VSE - Introduction to Game Theory
Problem set #1 - Due Wednesday, October 21, 2015

Teamwork is an important part of this course. Therefore, please **work in groups of up to 4 students.** Each student can only be in one group. Each group submits **one copy** of problem set with the names of all members.

Homework can be delivered: (1) by email or (2) personally during the lecture or office hours.

No late submissions will be accepted.

Problem 1 [22 points]: Consider Pat and Mat playing the paintball. Pat runs out of paint balls and Mat is aiming at him to shoot. Mat knows that Pat will try to escape and so he is deciding to shoot a little bit to the right or to the left (he knows that Pat will not stay still for sure). Pat can try to move to the left or to the right to escape the ball. Given the close distance and the speed of the ball, they have to choose an action simultaneously. If Pat guesses where Mat shoots correctly and avoids the ball, Pat wins the game. If Pat guesses incorrectly and Mat is shooting to the right, Mat has chance of 80% to hit Pat and win the game. If Pat guesses incorrectly and Mat is shooting to the left, Mat has chance of 40% to hit Pat and win the game.

    (a) Find normal form of this game.
    (b) Find all pure strategy Nash equilibria of this game.
    (c) Find mixed strategy Nash equilibrium of this game.

Problem 2 [30 points]: Find all the mixed strategy Nash equilibria of the strategic games below. Sketch best response functions of both players and NE on the graph.

[a]

1 \ 2	L	R
T	6,0	0,6
B	3,2	6,0

[b]

1 \ 2	L	R
T	0,2	0,4
B	4,4	0,2

Problem 3 [24 points]: Go to the link below and watch the movie extract. Model this situation with help of game theory, i.e. describe players, their actions, action profiles and payoffs. Find all pure strategy Nash equilibria in this game.

https://www.youtube.com/watch?v=U_eZmEiyTo0

Problem 4 [24 points]: Find strictly dominated strategies using also mixed strategies and use iterative elimination of strictly dominated strategies to simplify the following game as much as possible.

1 \ 2	A	B	C
D	1,2	2,4	4,1
E	3,3	2,2	1.5,1
F	4,3	4,2	1,4