Game Theory, Spring 2024

Problem Set # 5

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Due May 15 at 5:15 PM

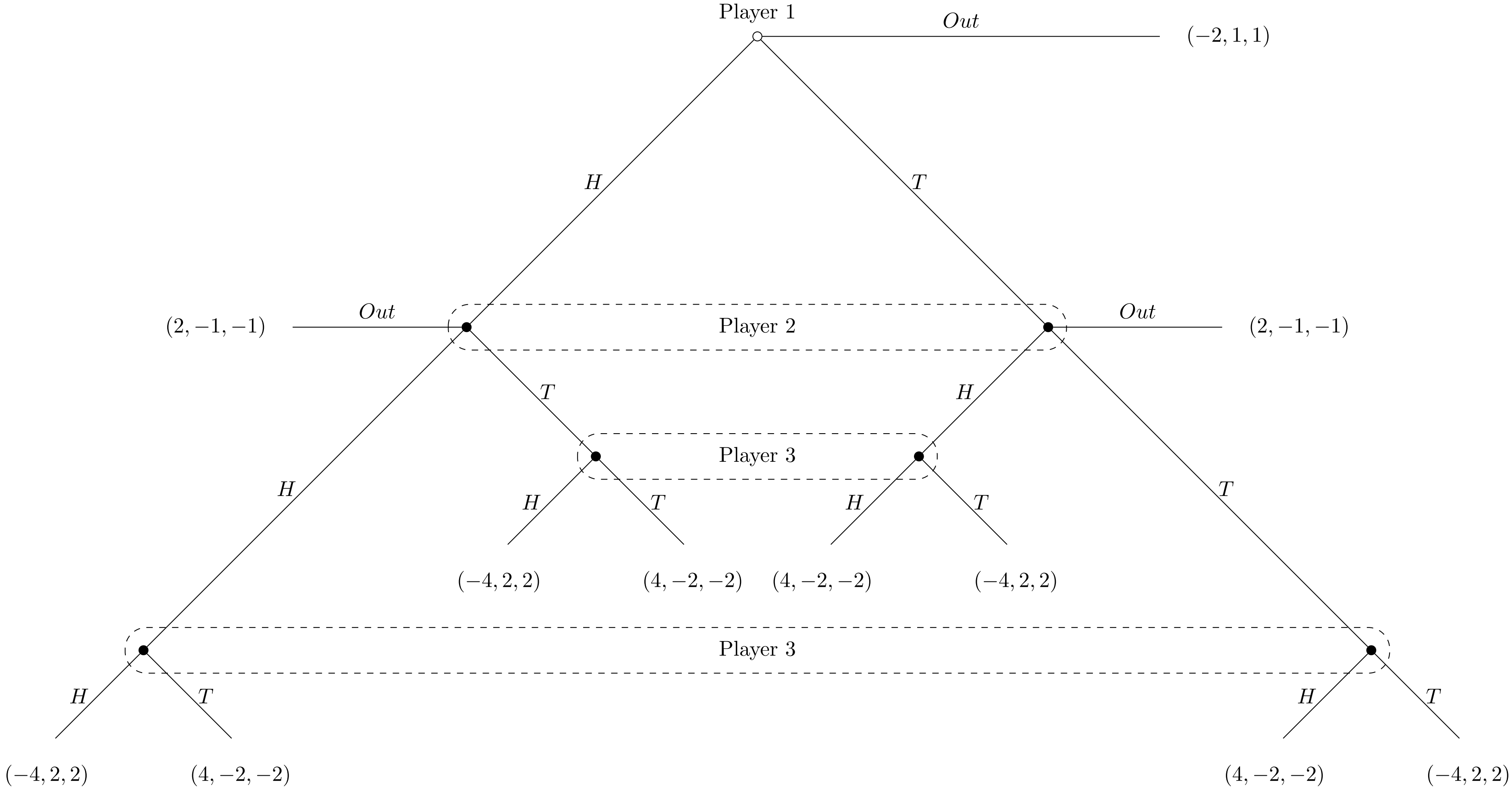
Exercise 1

1. In Example 3 from Lecture #7, show that $\big((R, B, r), \mu^* = 0\big)$ is a sequential equilibrium.
2. In Example 5 from Lecture #7, check whether its remaining weak perfect Bayesian equilibria are sequential.
3. In Example 8 from Lecture #7, find all the remaining sequential equilibria, or show that no other sequential equilibrium exists.
4. In Example 9 from Lecture #7, find all the sequential equilibria, and thus directly show that there is no sequential equilibrium, in which player 1 plays A.

Exercise 2

Find all the sequential equilibria of the following extensive-form game[1]

[1]This example appears in Chapter 7 of *"Advanced Microeconomic Theory"* by Geoffrey A. Jehle and Philip J. Reny.


Player 1
Out
(−2, 1, 1)
H
T
(2, −1, −1)
Out
Player 2
Out
(2, −1, −1)
T
H
Player 3
H
T
H
T
H
T
(−4, 2, 2)
(4, −2, −2)
(4, −2, −2)
(−4, 2, 2)
Player 3
H
T
H
T
(−4, 2, 2)
(4, −2, −2)
(4, −2, −2)
(−4, 2, 2)

Exercise 3

Consider the following prisoner's dilemma (with $\ell > r > p > s$).

	c	d
c	r, r	s, ℓ
d	ℓ, s	p, p

Suppose it is repeated finitely many times (i.e. $T < \infty$). Show, using backward induction, that the unique subgame-perfect equilibrium outcome is (d, d) in every period for any $\delta \in (0, 1]$ and any T.

Exercise 4

Consider the stage game from Example 3 of Lecture #8:

	c	k	d
c	$5, 5$	$0, 0$	$1, 6$
k	$0, 0$	$4, 4$	$0, 0$
d	$6, 1$	$0, 0$	$2, 2$

Suppose it is played twice. Find all of its subgame-perfect Nash equilibria in pure strategies for each $\delta \in (0, 1]$.