

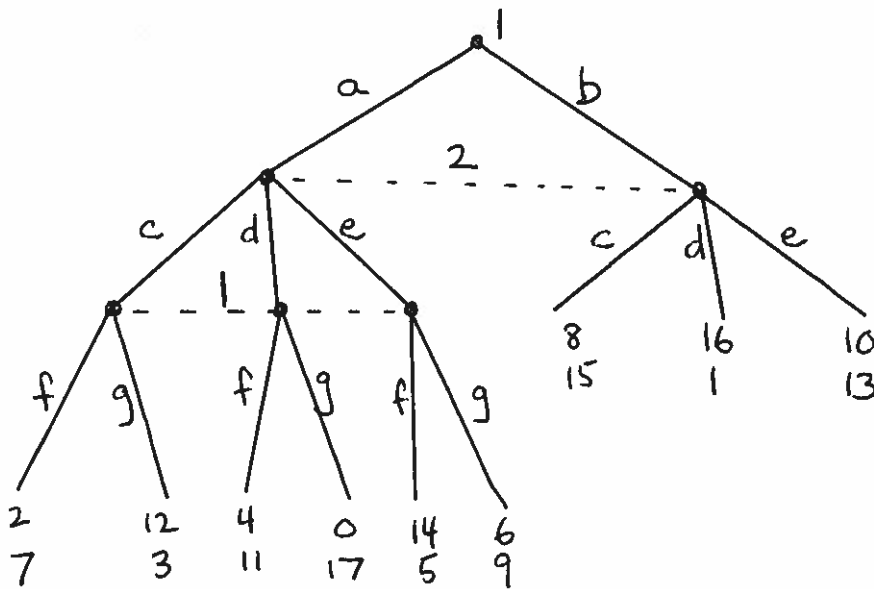
Your Name: _____

The Ohio State University
Department of Economics
First Midterm Examination

Econ 5001
Spring 2018
Prof. James Peck

Directions: Answer all questions, show all work, and label all figures.

1. (20 points) Convert the following extensive form game into normal form, by drawing the payoff matrix, labeling the strategies corresponding to the rows and columns, and filling in the payoffs.



2. (20 points) Consider the following game.

		player 2		
		a	b	c
player 1	w	4, 3	7, 2	1, 2
	x	3, 3	5, 2	8, 2
	y	6, 3	2, 2	4, 2

Find player 1's expected payoff when player 1 plays the mixed strategy, $\sigma_1 = (\frac{1}{2}, 0, \frac{1}{2})$, and player 2 plays the mixed strategy, $\sigma_2 = (\frac{3}{5}, \frac{1}{5}, \frac{1}{5})$. That is, player 1 chooses w with probability $\frac{1}{2}$, x with probability 0, and y with probability $\frac{1}{2}$; player 2 chooses a with probability $\frac{3}{5}$, b with probability $\frac{1}{5}$, and c with probability $\frac{1}{5}$.

3. (20 points) In the following game, is player 2's strategy B dominated? If your answer is YES, provide a strategy (pure or mixed) that dominates B. If your answer is NO, provide a belief that player 2 can have, for which B is a best response.

		player 2			
		B	C	D	E
player 1	X	6,3	8,0	0,5	2,2
	Y	2,3	3,5	5,0	6,2
	Z	9,0	3,5	2,5	3,10

4. (20 points) Consider the following game with 100 players. Each player simultaneously decides whether to join a club (strategy J) or to not join the club (strategy N). Let M denote the number of players who decide to join the club. Any player who decides not to join the club receives a payoff of zero, so for all i , we have

$$u_i(s) = 0 \quad \text{if} \quad s_i = N.$$

If player i decides to join the club, his/her payoff depends on the number of players who join and on his/her player number, given by

$$u_i(s) = M - 2i + 11 \quad \text{if} \quad s_i = J.$$

Find the set of rationalizable strategies for each player. Equivalently, iteratively eliminate dominated strategies until no more strategies can be eliminated, and report which strategies are left for each player.

5. (20 points) Consider the following game.

		player 2				
		P	Q	R	S	T
player 1	B	1,4	3,4	1,5	4,3	5,1
	C	2,5	1,1	2,2	0,2	3,4
	D	3,3	4,2	3,4	4,5	3,1
	E	4,2	5,1	4,5	0,2	5,3
	F	1,1	2,5	2,4	1,3	2,3

(i) (15 points) Find all of the (pure strategy) Nash equilibria of this game, and report your answer here:

(ii) (5 points) Is the profile, (E, T) , efficient? Briefly explain your reasoning.