

DMP-01 – Assignment

Instruction to be followed:

Due Date:

- In case you submit it after 15 days, there will be no feedback/evaluation provided
- Please submit only one Jupyter Notebook file (.ipynb) which has the answers to all the below questions

Please write your explanations as markdowns in the .ipynb file that you send. Please do not send a separate word document.

The assignment is based on the DMP-1 session. Programming can be done in many ways so feel free to build your own approach.

We expect you to use a search engine to read up methods/techniques that you're not familiar with. The official documentation is great. And so is a lot of other stuff that you'll find online.

Use the adjusted close price of MSFT from January 2nd 2015 to April 30th 2020 for questions 1 to 4.

Q1: Try out the 'Big Moves Monday' strategy on the above data with the standard conditions as taught in the class. Now back-test the strategy again but this time tweak one of the conditions such that the 'ibs' value must be lower than 0.8. Compare the results(total return) with the standard conditions case. Comment on the results. (5 marks)

Q2: You have seen a strategy based on MACD indicator in the class. Now back-test the following strategy based on Bollinger bands:

- Create 20-day (+/- 2 standard deviations) Bollinger bands on the adjusted close price for the above equity
- Buy when the price crosses the lower band from top and hold until the price crosses the upper band from below the next time.
- Sell when the price crosses the upper band from below and hold until the price crosses the lower band from top the next time.
- Once we get into a trade, we always have an open position at all times.

Compare the total returns of the above strategy with a simple 'buy & hold' strategy. Comment on your findings. (5 Marks)

Q3: Write a customized function that computes returns for the exponential moving average (EMA) strategy (discussed in class) for different windows(spans). Find the optimal value of span between 1 and 30 which produces the best overall total return. (5 Marks)

Q4: The moving average crossover (MAC) code is implemented where we always have an open position. Calculate returns where short selling is not allowed. Plot a graph comparing returns from buy-and-hold, no short selling, and the one we did in class. Comment on your results. (5 Marks)

Q5: Download the data for the following companies TSLA, NFLX, AMZN, GOOG and CVX using the code for automatically downloading multiple stocks from January 1st 2015 to April 30th 2020. You can use Yahoo Finance for downloading the data. (5 Marks)

For the above-mentioned time period

- a) Compute the daily returns (assuming you buy at open and sell at close) every day.
- b) Compute the hit ratio for each of them(recall that the hit ratio is the ratio of number of positive trades to total number of trades).
- c) Compute the cumulative returns for each of them.

Plot them graphically and comment on your results.

Optional: - Installations/Readings/Practice

6) Try creating the simple/ full tear sheets using the pyfolio library for questions 1 to 4. Compare various performance and risk metrics for the EMA, the MAC and the Bollinger band strategy.

7) Install the TA-lib package. You can go through the attached document to get it installed.

Go through the link to get an overview of the features. <https://blog.quantinsti.com/install-ta-lib-python/>