Portfolio Optimization

(A) What is the issue being addressed?

Optimization's main goal can be determined as the "best" decision from a set of possible decisions. What's more applicable than to apply this concept in determining which stocks to invest in? We have identified three different companies whose stock listing prices have shown upward trends in the last month. Namely, these companies are Disney, Netflix, and Eros. **Our issue is to figure out how much of 1000$ to invest in each of these three stocks that will provide an expected return of 50$.**

(B) Where does the data come from and how will it be obtained?

The data will be obtained through publicly available stock trading websites, namely Robinhood, Google Stocks. We will operate under the assumption that the closing listing price of that stock has a stationary probability distribution. Then, we will be able to estimate the expected values and covariance of this distribution through statistical analysis of historical data.

(C) What is the optimization problem underlying this project?

As a rational investor, we hope to make a profit out of this endeavor with minimal risk. In our model, the decision variables will represent the investment levels in each of the three stocks. The constraints will specify the restriction that our investment should provide an expected return of at least 5%. The objective function is the risk level of the investment that we seek to minimize. For determining the minimum variance of the return on the investment portfolio, we will adopt the Markowitz model. Thus, our portfolio optimization model involves minimizing a quadratic objective function subject to linear constraints.

(D) What are the deliverables?

With this model, we seek to deliver the optimal level of investment in each of the three stocks taken under consideration with a return of at least 5% of the amount invested with the least level of risk involved.

(E) Other points for me to consider when evaluating.

It should be noted that this project has several assumptions:

(i) We don't allow the investor to short sell.
(ii) There will be no transaction costs when stocks are purchased.
(iii) There are only three stocks to invest in – Disney, Netflix, Eros.
(iv) The final stock pricing of the month has a stationary probability distribution.

With that model, investors might be able to figure out which company they should invest in to get more potential returns. Considering the fact that 90% of people who trade on the stock market lose money, we believe this issue might help solve some problems in determining which stocks to invest in.