SI 301
Assignment 5
Due in class on Tue October 10th

Reading: Sections 6.1 – 6.9 of textbook.

1. 1, 2, 3, 4, 5, 10, 11, 13 in section 6.11 of textbook.
2. Recall the Exam/Presentation game discussed in class, where two students had a presentation and an exam the next day and could only choose to prepare for one of them. Now assume that the professor in the class with the presentation has announced an extra credit opportunity. If a student attends a lecture on the night before the presentation, they can get some extra credit points towards the presentation. However, the professor wants to give at most 14 points to each pair of students. Thus, if only one of the students attends the presentation, the student who attended will get the full 14 points (which only gets applied to the presentation grade of the student who attended). If both students attend the presentation, they each get 7 points. Additionally, since the professor is feeling so generous, students are allowed to get more than 100 points after adding their extra credit points to their presentation grade. Because the lecture is the night before the presentation, the students now have to choose one of: (i) studying for the exam, (ii) preparing for the presentation, or (iii) attending the lecture. We will assume the same scores as in the original problem and we will assume that the students only care about the average of their exam and presentation grade.

    Here are some examples:

    (i)   Assume student 1 studied for the exam and student 2 attended the lecture. Then student 1 will get a 92 on the exam (since they studied for the exam) and an 84 on the presentation (since neither student prepared for the presentation) for an average of 88. Student 2 will get an 80 on the exam (since they didn't study for the exam) and a 98 on the presentation (84 since nether student prepared for it plus 14 points of extra credit for attending the lecture) for an average of 89.
    (ii)   Assume both students attended the lecture. Then both students will get an 80 on the exam (since they studied for the exam) and an 91 on the presentation (84 since neither student prepared for the presentation plus 7 points of extra credit since both students attended the lecture) for an average of 85.5.

    a. Complete the payoff matrix shown below.
    b. What is the best response of Student 1 to each of Student 2's strategies?
    c. Which players have a dominant strategy? Explain.
    d. Find all pure-strategy Nash Equilibria. Explain.
    e. If the professor changed the total number of extra credit point they offered (without changing any of the other policies), what would be the largest

number of extra credit points they could offer to a pair of students such that (Exam, Exam) is a Nash equilibrium? Explain.

Student 2

	Exam	Presentation	Lecture
Exam	88, 88	92, 86	
Presentation	86, 92	90, 90	
Lecture			

(Student 1 labels the rows.)

3. For each of the following, either give an example of the payoff matrix of a game with 2 players and 3 strategies per player that satisfies the requirement, or explain why the requirement is impossible to satisfy (do not choose examples of games covered in class, discussion, or in the textbook):
   a. There are exactly 2 pure-strategy Nash equilibria.
   b. Neither player has a dominant strategy.
   c. One player has a strictly dominant strategy and the other player does not have a dominant strategy.
   d. One player has a strictly dominant strategy and the other player has a dominant strategy but not a strictly dominant strategy.
   e. One player has a strictly dominant strategy and there are two pure-strategy Nash equilibria.
   f. One player receives the same payoff regardless of the chosen strategies and neither player has a dominant strategy.
   g. There is a strategy by player 2 for which player 1 has no best response.
   h. There are no pure-strategy Nash equilibria.