

Written Exam for the B.Sc. in Economics winter 2014-15

Microeconomics C

Final Exam

Date: 18 February 2015

(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 3 pages in total

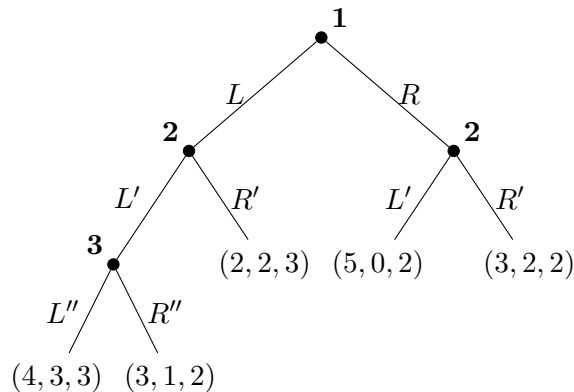
PLEASE ANSWER ALL QUESTIONS.
PLEASE EXPLAIN YOUR ANSWERS.

1. **Nash Equilibrium and Subgame-perfect Nash Equilibrium.**

- (a) Denote the normal-form game below by G . Solve G by iterated elimination of strictly dominated strategies. Explain briefly each step (1 sentence).

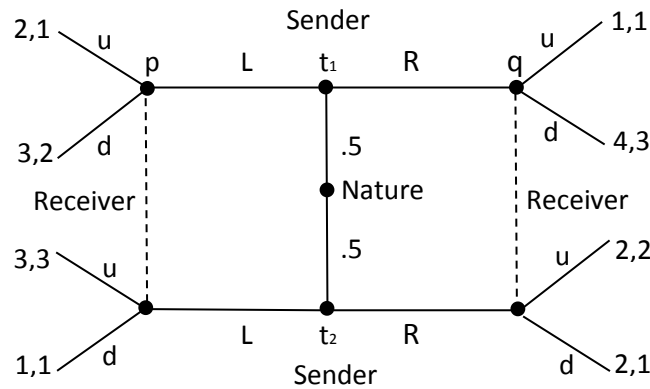
		Player 2		
		t_1	t_2	t_3
Player 1	s_1	2, 4	3, 5	1, 3
	s_2	3, 3	6, 1	3, 2
	s_3	4, 2	2, 1	4, 0
	s_4	1, 4	4, 4	2, 5

- (b) Suppose we repeat G twice. Denote the resulting game by $G(2)$. Find the set of Subgame-perfect Nash Equilibria of $G(2)$. Be careful to write out the equilibrium strategies. (*Hint*: No new calculations are required.)
- (c) Consider the extensive-form game given by the following game tree (the first payoff is that of player 1, the second payoff that of player 2, etc.):



- i. Is this a game of perfect or imperfect information? How many proper subgames are there (excluding the game itself)? What are the strategy sets of the three players?
 - ii. Find all (pure strategy) Subgame-perfect Nash Equilibria.
 - iii. Is the strategy profile $(R, R'R', R'')$ a Nash Equilibrium? Discuss briefly (max. 3 sentences).
- (d) Consider again the game in (c), but suppose now that player 2 does not observe the move of player 1.
- i. Draw the resulting game tree.
 - ii. Is this a game of perfect or imperfect information? How many proper subgames are there (excluding the game itself)? What are the strategy sets of the three players?
 - iii. Find all (pure strategy) Subgame-perfect Nash Equilibria. Discuss briefly (max. 3 sentences).

2. **Signaling.** Consider the following signaling game.



- (a) Find all the (pure strategy) separating Perfect Bayesian Equilibria (PBE).
 - (b) Find the (pure strategy) pooling equilibrium in which both types send message L . Does it satisfy signaling requirement 5 (SR5)? Does it satisfy signaling requirement 6 (SR6)? Explain briefly (2-3 sentences).
 - (c) Suppose you are a used-cars salesman and you want to prove that your cars are of high quality (quality is unobserved by customers, but known by you).
 - i. Give an example of a signal that is not credible and explain briefly (1 sentence) why it is not credible.
 - ii. Give an example of a signal that is credible and explain briefly (1 sentence) why it is credible.
3. **Nash bargaining.** Suppose two friends, Anne and Peter, have bought a piece of land of size 10 with the idea of building each of them a summerhouse on the land. They bargain over how much land each of them should get. Peter's utility from getting x_P units of land is:

$$u_P(x_P) = x_P.$$

Anne, on the other hand, has the following utility from getting x_A units of land:

$$u_A(x_A) = 3x_A.$$

If they cannot reach an agreement, they don't get to build their summerhouse, so $x_A = x_P = 0$.

- (a) Represent the situation as a bargaining problem, i.e. draw the sets X and U , and mark the disagreement points. Describe the Pareto efficient allocations.
- (b) Determine the Nash bargaining solution of the game. What are the allocations of land to Anne and Peter?
- (c) Assume now that the dictatorial president of the summerhouse community decides that in case of dispute, the summerhouse community will take 40% of the land and use it for building communal parks. The remaining 60% is for Anne and Peter, but the president has decided that Anne should get twice as much as Peter, because she has a larger family. What is the new disagreement point? What is the Nash bargaining solution of the new game? What are the allocations? Briefly explain the difference to (b) (max. 3 sentences).