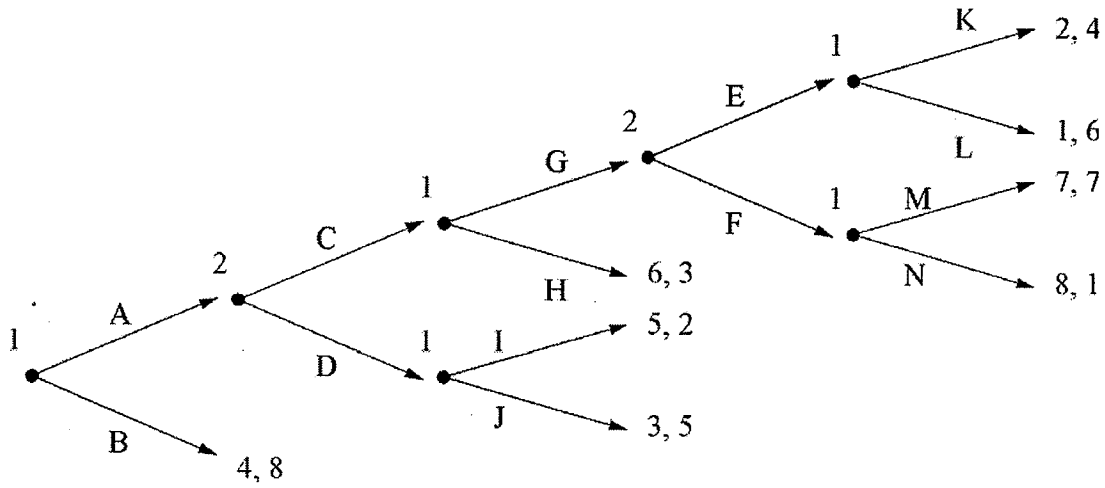
The Ohio State University
Department of Economics
Econ 601–Prof. James Peck
Final Exam

Directions: Neatly write your name at the top of this page. Answer all questions, show all work, and neatly label all diagrams.

1. (20 points) Consider the following extensive-form game.



(a) (15 points) Solve the game by backward induction, and report the resulting strategy profile.

(b) (5 points) How many subgames does this game have?

2. (30 points) The matrix given below is the stage game of a repeated game, where a player's payoff is his/her average payoff received in each stage.

		player 2 X	player 2 Y
player 1	A	2, 2	0, 6
	B	6, 0	4, 4

(a) Suppose that the stage game is played twice, $T = 2$. What is the highest average payoff that player 1 can receive in any subgame perfect Nash equilibrium? Justify your answer.

(b) Suppose that the stage game is repeated an infinite number of times, $T = \infty$. What is the highest average payoff that player 1 can receive in any subgame perfect Nash equilibrium of the infinitely repeated game? Justify your answer.

(c) Find a subgame perfect Nash equilibrium for the infinitely repeated game that yields player 1 the payoff found in part (b). Specify the strategy profile completely. Remember that an action at stage t can depend on the history of actions taken before stage t.

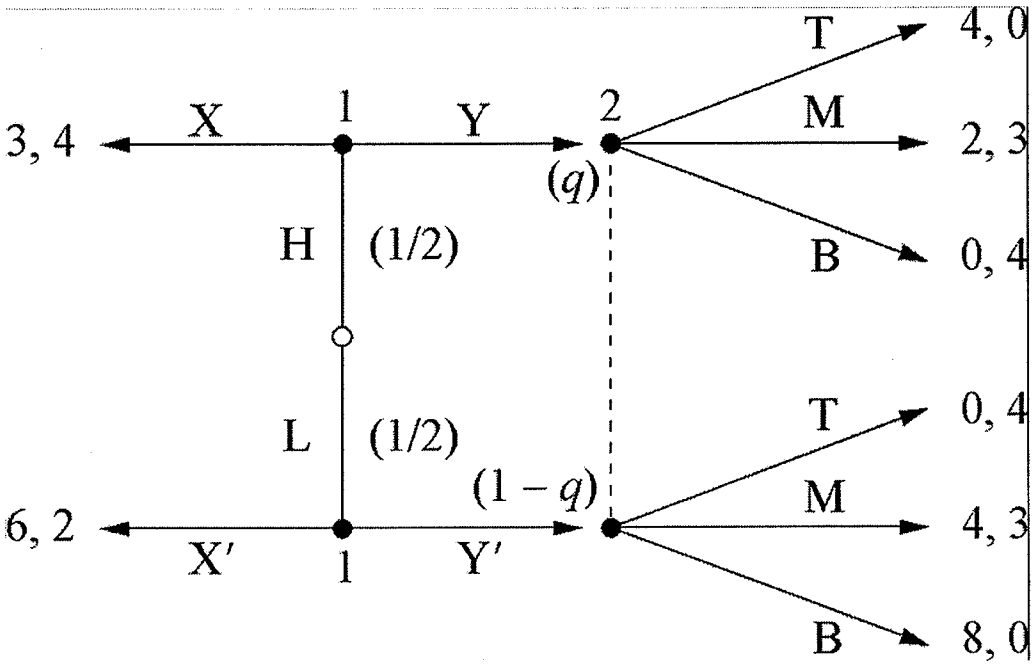
3. (25 points) For the following Cournot duopoly, each of the two firms has zero cost (type L) with probability $\frac{2}{3}$, and constant marginal cost of 1 (type H) with probability $\frac{1}{3}$. Assume that before choosing its output, each firm observes its own cost type but not the other firm's cost type, and assume that cost realizations are independent across firms. The market price is given by the inverse demand function,

$$p = 1 - q_1 - q_2.$$

Find the Bayesian Nash Equilibrium of this game.

Hint: Given the demand function, can a type H firm possibly make positive profits by producing?

4. (25 points) Consider the following Bayesian extensive form game.



(a) (12 points) Does this game have a ***separating*** *perfect Bayesian equilibrium (that is, where player 1's strategy is either XY' or YX')? Explain your reasoning, and if there is such a PBE, report it.*

(b) (13 points) Does this game have a ***pooling*** *perfect Bayesian equilibrium (that is, where player 1's strategy is either XX' or YY')? Explain your reasoning, and if there is such a PBE, report it.*

For each PBE that you report, explain why strategies are sequentially rational and player 2's beliefs are consistent. (Use the notation that q is player 2's belief that player 1 is type H, conditional on reaching player 2's information set.)