

Name: _____

CS / SySc 346U Week 9: Cooperation in Social Systems

Take-Home Test

Due Monday, December 2

Instructions: You may use any books, course materials, websites, Netlogo models, calculators, etc. for this test. Just don't ask another person for the answers or share your answers with other people. Write your name and answers on this sheet.

1. Suppose Alice and Bob are playing the Prisoner's dilemma exactly once, and each has the goal to obtain as high a payoff as possible. Explain in one sentence why they should both defect.

For Questions 2-4: Suppose Alice and Bob play an iterated Prisoner's Dilemma (that is, play N repeated games against each other), using the payoff matrix given on p. 215 of the textbook.

2. Suppose Alice's strategy is "always defect" and Bob's strategy is "always defect". What will each player's average score be at the end of the N games?

3. Suppose Alice's strategy is "always cooperate" and Bob's strategy is "always cooperate". What will each player's average score be at the end of the N games?

4. Suppose Alice's strategy is "always defect" and Bob's strategy is "always cooperate". What will each player's average score be at the end of the N games?

5. Suppose Alice's strategy is "always defect" and Bob's strategy is "Tit For Tat". (Assume Tit For Tat always starts with a cooperation.) What will each player's average score be at the end of 10 games?

6. Suppose Alice's strategy is "always cooperate" and Bob's strategy is "Tit For Tat". (Assume Tit For Tat always starts with a cooperation.) What will each player's average score be at the end of 10 games?

7. Assume that both Alice and Bob can remember what the other did on the previous turn. As described in class, Alice's strategy for the Prisoner's dilemma can be represented like this:

Previous Turn		Current Turn (Alice)
Alice	Bob	
C	C	C
C	D	C
C	D	C
C	D	C

This is the "Always Cooperate" strategy for Alice. To write another strategy, the values in the "Current Turn" column must be changed. Write the "Tit for Tat" strategy in this form.

8. How many possible strategies are there when each player remembers only the previous turn?