**Problem Set #6**

As usual, you are encouraged to discuss all problems with other members of your group, and other class members. Please turn in **your own individual writeup** of problems in Parts I and II. For Part III, please turn in only **one copy for the entire group**, with all members’ names written down.

Due in class Tuesday November 17.

**Part I. Problems.**

1. Athos, Bathos and Cathos currently live in Paris and are considering moving to London or Madrid. Inseparable friends, they each would get a payoff of 0 if they lived in different cities, but even when they all live in the same city they have different payoffs. They all know (as common knowledge) that A’s payoffs are 2 in Paris, 3 in London and 5 in Madrid; B’s are 3 in Paris, 5 in London and 2 in Madrid; and C’s are x in Paris, 2 in London and 3 in Madrid. The others are a bit unsure of C’s love of Paris and regard x=4 and x=6 as equally likely. C knows that x=6.

a. What does the parenthetical note on common knowledge tell you?

b. Suppose A proposes a single alternative city and they decide by majority rule. Draw and solve the extensive form game. Hint: first do it assuming that x=6 is common knowledge. Then do it in the more complicated situation described.

c. Suppose that, having followed the solution of the extensive form game they find themselves in another city. The least happy member then gets to propose an alternative city. What will the equilibrium outcome be for this new game?

d. Imagine an infinitely repeated game in which each period one of the friends gets to propose a move to a different city and they choose by majority rule. What can you say about the equilibria of such a game?

e. What is the efficient outcome? What sort of signal might make it possible to achieve that outcome?

2. Abe is thinking of asking Beth out on a date, but doesn’t know whether she likes him. If she does like him, then the payoffs are (uA, uB) = (2, 2) if she says no to an invitation and are (10, 7) if she says yes. If she does not like him, then the payoffs are (uA, uB) = (2, 3) if she says no and are (8, 1) if she says yes. If Abe doesn’t invite her, the payoffs are (uA, uB) = (3,4). Abe thinks that the probability Beth likes him is p=0.25.

1. Draw the EFG for this strategic situation. (4 pts)
2. Find all subgames of this EFG. (2 pts)
3. Find a (Bayesian) NE that is subgame perfect. (6 pts)
4. For what range of beliefs p will Abe make the same choice in (B)NE? (4 pts)

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| --- | --- | --- |
|  | H:p | D:1-p |
| H | (v-c)/2 | v |
| D | 0 | v/2 |

3. First verify that p\* = v/c is the unique NE mixture for the Hawk-Dove game shown, where 0<v<c. Recall (from the 11/12 guest lecture or from Harrington Ch 16) the definition of ESS, and then determine whether p\* satisfies the definition. If it helps, you may assume that v=4 and c=6.

**Part II. Problems from Harrington.**

Look at all chapter-end exercises of Ch 9-11 of your textbook, and write out your solutions to the following.

Chapter 9: #3

Chapter 10: #1, 3 [extra credit: 7].

Chapter 11: #5.

**Part III. Team Games.**

Turn in a rough draft of your term paper, after reviewing the guidelines posted on the class website.