

Midterm Exam Answers: Economics 101

February 10, 1997 © David K. Levine Short Answers

a)

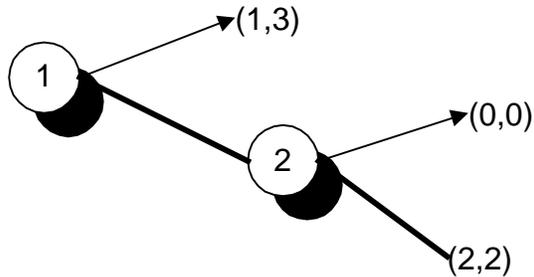
	R	L
U	2*,2*(efficient)	0,0
D	0,0	1*,1*

b)

	R	L
U	3,3	0,4*
D	4*,0	1*,1*(not efficient)

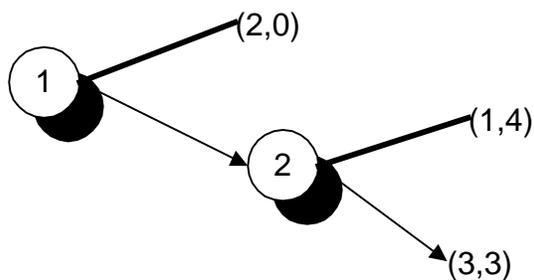
For each of the extensive form games below, find all of the subgame perfect equilibria

c)



equilibrium (2,2) is efficient

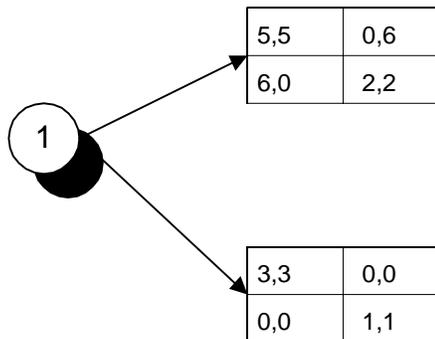
d)



equilibrium of 2,0 is not efficient

2.

a)



b)c)

	LL	LR	RL	RR
Uu	5,5*	5,5*	0,6	0,6
Ud	6*,0	6*,0	2,2*	2*,2*
Du	3,3*	0,0	3*,3*	0,0
Dd	0,0	1,1*	0,0	1,1*

d) Du,RL and Ud,RR are the Nash equilibria; both are subgame perfect

e) Du,RL Pareto dominates Ud,RR

f) Ud strictly dominates Uu and Dd

RL weakly dominates LL

RR weakly dominates LR

	RL	RR
Ud	2,2*	2*,2*
Du	3*,3*	0,0

RL weakly dominates RR

	RL
Ud	2,2*
Du	3*,3*

Du weakly dominates Ud

1. Duopoly

Let Microsoft be firm 1, and Peach firm 2.

a) profits for Microsoft $\pi_1 = (16 - x_1 - x_2)x_1$, reaction function for Microsoft from

$$16 - 2x_1 - x_2 = 0 \text{ is } x_1 = 8 - x_2 / 2.$$

Profits for Peach $\pi_2 = (14 - x_1 - x_2)x_2$, reaction function for Peach from $14 - x_1 - 2x_2 = 0$

$$\text{is } x_2 = 7 - x_1 / 2$$

Solving the two reaction schedules

$$7 - x_1 / 2 = 16 - 2x_1$$

$$3x_1 / 2 = 9, x_1 = 6$$

and solving for $x_2 = 4$, industry output is 10 and price 7

profits are $\pi_1 = 36, \pi_2 = 16$

b) in Bertrand, Microsoft has the whole market at a price of 3. Output is 14, and Microsoft profits are 28. Peach produces nothing and has no profits.

c) In Stackelberg with Microsoft as leader, Microsoft chooses both x_1, x_2 to maximize profits $\pi_1 = (16 - x_1 - x_2)x_1$ subject to Peach's reaction function $x_2 = 7 - x_1 / 2$ as a constraint. Substitute into profit to find $\pi_1 = (16 - x_1 - (7 - x_1 / 2))x_1 = (9 - x_1 / 2)x_1$.

Differentiate to find $9 - x_1 = 0$. So output by Microsoft is 9, output by Peach is $2\frac{1}{2}$, industry output is $11\frac{1}{2}$, price is $5\frac{1}{2}$, Microsoft profit is 40.5 and Peach output is 6.25.