



ECN214 Games and Strategies
May/June 2023 Examination Period
Resit Paper for 2021–22 Students
Duration: 2 hours

You are not permitted to read the contents of this question paper until instructed to do so by an invigilator.

This examination has two parts: Part A consists of several analytical questions, while Part B consists of one essay question. Answer all questions in both parts.
In Part A, mark allocations are shown for each main question. The parts of each main question are weighted equally.
To receive credit, your answers must be adequately justified.

Calculators are **not** permitted in this examination.

Complete all rough workings in the answer book and cross through any work that is not to be assessed.

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Exam papers may not be removed from the exam venue.

Examiner: Christopher J. Tyson

PART A [70 marks]

1. [10 marks] Consider the following game in strategic form.

	l	c	r
u	2, 0	1, 0	1, 1
m	1, 0	2, 1	1, 0
d	2, 3	0, 2	1, 2

- (a) Find all pure strategy Nash equilibria.
(b) List the pure strategy profiles that survive iterative deletion of weakly dominated strategies.

2. [10 marks] Consider the following game in strategic form, where Alice chooses the row and Bob chooses the column.

	l	c	r	
u	3, 2	3, 3	1, 1	π
m	1, 4	0, 4	2, 2	ρ
d	3, 4	5, 1	0, 7	$1 - \pi - \rho$
	σ	τ	$\uparrow 1 - \sigma - \tau$	

- (a) Find all pure strategy Nash equilibria.
(b) If Bob uses the mixed strategy $\langle \sigma, \tau \rangle = \langle 1/4, 1/4 \rangle$, which of Alice's pure strategies are best responses?

3. [15 marks] Alice and Bob are choosing a number from the set $\{1, 2, 3, 4\}$ as follows. First Alice vetoes (i.e., eliminates from consideration) either both even numbers or both odd numbers. Then Bob vetoes one of the remaining two numbers, and the last number—the one not vetoed by either player—is the option chosen.

The players' preferences over the four options are $2 >_A 3 >_A 4 >_A 1$ for Alice and $1 >_B 4 >_B 2 >_B 3$ for Bob.

- (a) Which of the four options, if any, are Pareto efficient?
(b) How many pure strategy profiles exist in this game?
(c) Which outcome (i.e., option) is selected by backward induction?

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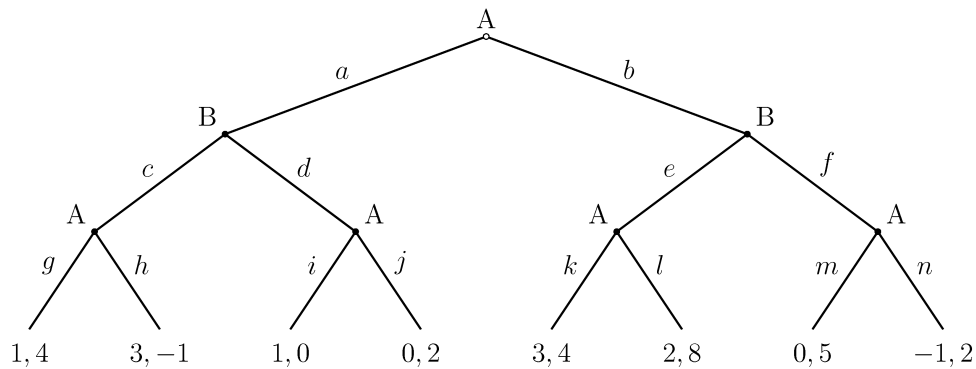
4. [15 marks] Consider the following class of games in strategic form.

	l	r	
u	4, 0	1, 1	π
d	x, x	0, 4	$1 - \pi$
	σ	$1 - \sigma$	

Here a particular game is specified by choosing the payoff parameter x .

- For what values of x is the resulting game a prisoners' dilemma?
- For what values of x is the resulting game an outguessing game?
- Let $x = 8$. Find all Nash equilibria (in pure or mixed strategies).

5. [10 marks] Consider the following game in extensive form.

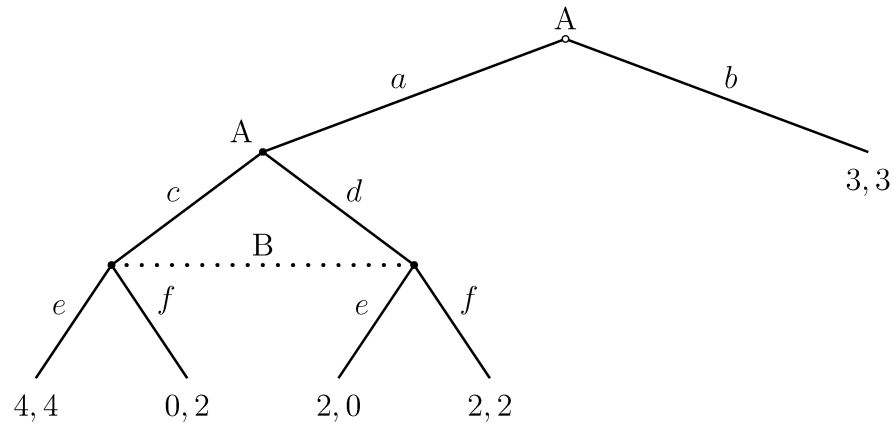


As usual, A[lice] earns the first payoff and B[ob] earns the second payoff.

- In the unique subgame perfect Nash equilibrium, what are the payoffs to the two players?
- The strategy profile $\langle bhikn, ce \rangle$ is a Nash equilibrium that is not subgame perfect. List all subgames in which this profile fails to induce an equilibrium. (Here you should indicate a subgame by describing the partial history of play that precedes it; for example, the partial history ac precedes the subgame that begins with Alice choosing between g and h .)

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6. [10 marks] Consider the following game in extensive form.



- Identify all strictly dominated (pure) strategies for either A[lice] or B[ob].
- This game possesses three pure strategy Nash equilibria: $\langle ac, e \rangle$, $\langle bc, f \rangle$, and $\langle bd, f \rangle$. Which of these equilibria, if any, are subgame perfect?

PART B [30 marks]

Provide at least one original illustration (from history, current affairs, your own life, or another source) of a promise game or a threat game.

Be sure to identify the players involved in your scenario, the strategies available to them, the possible outcomes of their actions, and their preferences over these outcomes.

Although drawing an extensive or strategic form game is not required, you may find this an effective way to communicate the situation you have in mind.

If your answer is focused and precise, it need not be very long.

End of examination.