This take-home final consists of three parts. Please type as much as possible, but handwritten work on the more mathematical parts is acceptable. This take-home must be your own work. Please staple these as follows: Staple I and II together, but leave III separate from I and II (but stapled if you want to hand in more than one page).

Part I Hypothesis testing

For the following zero-sum game, a plus value means that player A gains that amount and player B loses that amount. Similarly a negative value means that player A loses that mount and player B gains that amount.

1. Hypothesize which player has the advantage and by how much. Also hypothesize what strategy the two players should use. This is mostly a guess but give an explanation of how you made that guess.
2. Then find player A's best strategy and player B's best strategy using the techniques we've discussed in class. Does this game favor either player? If so who and by how much? In doing the calculations, explain each step. Make sure I can understand your notation.

	Player A picks a column	
Player B picks a row	3	-2
	-1	0

Part II

Using the web or the library, find an example of game theory in a real world situation. Wite a short paper (1-3 pages) explaining the example. The more you are able to use payoff matrices to explain the situation the better. The purpose of the paper is to convince me you understand how the mathematics of game theory connects with your problem.

Part III
The game of five suited poker.

In this game the deck consists of five suits, C,D,H,S, and U (the usual suits and Unicorns). There are thirteen card values: A, 2, 3, …,9, 10, J,Q, K (the usual values).

A hand consists of seven cards.

Find the probabilities of being dealt the following hands (SHOW YOUR WORK, EXPLAIN YOUR REASONING):

1. 5 of a number and a pair. E.g. 2,2,2,2,2,7,7
2. 4 of a number plus a triple. E.g. 3,3,3,3,J,J,J
3. Double trips. E.g. 5,5,5,9,9,9,10
4. Three pairs. E.g. 8,8,J,J,A,A,7