

Multi-Agent Systems

Vakcode : INFOMAS Date : 30 January 2013 Tijd : 9:00-12:00

There are four questions resulting in 10 points in total. Each question can have 2.5 points.

Question 1

- (a) Give a 2×2 strategic normal-form game which has one Nash equilibrium that is not a Pareto efficient outcome.
- (b) Consider the following game with players A and B in which the outcome $50 \setminus 30$ indicates that the A 's payoff is 50 and the B 's payoff is 30.

$A \setminus B$	α	β
α	$50 \setminus 30$	$5 \setminus 20$
β	$30 \setminus 10$	$10 \setminus 40$

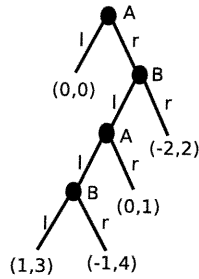
Determine the pure & mixed strategy equilibria of this game. What are the (expected) utility of players A and B for these strategy equilibria?

- (c) Would the declaration to play β by player A be a self-committed utterance? Would it be a self-revealing utterance?

Question 2

- (a) Describe the Dutch auction in terms of bidding, clearing, and information rules?
- (b) Does the bidders in the first price sealed auction have a dominant strategy? If yes, which strategy? If no, motivate your answer.
- (c) Is there any equilibria in the first price sealed auction? If yes, which one?

Question 3 Consider the following extensive game with players A and B . The outcome (X, Y) indicates that the payoff of player A is X and the payoff of player B is Y .



- Which decision should the rational player A make at the root node? Provide an informal proof that explains the choice?
- What are the subgame-perfect Nash equilibria of this extensive game.
- Suppose player B has imperfect information and cannot distinguish between its two choice nodes. Answer the above questions (i.e., parts (a) and (b)) for this imperfect information game.

Question 4 Consider the following voting scenario.

130	120	100	150
a	d	d	c
b	b	b	b
c	c	a	a
d	a	c	d

- Give the winners according to the plurality, majority, Condorcet, and Borda voting systems.
 - Which candidate is the winner according to the method of Plurality with Elimination?
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- Investigate whether different comparison orders of the candidates result in different winners using the pairwise elimination method.
 - Are these preferences single-peaked? Explain your answer.