Econ 400, Final Exam

Name: _____

There are three questions taken from the material covered so far in the course. All questions are equally weighted. If you have a question, please raise your hand and I will come to your desk.

Make sure that you defend your answers with economic reasoning or mathematical arguments, and show that you are using the correct game theoretic concepts by identifying the equilibria explicitly.

Good luck.

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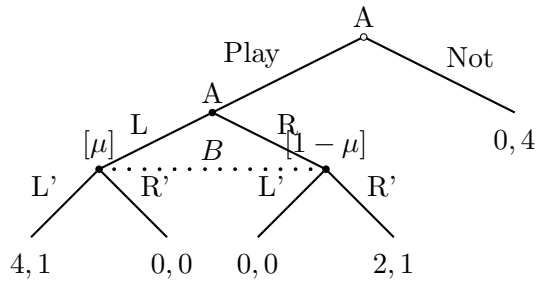
1. Consider the following game: Player A chooses whether to play or not; if A chooses to play, A then decides between action L and action R; B observes whether player A choose to play, but not what action A took, and then chooses between L' and R'.



i. Show there is a perfect Bayesian equilibrium where player A chooses to play, player A chooses L, and player B chooses L'.
ii. Show there is a perfect Bayesian equilibrium where player A chooses to player, player A mixes over L and R, and player B mixes over L' and R'.
iii. Briefly explain which equilibrium you think is more likely to arise in practice, and why.

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2. Consider the following strategic form game:

			B	
		L	C	R
	u	4,4	-1,5	-1,-1
A	m	5,-1	0,0	2,1
	d	-1,-1	1,2	0,0

i. Find all pure-strategy equilibria of the game. Find a mixed strategy equilibrium in which player A mixes over m and d, and the column player mixes over C and R .
ii. Consider the infinitely repeated game where the stage game is given above and players have a common discount factor $0 < \delta < 1$. Use the Nash threats folk theorem to show that, for δ sufficiently close to 1, there exists a Subgame Perfect Nash Equilibrium in which players use u and L in every period.
iii. Can you construct another equilibrium using the Nash threats folk theorem that achieves a lower minimum δ to support cooperation? If so, briefly explain how it works and why it would achieve a lower δ. If not, explain why yours outperforms the others.

3. A new firm has recently entered a market. The incumbent, whose costs are known by all players to be $C(D) = cD$, is unsure of whether the new firm is fit or not. The entrant knows that it is fit — has costs $C(D) = c_L D$ with $c_L < c$— or unfit — has costs $C(D) = c_H D$ with $c_H > c$. The incumbent only knows that the entrant is fit with probability p and unfit with probability $1 - p$. The two firms simultaneously choose prices, giving them demands

$$D_i(p_i, p_e) = 1 - p_i + \frac{1}{2}p_e$$

$$D_e(p_e, p_i) = 1 - p_e + \frac{1}{2}p_i$$

i. What are the firms' types? What is a Bayesian Nash Equilibrium of this game?
ii. Solve for a Bayesian Nash equilibrium of the game.
iii. How do the firm-type's strategies depend on p?
iv. If the entrant had to pay a fixed cost F to enter the market, explain how we could model the entry decision in a two-stage game, where the entrant first decides whether to enter or not, and then the two firms compete as above. How would the entrant's decision of whether to enter or not depend on p?