Economics 316

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Problems for Tutorial 9

1. An incumbent plays an entry game with two challengers sequentially. In the first period, challenger 1 chooses between *In* and *Out*; if it chooses *In*, then the incumbent chooses between *Acquiesce* and *Fight*; if it chooses *Out*, then the incumbent has no action in the first period. In the second period, challenger 2 chooses between *In* and *Out*; if it chooses *In*, then the incumbent chooses between *Acquiesce* and *Fight*; if it chooses *Out*, then the incumbent has no action in the second period. Thus two examples of terminal histories are $(In, Acquiesce, In, Fight)$ and $(In, Acquiesce, Out)$. Each challenger's payoff is its standard entry game payoff in the period in which it interacts with the incumbent. For example, the payoff of challenger 1 is 2 for any terminal history starting $(In, Acquiesce)$, 0 for any terminal history starting $(In, Fight)$, and 1 for any terminal history starting *Out*. The payoff of the incumbent is the sum of its payoffs in the two periods. For example, its payoff for the terminal history $(In, Acquiesce, Out)$ is $1 + 2 = 3$.

   (a) Draw a diagram of the game.

   (b) How many strategies does the incumbent have?

   (c) Find the subgame perfect equilibrium (equilibria?) of the game.

   (d) Can you extend your argument to the case of a game with one incumbent and n challengers (who act sequentially)?

2. Two players use the following procedure to divide a cake. Player 1 divides the cake into two pieces and then player 2 chooses one of the pieces, leaving the other piece for player 1. Both players like cake.

   (a) Suppose that the cake is perfectly homogeneous. Describe a strategy for player 1 and a strategy for player 2 in the extensive games that models the procedure. Find the subgame perfect equilibria of the game. (Be sure to give a pair of *strategies*!)

(b) Suppose that half of the cake is chocolate flavored and the other half is coffee flavored. Player 2 is indifferent between the two flavors—she cares only about the size of the piece she receives. Player 1 cares only about the size of the chocolate part of the piece she receives. Does the game has a subgame perfect equilibrium in which player 1 receives the chocolate half of the cake? Does it have a subgame perfect equilibrium in which the piece player 1 receives differs from the chocolate half?