Written Exam for the B.Sc. or M.Sc. in Economics summer 2013

Microeconomics C

Final Exam

June 6, 2013

(2-hour closed book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

This exam question consists of 4 pages in total including this page.

Please read the questions carefully and answer all questions. Please explain your answers.

1. Consider this game G:

	L	M	R
T	$7,6$	$3,5$	$3,8$
M	$5,9$	$6,0$	$2,1$
B	$8,2$	$2,1$	$0,0$

   (a) Eliminate all strictly dominated strategies. Explain each step briefly.

   (b) In the remaining game, find all Nash Equilibria (pure and mixed).

   (c) Imagine that G (the original game) is repeated twice. Write down one pure-strategy Subgame Perfect Nash Equilibrium of this repeated game $G(2)$.

2. Three people are bargaining over how to share 12 cookies. Each individual's utility is the number of cookies she gets. If they fail to reach an agreement, no one will get anything. Do the following distributions violate any of the Nash bargaining axioms? If yes, which?

   (a) $(3, 3, 3)$

   (b) $(2, 5, 5)$

3. Two farmers (A and B) are working on the same piece of land. The harvest from the field is

$$H(w_A, w_B) = w_A + w_B$$

   where w_i is the work that farmer i puts into the field.

   The costs of work for the two farmers are

$$c_A(w_A) = \frac{(w_A)^2}{2}$$

$$c_B(w_B) = (w_B)^2$$

   (note that these are cost functions, not marginal cost). After the harvest, farmer A will get two thirds of the harvest, while farmer B will get one third, so that their profits are

$$\pi_A(w_A, w_B) = \frac{2}{3}H(w_A, w_B) - c_A(w_A)$$

$$\pi_B(w_A, w_B) = \frac{1}{3}H(w_A, w_B) - c_B(w_B).$$

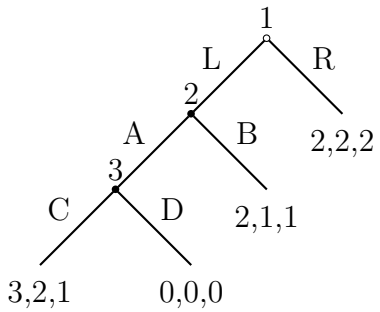
(a) Suppose the two farmers choose simultaneously and independently how much work to put into the field. Find the Nash Equilibrium of this game.

(b) Now find the values of w_A and w_B that maximize the total profit of the two farmers. Show that if the farmers choose these amounts of work, the sum of their profits is larger than in the Nash Equilibrium.

(c) Why is the total profit in (b) larger than in the Nash Equilibrium from (a)? Explain briefly (2-3 sentences).

(d) Suppose that the farmers work on the same field every year, so that the game is repeated over an inifinite time horizon $t = 1, 2, \ldots, \infty$. The farmers discount future gains by the discount factor $\delta \in (0, 1)$, and they maximize expected payoffs. In this infinitely repeated game, is there a Subgame Perfect Nash Equilibrium in which the farmers choose the work amounts from (b) in every round? Explain your answer briefly (3-5 sentences).

4. Consider this game:



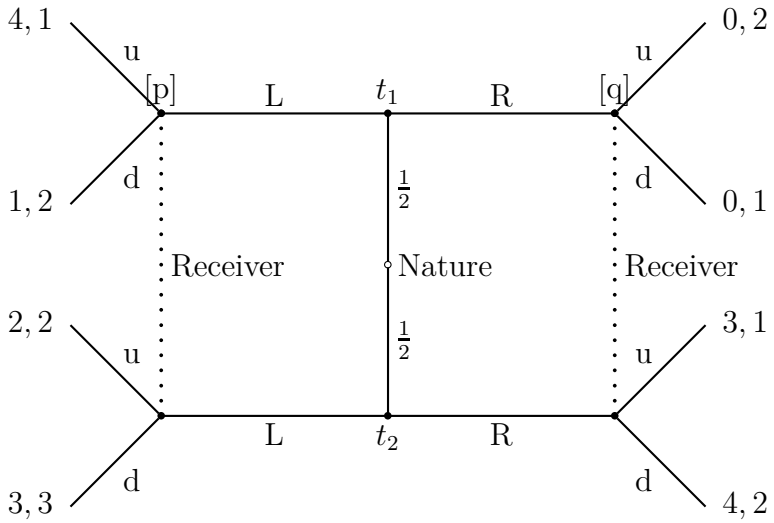
(a) Is it a game of perfect or imperfect information? What are the strategy sets of the players?

(b) What is the backward-induction outcome? What is the Subgame-Perfect Nash Equilibrium?

(c) Write the game in payoff-matrix form (hint: you have to write two matrices). Find all Nash Equilibria that are not subgame-perfect.

(d) Choose one of the equilibria you found in (c). Why is it not subgame-perfect? Explain briefly (2-3 sentences).

5. Consider the following signaling game:



(a) Find a separating Perfect Bayesian Equilibrium.

(b) Find the pooling Perfect Bayesian Equilibrium in which both types send the message L. Does it satisfy signaling requirement 5? Explain briefly (2-3 sentences).