Definitions:

- A *fully mixed strategy* for player i is a mixed strategy that assigns positive probability to each action in A_i.

- A *fully mixed strategy profile* is formed by a fully mixed strategy for each player.

3   Mixed Nash equilibrium

3.1. Consider the following strategic game:

Player 2

		R	S	T
Player 1	A	6,6	2,7	2,6
	B	7,2	3,4	0,0

Determine whether the strategy profile

$$(0.6, 0.4), (0.2, 0.4, 0.4)$$

is a Nash equilibrium.

3.2. Players 1 and 2 each chose a positive integer up to K. If the players choose the same number, then player 2 pays 1€to player 1 otherwise no payment is done. Each player utility is their corresponding monetary payoff.

  (a) Show that this game has a mixed NE in which each player chooses each positive integer up to K with probability $1/K$.

  (b) Show that the game has no other mixed NE.

3.3. Consider the two player's game described by the following bi-matrix.

Player 2

		A	B
	C	1,1	4,2
Player 1	D	3,3	1,1
	E	2,2	2,3

Find all the NE for the game having a fully mixed strategy profile or show that such Nash equilibria do not exists.

3.4. Compute all the Nash equilibria (pure and mixed) of the following game:

Player 2

		A	B
Player 1	A	6,6	2,7
	B	7,2	0,0

3.5. Consider the Cover game (game 1.6). Is a fully mixed strategy profile a NE?

3.6. Given the zero sum game described by the following matrix:

$$A = \begin{pmatrix} 3 & 6 & 5 \\ 5 & 2 & 4 \\ 1 & 0 & 3 \end{pmatrix}$$

find the value of the game and a NE for it.

3.7. Two friends play the following game: both players have a sheet of paper. One paper contains the number 7 in red on one side and 3 in black on the other side, the other one 6 in red and 4 in black. They must show at the same time one side of the paper: if the two colors agree the player having 7 and 3 wins the number written in other player's paper. The opposite if the colors disagree. What sheet of paper would you like to have?