

CS 346U: Exploring Complexity in Science and Technology

Week 9 Assignment

Due Monday, December 2

Assignments on “Models of Cooperation in Social Systems”

Videos and Online Test: No videos or on-line test on this topic. Instead there will be a short “take-home” test handed out on Wednesday.

Written assignments:

1. Explain, in your own words (in a paragraph) what the “paradox” of the Prisoner's Dilemma is, as discussed in Chapter 14, p. 214. Describe a real-life example of this paradox.
2. As described in Chapter 14, Axelrod proposed that the characteristics needed for a successful iterated Prisoner's Dilemma strategy are to be “nice, retaliatory, forgiving, and clear”. Explain (in one paragraph) why the TIT FOR TAT strategy has these four characteristics.
3. From your own experience, give an example of a “Social Norm” and an example of a “Meta-norm”, analogous to those discussed in Chapter 14. Answer in a paragraph or so: Do you think that the norm and / or meta-norm from your example have been effective in producing the desired social behavior?

Netlogo assignments:

In this part 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.

- (a) 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.
- (b) 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?

(c). Propose a new strategy, different from the six listed above. Describe it in your written 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.

(d). 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).

What to turn in: Email a pdf document to mm@cs.pdx.edu with a written report with your answers to the assignments above. You don’t need to turn in any NetLogo models this week.