Intermediate Microeconomics

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Homework 10

Due Wednesday, 27th April

Consider the following game

	A	B	C	D
1	$2,0$	$10,0$	$1,12$	$2,15$
2	$10,8$	$5,-1$	$2,5$	$3,3$
3	$1,7$	$6,-3$	$1,15$	$11,2$
4	$1,7$	$9,0$	$11,6$	$3,1$

1. Calculate the best responses for each player to each strategy of the other players. Does this game have a Nash Equilibrium?
2. Show that strategy B for the column player is strictly dominated by strategy C. Can this game be solved by the iterated deletion of dominated strategies?
3. Now consider the following game

	A	B
1	$2,2$	$1,0$
2	$6,1$	$0,2$
3	$0,1$	$6,2$

   Does this game have a Nash Equilibrium? Is strategy 1 dominated for the row player? Does your answer depend on whether the row player is allowed to play mixed strategies?

4. Now consider the following game.

	A	B	C
1	$7,3$	$1,7$	$5,0$
2	$4,6$	$10,1$	$3,0$
3	$0,10$	$0,15$	$1,6$

   Does this game have a Nash Equilibrium in pure strategies? Can any strategies be removed by the iterated deletion of strictly dominated strategies. Show that there is a mixed strategy Nash equilibrium where the row player mixes between 1 and 2 and the column player mixes between A and B

5. In class we discussed the following game of Goree and Holt

	A	B
1	$320,40$	$40,80$
2	$40,80$	$80,40$

   When this game was played by experimental subjects, the row players played up 96% of the time, and the column players player B 84% of the time. Show that this is not a nash equilibrium.

Question 2 Thor Industries and Zeus Technology both produce yoyoos. The cost function of Thor is $c(q_T) = c_T q_T$ and the cost function for Zeus is $c(q_z) = c_Z q_z$ where $c_T > c_z$. The price that each firm can sell yoyos for is $p(q) = a - b(q_T + q_z)$

1. Calculate Zeus's best response to Thor producing q_T
2. Calculate Thor's best response to Zeus producing q_z
3. Find the Nash equilibrium level of output. Who produces more in the Nash equilibrium?
4. Say that Thor improves his technology, so his cost function is now the same as Zeus's. Moreover the two gods want to collude in the yoyo market (i.e. each produce half the monopoly output). The game is not going to be repeated, so in order to achieve this, the gods write a contract with each other such that each one has to pay the other F if they deviate from this level of output. How big does F have to be to ensure that neither god will cheat on the agreement

Question 3 Consider the game in part (3) of question 2 above, but now as a sequential game: Thor gets to decide how much to produce, then Zeus decides how much to produce having observed Thor's production. How does this change the equilibrium of the game? Would Thor make higher profits if they moved first or second