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

Find all the pure strategy Nash equilibria for the following game:

	l	c	r
T	4, 4	2, 3	1, 1
M	3, 1	3, 5	4, 6
B	1, 8	3, 8	2, 1

Problem 2

Look at the game in Figure 2.18 on page 71 of the textbook (the payoffs are for player 1, player 2's payoffs are the opposite). Construct a normal form representation of this game. Find all the pure strategy Nash equilibria of this game. Which of those equilibria are subgame perfect equilibria?

Problem 3

Suppose that (s, t) and (a, b) are two different saddle points in a strictly competitive game. Prove that (a, t) and (s, b) are also both saddle points of the game.

We proved in class that every saddle point of a strictly competitive game is also a Nash equilibrium of that game. Illustrate that the claim above is not true for Nash equilibria in games which are not strictly competitive. I.e., give a game where (s, t) and (a, b) are both Nash equilibria of the game, but (a, t) and (s, b) are not.

Problem 4

A fair coin is tossed until two heads appear in a row. What is the space of possibilities, Ω? What is the probability that it will be tossed exactly four times?

Graduate student problems (extra credit for undergrads)

Problem 5

Prove that in any initially unbalanced Nim game player 1 has a winning strategy (you must prove the lemmas I mentioned in class).

Problem 6

Suppose the following game. There is a pile of N stones and two players. The players alternate taking 1, 2 or 3 stones from the pile. The person who removes the last stone loses and the other player wins. For what values of N does player 1 have a winning strategy and for what values of N does player 2 have a winning strategy? Prove your answer.