

General Game Playing

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Exercise 7.1

		Player 2			
		<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>
Player 1	<i>x</i>	2	2	3	4
	<i>y</i>	5	5	1	2
	<i>z</i>	3	4	0	5

- Are there strictly or weakly dominated strategies?
- Find the pure strategy nash equilibria!

Exercise 7.2

		Player 2		
		<i>a</i>	<i>b</i>	<i>c</i>
Player 1	<i>x</i>	0	3	1
	<i>y</i>	2	0	3
	<i>z</i>	1	2	0

- Find the pure strategy nash equilibria!
- Is the following combination of strategies a mixed strategy equilibrium?
 Player 1: $(\frac{1}{10}, \frac{2}{5}, \frac{1}{2})$, Player 2: $(\frac{1}{3}, \frac{1}{9}, \frac{5}{9})$

Exercise 7.3

In the following three-player game, player 1 has strategies *t* and *b* (top and bottom row), player 2 has strategies *l* and *r* (left and right column in each matrix), and player 3 has strategies *L* and *R* (left and right matrix). The payoffs in each cell are given in the order of the players.

		Player 2				Player 2	
		<i>l</i>	<i>r</i>			<i>l</i>	<i>r</i>
Player 1	<i>t</i>	3, 4, 4	1, 3, 3	Player 1	<i>t</i>	4, 0, 5	0, 1, 6
	<i>b</i>	8, 1, 4	2, 0, 6		<i>b</i>	5, 1, 3	1, 2, 5
Player 3: <i>L</i>				Player 3: <i>R</i>			

Apply iterated elimination of strictly dominated strategies to this game. What are the Nash equilibria?

Exercise 7.4 (optional)

On a beach there are several ice-cream vendors competing for customers. Since they all sell the same brand the price of the ice-cream is fixed and the customers just go to the nearest ice-cream stall. For simplicity, consider the beach to be one-dimensional and of limited length l . The number of ice-cream vendors is n . If two or more vendors are at the same position, customers are evenly distributed among them. A strategy for each ice-cream vendor is to choose a position on the beach, that means a real number between 0 and l .

- a) Find a pure nash equilibrium for $n = 2$!
- b) Find a pure nash equilibrium for $n = 4$!