ECON 402. Fall 2015
HOMEWORK 5

Due in class on Thursday, November 12th

(PLEASE NOTE THE DATE CHANGE.)

1. As we did in class (in our discussion on Chapter 11 and Mixed-strategy Nash equilibrium), consider a **Bertrand, price-competition model between two firms with capacity constraints**. Suppose the market consists of 20 consumers, each of which will purchase one unit of the good. Suppose that each consumer is willing to pay at most \$2.00 for the good. Suppose that each unit can be produced at a cost of \$0.50 (fifty cents) and this cost is the same for both firms. Suppose that each firm can produce at most 15 units of the good (so the capacity constraint is 15 units for each firm).

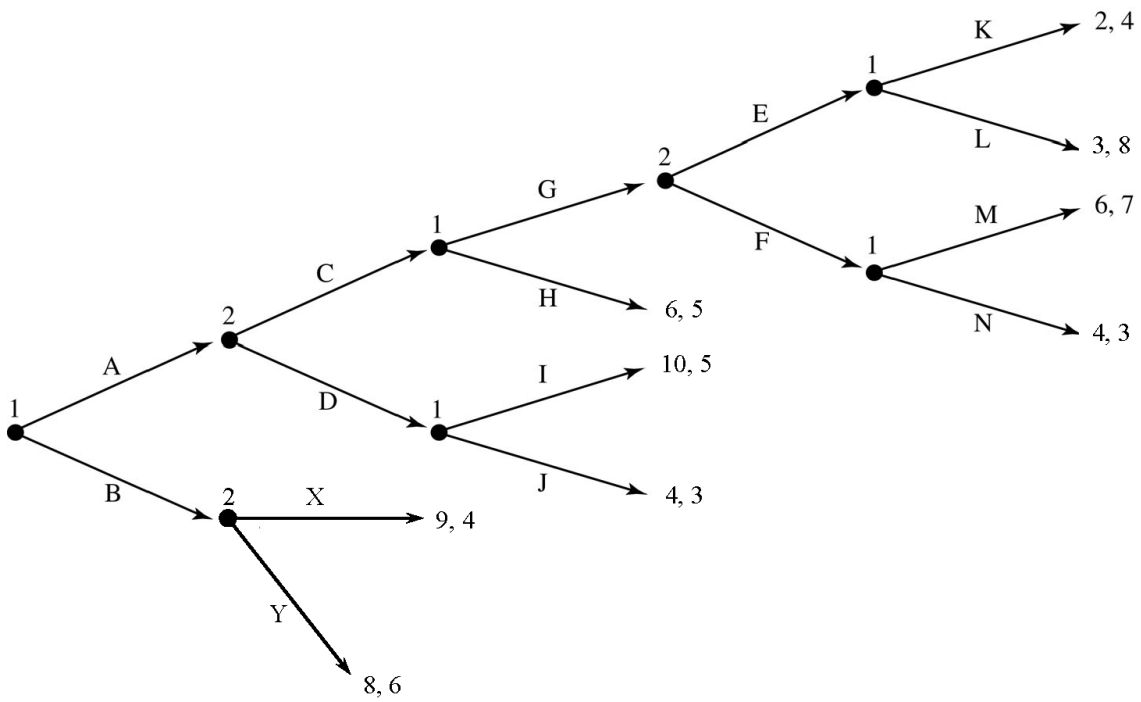
   (i) Is there a pure-strategy Nash equilibrium?

   (ii) Find the Nash equilibria in this game.

2. For the following extensive game:

(i) Look for all subgame perfect Nash equilibria (SPE) using backward induction.

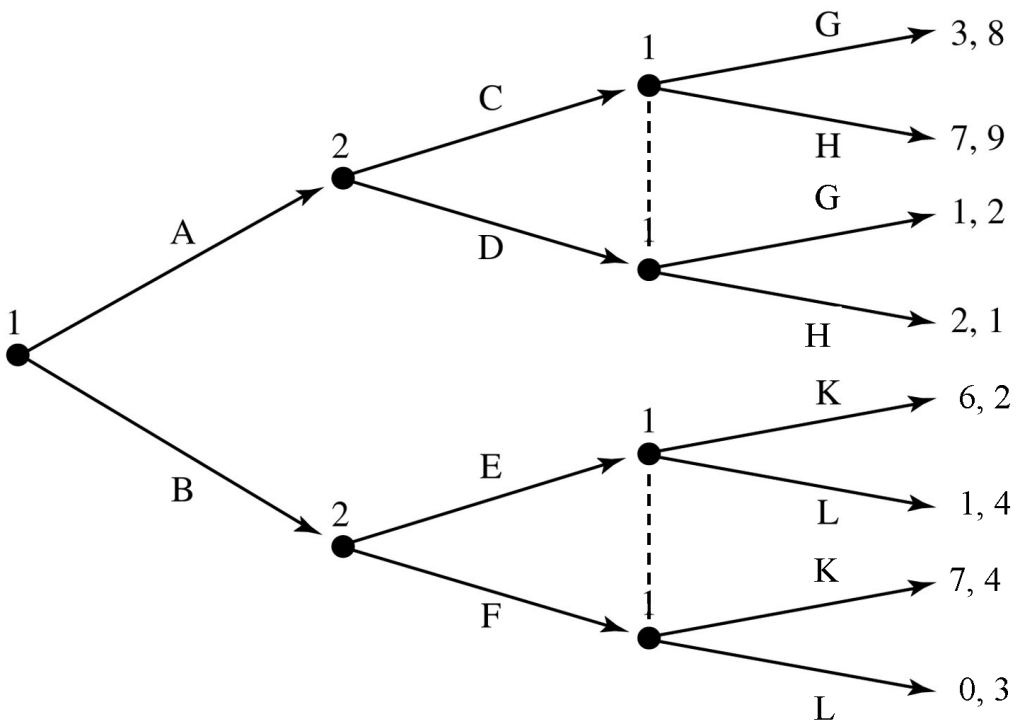
(ii) Repeat this exercise by identifying all subgames and looking for the strategy profiles that induce a Nash equilibrium in each subgame. Was this easier/faster than backward induction in this particular example?



3. For the following extensive game:

   (i) Look for all Nash equilibria

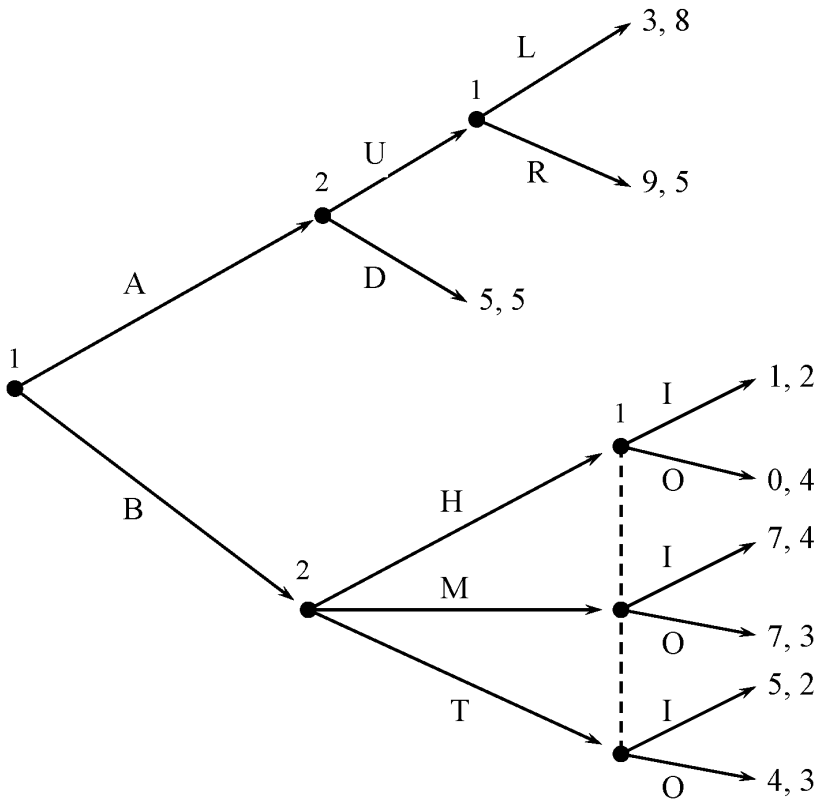
   (ii) Look for all subgame perfect Nash equilibria (SPE).



4. For the following extensive game:

   (i) Look for all Nash equilibria

   (ii) Look for all subgame perfect Nash equilibria (SPE).



5. Consider the **location game from Chapter 8** with nine possible regions where vendors can locate. Suppose that, instead of choosing their locations simultaneously, both players move **sequentially**. Specifically, suppose player 1 moves first and selects his location. Then, after observing the location chosen by player 1, player 2 chooses where to locate. Use backward induction to identify the subgame perfect Nash equilibrium (SPE). Remember that you need to focus on player 2's sequentially optimal strategy once he observes the location chosen by player 1. This will enable you to calculate the continuation payoffs in the first stage for each one of the nine possible locations that player 1 can choose.