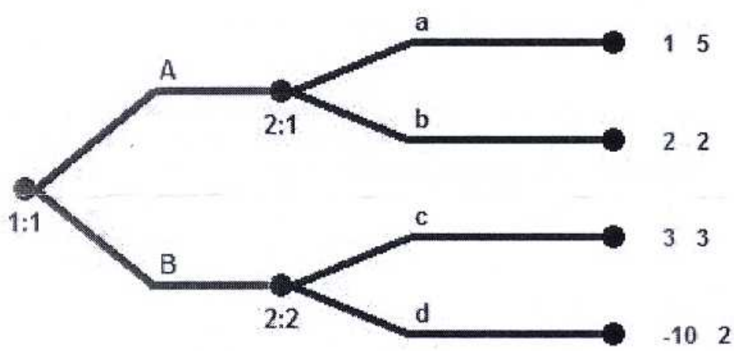
Game theory exam 31.10. 2013/Kultti
Notice that there are problems on both sides of the paper!

1. Depict the following game in normal form. Player-1 has action set $A_1 = \{A, B\}$ and player-2 has action set $A_2 = \{c, d\}$. The utility function of player-1 is given by $u_1(A, c) = 5$, $u_1(A, d) = 2$, $u_1(B, c) = 3$, $u_1(B, d) = 4$, and the utility function of player-2 is given by $u_2(A, c) = 5$, $u_2(A, d) = 1$, $u_2(B, c) = 1$ and $u_2(B, d) = 4$. Determine all the equilibria of the game.

2. Express the following extensive form game in normal form; be certain to determine the strategies of the players carefully.



Go back to the game tree representation and determine whether all the equilibria are reasonable or sensible.

3. Consider a three period alternating offers bargaining where the players divide a cake of size unity, and have the same discount factor $0 < \delta < 1$. Determine the subgame perfect equilibrium, and the outcome of the game.

ANSWER ONLY 4.a) OR 4.b) NOT BOTH OF THEM.

4. a) There are two sellers and one buyer. Seller-1 has one good for sale, and the buyer wants exactly one good. Seller-2 has one good for sale with probability $0 < p < 1$, and no good at all with probability $1 - p$. Only seller-2 and the buyer can observe whether seller-2 has a good. Sellers value their goods at zero and the buyer values each good at unity. Each seller has to post a price at which s/he is willing to sell his/her good (you can assume that if seller-2 has no good s/he post a very high price). Determine the sellers' pricing strategies. i) Show first that there does not exist a symmetric pure strategy equilibrium. ii) Show then that there does not exist an asymmetric pure strategy equilibrium. iii) Assume then that there is a mixed strategy equilibrium which is continuous on interval $[a, b]$, and determine first the end point, and then the rest of the strategy.

4. b) Let there be two possible states of the world ω_1 and ω_2. Player 1 (row player) knows the state of the world while player 2 associates probability p to state ω_1. Determine the equilibrium for all values of p.

ω_1	E	F
C	$1, 0$	$3, 1$
D	$3, 2$	$4, 1$

ω_2	E	F
C	$4, 0$	$6, 1$
D	$3, 2$	$4, 1$