<u>Assignment 3</u>

Questions from the textbook.

1. Chapter 3, Exercises 3.

Question 1. (from Osborne 5.3) Person 1 cares both about her income and person 2's income. Precisely, the value she attaches to each unit of her own income is the same as the value she attaches to any two units of person 2's income. For example, she is indifferent between a situation in which her income is 1 and person 2's income is 0, and one in which her income is 0 and person 2's income is 2. How do her preferences order the outcomes (1,4), (2,1), and (3,0), where the first component in each case is her income and the second component is person 2's income? Give a payoff function (i.e. a function of two variables: the income of person 1, and the income of person 2) consistent with these preferences.

Question 2. (from Osborne 27.1) Each of two players has two possible actions, *Quiet* and *Fink*; each action pair results in the players' receiving amounts of *money* as follows. If both players choose *Quiet* they each receive $2, if both choose *Fink* they each receive $1, and if they choose different actions the player choosing *Quiet* receives $0 and the other player receives $3. The players are not "selfish"; rather, the payoff to each player equals the amount of money she receives plus the amount of money the other player receives multiplied by the number α. For example, when both player choose *Quiet*, player 1's payoff is given by $2 + 2\alpha$.

1. Formulate a strategic game that models this situation in the case $\alpha = 1$. Is this game a *Prisoner's Dilemma* (i.e. a game where both player have a strictly dominated strategy and each player choosing his not-dominated strategy leads to a Pareto dominated outcome)?

2. Find the range of values of α for which the resulting game is the *Prisoner's Dilemma*.

Question 3. (from Osborne 27.2) Two people enter a bus. Two adjacent cramped seats are free. Each person must decide whether to sit or stand. Sitting alone is more comfortable than sitting next to the other person, which is more comfortable than standing.

1. Suppose that each person cares only about her own comfort. Model this situation as a strategic game. Is there any dominated strategy? Is this game the Prisoner's Dilemma?

2. Suppose that each person is altruistic, ranking the outcome according to the *other* person's comfort, but, out of politeness, prefers to stand than to sit if the other person stands. Model this situation as a strategic game. Is this game the *Prisoner's Dilemma*?

3. Compare the people's comfort in the two games when both players are rational (i.e. they do not choose dominated actions.)

Question 4. Give an example of a strategic game with two players such that:

1. one player has a strictly dominated action; **and**

2. one player has a weakly dominated and no strictly dominated action.