

The goal of this assignment is to write a code to backtest a **long-only** trading system based on certain technical indicators. Furthermore, you have to create your own '**Profit Booking Logic**' that will decide your entry and exit criteria and encapsulate it with a '**Position Management Logic**' that maximizes the strategy's gross profit (**remember not to overfit on training period**).

The following tasks are to be accomplished in the trading system-

- 1) Your first task is to read the last five-year stock data of the given stock from "yahoofinance" or "googlefinance" python APIs. After that, take the first three years' data for training (in sample) and the last two years' data for testing (out sample).

You can use daily Open-High-Low-Close-Volume data. **All the prices should be in INR.**

(Note1: Take 100,000 INR as initial capital)

(Note2: Use close prices as entry and exit prices)

- 2) Next you have to implement the trading logic:

You may use any indicator/feature of your choice to develop a profitable strategy to outperform the benchmark (consider the stock as the benchmark & remember not to overfit).

Some technical Indicators for your reference:

- ❖ Simple Moving Average (SMA)
- ❖ Relative Strength Index (RSI)
- ❖ Stochastic Oscillator
- ❖ Average Directional Index (ADX)
- ❖ Bollinger Bands, etc..

- 3) At every price-data point, you should compute the indicators. Based upon these indicators, you have to come up with a '**Trading logic**' and a '**Profit Booking Logic**' which will define your trading entry and exit rules respectively.

- 4) Your next task is to come up with a '**Position Management Logic**' with the following constraints:

- At any given point of time, your maximum open interest should not exceed your total cash amount available.
- The transaction cost for every trade is 1% of the total amount traded.
- There should be a reasonable stop loss logic in your strategy.
- Profit or Loss per trade shall be computed as follows :

$$\text{PnL per trade} = (\text{stock Exit Price} - \text{stock Entry Price}) * \text{Trade\_Size} - \text{Transaction Cost}$$

5) The submission of this assignment is expected from you in the form of a zip folder in the following format:

- **Summary.doc** - A thorough summary of the final implementation of the technical indicators, trade entry and exit rules, position management logic, and profit/loss booking criteria.
  - ❖ Total number of Buy(Entry) signals generated
  - ❖ Total number of Sell (Exit) signals generated
  - ❖ Total number of trades executed (with timestamp)
  - ❖ Profit or loss per trade computed as per the formula provided in the previous section
  - ❖ Total Profit or Loss for the entire period, and for the testing and training period separately also
  - ❖ Annualized Return
  - ❖ Win/ Loss Ratio for the entire period, and for the testing and training period separately also
  - ❖ Maximum Drawdown
  - ❖ Daily Return Graphs of Strategy and the Benchmark (consider your stock as the benchmark)
- **Summary.csv** - Your trading summary should consist of the following statistics-
  - ❖ Indicator values that you computed at each timestamp
  - ❖ Position at each timestamp (neutral / long)
  - ❖ And any other information/data variable you used
- **Code Project**: Complete clean code with proper comments (use Google Colab for the coding).

### **File input and output directions-**

Your code should not take any input file (use “googlefinance” and “yahoofinance” for extracting data) and generate ‘Summary.csv’ containing OHCLV (whatever you used) and the indicator values and the entry and exit signal at each timestamp as output file.

### **STOCKS-**

- Reliance(energy minerals) - Harsh Kumar
- Tcs (tech services) - Dhruv Mehrotra
- infy (tech services) - Reeshita Paul
- hdfcbank (fin) - Aditya Agrawal
- hdfc (fin) - Aaryan Trivedi

- hindunilvr (consumer non-durables) - Dhruv Shandilya
- itc (consumer non-durables) - Shashank Mathania
- bhartiartl (communication) - Shauraya Semwal
- asianpaints (process industry) - Mayank Chauhan
- Maruti (consumer durables)
- Sunpharma (health)
- Tatasteel (non energy minerals)
- powergrid (utilities)

#### Resources:

- ❖ Investopedia
- ❖ Rayner Teo (Youtube Channel)
- ❖ Quantinsti
- ❖ Quantconnect
- ❖ Seeking Alpha
- ❖ W3schools & Stackoverflow for Python

*“Only The Game, Can Teach You The Game” – Jesse Livermore*