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Calculating

p2 plays B with p p2 plays F with 1-p

Us(B) cetility of player 1 to play B /
given that player 2 plays B and F with (p. 1-p)

Uz(F) - whility of pl to play F given that p2 plays B and F with (p, 1-p)

Us(B): p1 plays B

2 * p + 0 * (1-p)probability payoff p1 gets when that p2 plays B p2 mays B.

payoff p 1 probability
gets when that på
p2 plays F plays F

P2 plays B

p2 plays F.

U1(F) (p1 plays F

By making pre indifferent, let's find his p:

U,(B)= Ua(F)





NEERING BUSINESS PERFORMANCE



@ predator vs prey

pred prey p 1-P =

pred prey Active Passive

Passive 2,-5 3,-6

1-9 Passive 3,-2 -1,0

prey plays A with p mey plays P n. th 1-p

pried plays A with a pried plays P with 1-q

predator plays A:

prey A: p, gets 2

prey P: 1-p, gets 3

predator plays P: prey 4: p, gets 3 prey P, 1-p, gets -1

p.2 + (1-p).3 = p43 + (1-p)(-1) $p = \frac{4}{5}$

predator plays A with 5 /5-

prey plays A pred A: 9, gets -5 pred P: 1-9, gets -2

prey prays P
pred A: q, gets -6
pred P: 1-q, gets O

q. (-5) + (1-q). (-2)=
= q(-6) + (1-q).0

Q=2/3

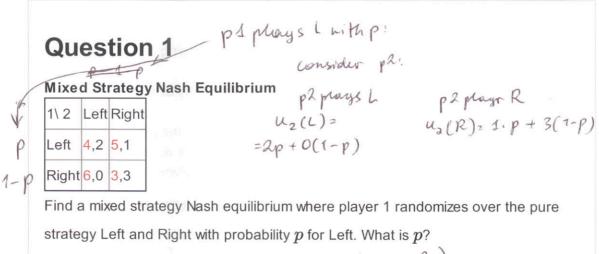
prey prays A with 2/3

prays P with 1/3

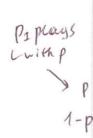
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Problem Set 2

The due date for this homework is Sun 27 Jan 2013 8:59 PM CET.



c a) 1/4 $u_a(L) = u_a(R)$ $u_a(L) = u_a(R)$ $u_$



	a	tion	1	Pa plays L nitha	P31	X. q	P+0(1-q)	- 0 -	2(1-q)
1\2	Left	Right				211-			
Left	x ,2	0,0			,	22-2			
Right	1 2	2,2			9 (x	+2)2/2/2+1	2 the	less q	

In a mixed strategy Nash equilibrium where player 1 plays Left with probability p and player 2 plays Left with probability q. How do p and q change as X is increased (X>1)?

 $(a) \ p$ is the same, q decreases.

 $_{C}$ b) p increases, q increases.

c c) p decreases, q decreases.

12! 2p+0 = 0+2(p-1)

R

Loesn't depend on x,

Vernouns the same

c d) p is the same, q increases.

Question 3

Employment

- There are 2 firms, each advertising an available job opening.
- Firms offer different wages: $w_1=4$ and $w_2=6$.
- There are two unemployed workers looking for jobs. They simultaneously apply to either of the firms.
 - If only one worker applies to a firm, then he/she gets the job
 - If both workers apply to the same firm, the firm hires a worker at random and the other worker remains unemployed (and receives a payoff of 0).

Find a mixed strategy Nash Equilibrium where p is the probability that worker 1 applies to firm 1 and q is the probability that worker 2 applies to firm 1.

applies to firm 1 and
$$q$$
 is the probability that worker 2 applies to firm 1.

C a) $p = q = 1/2$; where $q = 1/3$ is the probability that worker 2 applies to firm 1.

C b) $p = q = 1/3$; if $q = 1/3$ is the probability that worker 2 applies to firm 1.

C a) $p = q = 1/2$; where $q = 1/3$ is the probability that worker 2 applies to firm 1.

P is $q = 1/3$ if $q = 1/3$ if $q = 1/3$ is $q = 1/3$ if $q = 1/3$ if $q = 1/3$ if $q = 1/3$ is $q = 1/3$ if $q = 1/$

Question 4

Treasure

- A king is deciding where to hide his treasure, while a pirate is deciding where to look for the treasure.
- The payoff to the king from successfully hiding the treasure is 5 and from having it found is 2.
- The payoff to the pirate from finding the treasure is 9 and from not finding it is
 4.
- The king can hide it in location X, Y or Z.

Suppose the pirate has two pure strategies: inspect both X and Y (they are close together), or just inspect Z (it is far away). Find a mixed strategy Nash equilibrium where p is the probability the treasure is hidden in X or Y and 1-p that it is hidden in Z (treat the king as having two strategies) and q is the probability that the pirate inspects X and Y:

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Homework | Game Theory | $\frac{1}{2}$ | $\frac{1$

Question 5

king: hide in Xy hide in 2 2q+5(1-8) = 5q+2(1-q) -2q+5=3q+2,6q23,q21/2

Treasure

- A king is deciding where to hide his treasure, while a pirate is deciding where to look for the treasure.
- The payoff to the king from successfully hiding the treasure is 5 and from having it found is 2.
- The payoff to the pirate from finding the treasure is 9 and from not finding it is 4.
- The king can hide it in location X, Y or Z.

Suppose instead that the pirate can investigate any two locations, so has three pure strategies: inspect XY or YZ or XZ. Find a mixed strategy Nash equilibrium where the king mixes over three locations (X, Y, Z) and the pirate mixes over (XY, YZ, XZ). The following probabilities (king), (pirate) form an equilibrium:

- o b) (4/9, 4/9, 1/9), (1/3, 1/3, 1/3);
- c) (1/3, 1/3, 1/3), (2/5, 2/5, 1/5);
- a) (1/3, 1/3, 1/3), (4/9, 4/9, 1/9);
- □ In accordance with the Honor Code, I certify that my answers here are my own work.

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