Exercises for Algorithmic Game Theory

http://www.mpi-inf.mpg.de/departments/d1/teaching/ss11/AGT/

Assignment 1 Deadline: Fr 15.4.2011

Exercise 1 Variations on the Prisoner’s Dilemma

a) Let the costs in the case where both players confess be 4 and $a$ ($P_2$ gets $a$ instead of 4). Determine the Nash equilibria of this game for all $a \in \mathbb{R}^+$. 

b) Suppose both players receive $b$ in case they are both silent (all other costs are as in the standard prisoner’s dilemma). Determine the Nash equilibria of this game for all $b \in \mathbb{R}^+$. 

Exercise 2 Calculating Nash equilibria

Give a finite (not necessarily polynomial-time) algorithm for finding the Nash equilibria for a two-player game (in matrix form).

Exercise 3 Number of Nash equilibria in a game

Give a 2-player game (in matrix form) where player 1 has 5 strategies, player 2 has 7 strategies, and there are 23 Nash equilibria.

Exercise 4 Matching pennies

Give a mixed Nash equilibrium for the matching pennies game. Prove that it is the only Nash equilibrium. (What happens if player 1 deviates from the strategy suggested by it?)