Econ 327: Game Theory

Practice Exam

University of Oregon

February 1, 2024

Version 1

Question:	**Question 1**	**Question 2**	Total
Points:	20	30	50
Score:			

For Exams:

- Complete *all* questions and parts. All questions will be graded.
- Carefully explain all your answers on short and long answer questions.

  An incorrect answer with clear explanation will earn partial credit, an incorrect answer with no work will get zero points.
- If you do not understand what a question is asking for, ask for clarification.

Allowed Materials:

- A single 5" by 3" note card
- A non-programmable calculator
- Pencils, color pens, eraser, ruler/straight-edge etc.

Name _____

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page or another sheet of paper.

Question 1. [20 points] **Multiple Choice**

See the study guide for definitions and concepts you should know. They will look like the multiple choice questions from homework, but there will be 10 total instead of 5.

Long Answer

Question 2. Consider the strategic form game below:

		P_2			
		A	B	C	D
P_1	W	15, -7	8, 2	18, -7	11, 5
	X	-3, 18	6, -7	8, -7	17, 18
	Y	9, 19	20, -4	13, 6	10, 16
	Z	-9, 20	14, 16	15, -5	-3, 4

(a) [6 points] Use Iterated Deletion of Strictly Dominated Strategies and write out a simplified game table with any remaining cells.

(b) [8 points] Find all Nash equilibria in *pure strategies*. Explain why you know they are Nash equilibria.

(c) [4 points] Define mixed strategies for each player using any pure strategies left after IDSDS. Make sure to define all variables you introduce.

(d) [6 points] Graph each player's expected utilities as functions of the other players' mixed strategy you defined in part (c).

(e) [6 points] Solve for all Mixed Strategy Nash equilibria in this game. A complete answer will include all calculations used and a graph of best response functions.

Short Answer

These questions were cut for time on the actual midterm exam, but they are still good practice. Just don't count how much time you spend on them when you're gauging how long the real exam will take you.

(a) Consider the strategic form game below:

		Aslanbek		
		Low	*Moderate*	*High*
Hagano	*Low*	0,0	3,2	7,3
	Moderate	2,3	5,5	6,4
	High	3,7	4,6	4,5

Find all pure Nash strategy profiles.

(b) Akua, Barta, and Gilberta are playing a version of hide and seek. There are only two good hiding spots; up a tree, or behind a rock. Akua gets to hide first. Barta also hides, but she gets to see which spot Akua is hiding before she picks. Once Akua and Barta are hidden, Gilberta has to choose one and only one place to look. If there are two people hiding in the same spot, they crowd each other and Gilberta can see them. If there is only one person in a spot, Gilberta can't see who's hiding there.

Create an extensive form game tree and clearly specify Gilberta's information set.

(c) Suppose that two fishing boats are selling to the same market. Let V be the tons of fish caught by Vlatislav's boat, and J be the tons of fish caught by Jeren's boat. People in this town only want to buy so many fish, so the price P of fish is given by the inverse demand function:

$$P = 60 - (R + S)$$

Assuming both boat owners only care about profit, we get that Vlatislav's best response function is

$$V = 15 - \frac{J}{2}$$

and that Jeren's best response function is

$$J = 12 - \frac{V}{2}$$

Graph both players' best response functions and find all Nash Equilibria. Label your graph appropriately.