

Economics 316

Fall 2017

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Problem Set 4

1. Find all the mixed strategy Nash equilibria of the games in Figure 1.

	<i>L</i>	<i>R</i>
<i>T</i>	2, 1	0, 1
<i>B</i>	2, 0	1, 2

	<i>L</i>	<i>R</i>
<i>T</i>	2, 2	0, 1
<i>B</i>	1, 0	2, 0

Figure 1. The games for problem 1.

2. Find two mixed strategy Nash equilibria of the game in Figure 2 (which I talked about a bit in class).

	<i>L</i>	<i>R</i>
<i>T</i>	1, 0	0, 4
<i>B</i>	0, 1	2, 0
<i>X</i>	1, 0	1, 0

Figure 2. The game in Problem 2.

3. (a) Find all the mixed strategy Nash equilibria of the game in the left panel of Figure 3.
- (b) Find a mixed strategy Nash equilibrium of the game in the right panel of Figure 3 in which neither player's strategy is pure. (Notice the similarity of this game and the game in the left panel. Note that you are not asked to find *all* equilibrium of the game.)

	<i>B</i>	<i>S</i>
<i>B</i>	6, 2	0, 0
<i>S</i>	0, 0	3, 4

	<i>B</i>	<i>S</i>
<i>B</i>	6, 2	0, 0
<i>S</i>	0, 0	3, 4
<i>X</i>	1, 0	1, 6

Figure 3. The games in Problem 3.

4. For each of the games in Figure 4 check whether the indicated strategy pair is a mixed strategy Nash equilibrium.

		$\frac{1}{4}$ L	$\frac{3}{4}$ C	0 R
0	T	3, 2	0, 4	2, 1
$\frac{1}{2}$	M	4, 6	1, 3	4, 2
$\frac{1}{2}$	B	1, 0	2, 3	3, 4

		$\frac{1}{3}$ L	0 C	$\frac{2}{3}$ R
$\frac{1}{3}$	T	5, 2	0, 3	2, 4
$\frac{1}{3}$	M	1, 1	4, 2	4, 1
$\frac{1}{3}$	B	7, 3	2, 2	1, 1

Figure 4. The games in Problem 4.

5. Each of two players simultaneously announces either *Rock*, or *Paper*, or *Scissors*. *Paper* beats (wraps) *Rock*, *Rock* beats (blunts) *Scissors*, and *Scissors* beats (cuts) *Paper*. The player who names the winning object receives \$1 from her opponent; if both players make the same choice, then no payment is made. Each player's preferences are represented by the expected amount of money she receives. (For amusement, you can watch <http://www.youtube.com/watch?v=O2JUUFFdWpk> and <http://www.youtube.com/watch?v=yuEZEyDdmvQ>.)
- Formulate this situation as a strategic game.
 - Find a mixed strategy Nash equilibrium of the game. (Guess the nature of an equilibrium, then verify that your guess is correct.)
 - Find all the mixed strategy Nash equilibria of the modified game in which player 1 is prohibited from announcing *Scissors*.