

Exam solutions 2018-11-26

ENM140, Game theory and rationality 2018

Question 1

Consider a two-player simultaneous action game, where Player 1 has actions A , B , C and D and Player 2 has actions e , f , g and h . The payoffs are given by

	e	f	g	h
A	(9, 8)	(2, 6)	(9, 9)	(3, 8)
B	(10, 6)	(4, 8)	(7, 3)	(3, 9)
C	(7, 5)	(10, 3)	(8, 4)	(6, 6)
D	(7, 8)	(4, 3)	(8, 10)	(4, 4)

1.1

The game has exactly 16 strategy profiles.

False

1.2

The game has a mixed-strategy Nash equilibrium.

True

1.3

The pure strategy f for player 2 is strictly dominated.

True

1.4

There is a dominant strategy for player 1.

False

1.5

The pure strategy D for player 1 is strictly dominated.

True

1.6

The pure strategy B for player 1 is strictly dominated.

False

1.7

The game has exactly three pure-strategy Nash equilibria.

False

1.8

All Nash equilibria of this game are Pareto optimal.

False

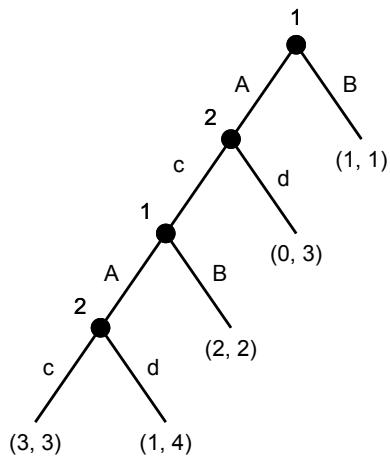
1.9

There are no Pareto optimal Nash equilibria for this game.

False

Question 2

Consider the two-player game depicted below.



2.1

The game has exactly four pure-strategy Nash equilibria.

True

The four NE can be found by writing the game in normal form. There are four pure strategies for player 1 (AA, AB, BA, BB) and four pure strategies for player 2 (cc, cd, dc, dd).

2.2

The game has exactly two subgame perfect Nash equilibria.

False

2.3

This is a game of imperfect information.

False

Question 3

Consider the infinitely repeated game with average payoffs where the simultaneous-action stage game (one-round game) has payoffs as follows:

	<i>C</i>	<i>D</i>
<i>A</i>	(0, 0)	(5, 3)
<i>B</i>	(4, 4)	(6, 2)

3.1

The minimax value is 0 for both players.

False

3.2

The payoff profile (3, 1) is feasible.

True

3.3

The payoff profile (3, 1) is enforceable.

False

3.4

The infinitely repeated game has a Nash equilibrium with payoff profile (5, 3).

True

Use the Folk theorem.

Question 4

Consider a game with the following payoff matrix:

	<i>A</i>	<i>B</i>
<i>A</i>	(4, 4)	(0, 1)
<i>B</i>	(1, 0)	(0, 0)

4.1

The pure-strategy profile (B, B) is a weak Nash equilibrium.

True

4.2

The pure strategy B is a weak evolutionarily stable strategy.

False