

MAT 116E

PROJECT-6

What to turn in: Copy the text from your scripts and paste it into a document. If a question asks you to plot or display something to the screen, also include the plot and screen output your code generates. Submit either a *.doc or *.pdf file.

Write the following function:

```
endValue=tradeStock(initialInvestment, price, buy, sell)
```

The weekly price of Google stock from 8/23/2004 until 1/11/2010 is saved in the file `googlePrices.mat`. This file also contains two other vectors: `peaks` and `lows`. The `peaks` vector contains indices into the `price` vector when the stock peaked, and the `lows` vector contains indices into the `price` vector when the stock hit a low. Run your program so that it buys stock when it's low, and sell it when it's high. Below is a list of specifications.

- The inputs are: `initialInvestment` – the amount of money you have to invest at the beginning, in dollars; `price` – a vector of stock prices over time; `buy` – a vector of times when to buy (should just be integers that index into the price vector); `sell` – a vector of times when to sell (similar to the buy vector). `endValue` is the end value of your investment. If all of your stock isn't sold at the end, use the last price of the stock to calculate how much it's worth and add it to your available cash. Make the function general so that it will work with any given `price`, `buy` and `sell` vectors.
- You can only buy integer numbers of shares of stock (you can't buy 3.23 shares). You also can't buy more stock than you can afford (if the current price is \$100 and you have \$599 in cash, you can only buy 5 shares). When deciding how much you can buy, factor in the transaction cost (see next section) so that you don't go negative. When buying, always buy as many shares as you can, and when selling, sell all your shares.
- Each buy or sell transaction costs you \$12.95, make sure you include this in your program. If your initial investment is small, you may not be able to carry out all the buy and sell orders. It may also not make sense to sell at each specified time: for example if you bought 10 shares of stock and the price increases by \$1, it doesn't make sense to sell it since the transaction cost would eat up all your profit and cost you \$2.95 extra. However you can't make the decision of whether to buy or not since you don't know where the price is going to go (you can't look forward in time). You don't have to be super clever about deciding whether to sell or not, but you can if you're so inclined.
- After it's complete, run your program with various initial investments. Load `googlePrices.mat` into your workspace and then run the function using the `price`, `peaks`, and `lows` vectors. To check that you did it right, try an initial investment of \$100. This should give you an end value of \$100. Also try an initial investment of \$100000, which should result in a total value of about \$61,231,407 (with a \$100,000 initial investment, it turns out that you don't even have to decide whether it's a good idea to sell because the transaction cost becomes negligible compared to the number of shares you have).