Homework 2: Due 10am on 22-Jan.

Consider the game explained in the class. You start with 5 dollars. At each time step, you can decide how much to bet. After you put your bet, a coin will be tossed. If the result of the coin toss is Head, you win the amount of money you bet. If the result of the coin toss is Tail, you lose the money you bet. The game ends once you have no money left or you have 10 or more dollars. Assume the probability of Head is 0.9. Your goal is to win the maximum total amount. Set $\gamma = 1$ as this is an episodic task.

Write matlab program to implement the policy evaluation algorithm, and compute $v_\pi(s)$ for the following policies:

- The aggressive policy, in which you always bet the maximum amount. For example, if you have 7 dollars, you bet 7 dollars. If you have 3 dollars, you bet 3 dollars.

- The conservative policy, in which you always bet 1 dollar no matter how much money you have.

- The random policy, in which you randomly pick an amount to bet with uniform distribution. For example, if you have 3 dollars left, you will randomly pick a number from $\{1, 2, 3\}$ to bet, each of which has probability 1/3. As another example, if you have 8 dollars, you will randomly pick a number from $\{1, 2, 3, \cdots, 8\}$ to bet, each of which has probability 1/8.

Submit your code and report. Follow the same instructions as in homework 1. In addition, please include the value functions you compute for each policy in your report.