Written answers are acceptable so long as they are legable. Remember, you can work with others but you must write the answers on your own. IF YOU WORK WITH OTHERS YOU MUST NOTE WITH WHOM YOU WORKED IN YOUR ANSWER.

Problem 1

10 points

Consider Rock-Paper-Scissors:

	Rock	*Paper*	*Scissors*
Rock	0,0	-1, 1	1, -1
Paper	1, -1	0, 0	-1, 1
Scissors	-1, 1	1, -1	0, 0

What payoffs are feasible in equilibrium in the indefinitely repeated version of Rock-Paper-Scissors? Explain how you arrived at your answer.

Problem 2

10 points

Consider this version of the Prisoner's dilemma:

	Cooperate	*Defect*
Cooperate	3 3	4 1
Defect	1 4	2 2

Tit-for-tat is a strategy in the indefinitely repeated prisoner's dilemma. It begins by playing Cooperate and then plays whatever its partner played on the previous round. It follows defection with Defect and cooperation with Cooperate. Show that Tit-for-tat played against itself is a Nash equilibrium for some values of α and show for which values it's a Nash equilibrium.

Problem 3

5 points

Give an example of a game with a Subgame perfect equilibrium that is not Trembling Hand perfect.

Problem 4

10 points

In class I described the job search game. There are two types of potential employees *high quality* and *low quality*. Nature decides with probability p if the employee if of *high quality*. The employee can then choose either to send a signal or not to the employer. In order to send the signal the employee must pay a cost c, if she doesn't send a signal she pays no cost. The employer observes the signal sent (but not the quality) and then must determine whether to hire the employee or not. If the employer hires the employee, the employee gets paid 1 (regardless of type), otherwise the employee gets 0. If the employer hires the *high quality* employee he gets a payoff of 1, if the employer hires the *low quality* employee he gets a payoff of -1, and if the employer doesn't hire he gets a payoff of 0.

Describe all the pure strategy Nash equilibria of this game for all values of p and c.

Graduate student problems (extra credit for undergrads)

Problem 5

10 points

Illustrate a strategy which, when played against itself, secures an average payoff of 2.5 in the indefinitely repeated prisoner's dilemma and prove that this is a Nash equilibrium.

Problem 6

10 points

A *strict Nash equilibrium* is a Nash equilibrium where all players are strictly worse off by switching, and so they have a positive incentive to stay with their current strategy. In the book, Binmore says that the motivation for equilibrium refinements is to reduce the possible set of non-strict Nash equilibria. I want you to show that this is the only thing the two refinements do. Prove that every strict Nash equilibrium is Subgame perfect and Trembling Hand perfect.