Algorithms for Data Science
Assignment 2
Max Stock Profit

In this assignment, you will be implementing a version of the Max Stock Profit problem discussed in the videos/PowerPoint slides. You will be given actual NYSE data from Kaggle (https://www.kaggle.com/dgawlik/nyse). Find the best stock that you could have purchased during the time frame covered by the data (about six years). You will also determine the specific buy and sell dates for this stock that maximizes your profit.

Start with the data itself. You will use two CSV files. The first is prices-split-adjusted.csv. It contains data for every stock on every day. Each line has the following information:

```
date,symbol,open,close,low,high,volume
```

For example, a sample line from Apple follows:

```
2010-01-05,AAPL,30.6571,30.6257,30.4642,30.7985,1504.0
```

The closing price for the date 2010-01-05 was 30.6257. This is the information we will need for the Max Stock Profit problem. You should write functions to read in this file and find all lines with a particular ticker symbol (i.e., AAPL). Note that the DAC implementation of the Max Stock Profit problem requires changes in price, not actual price, so you will have to manipulate the data so it matches what the implementation requires. Also note that the file contains a header line you will want to read past once you open the file.

The other file we will use is securities.csv. It contains, among other things, all the ticker symbols and names of NYSE companies. For example

```
"AAPL","Apple Inc.","reports","Information Technology","Computer
Hardware","Cupertino, California","1982-11-30","0000320193"
```

I would suggest you get the Max Stock Profit code working (below) before reading this file. You can simply hard-code a symbol like AAPL until you are ready for this step. You will use this file to read in every company and its associated ticker symbol. You then run the Max Stock Profit algorithm on each symbol and keep track of the one with the best profit, printing this information out at the end of the run. Note that this might take a few minutes to compute. Also note that there may be a few symbols that have no price data, in which case you can simply skip those. You should display the company name rather than the ticker symbol. For example

```
Best stock to buy: "Priceline.com Inc" on 2010-06-09 and sell on
2016-11-07 with profit of 1402.9399999999996
```

To actually figure out the max stock profit, you should implement the DAC version of the algorithm. There is some sample code in the video/PowerPoint slides to guide you. However, you will need to add to it to figure out the best buy and sell date for the optimal profit it calculates. I would start with hard-coding a ticker symbol, such as AAPL. If everything goes well you should get results similar to the ones that follow:

```
AAPL Profit: 105.5710 buy on day: 22 (2010-02-04) and sell on
day: 1291 (2015-02-20)
```