Econ 4020 – Second Preliminary Exam Practice

There are 6 problems. You have 70 minutes. Justify all your answers. Good luck!

1. What is your name?

2. What percentage grade from 0 to 100 do you think you will get on this exam?

3. Find all the NE, both in pure and mixed strategies, for the following game

	a	b	c
x	1 , 7	1 , 5	3 , 4
y	2 , 3	0 , 4	0 , 6

4. Anna and Bob bargain to split \$100 following the protocol described as follows. There are at most two rounds, and players do *not* discount the future ($\delta = 1$). On each round, a player is selected at random to act as the proposer. Anna is selected with probability $p \in (0, 1)$ and Bob is selected with probability $1 - p$. The proposer proposes a split $(x, 100 - x)$ with $0 \leq x \leq 100$. The other player either accepts or rejects the proposal. If the offer is accepted, the game ends with payoffs $(x, 100 - x)$. If an offer is rejected on the first round, the game moves onto the second round. If an offer is rejected on the second round, the game ends with payoffs $(0, 0)$.

(a) Find a SPNE of the game

(b) Is the SPNE unique? (Justify your answer)

5. Anna and Bob work as partners. The firm's revenue depends on the level of effort provided by each of them. Each of them can provide any level of effort in $[0, 100]$. Let A denote the level of effort provided by Anna, and B the level of effort provided by Bob. Providing effort is costly. The cost for Anna is $-A^2$ and the cost for Bob is $-2B^2$ (note that the game is *not* symmetric). The total revenue of the firm equals $A + B + AB$. Anna and Bob receive half the firm's revenue each.

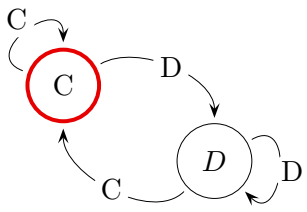
(a) Find the unique SPNE assuming that Anna and Bob choose their levels of effort independently.

(b) Find the unique SPNE assuming that Anna chooses her level of effort first, and then Bob chooses his level of effort after observing Anna's level of effort.

6. Consider an infinitely repeated prisoners dilemma with $\delta = 0.9$ and stage game payoffs given in the table below, and the tit-for-tat strategy described as follows:

- Cooperate on the first period
- On each period after the first one $t > 1$, take the same action your opponent took on period $t - 1$

	C	D
C	$9, 9$	$0, 10$
D	$10, 0$	$1, 1$



(a) Suppose that the outcome today is (C, D) and players are using tit-for-tat strategies, what would be the expected discounted continuation payoff?

(b) Do the tit-for-tat strategies constitute a NE of the supergame?

(c) Do the tit-for-tat strategies constitute a SPNE of the supergame?