

Algorithmic game theory — Homework 3¹

CCE and mechanism design

assigned 2.12.2021, deadline 16.12.2021

Homework 1. Let $G = (P = \{1, 2\}, A, u)$ be a normal-form game of two players with $A_1 = \{a, b, c\}$ and $A_2 = \{d, e, f\}$ and with the utility function from Table 1.

	d	e	f
a	(1,1)	(-1,-1)	(0,0)
b	(-1,-1)	(1,1)	(0,0)
c	(0,0)	(0,0)	(-1.1,-1.1)

Tabulka 1: Thee game from Exercise 1.

Show that the probability distribution p on A with $p(a, d) = p(b, e) = p(c, f) = 1/3$ is a coarse correlated equilibrium in G (CCE), but it is not a correlated equilibrium in G (CE). [2]

Homework 2. Consider a single-item auction with at least three bidders. Prove that selling the item to the highest bidder at a price equal to the third-highest bid, yields an auction that is not dominant-strategy incentive compatible (DSIC). [2]

Homework 3. Assume there are k identical items and $n > k$ bidders. Also assume that each bidder can receive at most one item. What is the analog of the second-price auction? Prove that your auction is DSIC. [3]

¹Information about the course can be found at <http://kam.mff.cuni.cz/~balko/>