**Part – I:**

**Project Proposal:**

I try to simulate an alpha using a formulaic expression within Websim. The Alpha is as follows:

*(-1 \* rank(covariance(rank(close), rank(volume), 5)))*

The expression means that we heavily utilize the function ‘rank’

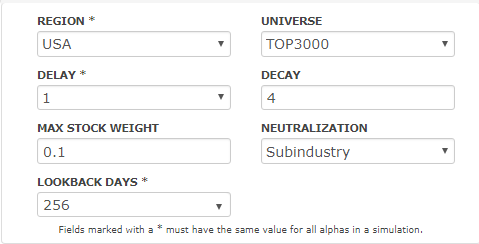
That is, rank the values of x among all instruments, and returns float numbers equally distributed between 0.0 and 1.0.  
For example, given 6 stocks with close price [20.2, 15.6, 10.0, 5.7, 50.2, 18.4], Rank(close) returns [0.8, 0.4, 0.2, 0.0, 1.0, 0.6]

We then use covariance, that is, Covariance of the values in vectors x and y for the past n days. Here, n is 5, and we then negate that.

This formulaic expression is then run over a given US equity population and a simulation is generated.

**Explanation:**

**Data used:**



The above screenshot depicts the Websim settings used for the simulation. From this, it is clear that the Region for which the simulation was carried out was US, and the universe of stocks was Top3k.

**Methodologies:**

Delay refers to the availability of data relative to decision time, which was set to 1, this means that our strategy is conservative, and that there is a lag of a day.

A decay of 4 is used. Decay performs a linear decay function over the past n days by combining today’s value with previous days’ decayed value.

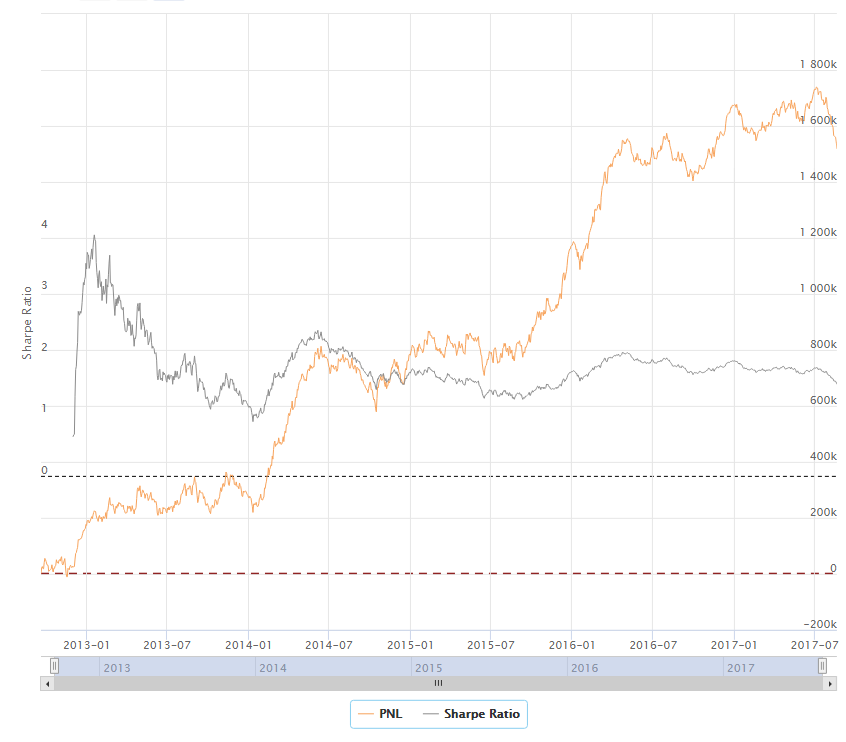
The maximum weight for each stock in the overall portfolio is set to 0.1, that is, 10%.

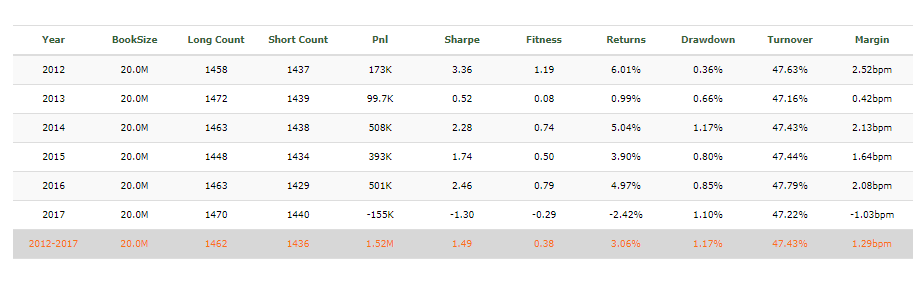
Neutralization = Industry or Subindustry, means that all the instruments in the Alpha vector are grouped into smaller buckets corresponding to industry or sub-industry and neutralization is applied separately to each of the buckets.

Loopback days is the number of prior days’ data to look at when running the Alpha for each day, which is set to 256.

**Obeservations / Performance Metrics:**

The simulation is run for 5 years, and the following is the backtest output:





As one can observe, the sharpe ratio is positive throughout for all the years, except for 2017. Overall, the average sharpe ratio for 5 years, between the year 2012 to 2017 is **1.49** which means that this alpha is decent due to its positive sharpe ratio.

**Potential Improvements:**

One improvement could be the fact that we could take co-variance of high and volume, instead of close, and play around with the ‘n’ value of co-variance to give a better yielding alpha.