Boğaziçi University, Department of Economics
Spring 2013
EC 206 MICROECONOMICS II
MIDTERM
04.04.2013, Thursday

• Do not forget to write your full name, student number and registered section on the top.

• Turn off your cell phone and put it away. During the exam if you are seen with a cell phone, on or off, 50 points will be taken off from your exam immediately.

• Put away all your lecture notes, books, etc.

• There are 5 questions and 10 pages in the exam. Make sure you have them all.

• Please answer all of the questions in the space provided for each question.

• Show your work.

• You have 120 minutes.

GOOD LUCK!!
1. (20 pts) Consider the two player normal form game below.

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(a) (8 pts) Is this game weak dominance solvable? If it is, find the solution. If not, find the final reduced game.
(b) (6 pts) For player 1, find a multi-layer belief structure to show that $\gamma$ is rationalizable.

(c) (6 pts) Find the set of all rationalizable strategy profiles.
2. (18 pts) There are five close friends, Fozzie, Janice, Kermit, Mahna and Piggy. They each simultaneously decide whether to attend a wedding or not. If they all attend the wedding, they will for sure enjoy the wedding. If exactly 4 of them attend, those who attend will enjoy the wedding with probability 2/3. If exactly 3 of them attend, those who attend will enjoy the wedding with probability 1/2. If exactly two of them attend, those who attend will enjoy the wedding with probability 1/4. If only one of them attends, then he/she will definitely not enjoy the wedding. For those who attend, enjoying the wedding brings a benefit of 10 and not enjoying brings a benefit of 0. For those who do not attend, they get a benefit of 3. Attending the wedding is costly. For Fozzie, Janice and Kermit it costs 3 each, and for Mahna and Piggy it costs 2 each. Find the set of pure-strategy Nash equilibria, if any.
3. (20 pts) Suppose there are two roommates, Statler and Waldorf, who try to collect money among themselves to buy a new oven. A new oven costs 150 TL in the market. They agree on the following set of rules. Each one will contribute a nonnegative amount of money simultaneously. Denote these amounts by $x_s$ for Statler and $x_w$ for Waldorf. If they collect an amount at least as big as 150 TL, then they buy the oven and each one pays exactly the amount he has contributed (if they collect more than 150 TL, then they donate the leftover money to a charitable organization). If they collect an amount that is less than 150 TL, then they don’t buy the oven and none of them pays anything, that is, each one gets his contribution back. Each has a valuation for the new oven that is equal to 120 TL.

(a) (12 pts) Find the set of all pure-strategy Nash equilibria, if any. Are there any inefficient ones?
(b) (8 pts) Now, suppose that in case there is not enough money contributed to buy the oven, they don’t get their money back, instead all of the contributions are donated to a charitable organization. Find a strategy profile which is a Nash equilibrium in part (a), but no longer an equilibrium here.
4. (22 pts) Suppose two students, Beaker and Gonzo, are working on a joint term project for one of their courses. Each one devotes some effort, any nonnegative number, simultaneously. Denote Beaker’s effort level by, \( e_B \), and Gonzo’s effort level by \( e_G \). The payoff of each student increases as the other student’s effort level increases, given that own effort level is positive. Own effort level increases own payoff on one hand, but it’s also costly on the other hand. These effects are summarized in the payoff functions, which are functions of effort levels, given below.

\[
\begin{align*}
    u_B(e_B, e_G) &= 2e_B(10 + 2e_G - e_B) \\
    u_G(e_B, e_G) &= e_G(12 + 6e_B - 3e_G)
\end{align*}
\]

(a) (10 pts) Find the reduced strategy sets for each player after eliminating never-a-best-response strategies for exactly three rounds.
(b) (4 pts) Make a guess about the final reduced game, hence about the set of rationalizable strategy profiles?

(c) (8 pts) Find the set of pure-strategy Nash equilibria, if any?
5. (20 pts) Consider the two player normal form game below.

\[
\begin{array}{ccc}
 & L & C & R \\
U & (4,2) & (0,0) & (2,3) \\
M & (0,2) & (3,4) & (1,1) \\
D & (1,1) & (2,2) & (1,2) \\
\end{array}
\]

(a) (12 pts) Find the set of mixed strategy equilibria, if any, in which player 2 assigns zero probability to exactly one of her strategies.
(b) (8 pts) Find the set of mixed strategy equilibria, if any, in which player 2 assigns positive probabilities to all of her strategy strategies.