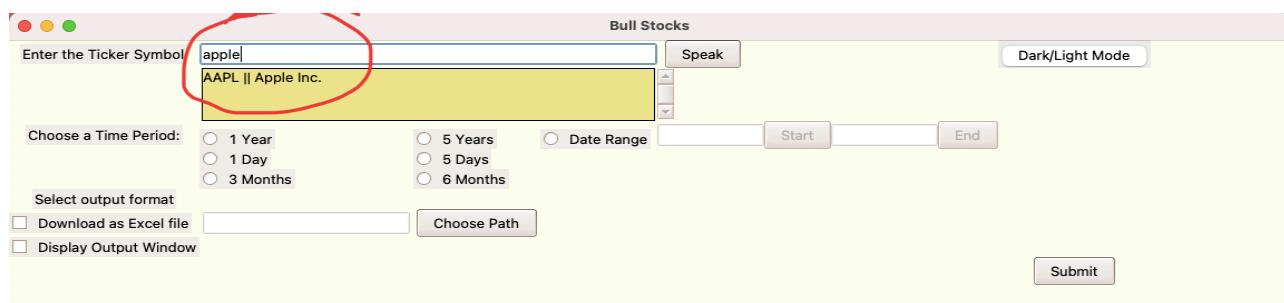
```
((base) Don-Sams-MacBook-Air:~ donsam$ cd /Users/donsam/LocalDocs/Python/Assignment
((base) Don-Sams-MacBook-Air:Assignment donsam$ python genesis.py
Welcome to Bull Stocks
Enter the user interface choice
1. Graphical User Interface
2. Command Line Interface
3. Quit
```

## 1.1 Graphical User Interface

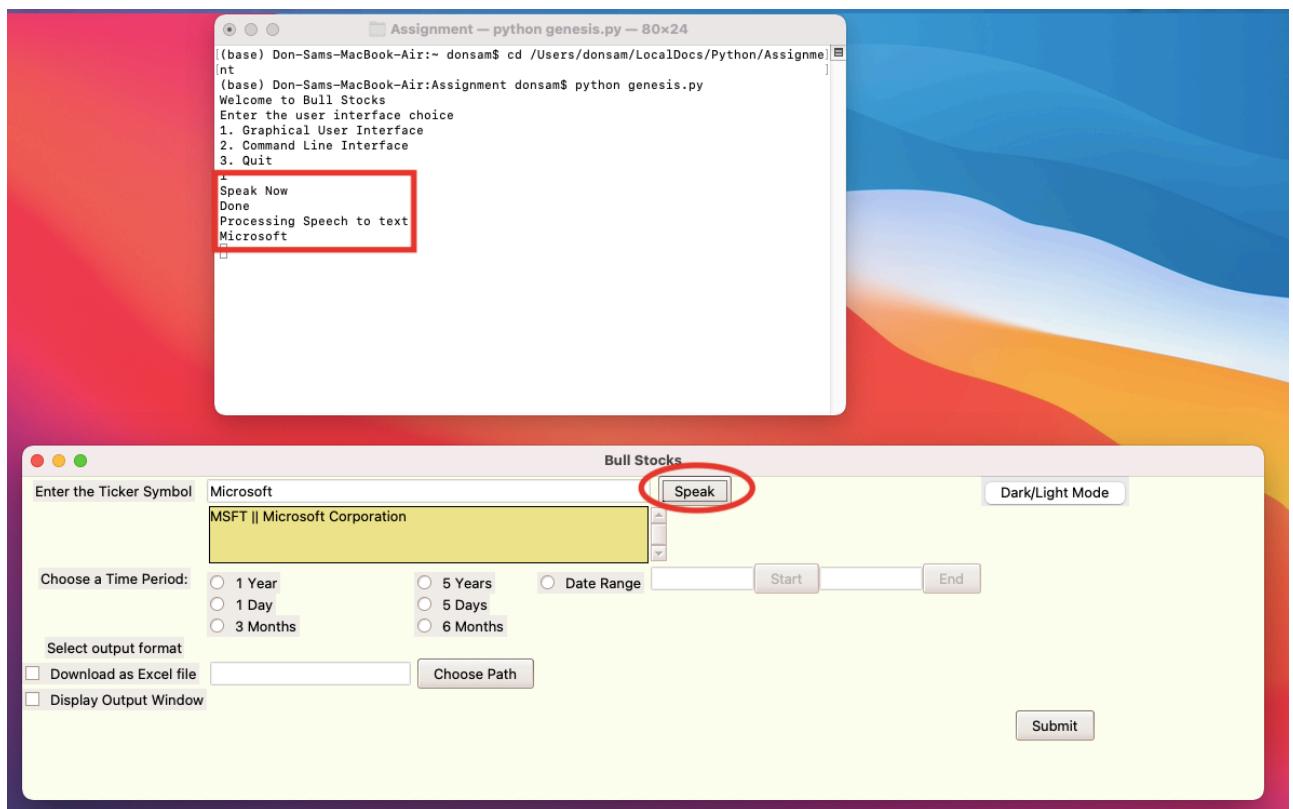
By selecting 1 i.e. Graphical User Interface the following screen is presented



In the first field the user is to key in the ticker symbol or the company name. The autocomplete list box below will assist you to pick the stock. Please select from the list box.



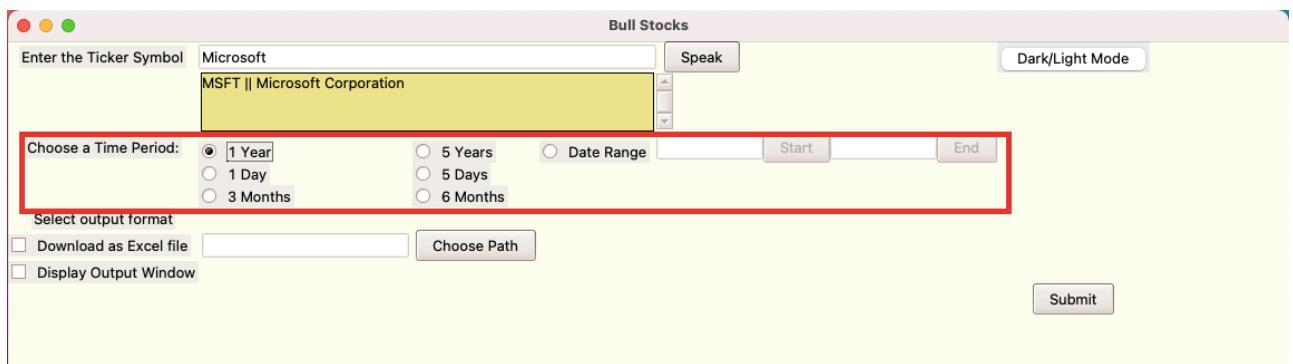
You may alternatively use the speak button to speak the company name or ticker symbol rather than typing it. The command line would prompt you to speak with a beep sound. Kindly speak clearly after 2seconds once you hit the Speak button.



If your voice isn't recognised it prompts you to try again.

```
Speak Now
Done
Sorry, did not catch that, Please try again...
□
```

Then the user is asked to pick a time period. You may choose to give a date range or a predefined time period backwards from today (1 Year, 5 Years, 6 Months. so on)



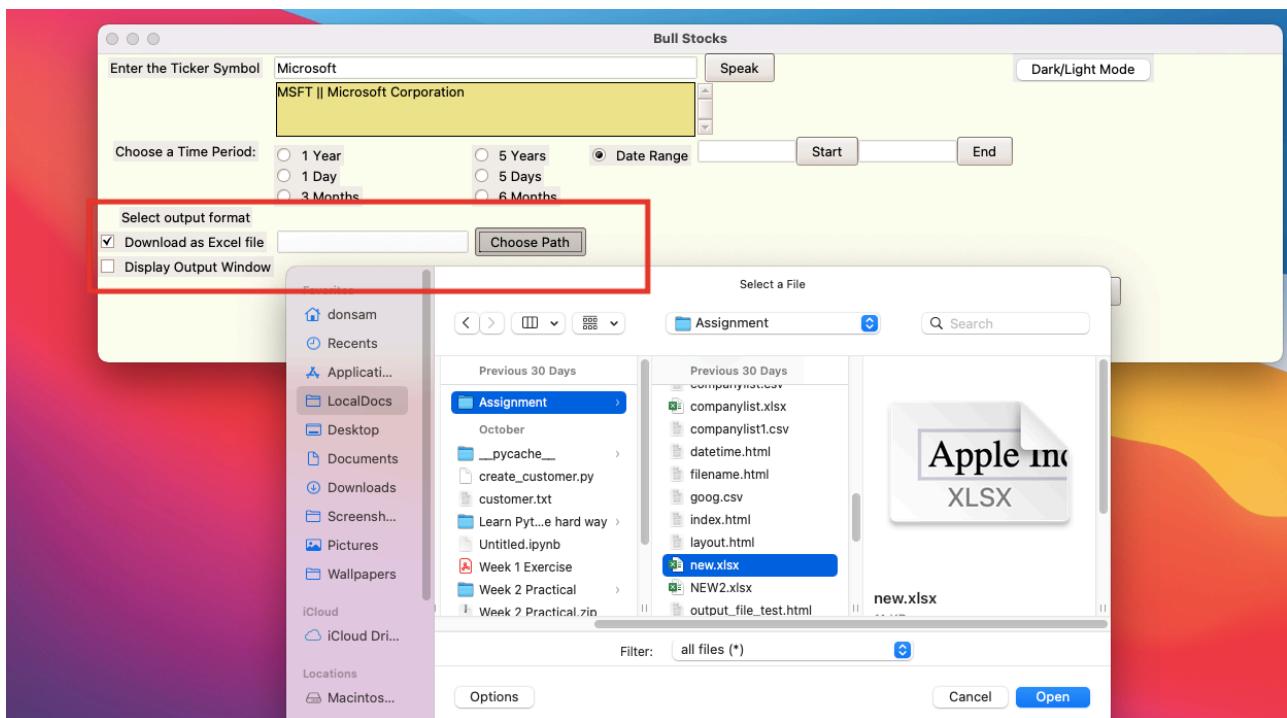
If date range radio button is selected then the entry fields and the start and end buttons become active for user input.

The user must enter date in YYYY-MM-DD format or choose the date from the calendar picker for Start and End dates and hit OK after choosing the date.

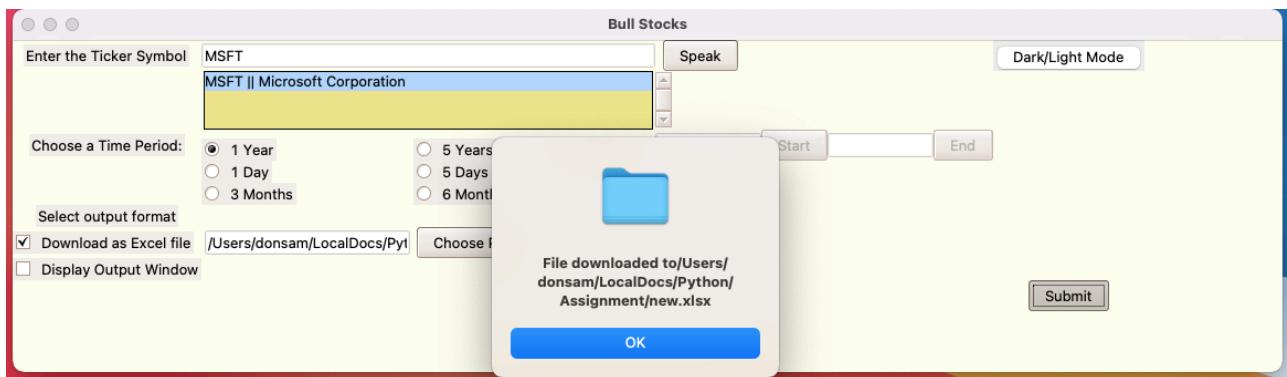
The screenshot shows the Bull Stocks application interface. At the top, there is a search bar with the ticker symbol "Microsoft" and a "Speak" button. Below the search bar, a yellow box displays the company name "MSFT || Microsoft Corporation". Underneath the search bar, there is a section titled "Choose a Time Period:" with several radio button options: "1 Year", "1 Day", "3 Months", "5 Years", "5 Days", and "6 Months". The "Date Range" option is selected, highlighted with a red box. To the right of the radio buttons are three buttons: "Start", "End", and "Submit". Below this section, there is a "Select output format" section with checkboxes for "Download as Excel file" and "Display Output Window", and a "Choose Path" button. The "Submit" button is located at the bottom right of the form.

This screenshot is similar to the one above, showing the Bull Stocks application interface. The "Date Range" radio button is selected, and a calendar overlay is displayed. The calendar shows the month of December 2020. The days are arranged in a grid: Mon, Tue, Wed, Thu, Fri, Sat, Sun. The days of the week are labeled at the top, and the weeks are labeled on the left. The date "3" is highlighted in blue, indicating it is the selected start date. The "ok" button at the bottom right of the calendar is visible. The rest of the interface elements are identical to the first screenshot.

Then the user has to choose the type of output needed. User may choose to download the stock price data as an excel file and/or choose to display it in a separate window. A file path must be mentioned in the entry field beside “Download as Excel file” checkbox if download is required. The user may alternatively choose a pre existing excel file from the choose path option or use the choose path option to choose directory to save excel. Please make sure to select all files from filter and select any file within the directory you wish to save the excel.



Once the path is selected hit the submit button. On successful download of file, user is presented with the following message

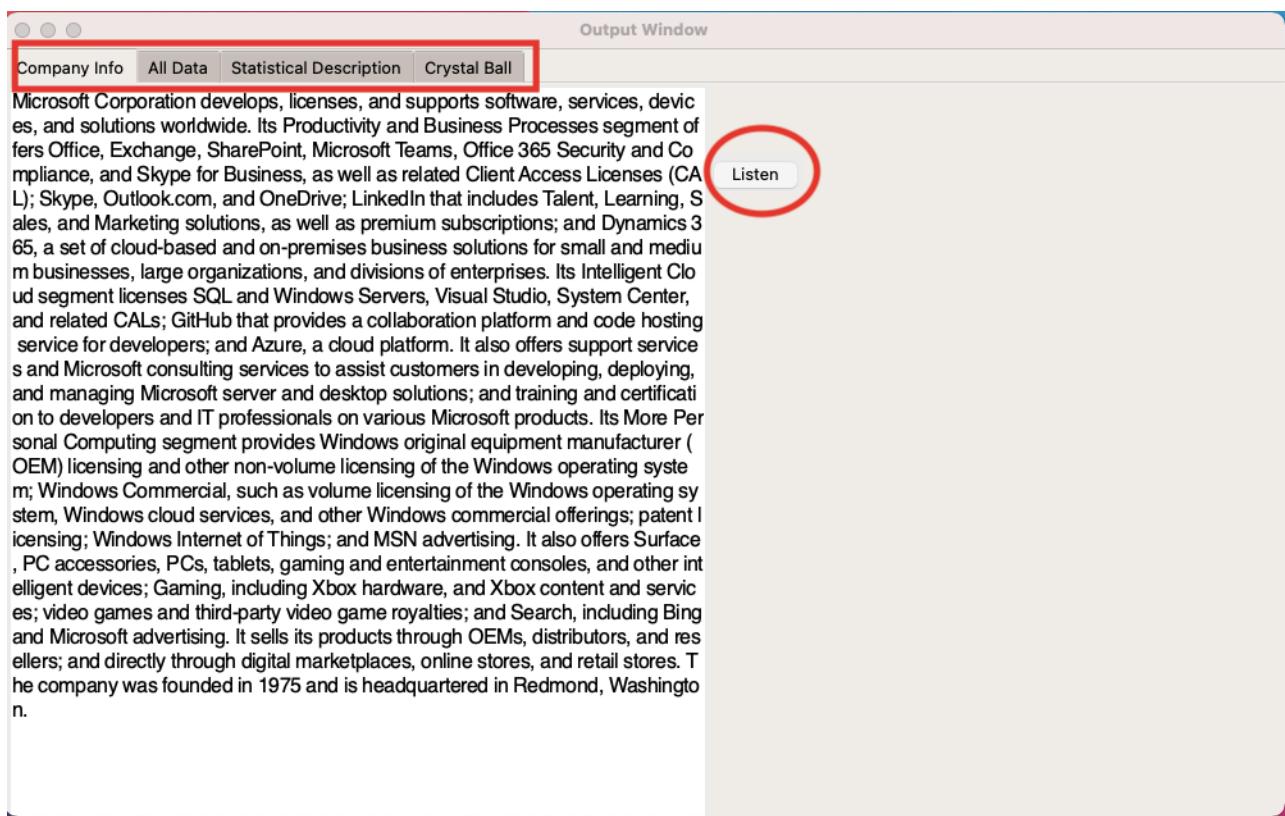


If the user wishes to view the stock prices in an output window, the user can check the “Display Output Window” and hit submit.

The terminal window shows a message saying Connected to the internet which confirms that you are connected to the internet and the price data can be requested from Yahoo Finance. The “Submitting...” message indicates that the output window is about to be displayed.

```
-----  
Connected to the Internet  
Submitting...
```

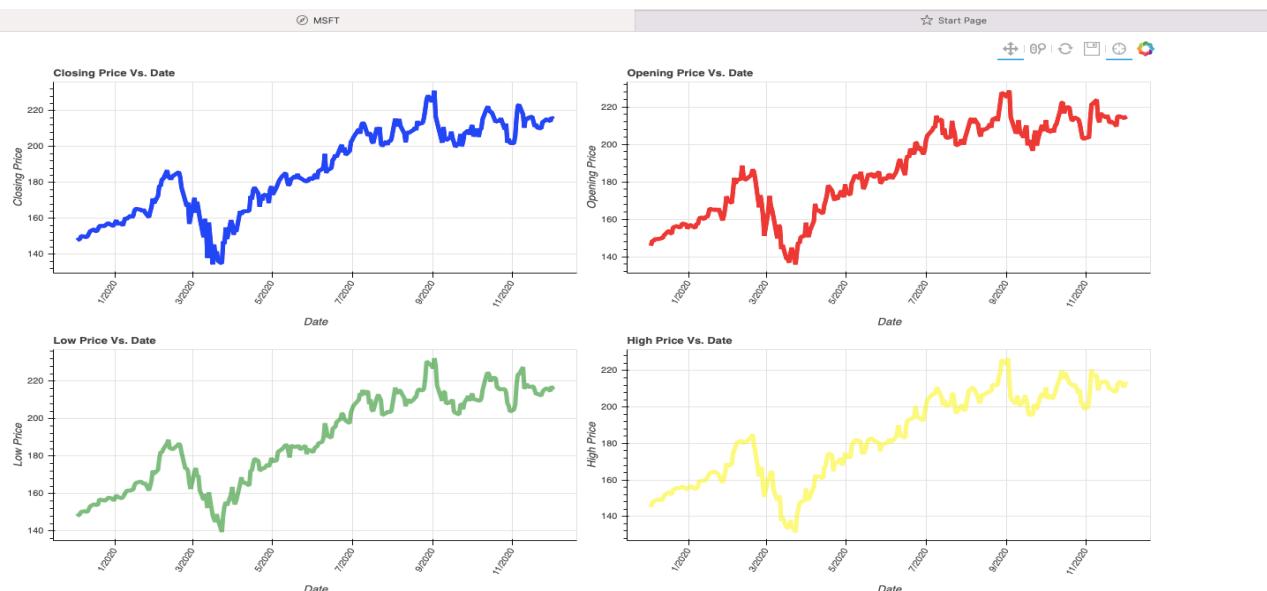
The output window displays four tabs as highlighted. The first tab “Company Info” gives a summary about the company. The listen button on the right side reads aloud the information. Please be aware that the full company information will be read out and it cannot be paused or stopped as of this application version



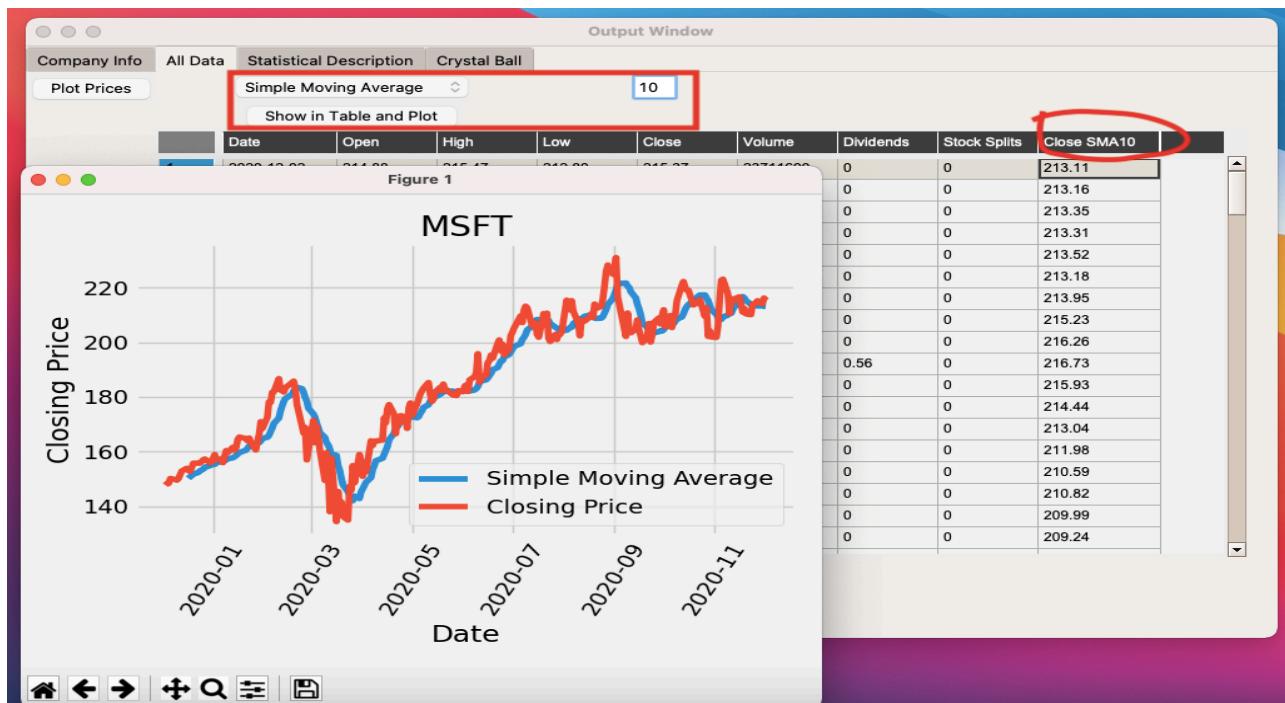
On hitting the All Data tab, the complete stock prices, dividends, stock splits and stock volume are displayed as a table. You can plot the prices (Open, Low, High and Close) against the date range input in the previous screen

	Date	Open	High	Low	Close	Volume	Dividends	Stock Splits
1	2020-12-02	214.88	215.47	212.80	215.37	23711600	0	0
2	2020-12-01	214.51	217.32	213.35	216.21	30931300	0	0
3	2020-11-30	214.10	214.76	210.84	214.07	33064800	0	0
4	2020-11-27	214.85	216.27	214.04	215.23	14512200	0	0
5	2020-11-25	215.11	215.29	212.46	213.87	21012900	0	0
6	2020-11-24	209.59	214.25	208.86	213.86	33979700	0	0
7	2020-11-23	210.95	212.29	208.16	210.11	25683500	0	0
8	2020-11-20	212.20	213.29	210.00	210.39	22829100	0	0
9	2020-11-19	211.38	213.03	209.93	212.42	24792700	0	0
10	2020-11-18	213.65	215.17	210.93	211.08	28372800	0.56	0
11	2020-11-17	215.54	217.11	213.52	213.90	24154100	0	0
12	2020-11-16	214.31	217.17	213.96	216.66	24953300	0	0
13	2020-11-13	215.80	216.85	213.60	215.94	18621100	0	0
14	2020-11-12	216.64	218.54	213.90	214.88	21593900	0	0
15	2020-11-11	211.84	217.47	211.65	215.98	29440800	0	0
16	2020-11-10	213.94	215.93	209.17	210.46	44045100	0	0
17	2020-11-09	223.85	227.52	217.31	217.82	44395000	0	0
18	2020-11-06	221.68	223.77	217.46	223.14	25231900	0	0

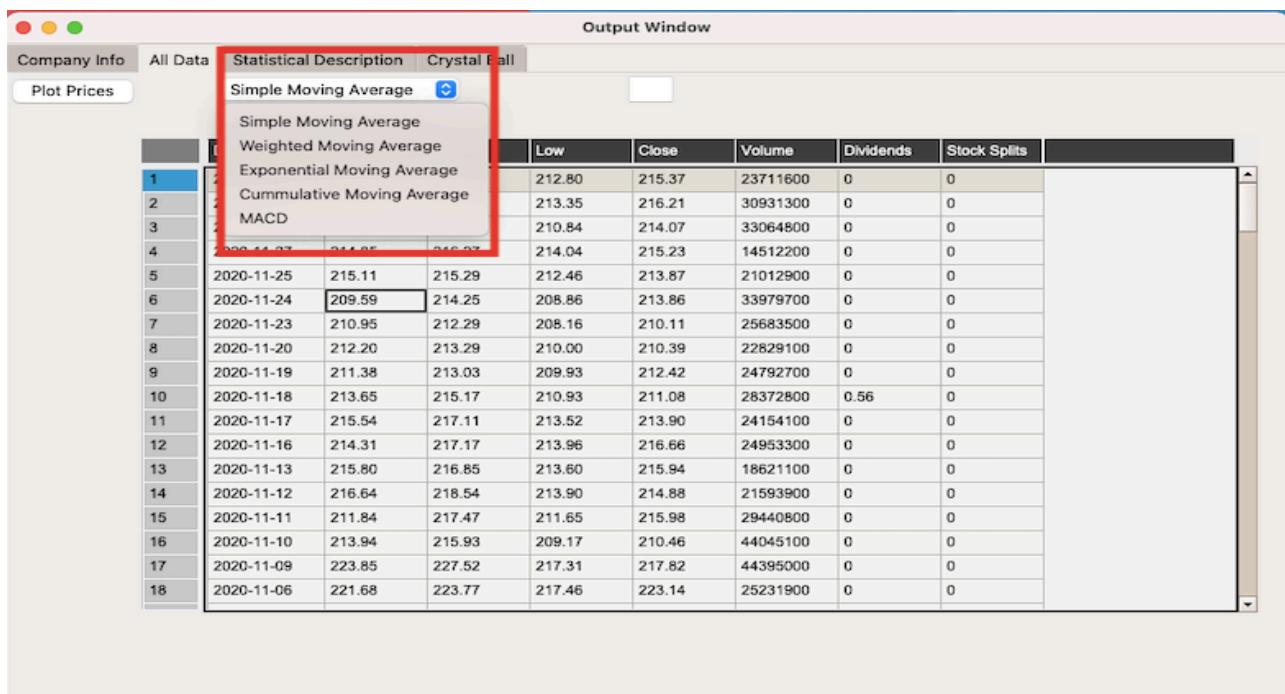
The plots are displayed on a browser window with the browser tab named as the ticker symbol



The user can input the number of days for which the user wants to compute the Simple Moving Average and plot it. User should hit the Show in table and plot button after inputting the number of days. The user has to scroll on the table for the Close SMA to be displayed. The plot has the average as well as the closing price plotted. Please use the full screen button to maximise the plot.



The user can similarly select other averages, input number of days and show in table and plot.



On hitting the Statistical Description tab a summary is presented to the user

	Statistic	Open	High	Low	Close	Volume	Dividends	Stock Splits
1	count	253.00	253.00	253.00	253.00	253.00	253.00	253.00
2	mean	186.79	189.25	184.35	186.91	37198632.41	0.0083	0
3	std	24.37	24.19	24.24	24.23	17183394.75	0.065	0
4	min	135.94	139.48	131.49	134.37	8989200.00	0	0
5	25%	165.07	166.07	162.31	164.43	25231900.00	0	0
6	50%	185.41	186.86	183.09	185.82	32656800.00	0	0
7	75%	208.99	211.24	206.47	209.23	43872300.00	0	0
8	max	228.67	232.25	226.76	231.05	97073600.00	0.56	0
9	range	92.73	92.77	95.27	96.68	88084400.00	0.56	0
10	standard variation	593.74	585.39	587.59	586.96	295269055238865.88	0.0043	0
11	coefficient of variation	455157.68	457880.84	446865.76	452837.54	63919878499266424.00	0.054	0

The user can hit the Crystal Ball tab for predicting stocks. Here the user should select one of the prediction models, enter the modelling period and the prediction date in yyyy-mm-dd format. Alternatively the user can utilise the calendar picker beside each of the date entry fields

Choose a Model:

 Linear Regression  Support Vector Regression

Enter the Modelling Period in yyyy-mm-dd format

Start

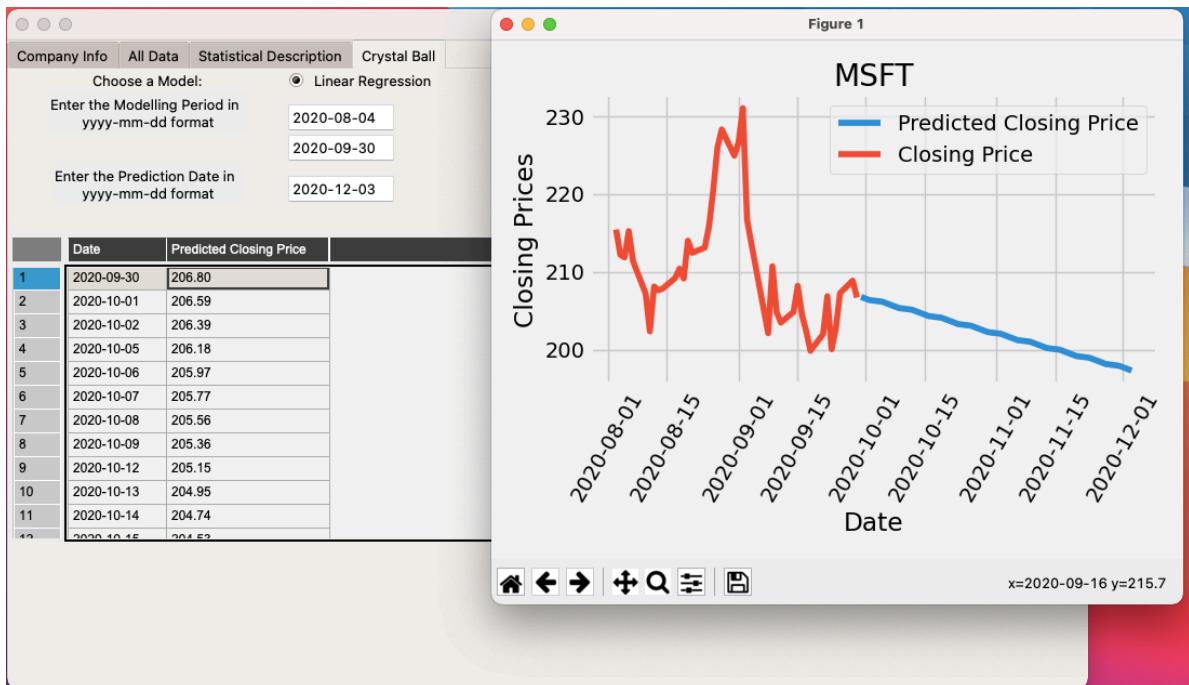
End

Enter the Prediction Date in yyyy-mm-dd format

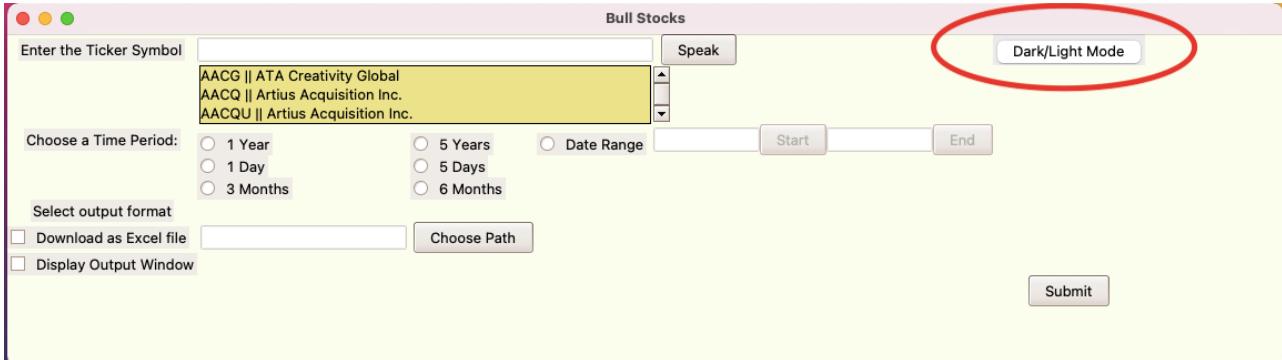
Predict Date

Predict

Once all the fields are input with the correct values. User can hit the predict button. The user is presented with a plot as well as a table with prediction values. Please ensure that the modelling period is less than 2 weeks and prediction date is less than 1 week ahead of the modelling period for support vector regression as it can take unusually high wait times. Please also ensure that the prediction date isn't within the modelling period. Please use the full screen button to maximise the plot.



There is an additional feature called dark mode for the Graphical user interface at the main screen.



The dark mode is enabled at all the windows with the toggle



You can switch to light mode with the same toggle at the main screen.

## 1.2 Command Line Interface

When the user first ran the program `genesis.py`, there was the option of Command line interface too.

```
((base) Don-Sams-MacBook-Air:~ donsam$ cd /Users/donsam/LocalDocs/Python/Assignment
(base) Don-Sams-MacBook-Air:Assignment donsam$ python genesis.py
Welcome to Bull Stocks
Enter the user interface choice
1. Graphical User Interface
2. Command Line Interface
3. Quit

```

If user selects 2 then the following is presented the following

```
((base) Don-Sams-MacBook-Air:Assignment donsam$ python genesis.py
Welcome to Bull Stocks
Enter the user interface choice
1. Graphical User Interface
2. Command Line Interface
3. Quit
2
Please press Q if you want to exit at any point...
Enter the ticker symbol
```

Once the user enters the correct ticker symbol, the start date is requested

```
((base) Don-Sams-MacBook-Air:Assignment donsam$ python genesis.py
Welcome to Bull Stocks
Enter the user interface choice
1. Graphical User Interface
2. Command Line Interface
3. Quit
2
Please press Q if you want to exit at any point...
Enter the ticker symbol AAPL
Enter the date range in YYYY-MM-DD format
Start Date:
```

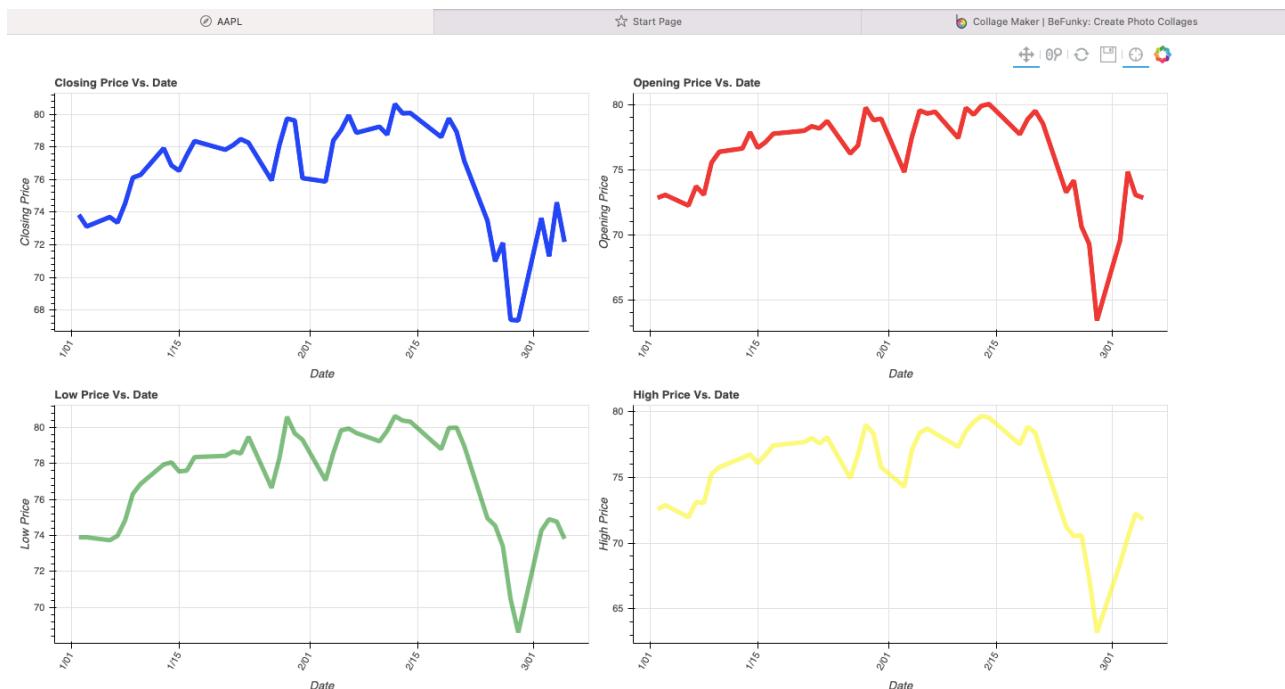
Once the user enters the correct start date, the end date is requested

```
((base) Don-Sams-MacBook-Air:Assignment donsam$ python genesis.py
Welcome to Bull Stocks
Enter the user interface choice
1. Graphical User Interface
2. Command Line Interface
3. Quit
2
Please press Q if you want to exit at any point...
Enter the ticker symbol AAPL
Enter the date range in YYYY-MM-DD format
Start Date: 2020-01-01
End Date:
```

Once the user enters the correct date range. A menu of choices is presented as follows

```
(base) Don-Sams-MacBook-Air:Assignment donsam$ python genesis.py
Welcome to Bull Stocks
Enter the user interface choice
1. Graphical User Interface
2. Command Line Interface
3. Quit
2
Please press Q if you want to exit at any point...
Enter the ticker symbol AAPL
Enter the date range in YYYY-MM-DD format
Start Date: 2020-01-01
End Date: 2020-03-06
Enter your choice
1. Show Plots
2. Show Statistical Description
3. Average Prices
4. Quit
```

On choosing 1 Show plots the following is presented



The menu is presented again.

```
(base) Don-Sams-MacBook-Air:Assignment donsam$ python genesis.py
Welcome to Bull Stocks
Enter the user interface choice
1. Graphical User Interface
2. Command Line Interface
3. Quit
2
Please press Q if you want to exit at any point...
Enter the ticker symbol AAPL
Enter the date range in YYYY-MM-DD format
Start Date: 2020-01-01
End Date: 2020-03-06
Enter your choice
1. Show Plots
2. Show Statistical Description
3. Average Prices
4. Quit
1
Enter your choice
1. Show Plots
2. Show Statistical Description
3. Average Prices
4. Quit

```

On choosing 2 Show Statistical Description the following is presented

```
Enter your choice
1. Show Plots
2. Show Statistical Description
3. Average Prices
4. Quit
2
      Statistic      Open      High      Low      Close      Volume  Dividends  Stock Splits
0       count  44.000000  44.000000  44.000000  4.400000e+01  44.000000          44.0
1       mean   76.112955  77.179545  75.289545  76.334773  1.595874e+08  0.004375          0.0
2       std    3.543547  2.857880  3.713282  3.296083  7.361229e+07  0.029020          0.0
3       min   63.400000  68.610000  63.180000  67.360000  8.011360e+07  0.000000          0.0
4      25%   73.595000  74.830000  72.810000  73.885000  1.104696e+08  0.000000          0.0
5      50%   77.260000  78.175000  76.625000  77.320000  1.360484e+08  0.000000          0.0
6      75%   78.815000  79.537500  78.135000  78.787500  1.773824e+08  0.000000          0.0
7       max   80.030000  80.640000  79.680000  80.630000  4.268848e+08  0.192500          0.0
8       range  16.630000  12.030000  16.500000  13.270000  3.467712e+08  0.192500          0.0
9  standard variation  12.556724  8.167479  13.788465  10.864165  5.418769e+15  0.000842          0.0
10 coefficient of variation  26970.981332  22056.988968  27957.133109  25160.576893  1.174759e+18  0.012696          0.0
Enter your choice
1. Show Plots
2. Show Statistical Description
3. Average Prices
4. Quit

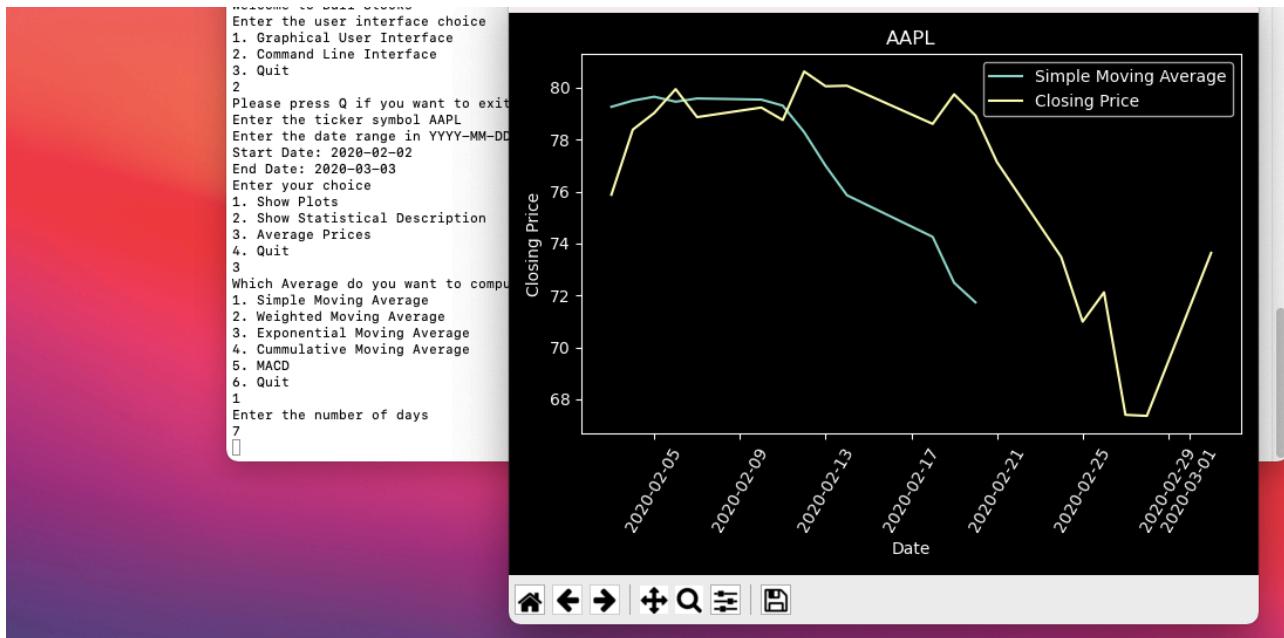
```

On choosing 3 from the same menu Average prices menu is presented

```
Enter your choice
1. Show Plots
2. Show Statistical Description
3. Average Prices
4. Quit
3
Which Average do you want to compute and plot?
1. Simple Moving Average
2. Weighted Moving Average
3. Exponential Moving Average
4. Cumulative Moving Average
5. MACD
6. Quit

```

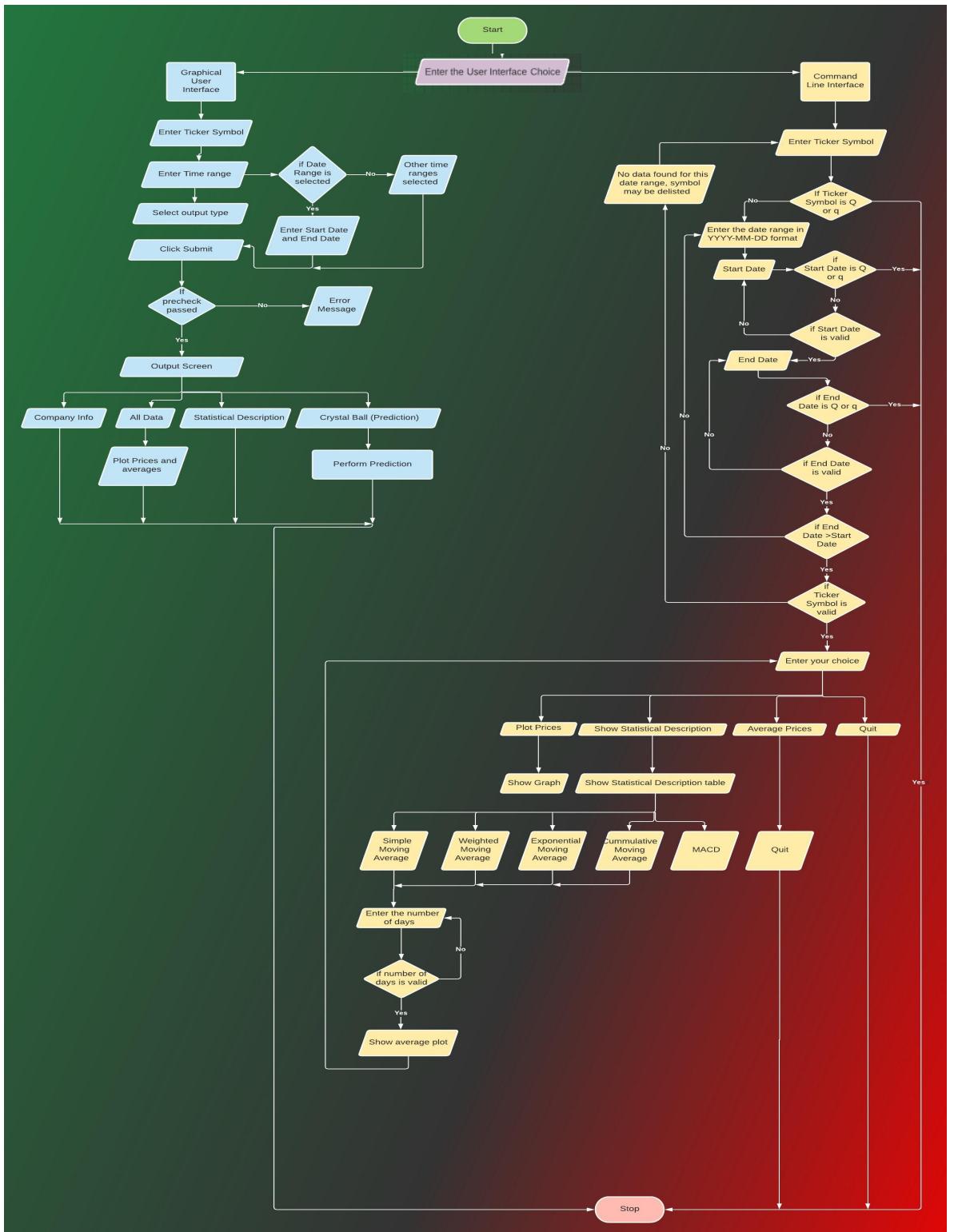
User can choose any of the average prices and provide the number of days, to display the average prices plot.



At any instance user can hit the key ‘q’ or ‘Q’ to quit out of the command line.

## 2. UML Diagram

Please zoom in



### 3. Unit Testing

Please execute the file Test\_checks\_and\_validations.py to test few functions in the checks\_and\_validations.py module.

```
In [2]: runfile('/Users/donsam/LocalDocs/Python/Assignment/Python Code and Resources/Test_checks_and_validations.py', wdir='/Users/donsam/LocalDocs/Python/Assignment/Python Code and Resources')
Reloaded modules: GUI_functions, auxillary_functions, plots_and_averages,
checks_and_validations, output_window, data_functions, main_window,
command_line_functions
.....
Ran 4 tests in 3.128s
OK
```

## 4. REFERENCES

1. <https://datatofish.com/entry-box-tkinter/>
2. <https://datatofish.com/matplotlib-charts-tkinter-gui/>
3. <https://stackoverflow.com/questions/26629695/how-to-display-content-of-pandas-data-frame-in-tkinter-gui-window>
4. <https://pypi.org/project/yfinance/>
5. [https://www.youtube.com/watch?v=l6ZBJo\\_xt2I](https://www.youtube.com/watch?v=l6ZBJo_xt2I)
6. [https://www.youtube.com/watch?v=l6ZBJo\\_xt2I](https://www.youtube.com/watch?v=l6ZBJo_xt2I)
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8. <https://www.statology.org/convert-datetime-to-date-pandas/>
9. <https://realpython.com/pandas-plot-python/>
10. [https://matplotlib.org/3.1.1/gallery/ticks\\_and\\_spines/ticklabels\\_rotation.html](https://matplotlib.org/3.1.1/gallery/ticks_and_spines/ticklabels_rotation.html)
11. <https://www.activestate.com/resources/quick-reads/how-to-position-buttons-in-tkinter-with-pack/>
12. <https://effbot.org>
13. [https://physics.nyu.edu/pine/pymanual/html/chap5/chap5\\_plot.html](https://physics.nyu.edu/pine/pymanual/html/chap5/chap5_plot.html)
14. [https://runestone.academy/runestone/books/published/thinkcspy/GUIandEventDrivenProgramming/05\\_widget\\_grouping.html](https://runestone.academy/runestone/books/published/thinkcspy/GUIandEventDrivenProgramming/05_widget_grouping.html)
15. [https://www.python-course.eu/tkinter\\_text\\_widget.php](https://www.python-course.eu/tkinter_text_widget.php)
16. <https://blog.furas.pl/python-tkinter-pandastable-examples-gb.html>
17. <https://pypi.org/project/tksheet/>
18. <https://www.youtube.com/watch?v=hOLSGMEEwII>

19. <https://stackoverflow.com/questions/1841565/valueerror-invalid-literal-for-int-with-base-10>
20. [https://www.youtube.com/watch?v=2TR\\_6VaVS0s&feature=youtu.be](https://www.youtube.com/watch?v=2TR_6VaVS0s&feature=youtu.be)
21. <https://stackoverflow.com/questions/39929558/bokeh-multiple-figures-on-same-page>
22. <https://www.youtube.com/watch?v=kzXv5CCc4Hc>
23. <https://stackoverflow.com/questions/58265976/is-it-possible-for-a-progressbar-reaching-100-once-another-function-finishes>
24. <https://stackoverflow.com/questions/57525684/how-to-stop-pyttsx3-speech-whenever-i-want>

## 5. Project by

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