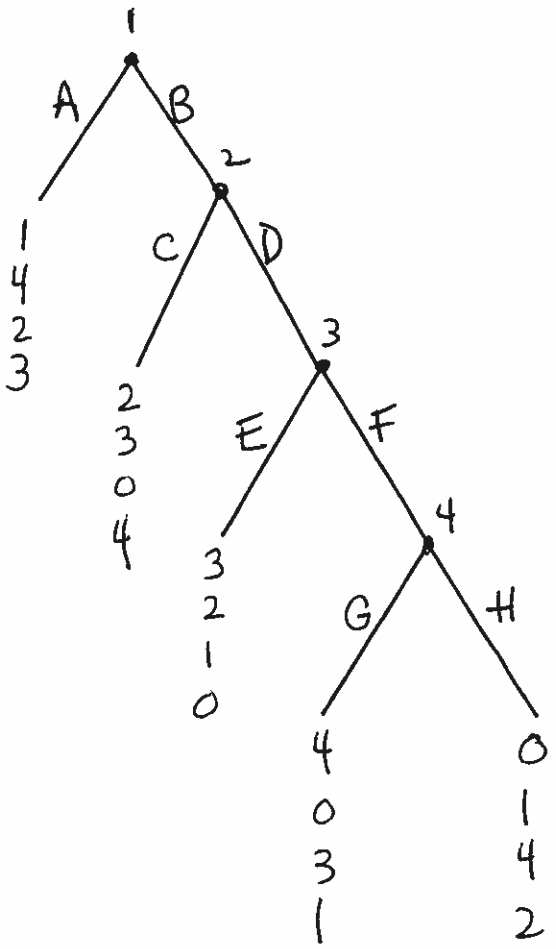
Your Name: _____

The Ohio State University
Department of Economics
Second Midterm Examination

Econ 5001
Fall 2017
Prof. James Peck

Directions: *Answer all questions, show all work, and label all figures.*

1. (20 points) Solve the following extensive form game using backward induction, and indicate the answer (a completely specified strategy profile) here:



2. (30 points) A team of newspaper reporters has won an award for their story. Each reporter is a player, and must decide whether or not to attend the awards banquet. Payoffs are as follows, reflecting the idea that the best outcome for a reporter is for someone else to attend, and the worst outcome is for no one to attend. If reporter i does not attend, but at least one other reporter does attend, then reporter i receives a payoff of 9. If reporter i attends the banquet, then he/she receives a payoff of 5. If none of the reporters attend the banquet, then they each receive a payoff of 0.

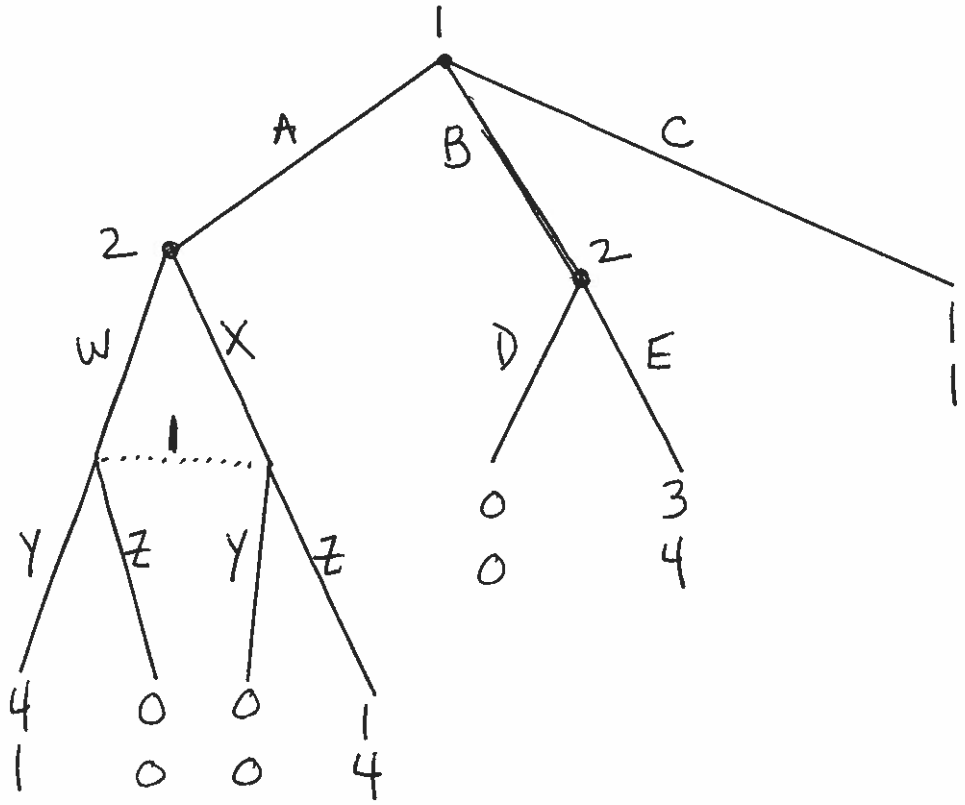
(a) (15 points) Assume that there are only two reporters. Find the mixed strategy Nash equilibrium of this game.

(b) (15 points) Assume that there are three reporters. Find the mixed strategy Nash equilibrium of this game. (Hint: Each reporter will choose the same mixed strategy, attending the banquet with some probability, p. Find the value of p in which each reporter is indifferent between attending and not attending.)

3. (25 points) Consider the following game in extensive form.

(a) (10 points) Find all of the Nash equilibria of this game.

(b) (15 points) Find all of the subgame perfect Nash equilibria of this game.



4. (25 points) Two firms are engaged in a Stackelberg game. First firm 1 chooses its quantity, q_1. Then firm 2 observes firm 1's quantity before choosing its own quantity, q_2. Firm 1 has a marginal production cost of c per unit, and firm 2 has production cost of zero. The market inverse demand function is given by

$$p = 60 - q_1 - q_2.$$

A firm's payoff is the profit that it receives.

(a) (15 points) Solve this game for the subgame perfect Nash equilibrium, keeping in mind that the SPNE strategies could depend on the parameter, c. Remember that a strategy for firm 2 is a function that specifies q_2 for every non-negative q_1.

(b) (10 points) For what value of c is the profit that firm 1 receives in the SPNE equal to exactly half of the profit that firm 2 receives in the SPNE?