

Operations Research 2  
Tutorial Sheet 1

1. Consider the following game. Player 1 moves first and can take action A or B. Player 2 observes the action of Player 1 and independently of the action of Player 1 can take action A or B. Once the players have chosen their actions a die is thrown. If the result of the die roll is 4 or less the payoffs obtained by the players are given by

	A	B
A	(2,1)	(1,3)
B	(0,4)	(3,0)

If the result of the die roll is 5 or more the payoffs obtained by the players are given by

	A	B
A	(0,8)	(6,0)
B	(5,2)	(2,6)

- i) Draw the tree depicting the extensive form of the game.
- ii) Solve the game using recursion.
- iii) Give the matrix form of the game.

2. Consider the following matrix game

	A	B
A	(5,5)	(1,3)
B	(0,2)	(2,3)

- i) Find the minimax solution of this game.
- ii) Derive all the Nash equilibria and values of this game.

3. i) By removing all strategies which are dominated by pure or mixed strategies, derive the reduced version of the following matrix game.

	D	E	F	G
A	(3,5)	(4,1)	(2,5)	(1,3)
B	(4,2)	(6,3)	(3,5)	(2,4)
C	(5,4)	(3,6)	(4,3)	(5,4)

- ii) Derive the minimax solution of this game.
- iii) Derive the Nash equilibria and values of this game.

4. i) Solve the game described in Example 3.3.1 of the lecture notes.

ii) Now consider the game in which the set of available strategies and the payoff functions are the same as in Example 3.3.1, but the moves of the players are made simultaneously. Derive the Nash equilibria and values of this game.