Assignment Week 4

Philosophy 444

Due 28 February, 2022

Question 1

Ankita and Beatrice would like to go on a date. They have two options: burgers at Fleetwood, or cocktails at Gandy Dancer. Ankita first chooses where to go, and knowing where Ankita went Beatrice also decides where to go. Ankita prefers Fleetwood, and Beatrice prefers Gandy Dancer. A player gets 3 if they end up with their preferred date, 1 if they end up with their unpreferred date, and 0 if they end up at different places. All these are common knowledge.

a. Find a subgame perfect equilibrium to this game.
b. Find a Nash equilibrium that is not subgame perfect.

Modify the game a little bit: Beatrice does not automatically know where Ankita went, but she can learn without any cost. That is, now, without knowing where Ankita went, Beatrice first chooses between Learn and Not-Learn; if she chooses Learn, then she knows where Ankita went and then decides where to go; otherwise she chooses where to go without learning where Ankita went. The payoffs depend only on where each player goes, as before. (Again, it is common knowledge that Beatrice has the ability to learn what Ankita knows before deciding.)

Now find a subgame perfect equilibrium of this new game in which the outcome (i.e., which place the two of them end up at) is the same as the outcome of the Nash equilibrium that is not subgame perfect in the original game.

HINT: In the latter game, Beatrice has sixteen strategies, since there are four points that she could make a binary choice. First, she has to decide Learn or Not-Learn. Second, she has to decide what to do if Not-Learn; that's a single choice since she is in the same position whether Ankita goes to Fleetwood or Gandy Dancer. Third, what to do if she chooses Learn and Ankita goes to Fleetwood. Fourth, what to do if she chooses Learn and Ankita goes to Gandy Dancer.

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Question Two

The players are Coke and Pepsi. Coke is deciding whether to enter a market, Pepsi is already in the market. (Apparently this happened a lot in the 1990s, because there were plenty of countries where Pepsi had a dominant market position and Coke was a newcomer.) Coke has to make two decisions in the game - whether to enter the market or not, and if they enter, whether to play tough or not. Pepsi has to make one decision, whether to play tough or not. If Coke enters, here is the payoff table for the players, with T for Tough, A for Accommodate.

	Pepsi Tough	Pepsi Accommodate
Coke Tough	-2, 1	0, -3
Coke Accomodate	-3, 1	1, 2

Find all subgame perfect equilibria to the game with the following three constraints:

1. If Coke doesn't enter, Coke gets 0, Pepsi gets 5. Coke first decides whether to enter or not, and then both Coke and Pepsi find out whether Coke decided to enter, then each company simultaneously decides on Tough or Accommodate.
2. Coke decides whether to enter at the same time Pepsi decides whether to be Tough or Accommodate. If Coke enters, it then decides whether to be Tough or Accommodating, knowing what Pepsi has decided. If Coke stays out, it gets 0, and Pepsi gets 0 if Accommodating, -1 if Tough.
3. Just like the previous case, but if Coke stays out, and Pepsi is Tough, it gets +1.

Due Friday January 28th, at 5pm