COP290: Design Practices
Assignment-1: Trading Simulator And Analyzer

General Guidelines and Submission Instructions

1. Subtask-1 is an individual task. Subtask-2 and Subtask-3 are to be done in groups of two.
2. Any sort of plagiarism will attract strict penalty and disciplinary actions will be taken as per the institute policy.
3. You have to host your codebase on GitHub starting Subtask-2 (with frequent git commits between you and your partner). Make sure your repository is private and is only shared with your project partner. At the time of demo, you will be asked to give access to the TA for evaluation. You have to make sure that the visibility of the repository is private and not public.
4. Bonus marks will be given for extra features relevant to the platform. Note that making *any* extra feature won't fetch you marks, it is at the discretion of the instructors to decide.
5. More information on Subtask-2 and Subtask-3 will follow later.

Problem Statement

The aim of this assignment is to build a trading simulator and analyzer on real (historic) data. The task will be divided into 3 subtasks. We will begin by collecting raw data, converting it into meaningful information and perform trend analyis. Finally, we will try to build some trading strategies and simulate them on the platform. By the end of this assignment, you would have provided features to view the stock graph, applied technical filters on the data and have the opportunity to implement your own strategies!

Subtask-1 [Deadline: 22nd Jan 2024 (5 Marks)]

This is the first checkpoint of the assignment. Also note that **this is an individual subtask**. Before you begin, you are required to setup your UNIX environment. Instructions regarding the environment are on course webpage.

In this subtask, we will collect some data of different stocks (which would be helpful to work with in the future subtasks).

For this assignment, we will be working with data available in the `jugaad-data` python library. The link to the library can be found here.
You need to download this data for the NIFTY-50 stocks. The list of the stocks can be found here.

Following are the steps you need to complete for this subtask -

1. Given a stock symbol, you should get the daily data of the stock for the last x years (x will also be given in the input). The token will belong to EQ series only. The data should include the following columns - Date, Open Price, Close Price, High, Low, Last Trade Price (LTP), Volumne, Value and Number of Trades.

2. Next, you need to write this data to a file. You should try out different file formats, including CSV, txt, binary and Parquet. You may also try other file formats with better performance and space optimizations.

3. For each of the file formats, benchmark the time taken to write the data into the file, and size of the file generated.

4. Generate a *single* graph, and compare different file formats on the basis of file size and time taken to write the file.

What to submit? You should submit a single zip file with name S1_EntryNumber.zip. After unzipping, we will run `make` command. Thus, you should also submit a Makefile. We will pass token symbol name and numher of years as command line arguments to make. You should submit code that will generate data for the passed symbol, write it to all file formats, and generate the required graph. You need to also submit a 1-2 page report containing insights about different file formats, and the methods used by you to benchmark them.

Subtask-2 [Deadline: 30th January 2023 (15 Marks)]

This subtask is aimed at creating the user interface. The exact starter code for the assignment will be shared later. You need to develop the user interface for the following features:

1. Plot the graph of a given stock on a defined time scale (daily, weekly etc)

2. Plot multiple stocks on the same graph to visually compare the prices.

3. Apply technical filters to get a list of stocks passing the filters (P/E ratio, average price etc.)

This subtask involves designing the UI elements, connecting them to the database, and updating the graphs based on user interactions. These are some of the basic requirements of the platform. On top of this, you can build other features as well. Feel free to take inspiration from platforms like Zerodha, Groww etc.

Subtask-3 [Deadline: 9th Feb 2023 (15 Marks)]

Having reached here, we would finally write some exciting trading strategies which can be implemented on the data available to us, and analyze them. More details on this would follow later :)

Other submissions

You need to also submit a README.md for the assignment by 7th Feb. It would serve as a documentation for the project. For writing good README files, refer to the link here. It would be a good idea to incrementally build your README with each subtask.