Economics 147: Bargaining Theory and Applications

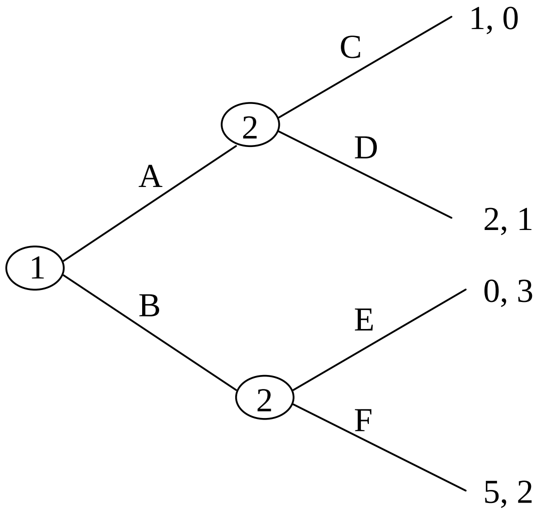
Spring 2005

Final (May 12th)

Name: ________________________________

You have 2 hours. 25 points per question. Good luck!!

1. Consider the following game:



a. Find the normal form of the game.

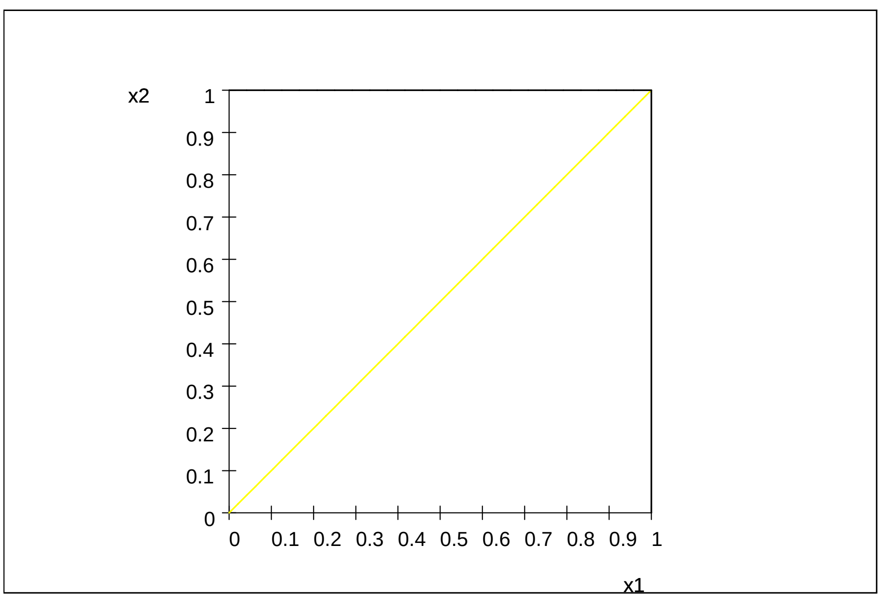
b. Find all the pure strategy Nash equilibria.

c. Find all the pure strategy subgame perfect Nash equilibria.

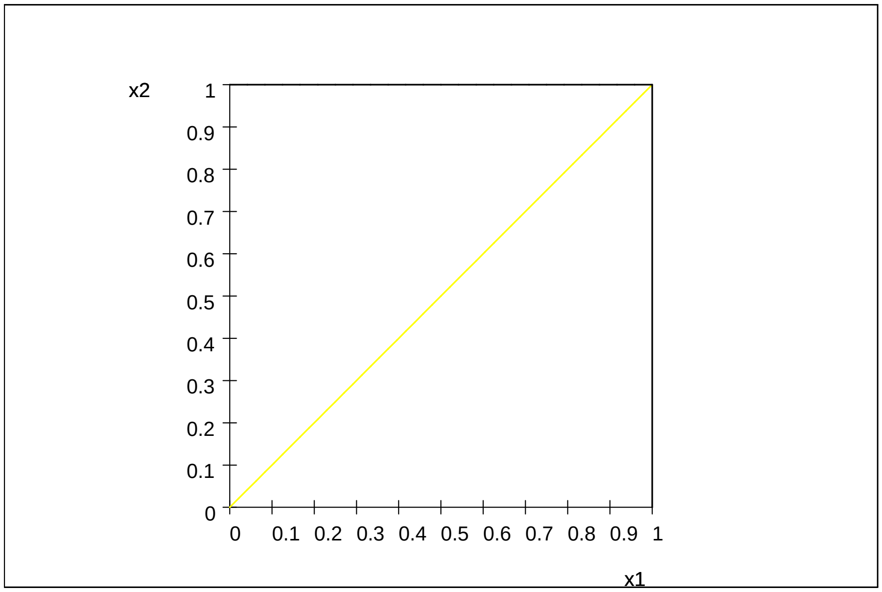
2. Electoral competition:

Consider the following variant of Hotelling's model of electoral competition. Voters are divided between two states. State 1 has 50 electoral college votes while state 2 has 51. The favorite positions of voters in state 1 are uniformly distributed between $\frac{1}{3}$ and 1. The favorite positions of voters in state 2 are uniformly distributed between 0 and $\frac{2}{3}$. There are two candidates and each of the candidates must choose one position between 0 and 1 (a candidate can not promise different things to the two states). Each citizen votes for that candidate whose position is closest to her favorite position. The candidate who wins a majority of the votes in a state obtains all the electoral votes in that state; if candidates obtain the same number of votes in a state they share the electoral votes of that state. (Of course, assume that candidates prefer to win rather than loose or tie and prefer to tie rather than loose.) Denote as x_1 the position of candidate 1 and x_2 the position of candidate 2.

a. Draw in the following graph the best responses of candidate 1 to each possible action of candidate 2.



b. Draw in the following graph the best responses of candidate 2 to each possible action of candidate 1.



c. Find the Nash equilibrium.

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3. Wage bargaining:

A firm and a union representing L workers negotiate a wage-employment contract. The firm produces $\sqrt{l}$ units of output when it employs l workers. Each worker not hired by the firm obtains a payoff of w_0. The contract (w, l), in which the firm pays the wage w and employs l workers, yields payoffs of $\sqrt{l} - wl$ to the firm and $wl + (L - l)w_0$ to the union.

a. Find the amount of labor that the firm should hire to maximize the sum of their payoffs.

In the event of disagreement, the firm's payoff is zero and that of the union is $w_0 L$.

b. Given the amount of labor from point a, find the payoff of both the firm and the union in the Nash bargaining solution of this problem.

c. Find the wage in the Nash bargaining solution. (Remember that the total payoff of the union is $wl + (L - l)w_0$, then find w that makes this equal to the answer in point b).

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4. Bargaining with random roles:

Consider an infinite offers model with discount factor δ and a pie of size 1 in which player A makes the first offer. After a rejection, who gets to make the next offer depends on the flip of a coin: player A gets to make the offer with probability $\frac{1}{2}$ and player B with probability $\frac{1}{2}$.

a. Assume players A and B follow these strategies:

$$s_A = \begin{cases} \text{always offer } x_A^* \\ \text{always accept } x_B \leq x_B^* \\ \text{reject otherwise} \end{cases} \quad s_B = \begin{cases} \text{always offer } x_B^* \\ \text{always accept } x_A \leq x_A^* \\ \text{reject otherwise} \end{cases}$$

. Find the equilibrium x_A^* and x_B^*.

b. How does x_A^* change if δ increases? Provide intuition.

c. How much pie will player B get in equilibrium?

Scratch paper: