Game Theory WS 2013/2014

1. Exercise Sheet

1. William and Henry are participants in a televised game show, seated in separate booths with no possibility of communicating with each other. Each one of them is asked to submit, in a sealed envelope, one of the following two requests that are guaranteed to be honored:

   (a) Give me 1000 $.

   (b) Give the other participant 4000 $.

   Describe the situation as a strategic form game. What will the players do and why?

2. Consider the strategic form game that appears in the following table.

		Player II		
		L	C	R
	T	1,2	2,3	0,3
Player I	M	2,2	2,1	3,2
	B	2,1	0,0	1,0

   Verify that in this game there are (at least) three strategy elimnination procedures, each leading to a different result.

3. Prove that the result of iterated elimination of strictly dominated strategies (that is the set of strategies remaining after the elimination process has been completed) is independent of the order of elimination. Deduce that if the result of the elimination process is a single vector s^*, then the same vector will be obtained under every possible order of the elimination of strictly dominated strategies.

4. Find all rational strategy vectors in the following games.

		Player II			
		a	b	c	d
	α	6,2	6,3	7,6	2,8
Player I	β	8,5	6,9	4,6	4,7

		Player II			
		a	b	c	d
	α	3,7	0,13	4,5	5,3
Player I	β	5,3	4,5	4,5	3,7
	γ	4,5	3,7	4,5	5,3
	δ	4,5	4,5	4,5	4,5

5. A Nash equilibrium s^* is called strict, if every deviation undertaken by a player yields a definite loss for that player, i.e., $u_i(s^*) > u_i(s_i, s^*_{-i})$ for each player $i \in N$ and each strategy $s_i \in S_i \setminus \{s^*_i\}$.

   (a) Prove that if the process of iterated elimination of strictly dominated strategies results in a unique strategy vector s^*, then s^* is a strict Nash equilibrium and it is the only Nash equilibrium of the game.

   (b) Prove that if $s^* = (s^*_i)_{i=1}^n$ is a strict Nash equilibrium, then none of the strategies s^*_i can be eliminated by iterative elimination of dominated strategies (under either strict or weak domination).