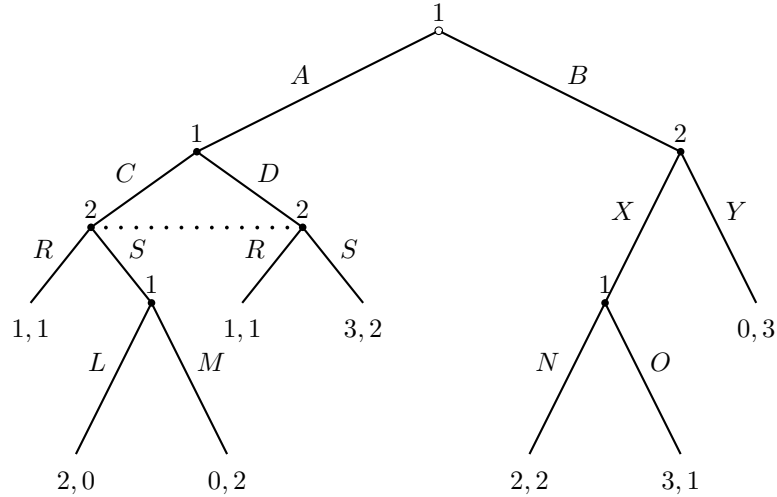# Microeconomic Theory II

Spring 2024

Midterm Exam

Mikhael Shor

Question 1. Consider the following extensive form game. The dotted line represents an information set.

(a) Write down a sample pure strategy for each player.

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

(c) Does this game contain a mixed-strategy subgame-perfect Nash equilibrium? Explain why or why not.

Question 2. Ten identical firms are deciding whether or not to enter a new industry. Competition occurs over two periods:

- In the first period, firms simultaneously choose whether or not to enter the industry. Entry requires a fixed payment of $F = 196$.

- In the second period, upon observing the number of entrants, entered firms compete a la Cournot by simultaneously selecting quantities, q_i. Profit of firm i is given by $p(Q)q_i$ where $p(Q) = 60 - Q$ and Q is the total quantity of all firms. Firms that do not enter naturally produce nothing and earn a profit of zero.

Determine all subgame-perfect Nash equilibria of this game.

Player 2

		L	R
	A	$X, 6$	$16, \ 5$
Player 1	B	$20, 6$	$40, \ 5$
	C	$36, 6$	$8, 50$

Question 3. Consider the following normal form game.

(a) For what values of X is strategy A strictly dominated? Demonstrate by identifying the necessary conditions for strategy A to be dominated/not dominated.

(b) For what values of X is A never a best reply? Demonstrate by identifying the necessary conditions for strategy A to be a best reply/not be a best reply.

(c) For what values of X is A consistent with rationality? Briefly explain.

(d) For what values of X is A consistent with both rationality and common knowledge? Carefully explain.

(e) For what values of X is A Player 1's unique strategy consistent with rationality and common knowledge? Carefully explain.

(f) ** For what values of X is there an equilibrium in which players use all strategies with positive probability?
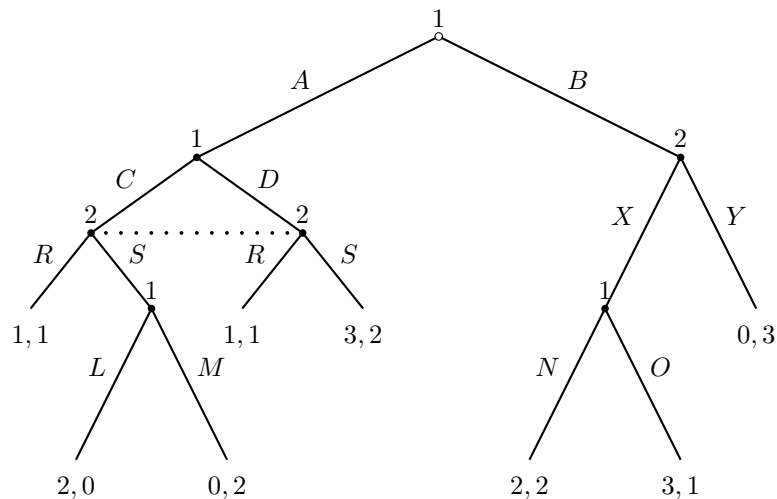
This is a duplicate tree for Question 1

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