14.12 Game Theory – Final

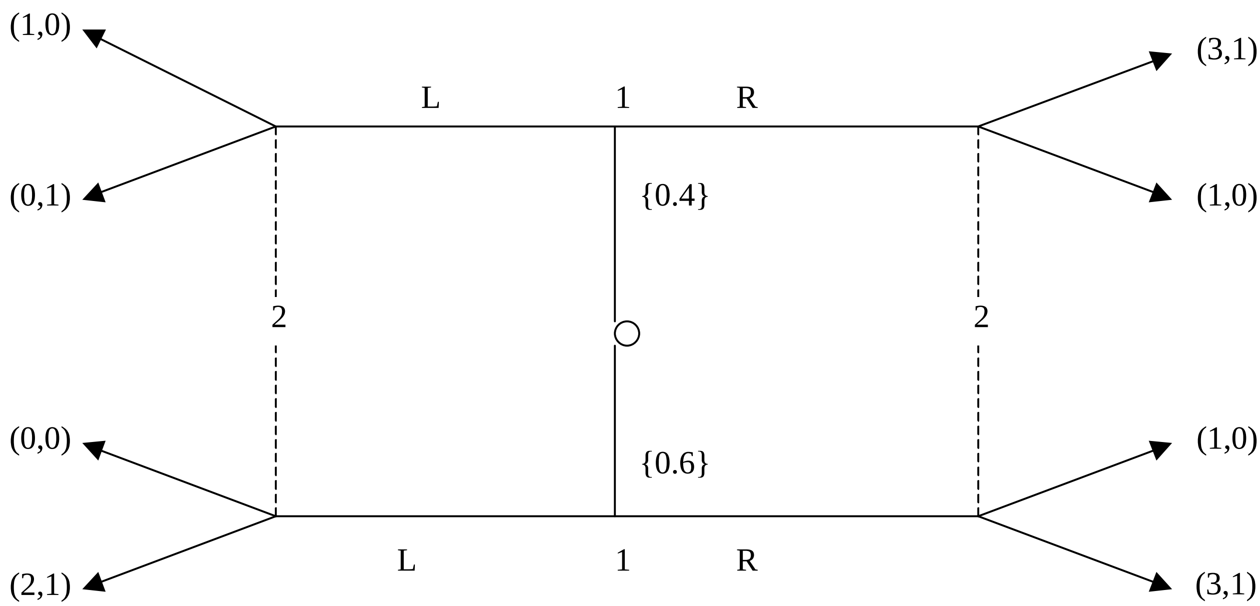
Instructions. This is an open book exam; you can use any written material. You have one hour and 20 minutes. Please answer only three of the following four questions. Each question is 33 points. Good luck!

1. In Spence's Job-market signalling game, assume that there are three types of workers, $t = 1, 2, 3$. Each worker of type t has payoff function $w - e/t$, where w is the wage and e is the education level. The payoff for the firm that hires a worker of type t with wage w is $t - w$. The firms compete for the workers.

   (a) Find a separating equilibrium. (Don't forget the beliefs and wages.)

   (b) Assuming each type is equally likely, find an equilibrium in which the types 2 and 3 are pooling while type 1 is separating.

2. Consider the following game.



   (a) Find a separating equilibrium.

   (b) Find a pooling equilibrium.

   (c) Find an equilibrium in which a type of player one plays a (completely) mixed strategy.

3. Consider a legal case where a plaintiff files a suit against a defendant. It is common knowledge that, when they go to court, the defendant will have to pay $1000,000 to the plaintiff, and $100,000 to the court. The court date is set 10 days from now. Before the court date plaintiff and the defendant can settle privately, in which case they do not have the court. Until the case is settled (whether in the court or privately) for

each day, the plaintiff and the defendant pay \$2000 and \$1000, respectively, to their legal team. To avoid all these costs plaintiff and the defendant are negotiating in the following way. In the first day demands an amount of money for the settlement. If the defendant accepts, then he pays the amount and they settle. If he rejects, then he offers a new amount. If the plaintiff accepts the offer, they settle for that amount; otherwise the next day the plaintiff demands a new amount; and they make offers alternatively in this fashion until the court day. Players are risk neutral and do not discount the future. Find the subgame-perfect equilibrium.

4. Consider a worker and a firm. Worker can be of two types, High or Low. The worker knows his type, while the firm believes that each type is equally likely. Regardless of his type, a worker is worth 10 for the firm. The worker's reservation wage (the minimum wage that he is willing to accept) depends on his type. If he is of high type his reservation wage is 5 and if he is of low type his reservation wage is 0. First the worker demands a wage w_0; if the firm accepts it, then he is hired with wage w_0, when the payoffs of the firm and the worker are $10 - w_0$ and w_0, respectively. If the firm rejects it, in the next day, the firm offers a new wage w_1. If the worker accept the offer, he is hired with that wage, when the payoffs of the firm and the worker are again $10 - w_1$ and w_1, respectively. If the worker rejects the offer, the game ends, when the worker gets his reservation wage and the firm gets 0. Find a perfect Bayesian equilibrium of this game.