14.12 Game Theory
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Homework 2

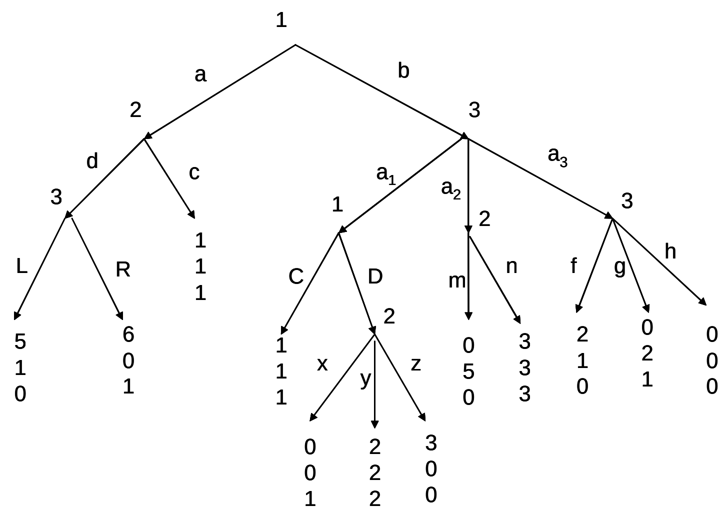
Due on 10/7/2005

(The homeworks are accepted until 10/12, but you need to turn in your homework on due date if you want to get your graded homework back on time.)

1. Find all the Nash equilibria of the following game.

	L	M	R
A	0,1	0,0	10,0
B	2,1	1,2	0,1
C	1,2	2,1	0,1

2. Use backwards induction to compute a Nash equilibrium of the following game.



3. Use backwards induction to find a Nash equilibrium for the following game, which is a simplified version of a game called Weakest Link. There are 4 risk-neutral contestants, 1,2, 3, and 4, with "values" $v_1, \ldots, v_4$ where $v_1 > v_2 > v_3 > v_4 > 0$. The game has 3 rounds. At each round, an outside party adds the value of each "surviving" contestant to a common account,[1] and at the end of the third round one of the contestants wins and gets the amount collected in the common account. We call a contestant surviving at a round if he was not eliminated at a previous round. At the end of rounds 1 and 2, the surviving contestants vote out one of the contestants. The contestants vote sequentially in the order of their indices (i.e., 1 votes before 2; 2 votes before 3, and so on), observing the previous votes. The contestant who gets the highest vote is

[1] For example, if contestant 2 is eliminated in the first round and contestant 4 is eliminated in the second round, the total amount in the account is $(v_1 + v_2 + v_3 + v_4) + (v_1 + v_3 + v_4) + (v_1 + v_3)$ at the end of the game.

eliminated; the ties are broken at random. At the end of the third round, a contestant i wins the contest with probability $v_i/(v_i + v_j)$, where i and j are the surviving contestants at the third round. (Be sure to specify which player will be eliminated for each combination of surviving contestants, but you need not necessarily specify how every contestant will vote at all contingencies.)