What is Sharpe Ratio

Why top ten stocks

Logic behind the code

Are the five we chose in top ten from Q1?

Why should we change the weight of the portfolio?

The expected return of a stock can be misleading as it doesn’t account for the volatility of the stock. The Sharpe Ratio takes into account both the expected return and standard deviation of a stock, provide a more concrete measure of the performance of an investment.

For the first question, we simply find the mean and standard deviation of each stock, calculate the Sharpe Ratio for each stock and rank them in descending order and take the top ten results.

For the second question, we need to find the best five stock portfolio of equal weightings. Initially we find all possible combinations of five stocks form the thirty provided, assigning an ID to each combination. We then use these combinations and IDs to produce a Candidate matrix, with each column representing a stock, filled with either 0.2 or 0 if that given combination involves that stock. By multiplying our time series of stocks by the transpose of the candidate matrix, we get a time series of each of our portfolios. Then, we repeat our logic from the first step to find the Sharpe Ratio of each portfolio and ranking them to find the best. ***<Insert comment here regarding whether Top 10 in Q1 are here>***

However, equal weightings will not necessarily give us the most optimal solution since certain stock are more volatile than the others causing them to skew the Sharpe Ratio. Thus we loop through different weightings of the portfolio in order to find the rating that gives us an optimum Sharpe Ratio. Note that we only need to loop through four of the weights since the fifth weight can be calculated by subtracting the other weights from one.

For Part 2 Question 1, firstly we filter out the dataset so it excludes all points preceding 15th March 2022. Then we follow the same logic from the second question in Part 1 to obtain a time series of all possible portfolios. Then we find the expected value of each portfolio and subtract our new risk free rate of 0.25%. Then find the standard deviation of each portfolio, work out the Sharpe Ratio for each portfolio and order them, thus allowing us to find the portfolio with the best Sharpe Ratio