

Problem Set 4

1. Find the Nash Equilibria of the following games:

(a) Prisoners' Dilemma:

	L	R
T	5, 5	-1, 7
B	7, -1	1, 1

(b) Chicken Game:

	L	R
T	4, 4	1, 6
B	6, 1	-3, -3

(c) Battle of Sexes:

	L	R
T	3, 1	0, 0
B	0, 0	1, 3

(d) Matching of Pennies:

	L	R
T	-1, 1	1, -1
B	1, -1	-1, 1

2. Consider a Cournot game with N firms. Suppose that all firms have identical unit costs given by c . Inverse demand is given by $P = a - Q$, where $a > c \geq 0$ and $Q = \sum_{i=1}^N q^i$.

(a) Find the Nash equilibrium of this game.

(b) What happens to P as $N \rightarrow \infty$.

3. Consider a repeated game with the Cournot game as the stage game. Find the value of the worst subgame perfect equilibrium payoff for firm i , for a given discount δ .

4. Consider the repeated game with the Prisoners' Dilemma as stage game, with discounting. Find a Nash equilibrium that is not subgame perfect. Prove that is a Nash equilibrium, but it is not subgame perfect.

5. Consider the following two-player, two-period game:

- In the first period, they play the game:

	L	R
T	3, 3	1, 4
B	4, 1	2, 2

- In the second period, they play the game:

	<i>l</i>	<i>r</i>
<i>t</i>	2, 2	0, 0
<i>b</i>	0, 0	1, 1

- The final payoff is the sum of the payoffs in the two periods (i.e. $\delta = 1$).
 - At the end of the first period, the players are informed of the action profile in that period.
- (a) Find a Nash equilibrium that is not subgame perfect.
- (b) Find all the subgame perfect Nash equilibria in which action profile (T, L) is played in the first period.