Assignment 2: Loops

Due: Sep 15th, 2015 at 9:59 am

Question 1: Loops

You need two csv files for this question: *Dow.csv* and *SP500.csv*, they are the list of constituents of S&P500 and the list of Dow Jones. You need to find out the *index of each Dow company in S&P500 company list*. Don't make any change in the tables. You must choose a loop to finish this question.

For example, "AXP" is the first symbol in Dow, and it is 29th in the table of S&P500.

Output example:

```
"AXP--29"
"BA--70"
"CAT--88"
...
```

(hint: try to use *paste()* or *cat()* for outputs)

Question 2: User Defined Functions

Recall the coin flipping example in lecture 2. Now we are simulating a dice for n times. You need to create 2 **functions**:

- The first function takes number of rollings as the only argument and doesn't have return value. The dice is fair. Draw a graph like what we did during class, x is the number of iterations and y is the mean of all previous values. The curve should converge to 3.5.
- The second function have two arguments, the first one is number of rolls, the second is a vector of probabilities of each side of that dice. Apparently this vector has at least 5 elements. Depending on the second argument, this dice may or may not be fair. At the end of this function, you should return the mean of all rollings. Don't draw the graph at this time.

Question 3

This is a game about rolling a fair dice, the goal is to obtain the highest payoff. At each play, you can roll the dice twice. After the first rolling, you can choose not to roll again. The payoff will be the number of the dice of your LAST rolling.
For example, I got 3 in the first rolling, if my strategy tells me to stop, my payoff will be 3. If my strategy let me roll again and I got a 5, my payoff is then 5.

Please complete the following:

1. Come up with a strategy in order to get the largest expected value of your payoff. In your strategy, indicate under what situations you will or will not do the second rolling.
2. Calculate the mean of your payoff after many simulations. Create one function for the whole simulating process, take number of trials as the only argument, and return the payoff mean.

Note that you won't lose any credits for a non-optimal strategy, but you will lose major credits if your strategy is not correctly interpreted by your code.

Bonus Question

1. You will get 5% bonus if your propose the optimal strategy.(5%)
2. Mathematically calculate the expectation of your payoff based on your strategy.(10%)