FINANCE CLUB

QUANTITATIVE ASSIGNMENT

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In this project, a long only trading strategy based on the Relative Strength Index (RSI) was back-tested on stocks of bhartiartl (communication) in the time period of 2016-08-08 to 2021-08-08 (a five year period).

The RSI is a momentum oscillator. A 14-day timeframe RSI was used which was computed using the formula:

$$RSI = 100 - 100 / (1 + RS)$$

Where,

RS is Relative Strength given as,

$$RS = \frac{\text{Average of all upward moves in the last 14 Close prices}}{\text{Average of all downward moves in the last 14 Close prices}}$$

The average upward and downward moves was calculated as simple moving averages.

The RSI values vary between 0 and 100. An RSI value of greater than 70 was considered to indicate overbought stock and of less than 30 to indicate oversold stock. Based on this, a simple profit booking logic was made.

The profit booking logic used was:

- To buy stocks if RSI crosses to less than 30 from above 30
- To sell all stocks if RSI crosses to above 70 from below 70

Based on the profit booking logic, buy and sell signals were generated depending on the RSI values. From these signals only those sell signals which were preceded by a buy signal and similarly for buy signals were chosen to represent the actual trading entry and exit points.

At each buy signal, the entire capital available was used in buying stocks. This is because, at the end of each trade, percentage profit will remain the same irrespective of the initial capital. Hence maximum profit will be extracted for maximum initial capital. So, all the capital available was used in buying stocks.

Rs. 85,000 is chosen as stop loss. This means that if the portfolio becomes lower than 85,000 at any time, stocks held are sold immediately. On the next buy signal, 10 days are given to the stock to rebound (become more than 85,000) before reactivating stop loss.

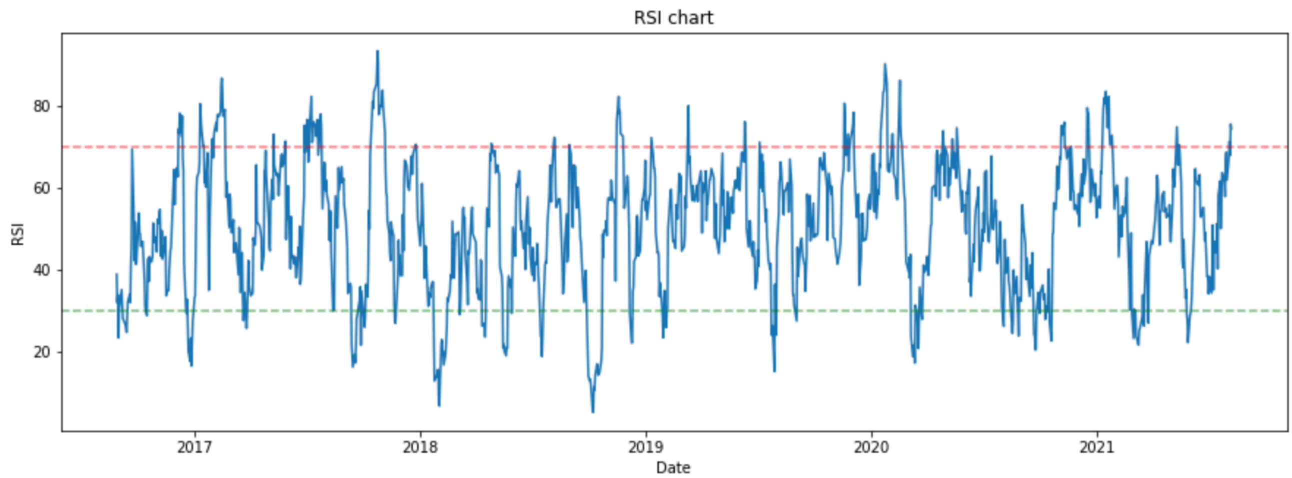
Link of Code (Google Colab file): https://colab.research.google.com/drive/1NL2yB_IO-JKlzGeOLHusMutHQmoUz0UBz

(On running the code, user input is taken to proceed with first 3 year data, last 2 year data or complete 5 year data. Then based on user's choice, backtesting is performed on the chosen timeframe)

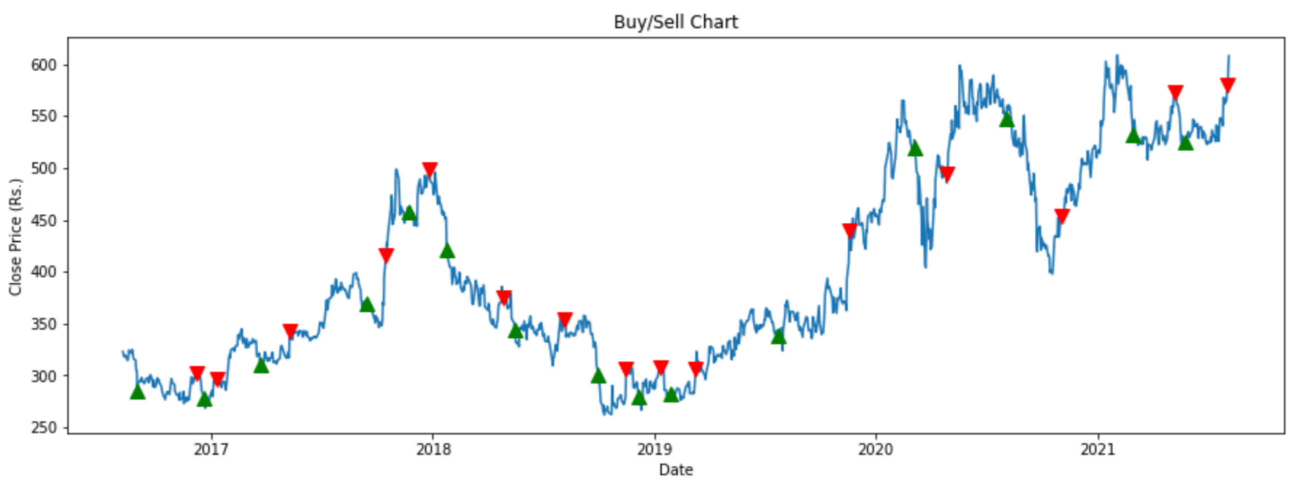
For complete 5 year data,

Close Price Chart:

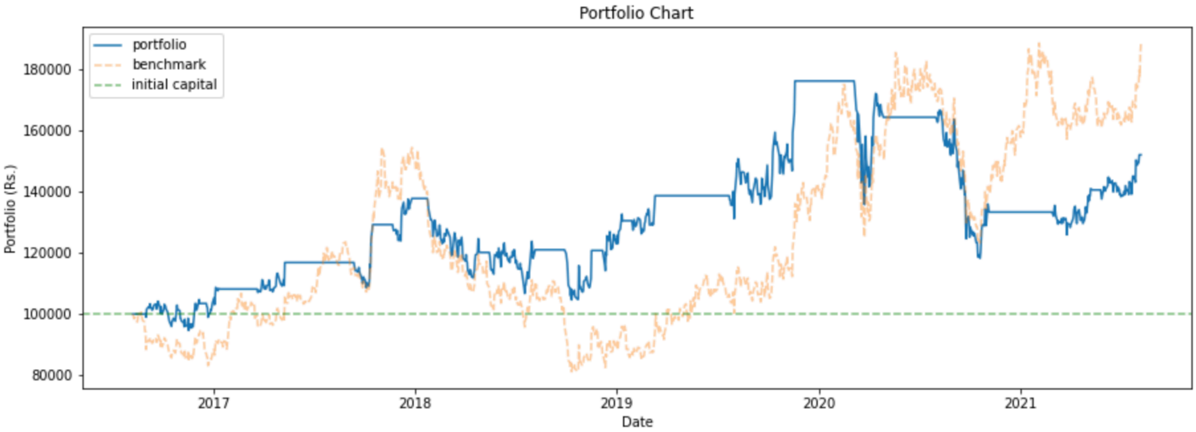
RSI Chart:



Buy and Sell Signals: (green: Buy, red: Sell)



Portfolio Chart:



Various Calculations:

```
Total number of buy signals generated= 41
Total number of sell signals generated= 37
Total number of trades executed= 30
Profit for period=Rs. 52089.62348812903
Annualized Return= 13.226988921344107 %
Win/Loss % for the period= 400.0 %
Maximum Drawdown= 32.90748079227374 %
```

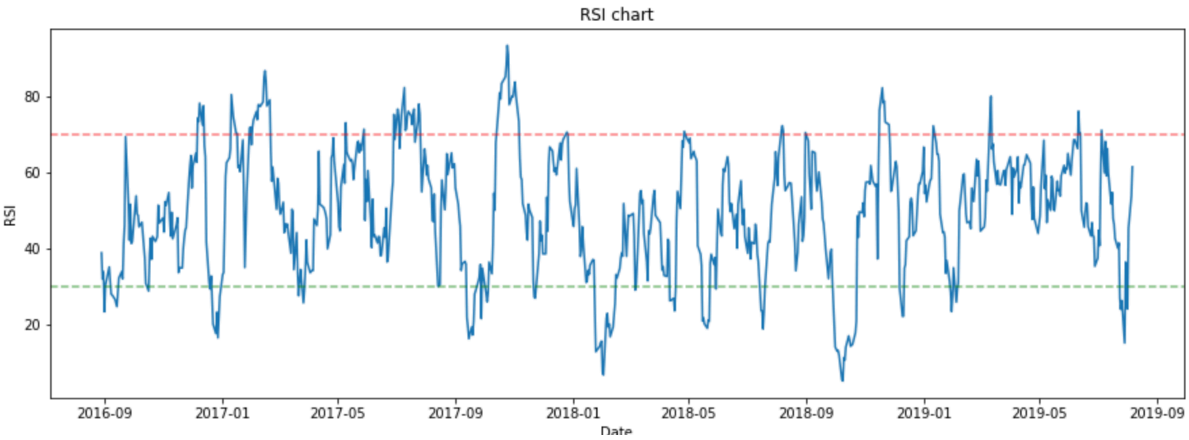
Trades with Timestamp:

	Date	Signal	Profit
0	2016-09-01	Buy	-1000.000000
1	2016-12-07	Sell	4464.635944
2	2016-12-20	Buy	-1034.646359
3	2017-01-11	Sell	5746.137421
4	2017-03-22	Buy	-1081.761270
5	2017-05-10	Sell	9760.245360
6	2017-09-13	Buy	-1168.546111
7	2017-10-16	Sell	13570.972524
8	2017-11-22	Buy	-1292.570375
9	2017-12-26	Sell	9850.647287
10	2018-01-24	Buy	-1378.151144
11	2018-04-27	Sell	-16282.610280
12	2018-05-16	Buy	-1201.543530
13	2018-08-06	Sell	2073.400793
14	2018-10-01	Buy	-1210.262103
15	2018-11-16	Sell	979.988531
16	2018-12-07	Buy	-1207.959367
17	2019-01-11	Sell	10937.411530
18	2019-01-29	Buy	-1305.253889
19	2019-03-11	Sell	9491.390258
20	2019-07-24	Buy	-1387.115252
21	2019-11-19	Sell	38922.703133
22	2020-03-06	Buy	-1762.471131
23	2020-04-27	Sell	-10096.527033
24	2020-08-03	Buy	-1643.881149
25	2020-11-04	Sell	-29385.389071
26	2021-03-01	Buy	-1333.588447
27	2021-05-10	Sell	8589.449781
28	2021-05-26	Buy	-1406.147061
29	2021-08-03	Sell	12881.064498

For first 3 years data,

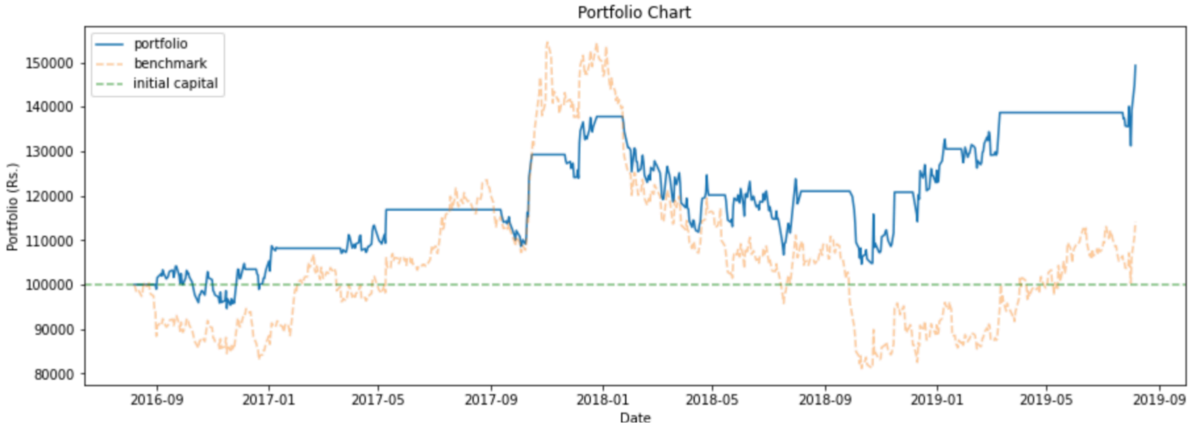
Close Price Chart:

RSI Chart:



Buy and Sell Signals: (green: Buy, red: Sell)

<u>Portfolio Chart:</u>



<u>Various Calculations:</u>

```
Total number of buy signals generated= 23
Total number of sell signals generated= 20
Total number of trades executed= 21
Profit for period=Rs. 49298.263323421415
Annualized Return= 21.889839341493577 %
Win/Loss % for the period= 450.0 %
Maximum Drawdown= 24.07582602111952 %
```

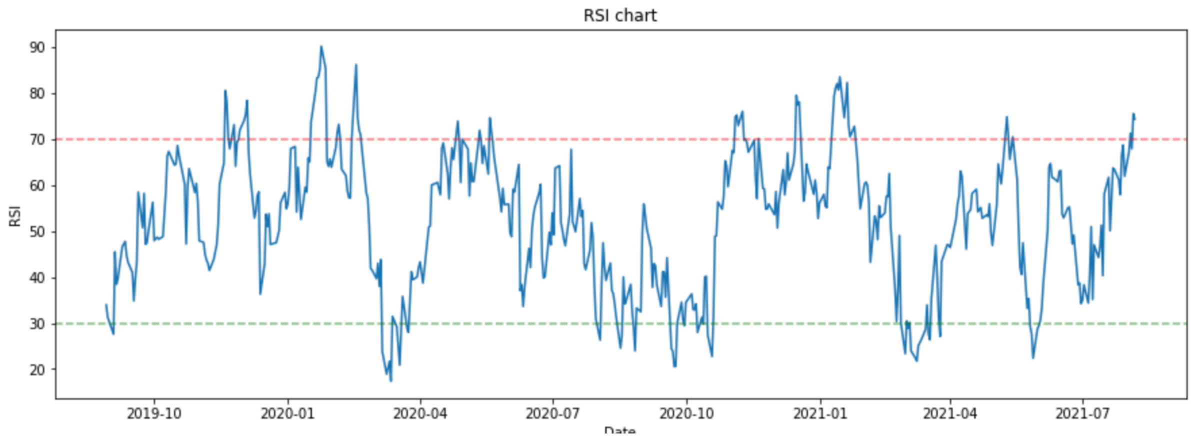
<u>Trades with Timestamp:</u>

	Date	Signal	Profit
0	2016-09-01	Buy	-1000.000000
1	2016-12-07	Sell	4464.635944
2	2016-12-20	Buy	-1034.646359
3	2017-01-11	Sell	5746.137421
4	2017-03-22	Buy	-1081.761270
5	2017-05-10	Sell	9760.245360
6	2017-09-13	Buy	-1168.546111
7	2017-10-16	Sell	13570.972524
8	2017-11-22	Buy	-1292.570375
9	2017-12-26	Sell	9850.647287
10	2018-01-24	Buy	-1378.151144
11	2018-04-27	Sell	-16282.610280
12	2018-05-16	Buy	-1201.543530
13	2018-08-06	Sell	2073.400793
14	2018-10-01	Buy	-1210.262103
15	2018-11-16	Sell	979.988531
16	2018-12-07	Buy	-1207.959367
17	2019-01-11	Sell	10937.411530
18	2019-01-29	Buy	-1305.253889
19	2019-03-11	Sell	9491.390258
20	2019-07-24	Buy	-1387.115252

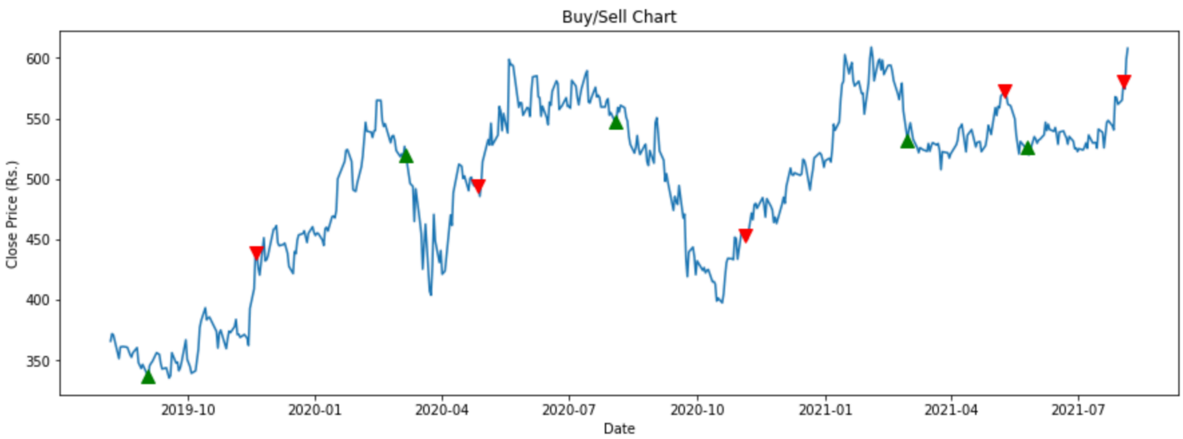
For last 2 years data,

Close Price Chart:

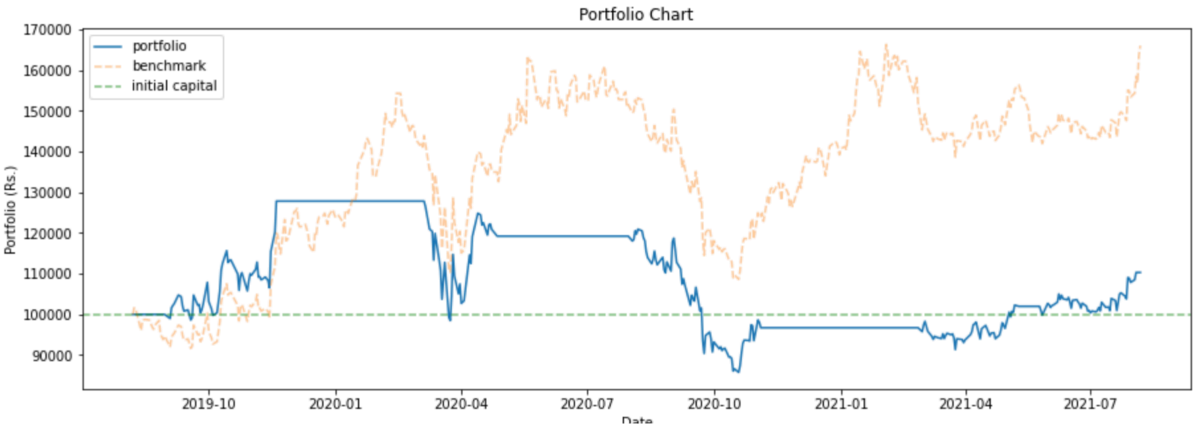
RSI Chart:



Buy and Sell Signals: (green: Buy, red: Sell)



Portfolio Chart:



Various Calculations and trades with Timestamp:

```
Total number of buy signals generated= 18
Total number of sell signals generated= 17
Total number of trades executed= 10
Profit for period=Rs. 10311.817252629626
Annualized Return= 7.536493412886669 %
Win/Loss % for the period= 150.0 %
Maximum Drawdown= 32.90748079227374 %
```

SUMMARY:

	Date	Signal	Profit
0	2019-09-03	Buy	-1000.000000
1	2019-11-19	Sell	28833.437192
2	2020-03-06	Buy	-1278.334372
3	2020-04-27	Sell	-7323.091605
4	2020-08-03	Buy	-1192.320112
5	2020-11-04	Sell	-21313.457124
6	2021-03-01	Buy	-967.262340
7	2021-05-10	Sell	6229.996451
8	2021-05-26	Buy	-1019.889681
9	2021-08-03	Sell	9342.738843