Midterm Exam Answers: Economics 101

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1. Short Answers

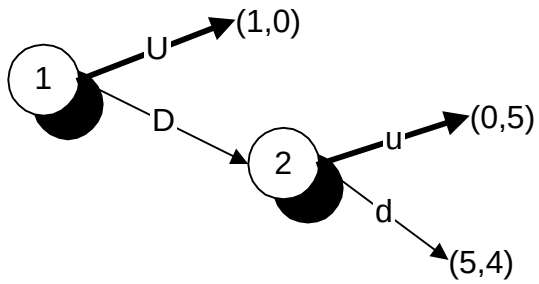
a)

	L	R
U	6*,3* (not efficient)	7,1
D	1,2	8*,3* (efficient)

b)

	L	R
U	3,3	2*,7* (efficient)
D	7*,2* (efficient)	1,1

c)



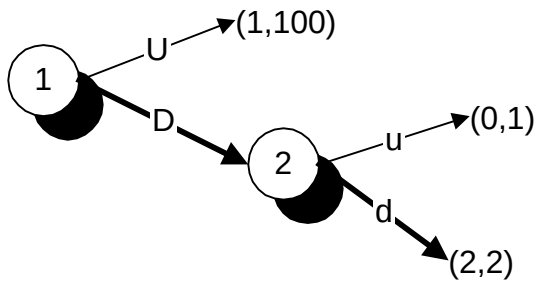
subgame perfect equilibrium (U,u) is not efficient

normal form

	u	d
U	1*,0* (not efficient)	1,0*
D	0,5*	5*,4

Note that there is only one Nash equilibrium and it is also subgame perfect

d)



subgame perfect equilibrium of D,d is efficient

normal form

	u	d
U	1*,100* (efficient)	1,100*
D	0,1	2*,2* (efficient)

Two Nash equilibria are both efficient, but only the one at D,d is subgame perfect

2. Duopoly

Let Macrosoft be firm 1, and Peach firm 2.

a) In competitive equilibrium only Peach produces; p=MC means $6 - x = 2$ or $x = 4$.

profits for Macrosoft $\pi_1 = (2 - x_1 - x_2)x_1$, reaction function for Macrosoft from $2 - 2x_1 - x_2 = 0$ is $x_1 = 1 - x_2 / 2$.

Profits for Peach $\pi_2 = (4 - x_1 - x_2)x_2$, reaction function for Peach from $4 - x_1 - 2x_2 = 0$ is $x_2 = 2 - x_1 / 2$

b) Peach monopoly is $x_1 = 0$ and $x_2 = 2$; Macrosoft monopoly is $x_2 = 0$ and $x_1 = 1$.

c) Solving the two reaction schedules

$2 - x_1 / 2 = 2 - 2x_1$

$3x_1 / 2 = 0, x_1 = 0$

so same as Peach monopoly

d) in Bertrand, Peach has the whole market at a price of 4. Output is 2. Once again, this is the same as a Peach monopoly. Macrosoft produces nothing and has no profits.

e) In Stackelberg with Macrosoft as leader, Macrosoft chooses both x_1, x_2 to maximize profits $\pi_1 = (2 - x_1 - x_2)x_1$ subject to Peach's reaction function $x_2 = 2 - x_1/2$ as a constraint. Substitute into profit to find $\pi_1 = (2 - x_1 - (2 - x_1/2))x_1 = (-x_1/2)x_1$. Differentiate to find $-x_1 = 0$. So even if Macrosoft is the Stackelberg leader, Peach still has the monopoly.

3. How to bid?

Hacker is player 1, Robot player 2

	2	4	6
2	-3,5*	-3*,3	-3*,1
4	-1*,0	-3*,3*	-3*,1
6	-3,0	-3*,0	-3*,1*

a) two Nash equilibria: both bid 4 or both bid 6

b) both bid 6 is Pareto dominated by both bid 4, which is in turn Pareto dominated by both bid 2, which is not a Nash equilibrium.

c) bidding 2 and bidding 6 for Hacker are both weakly dominated by bidding 4.

4	-1*,0	-3*,3*	-3*,1

Given this matrix, clearly Robot chooses to bid 4, so using iterated weak dominance we can pin down the equilibrium to both bidding 4.