Part I. Word Problems.

1. Player #1 (the Serf) first chooses either to plant crops (P) or to hide the seed (H). If he chooses P, then at harvest time Player #2 (the Duke) either takes the entire crop (T) resulting in payoffs (0, 6) for the two players, or else shares (S) resulting in payoffs (2, 2). If the Serf chooses H, then the game ends with payoffs (2, 0). Draw the tree (i.e., the extensive form) for this game. (In the next Problem Set you will be asked to solve this game; the assignment now is simply to write it out correctly.)

2. A pitcher (P) decides whether to pitch to the inside lower corner, inside upper (IU) corner, inside lower (IL) corner, outside lower (OL) corner, or outside upper (OU) corner of the strike zone. Suppose the hitter (H) has very bad side to side vision and can’t tell whether the ball is inside or outside. However, his up-down vision is very good, and he can tell if the pitch is coming toward the upper or lower part of the strike zone. After the pitch is thrown and he sees whether it is coming to the upper or lower part of the strike zone, the hitter(H) swings his bat towards the IU,IL,OL,or OU part of the zone. If the hitter puts the bat where the ball is actually going he gets +1 and the pitcher gets -1. If he misses the ball, the pitcher gets +1 and the hitter gets -1. Write out the extensive form game tree for this game. What is each player’s strategy set?

3. In the sea otter kidnap game, write out the extensive form game for the male kidnap of pup, with ransom or no ransom paid by the female, harm/release unharmed by the male, retaliate/no retaliate by the female, and fill in the payoffs to male and female (consider the action of retaliate/no retaliate to be costly, but has a deterrent effect [so you have to fashion payoffs thinking towards the future]). Assign ordinal payoffs. You will get zero if you do not explain your rationale for the ordinal payoffs that you assign.

4. In 1804, sitting Vice President Aaron Burr challenged Alexander Hamilton, former Treasury Secretary, to a gun duel. (H)amilton needs to decide whether to (A)ccept or (R)eject the challenge. Hamilton notifies Burr of his decision by letter. Rejecting the challenge will show Hamilton to be a coward, giving him a payoff of 0 and (B)urr a payoff of 20. At that point the game would end.

If Hamilton (A)ccepts the challenge, the two will meet in Weehawken, New Jersey just across the Hudson river from New York City. The two men will simultaneously decide whether to shoot to (K)ill or shoot the (G)round. If both shoot the ground, they each get a payoff of 10 because both have the honor of having participated in the duel without getting killed. If Hamilton shoots the Ground and Burr shoots to Kill, then Hamilton dies, giving Hamilton a payoff of -2 and Burr a payoff of 4. (Burr’s payoff isn’t higher because committing murder is bad for one’s political career, even in 19th century America!) In the reverse situation, when Burr shoots the Ground and Hamilton shoots to Kill, the payoffs are 4 for Hamilton and -2 for Burr. Finally, if both men shoot to Kill,
there's some probability that one or both men die, so we take the expected payoff to be 1 each in this scenario.

a) Draw the extensive form game tree. Pay attention to what each player knows when he has a decision point.

b) For each player specify his strategy set. (We will not try to analyze this game until later in the quarter.)

5. Harrington, Chapter 2, exercise 9 (pp. 51)

6. Think of two ideas for project topics that you could suggest to your group. We ask that everyone do this individually. For each idea please briefly explain:

i) Who are the players in the situation that is of interest to you?

ii) Why do these players have differing interests? (e.g. an employee is interested in raising his income and working less while an employer wants to maximize profit, or a suspect is interested in minimizing his expected time in jail, but is less concerned with how long his accomplices are in jail.)

iii) What are the actions each player can take that have effects both on themselves and others.