The Experimental Report 1

The experimental Report 1 contains 3 parts:

- Basic 1 (30 points) : submitted the program in weeks 1 and 2 and it is done.
- Basic 2 (40 points) : a direct change of some program and figuring, will introduce next week.
- Advance (30 &+ 10 points) : the new games with Bayes' theorem

  Scoring criteria:

  - Correctly use the Bayesian rule to determined the strategy 1 for game 1
  - Explain the strategy 1 correctly and clearly
  - Use appropriate system to perform the testing of strategy 1
  - Correctly design the game 2, and correctly use the Bayesian rule to determined the strategy 2 for game 2, and use appropriate system to perform the testing of strategy 2. (+10 points)

The Experimental Report 1

- Advance (30 &+ 10 points) : the new game with Bayes' theorem

  You will now joint this game 1:

  - You will trade with one counterparty; your counterparty's action can be trust or betray
  - You have two strategies: trust and call police, and the return table is:

		A: Your counterparty	
		trust	betray
B: You	trust	A: +10; B: +10	A: +10; B: -10
	call police	A: +10; B: -10	A: -10; B: +10

  - Before trading, you will be given the following information:
    - Your counterparty's probability of betray follows uniform distribution in (0, 1)
    - You will be given the counterparty's previous 10 actions towards other persons, which is an 10*1 vector of {trust, betray}
    - The system and the default strategy will be given, but you are required to design your own strategy, and explain why you design your strategy like this
  - You will trade with this counterparty 100 times, and show your total return
  - You should estimate your counterparty's probability of betray, but, never directly look at your counterparty's actual probability of betray, otherwise, 0 point.

The Experimental Report 1

- Advance (30 &+ 10 points) : the new game with Bayes' theorem

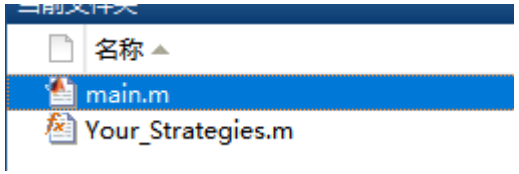
  Requirement for the testing of your strategy 1 for this game 1: (Score points)

  1. You should first submit the whole system with your strategy, and your system must be runnable (no error, warning accepted), otherwise, 0 point.
     - You can change your system for better testing or explanation of your strategy, but your counterparty's probability of betray must be a r.v with uniform distribution in (0, 1) in every independent run, which is, you should not set it as a constant, otherwise, 0 point.
  2. Explain the reason of your strategy, must related to probability. (Hint: see example 7, lesson 2)
  3. From a statistical point of view, how to design a system (which is, modify the default system) to evaluate your strategy? For example, you can evaluate your strategy with 1000 independent runs. Explain your modification of the default system, and explain your evaluation result of your strategy.

  30 points

The Experimental Report 1

- The system and the default strategy




```
clear;
clc;
warning off
% the above two commands clear all the previous record in the Memory
% counterparty action: 0 trust, others betray
% your action: 0 trust, others call police

N_trades = 100;                              % trade N_trades times
Return_total = 0;                            % the retrun
counterparty_betray_prob = rand(1);          % randomly initial the p
% note that it will last for the whole game
counterparty_previous_action_list = rand(10,1);
counterparty_previous_action = double(counterparty_betray_prob > counterparty_previous_act

for n_trade = 1 : N_trades                   % looping
    n_trade                                  % just to show the trade no for quick check
    Your_Strategy = Your_Strategies(counterparty_previous_action);
    % this time, you can pass anything you want into the 'Your_Strategies',
    % except the 'counterparty_betray_prob'
    % you can change the whole system as you wish
    counterparty_action = double(counterparty_betray_prob > rand(1));
    if Your_Strategy==0
        if counterparty_action==0
            Return_current = 10;   % both trust, add 10 points
        else
            Return_current = -10;  % self trust, counterparty betray, -10 points
        end
    else
        if counterparty_action==0
            Return current = -10;   % self call police, counterparty trust, -10 points
```

```
function Your_Strategy = Your_Strategies(counterparty_previous_action)
    % this is only a default strategy, it is not good
    Your_Strategy = double(0.5 > rand(1));
    % as the mean of the betray rate of your counterparty is 0.5, 50% trust
    % and 50% call police
end
```

The Experimental Report 1

- Advance (30 &+ 10 points) : the new game with Bayes' theorem

  You will now joint this game 2:

  - You will trade with one counterparty; your counterparty's action can be trust or betray
  - You have two strategies: trust and call police, and the return table is:

		A: Your counterparty	
		trust	betray
B: You	trust	A: +10; B: +10	A: +10; B: -10
	call police	A: +10; B: -10	A: -10; B: +10

  - Before trading, you will be given the following information:
    - Your counterparty's probability of betray follows uniform distribution in [0.4, 0.7]
    - You have 100 friends, and they had already trade with this counterparty 100 times independently, your friends will tell you how many times of 'betray' our of 100 this counterparty did in their trading
  - You will trade with this counterparty 1 time only, and show your return
  - You should estimate your counterparty's probability of betray, but, never directly look at your counterparty's actual probability of betray, otherwise, 0 point.

The Experimental Report 1

- Advance (30 &+ 10 points) : the new game with Bayes' theorem

  Requirement for the testing of your strategy 2 for this game 2: (Score points)

  1. You should first submit the whole system with your strategy, and your system must be runnable (no error, warning accepted), otherwise, 0 point.
     - You should design your testing system all by yourself, your counterparty's probability of betray must be a r.v with uniform distribution in [0.4, 0.7] in every independent run, which is, you should not set it as a constant, otherwise, 0 point.
  2. Explain the reason of your strategy, must related to probability. (Hint: see example 8, lesson 3)
  3. From a statistical point of view, how to design a system (which is, modify the default system) to evaluate your strategy? For example, you can evaluate your strategy with 10000 independent runs, record the total return, or record the action as 'success or fail'(but you should give the definition of success and fail). Explain your modification of the default system, and explain your evaluation result of your strategy.

  Extra 10 points