

Project Report
Final Project - Stock Trading
CS3050 – Spring 2016
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To complete this assignment our group started to come up with high level ways that we thought could possibly fit the constraints. These were not fully worked up, mostly just thoughts we had in since we first received the assignment. We then started to figure out how we would use the high level ideas and apply them to the project. Most of the original ideas failed and we were able to easily prove that they would fail. We ended up deciding to use two different algorithms for $r=1$ and $r=n$.

To solve the $r=1$ problem we use a $O(n^2)$ algorithm that searches every member of the input prices array. As the algorithm iterates through the array it searches every index starting at $i+1$ as sell days, if it finds a match that could work it will save it. As it keeps running the algorithm it continues to find matches with higher total buy sell differences, eventually ending with the highest combination. We decided to use this instead of a more efficient algorithm because we were trying to focus on accuracy as opposed to speed.

To solve the $r=n$ problem we use a completely different algorithm that runs in $O(n)$ time for each r value that you run through it. This algorithm will look for patterns in the prices array that it is given, it will start to iterate through the array and will keep going as long as the prices are going down. The first time they go up again it will set that as a buy day. To find a sell day it works the opposite way, it will look at each index it passes and if the numbers are always going up it will keep moving, if the prices start to drop it will mark that as a sell day. It will run for r number of times but if you lose money or simply don't make any money off of a trade it could finish without setting r number of buy/sell combinations.

Roles:

Michael: file parsing and print function

Jack: $r=1$ algorithm and $r=n$ algorithm

Reiker: $r=n$ algorithm, project report, README