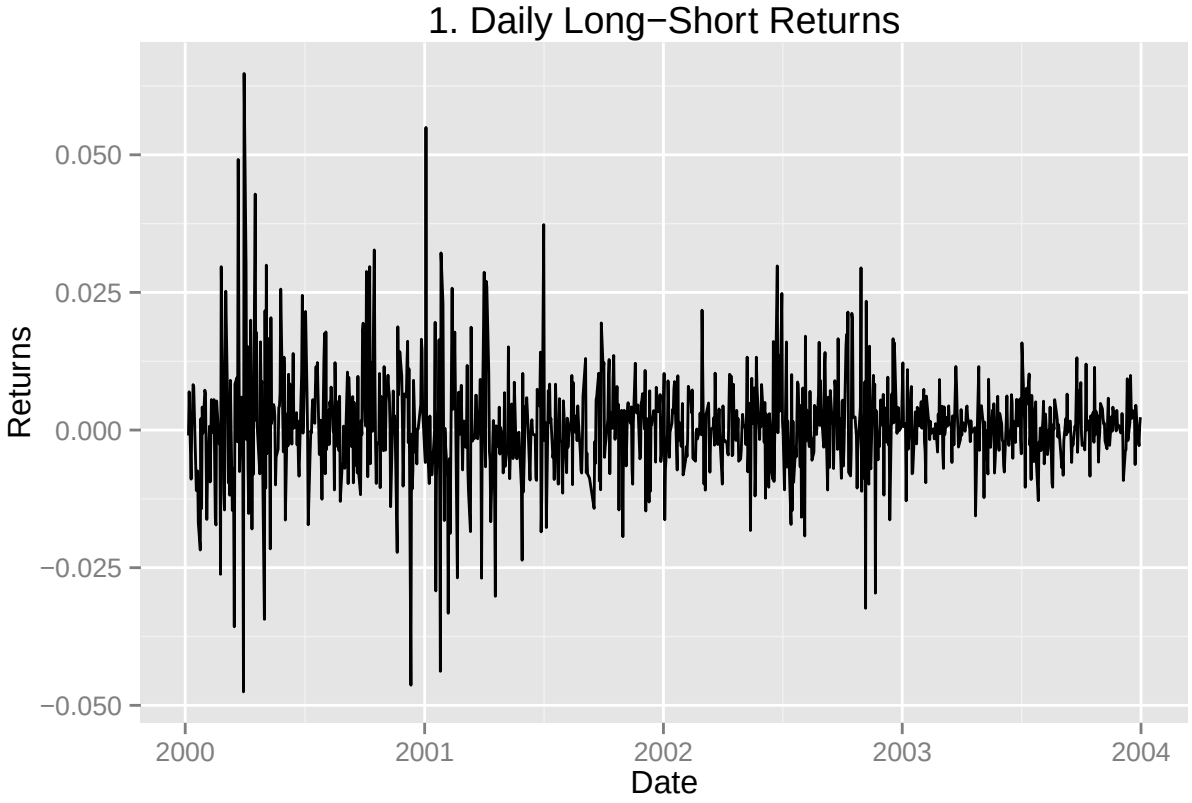
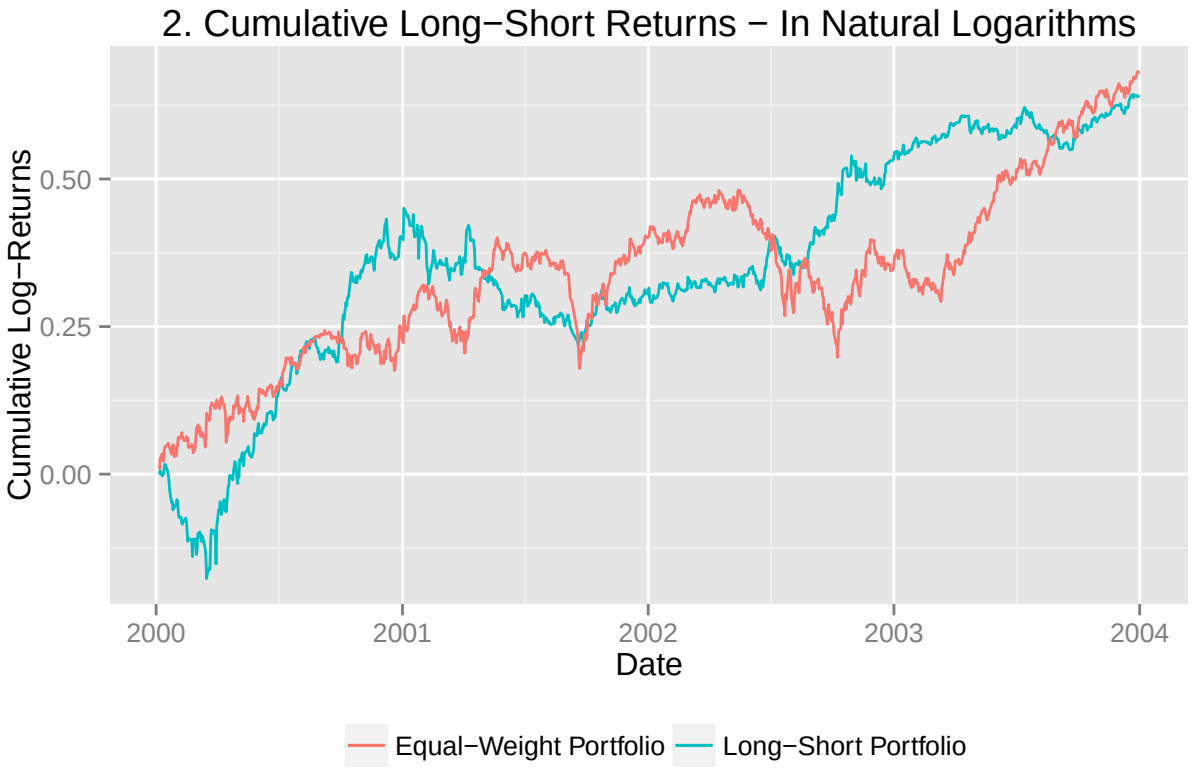
Solution Description - Part (1)

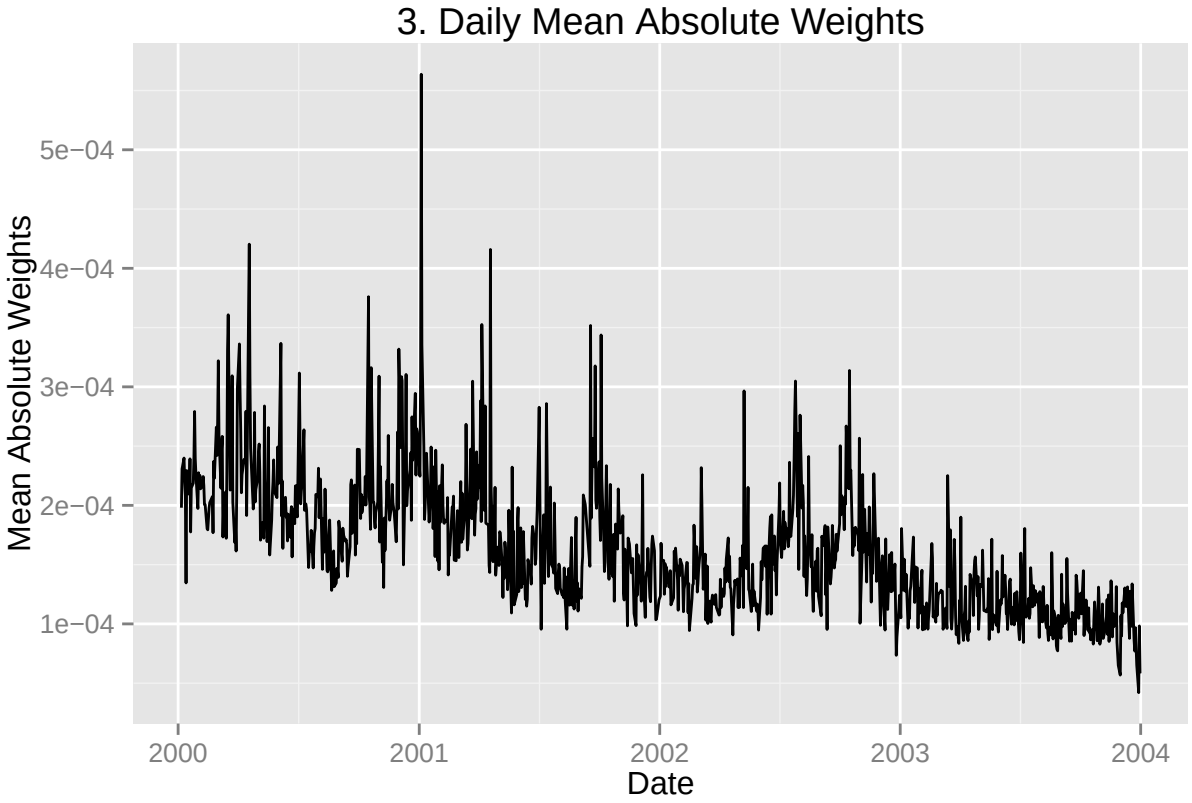
Team A - Mufan Li, Mengye Ren, Tian Xia

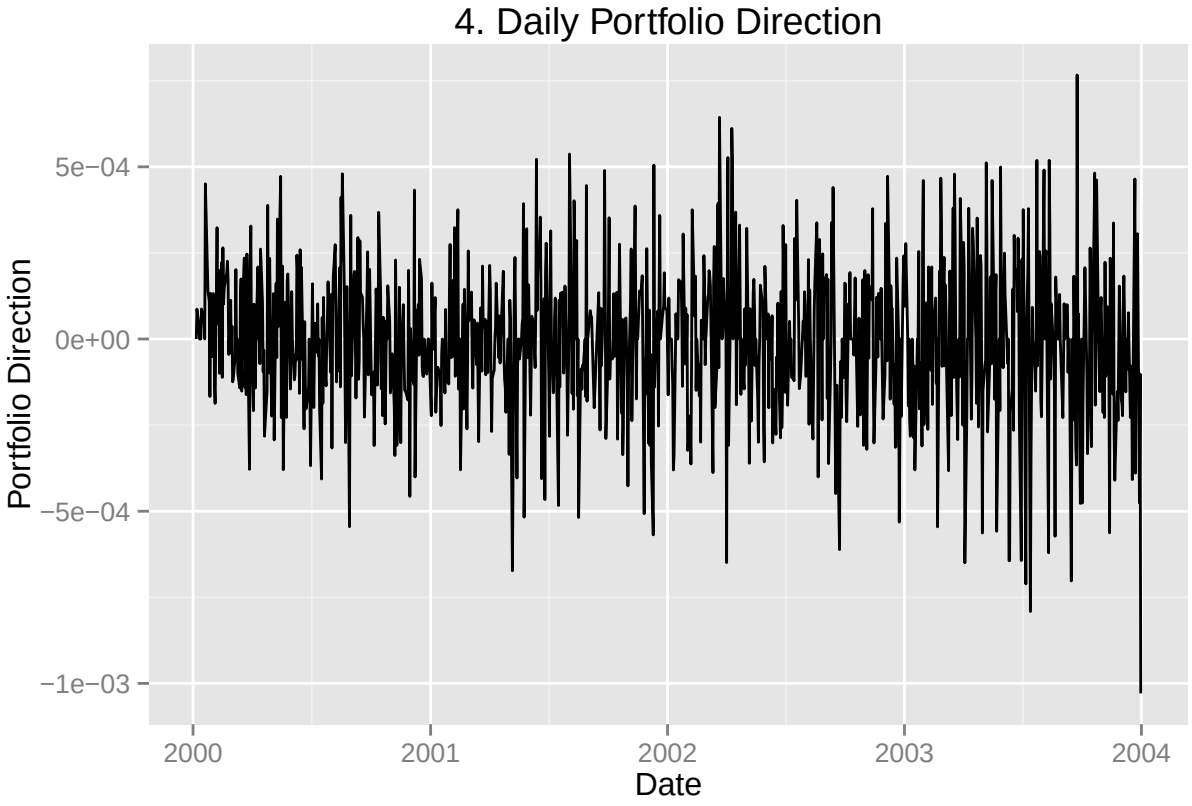
March 18, 2016

We first display the four time series plots.




2. Cumulative Long−Short Returns − In Natural Logarithms
Cumulative Log−Returns
0.50
0.25
0.00
2000
2001
2002
2003
2004
Date
Equal−Weight Portfolio
Long−Short Portfolio


3. Daily Mean Absolute Weights
Mean Absolute Weights
5e−04
4e−04
3e−04
2e−04
1e−04
2000
2001
2002
2003
2004
Date



We can also look at the relevant statistics below.

	Names	Values
1	Average Daily Log Returns	0.0006
2	Standard Deviation of Daily Log Returns	0.0097
3	Annualized Sharpe Ratio	1.0453
4	Skewness	0.3021
5	Kurtosis	5.7470
6	Maximum Drawdown - Number of Days	181.0000
7	Maximum Drawdown - Return	-0.2071
8	Correlation with Equal Weighted Returns	0.0840

Table 1: Summary Statistics

The strategy worked well considering how naive it was. We first observe plot 2 of the cumulative returns, where both the long-short and the equal-weight portfolios delivered similar long term returns. In fact the Sharpe ratio for the equal-weight portfolio is 1.03, which means the strategy in this part is not outperforming the market.

For the equal-weighted portfolio, the skewness of returns is 0.188, and the excess kurtosis is 1.405, both are lower than the long-short portfolio. Especially for the kurtosis of 5.747, this value is comparable to that of a student-t distribution with 5 degrees of freedom (which has kurtosis 5), implying the returns are extremely heavy tailed.

To provide futher intuition to the results, we observe the form of the strategy:

$$W_1(t,j) = -\frac{1}{N}[R_{cc}(t-1,j) - R_{cc,avg}(t-1)]$$

This weight is chosen based on whether the stock outperform its peers in the previous day or not. This strategy would work wonderfully if all of the big moves reverses itself in the next day. However, we observe

that a higher weight is given to the bigger movers in the previous day. Suppose a stock remains volatile for an extended period of time, we will have a greater risk exposure compared to the equal-weighted portfolio, possibly contributing to heavier tails of returns.