Recitation #7

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Question #1 Consider the following centipede game: First, P1 chooses either S or C; If S, payoffs are (2,0). If P1 chose C at the start, then P2 chooses S or C; If S, payoff (1,3). If P1 and P2 both chose C, then P1 moves again, and chooses S or C; Payoffs are (4,2) if history is CCS, and (3,5) at CCC. The game is over at this point.

Draw the game tree, write out all possible strategies for P1, and the unique SPNE

Question #2 Consider a 3-player political competition game, in which each candidate i chooses a policy position $x_i \in [0,1]$.Voters are uniformly distributed along the line [0,1]; each votes for the candidate whose position x_i is closest to him; in case of ties, he is equally likely to vote for any of the closest candidates. Each candidate also has an option to not compete.

Assume the following preferences: each candidate would rather win than tie, would rather tie than stay out, and would rather stay out than lose.

Show that (i) there is no NE in which only one candidate enters the race; (ii) in any NE, all candidates who enter tie for first place; (iii) there is no NE in which just two candidates enter the race

Solution (i) If only one candidate enters, then either of the candiates who stays out can profitably deviate by entering and choosing this candidate's position - thus he will tie, better than staying out;

(ii) Suppose by contradiction that there exist a NE in which not all candidates who enter tie for the first place, then one of the candidate who enters must lose; he then has a profitable deviation to stay out. This contradicts the NE assumption.

(iii) As remembered in class that if two enter, the only NE is for them both to choose at the midpoint. But then the stay-out-candidate can instead enter the race and choose to locate at midpoint, and thus tie, which is better off than staying out.

Quesion #3 Suppose the agent with initial wealth \$2 faces the following gamble. He is expected to lose \$2 with probability $\frac{1}{4}$, lose \$1 with probability $\frac{1}{4}$, and gain \$2 with probability $\frac{1}{2}$. Assume the utility-of-wealth function is $\sqrt{w}$

Calculate the expected utility (EU), the Certainty Equivalence (CE), and the maximum amount of money he is willing to pay to avoid such gamble.

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