

ASSIGNMENT 1

In this assignment, you will use a random number generator to simulate a game of craps and implement some simple machine learning strategies to automate your wager.

You can read more about the game of craps at <http://www.math.uah.edu/stat/games/Craps.html>. You will only be implementing the pass bet. Remember, in the pass bet, you win in two cases:

1. If on the first roll of dice, the sum is 7
2. After the first roll of dice, if the value of the first roll repeats before the number 7.

If you win, the winning amount is equal to the wager amount. For example, if you wager \$100, you win \$100.

You start off with a balance of \$1000 and play 10 games or until you run out of money. The wagering strategies will be as follows:

1. Even wager: On every roll, you wager \$100, irrespective of previous win or loss.

2. Martingale System: You can read about it https://en.wikipedia.org/wiki/Craps#Martingale_system. Basic idea is that if you win, in the next bet you wager \$100. If you lose, you double previous wager.

Note: If you don't have enough balance to double previous wager, then you should play with whatever is remaining. That is, if you have to wager \$800, but you only have \$600 available, then bet \$600.

Example:

Game #	Starting Balance	Wager	Outcome
1	1000	100	Loss
2	900	200	Loss
3	700	400	Win
4	1100	100	Win
5	1200	100	Loss
6	1100	200	Win
..

3. Reverse Martingale System: In this case, you double your wager in case of win and keep constant in case of loss.

Note: If you don't have enough balance to double previous wager, then you should play with whatever is remaining. That is, if you have to wager \$800, but you only have \$600 available, then bet \$600.

Game #	Starting Balance	Wager	Outcome
1	1000	100	Loss
2	900	100	Loss
3	800	100	Win
4	900	200	Win
5	1100	400	Win
6	1500	800	Loss
7	700	100	Loss

You have to implement these three simple algorithms and play 5 rounds with maximum 10 games each using the three strategies. To clarify, in round 1, you will play up to 10 games using strategy 1, 2, and 3 respectively.

Output the result to a text file in following format (no need for fancy tables, even tab or comma separated output is fine) :

Round 1:

Strategy	Number of games	Ending Balance
1	10	\$1500
2	10	\$2400
3	4	\$0

Round 2:

....

You can use R, Java, or Python for this. Include source code, output file, and a README file for compiling your code. In the README file, also include a short sentence explaining which strategy you think worked the best for you.