

NAME:

Instructions

- i. Indicate your name above. If you do your work on separate paper, do so there.
  - ii. Answer all six questions in the space provided.
  - iii. Show and explain your work. List and explain any assumptions you make.
  - iv. Be neat and concise.
  - v. You may use any resources at your disposal other than speaking or otherwise communicating with anyone else.
  - vi. Keep your camera, microphone, and speakers on for proctoring and test related communication with the instructor.
  - vii. Upload an electronic copy of your work to canvas by 11:00 AM.
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1. Draw the extensive form for this game:

- Hailey (H) is the supervisor of Gus (G) and Nathan (N). Both Gus and Nathan choose to work hard (W) or slack off (S). Neither Gus nor Nathan know if the other worked hard. Hailey can tell if anyone worked or not, but cannot tell who it was if only one does so.
- If both choose to work hard, the game ends, and all three get a payoff of 1.
- If both slack off, upper management sees the unit fail, all three get fired, and the game ends with all three receiving a payoff of -1. (You need not make upper management a player in the game—their only role was in determining the rule for payoffs.)
- If only one works hard, Hailey will see productivity is less than it should be and get a choice. Hailey can fire Nathan or Gus and keep her job, receiving a payoff of 0. If she fires neither, upper management fires the whole team and Hailey receives a payoff of -1.
- If Nathan is fired, if he worked hard his payoff is -2 and if he did not work hard his payoff is -1. If he is not fired, his payoff is 1 if he worked hard and 2 if he slacked off. Payoffs work the same way for Gus as for Nathan.

2. For the game below, find the set of rationalizable strategies and any Nash Equilibria.

		Player 1			
		W	X	Y	Z
Player 2	A	1, 2	1, 2	0, 1	0, 1
	B	2, 1	0, 0	3, 4	0, 1
	C	2, 2	2, 3	2, 1	0, 2

3. Jackson (J) and Nick (N), partners, each decide to work hard or not, without observing the choice of the other. Let  $H_i$  be one if player  $i \in \{J, N\}$  works hard and 0 otherwise. Payoffs for each are  $3(1+H_N+H_J)-4H_i$ . Represent the game in normal form. Find the rationalizable strategies and Nash equilibria of this game. Discuss the strategic tensions in the game.

4. Isabel (I) and Raquel (R) each choose how many minutes of air time to purchase to advertise their product, with  $A_i$  denoting the number of minutes chosen by player  $i \in \{I, R\}$ . Isabel's payoff is  $10A_I - 2A_R - 0.5(A_I + A_R)^2$ . Raquel's payoffs are similarly defined. Find and graph the best response functions. Find the set of rationalizable strategies and the Nash Equilibria, if any.