Multi-Agent Systems

Vakcode : INFOMAS Date : 3 February 2010 Tijd : 14:00-17:00

There are five questions resulting in 10 points in total. Each question can have 2 points.

Question 1

- Give three 2 × 2 strategic normal-form games which have zero, one, and two Nash equilibria, respectively. The Nash equilibria should not be the product of dominant strategies.
- Consider the following game in which two players (a and b) wish to go to either a Bach or a Stravinsky concert.

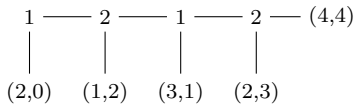
a\b	Bach	Stravinsky
Bach	2 \ 1	0 \ 0
Stravinsky	0 \ 0	1 \ 2

  Suppose player b does not want to make a choice (i.e., b selects randomly). Which mixed strategy should player a play in order to guarantee a Nash equilibrium? What is the expected utility of players a and b for this mixed strategy Nash Equilibrium?

Question 2

- Describe the Vickrey auction in terms of bidding, clearing, and information rules?
- What is the dominant strategy of each bidder in the Vickrey auction? Prove informally that this strategy is the dominant strategy.

Question 3 Consider the following two players (players 1 and 2) extensive game.



- Transform this extensive game to a normal-form strategic game.
- Determine the Subgame-perfect Nash equilibria of this game.
- Transform the Bach-Stravinsky normal-form game from question 1 to an equivalent extensive game.
- Let players in the Bach-Stravinsky game declare to play Bach. Would these utterances be self-commitment and self-revealing? Explain why.

Question 4 Consider the following voting scenario.

3	4	3	5
c	b	b	a
b	c	a	b
a	a	d	c
d	d	c	d

- Give the winners according to the plurality, majority, Condorcet, and Borda voting systems.
- Show if these preferences are single-peaked? Which candidate is the winner of the median voting rule?

Question 5 Design a mechanism with two alternatives and two players that implements a social choice function in Nash equilibria.