Financial Programming

Individual Project – Financial Dashboard

The project is a Python programming assignment where the student is required to construct a dashboard to present the financial data extracted from Yahoo Finance service together with some basic financial analyses. The structure of the dashboard is inspired by the Yahoo Finance service page [1].

Purpose

The main purpose of this assignment is to assess the student's Python programming skills on the ability to create a complete Python application, from collecting, processing to presenting data.

The student needs to fulfill the following tasks:

- Collect data from Yahoo Finance service using the Python library: **yfinance** [2] (or any similar library).
- Construct and deploy a dashboard using Python library: **streamlit** [3]. The dashboard must include the following items:

   0. **Header (or Sidebar):**
      - A dropdown menu to select the stock names from S&P 500.
      - An "Update" button to download and update stock data.

   1. **Tab 1: Summary**
      - Collect and present the information of the stock similar to the tab Yahoo Finance > Summary [4].
      - In the chart, there should be an option to select different duration of time i.e. 1M, 3M, 6M, YTD, 1Y, 3Y, 5Y, MAX. It is not necessary to go below 1 month (1M) of duration. For simplicity, the time intervals should be fixed at 1 Day.
      - Present also the company profile, description and major shareholders.
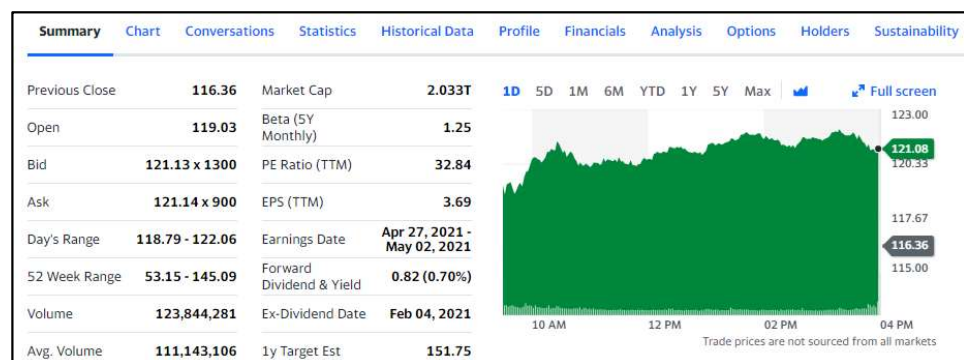
2. **Tab 2: Chart**
   - Collect and present the stock price similar to the tab Yahoo Finance > Chart. The chart should be able to:
     o Select the date range for showing the stock price.
     o Show the stock price for different duration of time i.e. 1M, 3M, 6M, YTD, 1Y, 3Y, 5Y, MAX. It is not necessary to go below 1 month (1M) of duration.
     o Switch between different time intervals i.e. Day, Month, Year. It is not necessary to go below 1 Day time interval.
     o Switch between line plot and candle plot for the stock price.
     o Show the trading volume at the bottom of the chart.
     o Show the simple moving average (MA) for the stock price using a window size of 50 days.

3. **Tab 3: Financials**
   - Collect and present the financial information of the stock similar to the tab Yahoo Finance > Financials [5].
   - There should be an option to select between Income Statement, Balance Sheet and Cash Flow.
   - There should be an option to select between Annual and Quarterly period.

| Summary | Chart | Conversations | Statistics | Historical Data | Profile | **Financials** | Analysis | Options | Holders | Sustainability |

Show: **Income Statement** | Balance Sheet | Cash Flow   Annual | Quarterly

Income Statement   All numbers in thousands   ⤢ Expand All

Breakdown	TTM	9/29/2020	9/29/2019	9/29/2018	9/29/
› Total Revenue	273,857,000	274,515,000	260,174,000	265,595,000	229,23
Cost of Revenue	169,277,000	169,559,000	161,782,000	163,756,000	141,04
Gross Profit	104,580,000	104,956,000	98,392,000	101,839,000	88,18(
› Operating Expense	37,442,000	38,668,000	34,462,000	30,941,000	26,84;
Operating Income	67,138,000	66,288,000	63,930,000	70,898,000	61,34<
› Net Non Operating Interest Inc...	1,052,000	890,000	1,385,000	2,446,000	2,878
› Other Income Expense	127,000	-87,000	422,000	-441,000	-133,
Pretax Income	68,317,000	67,091,000	65,737,000	72,903,000	64,08!
Tax Provision	9,893,000	9,680,000	10,481,000	13,372,000	15,73l
› Net Income Common Stockhold...	58,424,000	57,411,000	55,256,000	59,531,000	48,35;
Diluted NI Available to Com Stock...	58,424,000	57,411,000	55,256,000	59,531,000	48,35;
Basic EPS	-	0.0033	0.003	0.003	0.0(

4. **Tab 4: Monte Carlo simulation**
   - Conduct and present a Monte Carlo simulation for the stock closing price in the next n-days from today.
   - The number of simulations should be selected from a dropdown list of n = 200, 500, 1000 simulations.
   - The time horizon should be selected from a dropdown list of t = 30, 60, 90 days from today.
   - Estimate and present the Value at Risk (VaR) at 95% confidence interval.

Monte Carlo simulation for AAPL stock price in next 30 days
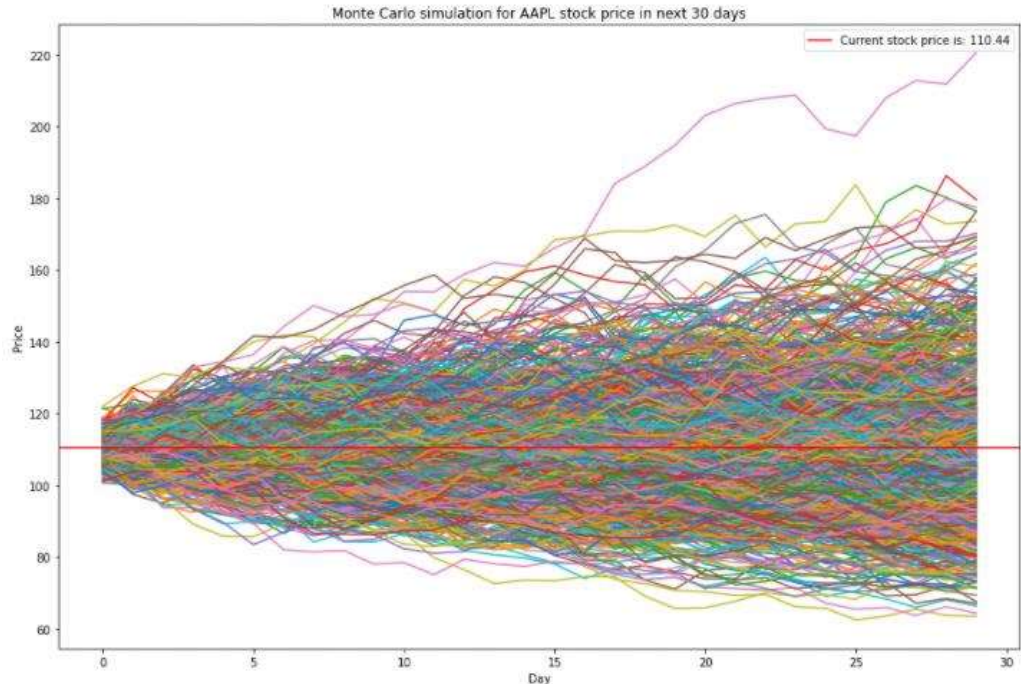
5. **Tab 5: Your own analysis**
   - You are free to design this tab with any financial analyses or additional information that you are interested in (e.g., news, financial metrics, stocks comparison, etc.). You may find some inspirations from [6].

<u>Submission</u>

- A project folder including:
  o The Python script file(s) (*.py) of the dashboard.
  o Link to the deployment of your dashboard on Streamlit Community Cloud [7].
  o A short PPT (5-10 slides) describing the key functions of your dashboard.
  o A 5min presentation about the functions of the dashboard. The presentation could be recorded within your PPT (no need to record the video).

Evaluation

The project will be evaluated on:

- The functions of the dashboard and the quality of the Python script [80%].
- The quality of the PPT and presentation [20%].

Timeline

- Deadline: 15 November 2024.

Note

- The dashboard does not have to be identical to the given Yahoo Finance examples. As long as it covers the required items and functions, it is perfectly fine.
- It is not necessary to make the dashboard updated in real-time. Using an "Update" button to refresh the data is good enough.
- To avoid being blocked from Yahoo Finance, the student should not repeatedly request much data in a short period of time.
- Finally, using the work (text or programming scripts) of other people without citing the source is considered as plagiarism, and is strictly prohibited.

Reference

[1] Yahoo Finance. Link: https://finance.yahoo.com/

[2] yfinance GitHub. Link: https://github.com/ranaroussi/yfinance

[3] Streamlit documentation. Link: https://docs.streamlit.io/

[4] Yahoo Finance > Summary. Link: https://finance.yahoo.com/quote/AAPL/?p=AAPL

[5] Yahoo Finance > Financials. Link: https://finance.yahoo.com/quote/AAPL/financials?p=AAPL

[6] Stock Analysis. Link: https://stockanalysis.com/stocks/aapl/

[7] Streamlit Community Cloud. Link: https://streamlit.io/cloud