

CS 346U
Exploring Complexity in Science and Technology, Fall, 2009

Prisoner's Dilemma Lab

Due Wednesday, November 25.

In this lab you will experiment with various strategies for playing the Prisoner's Dilemma, and with different variations on the Prisoner's Dilemma game. You will be using the Netlogo "PD Two Person Iterated" model, which can be accessed via the File menu, under Models Library → Social Science → (unverified) → Prisoner's Dilemma → PD Two Person Iterated.

1. The Netlogo model lets you experiment with six different strategies: (a) "random", (b) "cooperate", (c) "defect", (d) "tit-for-tat", (e) "tit-for-two-tats", and (f) "unforgiving". Briefly explain how each of these strategies work.
2. Set the computer-strategy to "random" (i.e., randomly cooperate or defect). What are the approximate average scores of the human and the computer when the human-strategy is set to each of the six possible strategies? (Record the approximate average score for each after about 300 iterations.) Which is the overall best strategy for the human when the computer has strategy "random"? Why do you think this one gets the best results?
3. Propose a new strategy, different from the six listed above. Describe it in your report. Under the Procedures tab, modify the function "to custom-strategy" to implement your new strategy. Assign this custom strategy to the human, and test it against the computer playing each of the six other strategies (for each computer strategy, record the approximate average score for the human and the computer after about 300 iterations). Discuss why your custom strategy produced the results you got.
4. Propose a modified payoff matrix, different from the one given in the textbook, p. 14.3, and describe it in your report. Under the Procedures tab, implement your modified payoff matrix by changing the numbers in the "to get-payoff" function. Repeat step (2) with this new payoff matrix, recording the approximate average scores of human and computer after about 300 iterations. Discuss if, how, and why your modified payoff matrix changed the results from those you obtained in step (2).