Introduction to Multi-Agent-Programming

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Exercise Sheet 13

Due: Febuary 8th, 2011

Exercise 13.1 (Nash-Equilibria in Mixed Extensions (2pt, written))

Consider the zero-sum game of Rock-Paper-Scissors-Well as a variant of Rock-Paper-Scissors. Two players make a hand gesture displaying a rock, a paper, scissors, or a well at the same time. If they show the same gesture nobody wins, otherwise rock beats scissors, scissors beat paper, and paper beats rock. The well beats scissors and rock, while paper beats the well.

(a) Formulate the game as a strategic game $G = (N, A, u_i)$. You can give the utility function in matrix-form.

(b) Do Nash-Equilibria in pure strategies exist? How about mixed-strategies and why?

(c) Calculate the Nash-Equilibria in mixed strategies or show that none exist.

Exercise 13.2 (Voting (1pt, written))

There are two alternative drinks for a party, wine or beer. 66 participants voted for the drinks. The results was calculated according to Borda protocol, in which the preferred drink gets 2 points, the other gets 1 point. Consequently, wine gets 94 points; beer gets 104 points. What are the results if the voting is counted by binary and plurality protocols? Why?

Exercise 13.3 (Game+voting (2pt, written))

This is an example of the exam

Consider a two–player strategy game with payoff function in the following matrix–form:

	j_defects	j_cooperates
i_defects	2,2	4,1
i_cooperates	1,4	3,3

(a) What are the action profiles of this game?

(b) Is there any pure strategy Nash equilibrium? Explain your answer.

(c) As you may already noticed, this game is just one example of "prisoner's dilemma". Explain, via the given game, why it is a "dilemma".

(d) Formulate the game as a voting consists of two voters. Define reasonable alternatives and provide preference relation over alternatives for each voter.