15-381/681
Homework 8
Deadline: 12/06/2018

1. Battle of Sexes: Here is a similar Battle of Sexes scenario (covered in lecture) between Alex and Berry. (30 points)

   a. Are there any pure strategy Nash equilibria in this game? If so, what are they? (10 points)
   b. What is the mixed strategy Nash equilibrium in this game? (10 points)
   c. What is the Strong Stackelberg Equilibrium if Alex is the leader and can make the decision first. (10 points)

Note: For each subproblem, please specify the equilibrium strategy for Alex and Berry clearly.

		Berry	
		Football	Concert
Alex	Football	8,8	1,7
	Concert	3,4	2,9

2. Social Choice and Mechanism Design: Which ones of the following are mechanism design problems with money? (There can be multiple correct choices) (10 points)

   a. Designer of an online game decides how to allocate trophies and "reputation score" to players who formed a team and defeated a monster together in the game
   b. A government develops an auction system to sell the rights(licenses) to transmit signals over specific bands of the electromagnetic spectrum and to assign scarce spectrum resources
   c. Government agencies design a new U.S. Presidential Election Process

3. AI and Ethics: Visit the website http://moralmachine.mit.edu/ and complete one round of judging (13 questions). (20 points)
a) Once you have finished, on the "Results" page, click the red button "Link" on the top, copy the link generated, and paste it here. (5 points)
b) Based on the results, which question has its average answer of "Others" closest to neutral? ("Neutral" refers to the middle of the result bar). (5 points)

c) Assume a company build an autonomous driving car, and the rule of taking actions when facing similar trolley problems is determined by the results of this online moral machine (e.g., take the action that most people choose). Is it reasonable? Please share your thoughts. (1-2 paragraphs, 150 words max) (10 points)

4. (Bonus Question, 10 points) First Price Auction: Consider first-price auction for a single item (the process is similar to the second-price auction introduced in class, but the winner pays the price he wrote down) with two players whose valuations of the item v_1, v_2 are drawn i.i.d. from uniform distribution on [0,1], is ($v_1/2$, $v_2/2$) (i.e., first player submit the bid $v_1/2$ and second player submit the bit $v_2/2$) a Bayesian Nash Equilibrium?

5. Programming Question: (40 points)
Download this zip archive and visit Multi-Agent Search with Pacman for the programming assignment. Please download the zip file we provide and not the one from the Berkeley website, since we made some adjustments to the autograder.

For this assignment, you are only responsible for **Questions 2** (20 points) and **Question 3** (20 points). You will not be graded on the other questions. Please post any concerns or issues you encounter, on Piazza.

Similar as Homework 7, we will also use the autograder script in the zip archive to grade the questions. We will rerun the autograder with your script and give you the points.

6. Handin:
The files that are needed for handing in is multiAgents.py as well as your answers to written questions answers.pdf. Please create a zip archive with exactly these 2 files, and submit the file via Autolab.