Microeconomic Theory II — Spring 2014

Midterm Exam — Mikhael Shor

Read all questions carefully and work carefully.

Question 1. Consider the following game.

		Player 2			
		A	B	C	D
Player 1	W	$30, 30$	$50, 10$	$20, 40$	$10, 30$
	X	$10, 50$	$0, 40$	$10, 30$	$30, 50$
	Y	$30, 20$	$20, 10$	$10, 30$	$10, 60$
	Z	$20, 20$	$10, 40$	$30, 30$	$50, 20$

(a) What strategies are weakly dominated?

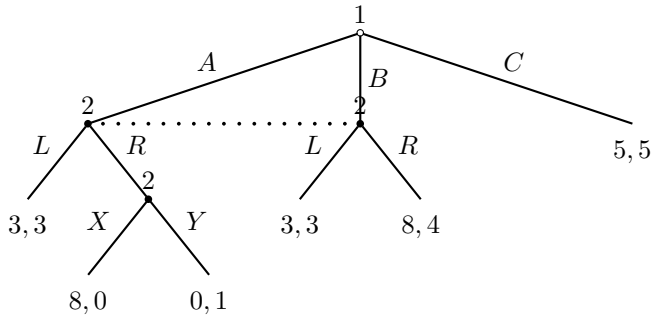
(b) What strategies survive the iterated deletion of strictly dominated strategies? For each iteration, specify the dominated strategy and the strategy that dominates it.

(c) Is the game dominance solvable? Explain.

(d) What is the unique equilibrium of this game?

(e) Imagine that the above game is repeated twice. Write down one (any) pure strategy subgame perfect equilibrium of this repeated game.

Question 2. Consider the game below. Both the extensive form and the normal form are given. The dotted line represents an information set.



		Player 2			
		L, X	L, Y	R, X	R, Y
Player 1	A	$3, 3$	$3, 3$	$8, 0$	$0, 1$
	B	$3, 3$	$3, 3$	$8, 4$	$8, 4$
	C	$5, 5$	$5, 5$	$5, 5$	$5, 5$

(a) List all pure-strategy Nash equilibria.

(b) List all pure-strategy subgame-perfect Nash equilibria.

(c) Briefly discuss which of the above Nash equilibria are also trembling-hand perfect equilibria.

(d) Briefly explain or demonstrate whether this game has any mixed strategy subgame-perfect Nash equilibria.

Question 3. Two firms produce an identical good. Inverse demand is given by P=32-Q. Competition between the two firms occurs in two stages:

- In stage 1, firms simultaneously choose whether to use the old or the new technology to produce their goods. The old technology has a marginal cost of 20 but requires no investment. The new technology reduces marginal cost to 8 but requires a fixed investment of 50.
- After the decisions from stage 1 are made public, in stage 2, both firms simultaneously choose a quantity.

Effectively, stage 2 is a two-firm Cournot game in which each firm has the marginal costs it chose in stage 1.

(a) Find the Nash equilibrium and resulting profits of the stage 2 subgame after both firms have chosen the *old* technology.

(b) Find the Nash equilibrium and resulting profits of the stage 2 subgame after both firms have chosen the *new* technology.

(c) Find the Nash equilibrium and resulting profits of the stage 2 subgames after the firms have chosen different technologies.

(d) Find all subgame perfect Nash equilibria of this game.

(e) Briefly discuss, intuitively, what type of game this appears to be, whether the outcome is efficient, and why or why not.

(f) (A brief and intuitive answer is likely sufficient for this:) Imagine that stage 2 involved Bertrand competition (in prices) instead of Cournot competition. What would the subgame perfect equilibria look like?