HOMEWORK 6: Game Theory- Sequential and Simultaneous Games

Due: Monday, March 31st, 2014

LEARNING OBJECTIVE

- Analysis of sequential games provides information about when it is to a player's advantage to move first and when it is better to move second.
- When a player in a simultaneous move game chooses her action, she does so without any knowledge of the choices made by other players (many familiar strategic interactions can be described as simultaneous-move games).

INSTRUCTIONS

Carefully read the questions before answering. Make sure your pages are in order and stapled together. Your work should be clear and easy to follow. When prompted, make sure that you have explained your answers completely.

QUESTION

1. (15 points) There are two distinct proposals, A and B, being debated in Washington. The Congress likes proposal A, and the President likes proposal B. The proposals are not mutually exclusive; either or both or neither may become law. Thus there are four possible outcomes, and the rankings of the two sides are as follows, where a larger number represents a more favored outcome.

Outcome	Congress	President
A becomes law	4	1
B becomes law	1	4
Both A and B become law	3	3
Neither (status quo prevails)	2	2

a. The moves in the game are as follows. First, the Congress decides whether to pass a bill and whether it is to contain A or B or both. Then the President decides whether to sign or veto the bill. Congress does not have enough votes to override a veto. Draw a tree for this game and find the rollback equilibrium.
b. Now suppose the rules of the game are changed in only one respect: the President is given the extra power of a line-item veto. Thus, if the Congress passes a bill containing both A and B, the President may choose not only to sign or veto the bill as a whole, but also to veto just one of two items. Show the new tree and find the rollback equilibrium.
c. Explain intuitively why the difference between the two equilibrium arises.

2. (15 points) Let's return to Emily, Nina, and Talia, our three players in a public good problem. Initially, we had them play a sequential version of the public good game in

which there are four distinguishable outcomes. For each player, the four outcomes are:

i. Player does not contribute, both of the others do (pleasant public good, saves cost of own contribution)
ii. Player contributes, and one or both of the others do (pleasant public good, incurs cost of own contribution)
iii. Player does not contribute, only one or neither of the others does (sparse public good, saves cost of own contribution)
iv. Player contributes, but neither of the others does (sparse garden, incurs cost of own contribution)

Of them, outcome i. is the best (payoff 4) and outcome iv is the worst (payoff 1). If each player regards a pleasant public good more highly than her own contribution, then outcome ii gets payoff 3 and outcome iii gets payoff 2.

a. Suppose that the ladies play this game simultaneously, deciding whether to contribute to the street garden without knowing what choices the others will make. Draw the three-player game table for this version of the game.
b. Find all of the Nash equilibrium in this game.
c. How might this simultaneous version of the public good game be played out in reality?

3. (5 points) Question 1.6 from Rasmusen, 4th edition.

4. (5 points) Question 1.7 from Rasmusen, 4th edition.