Creating a portfolio out of Nifty50 Stocks

The NIFTY 50 is a benchmark Indian stock market index that represents the weighted average of 50 of the largest Indian companies listed on the National Stock Exchange.

Objectives:

1. Create a benchmark strategy
2. Create a strategy to beat the benchmark
3. Create the equity curve for nifty index
4. Summarize the performance
5. Create and host an app to present the above

1. Benchmark Strategy:

Our Benchmark is going to be simple and basic, we are going to invest our initial investment equally among all the 50 stocks during the beginning of the simulation and hold it till the end and get the portfolio equity curve.

Initial Investment: INR 10,00,000 (10 Lakhs)
Start Period: 2020 – 10 – 01 (2020 Oct, 01)
End Period: Till Present

Equity Curve: Sum total of daily value of all stocks (This is just Illustrative, please code as per your understanding, we are interested in the equity curve value only, not the steps)

Initial Investment: 1000
Equal Allocation: 1000 / 2 = 500

Day	Open Prices		Close Prices		Qty		Daily Value		Equity Curve
	Stock 1	Stock 2	Stock 1	Stock 2	Stock 1	Stock 2	Stock 1	Stock 2	
1	10	50	11	48	50	10	550	480	1030
2	10	42	12	45	50	10	600	450	1050
3	8	44	10	47	50	10	500	470	970
4	11	49	13	52	50	10	650	520	1170

Note:
1. Buy on Open on day 1
2. Daily Value of Stock is Close X Qty
3. Equity Curve is sum of daily value of all stocks

2. (Sample Strategy) Past Returns based Selection:

Instead of investing in all the 50 stocks, let us select a few based on their performance in the past.

I. Take the prices till one day prior to investment day (Simulation Start Date)
II. Measure the performance of the latest 100 days, in terms of percentage returns
(Close (last day) / Close (100^{th} day before last day) - 1)
III. Select the top 10 best performing stocks (i.e., the ones that have the best returns)

Invest the Initial Investment equally among the 10 stocks during the beginning of the simulation and hold it till the end and get the portfolio equity curve.

3. Nifty Index Equity Curve: Find the equity curve for Nifty index for the simulation period using the same initial investment value.
4. Summarize the performance:

Get the following performance metrics for Nifty Index, Benchmark Allocation & Sample Strategy

a. CAGR (%): $\left(\left(\frac{V_{final}}{V_{begin}}\right)^{\frac{1}{t}} - 1\right) * 100$;

$V_{final}: Value\ on\ final\ day, V_{begin}: Value\ on\ begining\ day, t: number\ of\ years$

b. Volatility (%): $\left((standard\ deviation(daily\ returns))^{\frac{1}{252}}\right) * 100$

c. Sharpe Ratio: $\left(\frac{mean\ (daily\ returns)}{Standard\ deviation(daily\ returns)}\right)^{\frac{1}{252}}$

$daily\ returns: \left(\frac{V_t}{V_{t-1}} - 1\right)$; $V_t: Value\ on\ day\ (t), V_{t-1}: Value\ on\ day\ (t-1)$

5. App to host the performance:

Create & Host an app to which will have the following features.

Need to take the following as inputs:

1. Start date and end date of simulation
2. Number of days to measure the performance for stock selection required for the sample strategy
3. Number of top stocks to be selected for sample strategy
4. Initial Equity

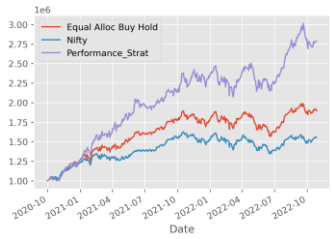
Need to display the following:

1. Equity Curves of Nifty index, benchmark and the Sample strategy for the given period in a single plot
2. Stocks that are selected for the sample strategy
3. Performance metrics for all the 3 stocks

Sample Input:

```
#Input Config
sim_start = '2020-10-01'
end_date = '2022-10-27'
n_days_measure_perf = 100
top_n_stocks = 10
in_eq = 1000000
```

Sample Output:



Index	CAGR %	Volatility %	Sharpe
Equal Alloc Buy Hold	126.567	18.085	1.815
Nifty	78.388	16.721	1.370
Performance_Strat	256.412	24.170	2.213

Top Stocks Selected:

['RELIANCE', 'HCLTECH', 'TATAMOTORS', 'M&M', 'EICHERMOT', 'JSWSTEEL', 'BAJFINANCE', 'APOLLOHOSP', 'WIPRO', 'ADANIENT']

Note:

1. Deliverables are the code files and the link to the app if you have hosted it.
2. Please send it to anand@agastyadatasolutions.com.
3. You can get the list of current nifty constituents from variety of places – Yahoo finance or NSE website - Wikipedia also has a list.
4. To get the stock data into python, you can use any module that will get the data from yahoo finance, it is one of the free sources for data.
5. You can create your app using the tool that you are familiar with (streamlit and dash are some of them).
6. You can host your app for free on any platform (Heroku is one free app hosting website).
7. It is **not** mandatory to answer all the questions. **Please make the submission with what ever progress has been made** – even if its not complete. We are looking for people who can take a challenging task and make progress on it.
8. Feel free to add any other insights or changes to the tasks once you are done with the given list.