Round 1 – Assignment

Instructions -

- Questions are designed to test your python skills as well as knowledge of systems and back-testing.
- All codes must be created, executed, submitted in python.
- Outputs are preferred in Jupyter Notebooks.
- Code must be submitted in .ipynb or .py or format only.
- There are 6 questions and 10 days given to solve them, some may take more time than others so ensure that you manage your time properly.
- The objective for this assignment is to push you out of your comfort zone and let you figure things out yourself.

Q1) NSE provides a "Security-wise Delivery Positions (DAT)" file at the end of every day. These files provide all the delivery/deliverable volume for the day for all symbols. Your assignment is to –

1) Obtain the list of NSE500 symbols as of today. (Proper symbol name as per Bhavcopy) (E.g. - Bajaj Finance = BAJFINANCE)

2) Query the "Security-wise Delivery Positions (DAT)" file date – wise from 1st Jan 2005 onwards till 8th July 2022 and read the "Deliverable Quantity (gross across client level)" column. Read data for those 500 symbols. Store these values in a pandas dataframe. **Alternatives methods for obtaining delivery data are not permitted.**

3) In your loops, print out whatever processing you are trying. Clear outputs per iteration. E.g. –

   Reading Data for Date: 01-01-2022

   Reading Data for Symbol: XYZ

4) Output must be in .xlsx in the following format –

XYZ DATE	XYZ DEL QTY	PQR DATE	PQR DEL QTY	…	….	SYM500 DATE	SYM500 DEL QTY
01-01-2005	123456	07-12-2013	1345679			12-05-2008	728394933
02-01-2005	1345679	08-12-2013	8655578			13-05-2008	3.83489E+12
03-01-2005	1345679	09-12-2013	134664			14-05-2008	47473373
04-01-2005	34577766	10-12-2013	1345679			15-05-2008	58686866
05-01-2005	1345679	11-12-2013	234579			16-05-2008	337734
06-01-2005	8655578	12-12-2013	1111111			17-05-2008	14868493
07-01-2005	134664	13-12-2013	123456			18-05-2008	234578383
08-01-2005	1345679	14-12-2013	1345679			19-05-2008	384832836
09-01-2005	234579	15-12-2013	1345679			20-05-2008	12409
10-01-2005	1111111	16-12-2013	34577766			21-05-2008	45278292

Q2) Use any free / paid python API to obtain daily historical OHLCV data per symbol from 1st Jan 2005 till 8th July 2022 for the NSE500 symbols obtained in the previous question. You can use any API of your choice. **Other methods to obtain this data are not permitted**.

1) Data must be stored in a pandas dataframe.

2) Data must be saved as a .xlsx file in the following format –

XYZ DATE	XYZ OPEN	XYZ HIGH	XYZ LOW	XYZ CLOSE	XYZ VOLUME	PQR DATE	PQR OPEN	PQR HIGH	PQR LOW	PQR CLOSE	PQR VOLUME	..	..	SYM500 DATE	SYM500 OPEN	SYM500 HIGH	SYM500 LOW	SYM500 CLOSE	SYM500 VOLUME
2007-09-11	182.22	199.56	182.22	195.37	31120304	2005-05-17	15.99	17.68	15.24	15.51	74517604			2016-02-12	860	1032	806.8	1022.85	5498099
2007-09-12	197.4	198.56	191.72	192.97	4648089	2005-05-18	15.32	17.58	15.32	16.55	97440814			2016-02-15	1083.75	1185	1081	1172.55	1484889
2007-09-13	191.32	193.78	187.22	188.67	2072209	2005-05-19	16.81	17.44	16.71	16.84	27699534			2016-02-16	1179	1209	1106	1164.45	913567
2007-09-14	189.74	203.4	189	194.28	5953049	2005-05-20	16.99	17.27	16.44	16.54	13543199			2016-02-17	1158	1158	1105.1	1126.95	277485
2007-09-17	196	198.5	192	192.55	1437229	2005-05-23	16.89	17.19	15.99	16.25	6184369			2016-02-18	1130	1153.8	1116	1131.05	204783
2007-09-18	192.8	195.46	191	191.52	758219	2005-05-24	16.39	16.43	15.85	16.03	3624474			2016-02-19	1121.25	1177.7	912.65	1150.8	2972757
2007-09-19	192.4	198.4	192	193.49	1097574	2005-05-25	16.11	16.13	15.61	15.69	2825844			2016-02-22	1155	1175	1086.8	1124.6	743284
2007-09-20	193.49	198.97	191.4	195.61	929719	2005-05-26	15.71	16.07	15.3	15.39	5563109			2016-02-23	1117	1140.15	1049.4	1084	501738
2007-09-21	193	201.98	193	198.63	1393409	2005-05-27	15.48	16.61	15.45	15.99	10436279			2016-02-24	1079.95	1086	1048	1065.75	201877
2007-09-24	199	216	198.38	212.66	2240479	2005-05-30	16.09	16.17	15.72	15.87	4402069			2016-02-25	1064.95	1075	1040	1052.35	69744

Q3) SEBI's website provides mutual fund statistics in a daily format for both 'Debt' as well as 'Equity' Markets. Your assignment is to -

1) Obtain this data from 1st Jan 2010 till latest available data point.

2) Web-scrape this data, store it in pandas and display final outputs in the following format –

	Trading Date	Debt/Equity	Gross Purchases(Rs Crore)	Gross Sales(Rs Crore)	Net Investment (Rs Crore)
0	01-01-2010	Equity	0.00	0.00	0.00
1	04-01-2010	Equity	612.26	809.72	-197.46
2	05-01-2010	Equity	1030.69	987.28	43.41
3	06-01-2010	Equity	654.39	1225.54	-571.15
4	07-01-2010	Equity	700.32	1122.05	-421.73
...	...	...	...	...	...
3105	24-06-2022	Equity	5114.76	3490.52	1624.24
3106	27-06-2022	Equity	2543.06	2053.88	489.18
3107	28-06-2022	Equity	3718.15	3101.35	616.80
3108	29-06-2022	Equity	6387.08	6880.82	-493.74
3109	30-06-2022	Equity	6018.07	7739.98	-1721.91

	Trading Date	Debt/Equity	Gross Purchases(Rs Crore)	Gross Sales(Rs Crore)	Net Investment (Rs Crore)
0	01-01-2010	Debt	3571.80	686.30	2885.50
1	04-01-2010	Debt	10096.96	1492.73	8604.23
2	05-01-2010	Debt	8066.23	3961.25	4104.98
3	06-01-2010	Debt	3953.11	3353.21	599.90
4	07-01-2010	Debt	5037.53	3617.58	1419.95
...	...	...	...	...	...
3105	24-06-2022	Debt	7678.84	7390.87	287.97
3106	27-06-2022	Debt	8721.75	8845.83	-124.08
3107	28-06-2022	Debt	5533.64	6101.43	-567.79
3108	29-06-2022	Debt	5910.97	6854.40	-943.43
3109	30-06-2022	Debt	4678.41	5690.34	-1011.93

3) Save this data as two separate .xlsx files. One for debt and one for equity. **Other methods to obtain this data are not permitted**.

Q4) The website 'https://www.niftytrader.in/' provides an historical archive of FII and DII activity in cash markets in a daily format from 2021 onwards. Your objective is to –

1) Web-scrape this data from 2021 onwards till latest available data point. Store FII activity and DII activity separately in a pandas dataframe as shown –

FII:

	Trading Date	Debt/Equity	Gross Purchases(Rs Crore)	Gross Sales(Rs Crore)	Net Investment (Rs Crore)
0	01-01-2021	Equity	1072.54	566.33	506.21
1	04-01-2021	Equity	5331.17	3487.95	1843.22
2	05-01-2021	Equity	7039.45	6053.15	986.30
3	06-01-2021	Equity	6733.28	7216.92	-483.64
4	07-01-2021	Equity	8481.77	8099.47	382.30
...	...	...	...	...	...
376	05-07-2022	Equity	6675.59	5379.75	1295.84
377	06-07-2022	Equity	7355.76	7685.89	-330.13
378	07-07-2022	Equity	5847.89	6773.11	-925.22
379	08-07-2022	Equity	6319.87	6429.18	-109.31
380	11-07-2022	Equity	5294.47	5464.98	-170.51

DII:

	Trading Date	Debt/Equity	Gross Purchases(Rs Crore)	Gross Sales(Rs Crore)	Net Investment (Rs Crore)
0	01-01-2021	Equity	2505.67	2436.27	69.40
1	04-01-2021	Equity	4575.57	5290.78	-715.21
2	05-01-2021	Equity	5092.00	5582.03	-490.03
3	06-01-2021	Equity	5686.04	6066.45	-380.41
4	07-01-2021	Equity	4815.72	5805.22	-989.50
...	...	...	...	...	...
376	05-07-2022	Equity	5191.05	5448.64	-257.59
377	06-07-2022	Equity	7751.44	6287.11	1464.33
378	07-07-2022	Equity	6974.09	5993.50	980.59
379	08-07-2022	Equity	5321.64	5287.03	34.61
380	11-07-2022	Equity	4558.10	4855.09	-296.99

2) Save these two as dataframes as .xlsx files. One for FII and one for DII. **Other methods to obtain this data are not permitted**.

Q5) Build and back-test the following trading system in TradingView (Pinescript v5) or Python.

- Timeframe – 30mins
- Back-test Period – 2 years minimum.
- Symbol – NIFTY 50
- Initial Capital - 1L
- Leverage - 1x
- FastMA = EMA(hlc3,12)
- SlowMA = EMA(hlc3, 26)
- Long Signal = FastMA cross above SlowMA
- Short Signal = FastMA cross below SlowMA
- The system reverses positions and is always in the market.
- Quantity per trade = INT((Capital*Leverage)/Entry Price)
- Note: The system given hasn't been designed with an intention to be a real trading system or to be profitable.

Your assignment is to –

1) Code and illustrate system signals with indicators on a candlestick chart.
2) Obtain a back-test for the performance of the signals. Do not include slippage, transaction costs. Assume entry / exit on the close value of a candle and not the open of the next candle. **The back-test should be saved in a .xslx** and have the following -

   I. Columns: PNL, Cumulative PNL, Win/Loss (1 if PNL +ve, 0 if PNL -ve), Drawdown (In Rs. from running equity high) , Drawdown (money as a % of running equity high), Drawdown (money as a % of initial capital)

   II. A properly labelled graph displaying the equity curve with Cumulative PNL on y-axis and Date on the x-axis.

   III. A properly labelled graph displaying a scatter plot of % returns of all trades.

   IV. A table displaying the following metrics –

   - Total profit
   - Initial Capital
   - ROI
   - Win Rate for System
   - Gross Profits
   - Gross Losses
   - Average Profit
   - Average Loss
   - Max Profit
   - Max Loss
   - Max DD (Money)
   - Max DD (Money as % of running equity high)
   - Max DD (Money as % of initial capital)

Q6) NSE provides data for OI chain for various symbols. This can be accessed via freely available APIs. Your assignment is to -

1) Obtain this OI chain data for NIFTY 50 in the form of a pandas dataframe.
2) Display this dataframe.
3) Obtain the last traded price for NIFTY 50 and print it as an output
4) Find the strike with the highest number of PUT contracts within a range 2.5 % below the last traded price.
5) Find the strike with the highest number of CALL contracts within a range 2.5% above the last traded price.

Submission Format

Submissions that do not adhere to the specified format will be ignored and the candidate will not be evaluated for those questions. **Submissions must be sent before 22-07-2022, 23:59:00.**

Submission guidelines.

1) All code files must be in .py or .ipynb only.
2) All required libraries must be mentioned in 'requirements.txt' file.
3) Each question must be answered in a separate folder and the folder name should be e.g - Q1 for the first question. Outputs as .xlsx / .csv must be saved in that folder along with the code and requirements.txt
4) No need to make sub folders for sub questions.
5) Main folder must be named as per the candidate's full name. E.g. – Zorawar Singh will be zorawar_singh
6) Main folder must be compressed to a .zip and sent to the following email ID – zzorawarssingh@gmail.com with the subject as 'Round 1 Submission for <FULL NAME>'.
   E.g. – 'Round 1 Submission for Zorawar Singh'

For any queries, contact on WhatsApp - +919822382721.

Zorawar Singh.

All the best!