Stock Price Analysis

When is a good time to invest money in the stock market? To a long-term investor, almost any time is a good time, but let's say you've got a friend who is a bit more cautious. Your friend is reluctant to buy into the stock market if he feels that the market is currently overvalued.

How can one tell if the market is "overvalued" or "overheated" ? Here is one definition that is pretty simple to gauge. On any given day, stock reports often indicate the highest and lowest price during the past year in addition to the current price. These historical prices are commonly referred to as the "52-week high" and "52-week low". If today's stock price is near the 52-week low, then this seems like a good day to buy – the stock market seems to be on sale. But if stock prices today are near or at their 52-week highs, then you could be wasting your money buying now. Instead, today might be a good day for selling shares instead of buying them. In the trading world, this is called "profit taking." After all, you know the old saying – buy low and sell high.

Here is one way that we can judge whether the stock market is overvalued or not. On any day, we can compare the current stock valuation within its range between the 52-week high and low. If today's stock price is closer to the high, then it's overvalued. If it's closer to the low, then it's undervalued. In other words, we can assign a "score" to each day's stock price. A score of 0.0 means it is equal to its year's low, and 1.0 means it's equal to its year's high. A score of 0.5 could be our threshold for determine an under- or overvalued market.

Unfortunately, that model is a bit too simple. Over long periods of time, the stock market's trend is one of growth, i.e. capital appreciation. In fact, if we smooth out all of the short-term market swings, then the market would be monotonically increasing in value, and every day we would always be at our 52-week high! Therefore, a threshold score of 0.5 between the year's low and high may not be realistic.

You will write a program that will calculate what this threshold should be. On the class Web site, you can find a file called stock.csv. I downloaded this file from Yahoo Finance. It shows the closing value of the S&P 500 index on each trading day since 1950. Write a program that scans this information. Note that on each line of data, you only need the first and last tokens – the date and closing price.

For each trading day since January 1, 1951, you can calculate that day's stock market "score", as described earlier: score = (today's stock price – 52 week low) / (52 week high – 52 week low). **Your program should compute the average score throughout this entire period.** Because of the stock market's upward trend, a hypothesis is that the average score should be somewhere between 0.5 and 1.0.

The output of your program should be a file showing the score for each trading day since 1/1/51. Also print out the average score. Once you know the long-term average score for the market, you will have a better idea of determining whether today's stock price appears too high in the current market environment during the last year. What other analysis could you perform?