Microeconomics for Business
Practice Session 3

Instructor: Eloisa Campioni
TA: Ugo Zannini
University of Rome "Tor Vergata"

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Esercizio 1. Show that there are no mixed-strategy Nash equilibria in the Prisoners' Dilemma

	Mum	Fink
Mum	$-1,-1$	$-9,0$
Fink	$0,-9$	$-6,-6$

and in

	L	M	R
U	1,0	1,2	$0,1$
D	$0,3$	$0,1$	$2,0$

Esercizio 2. Consider the following finite version of the Cournot duopoly model in an environment with inverse demand $P(Q) = a - Q$ and cost function cq_i for $i = 1, 2$.
Suppose each firm must choose either half the monopoly quantity, $\frac{q_M}{2} = \frac{a-c}{4}$, or the Cournot equilibrium quantity, $q_c = \frac{a-c}{3}$. No other quantities are feasible. Show that this two-action game is equivalent to the Prisoners' Dilemma: each firm has a strictly dominated strategy, and both are worse off in equilibrium than they would be if they cooperated.

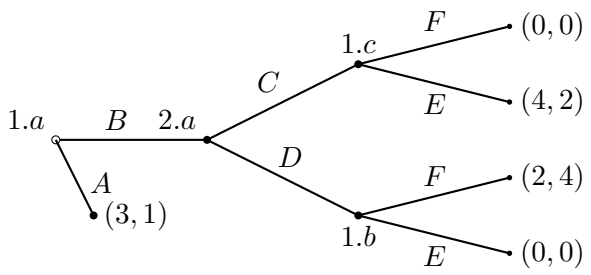
Esercizio 3.
Consider the following extensive form game. Characterize:

a. the pure-strategy subgame perfect Nash equilibria of the game;

b. write down the normal form representation of the same game, identifying the strategies of every player;

c. compute the Nash equilibria of the game, and compare them with the results in a.

Esercizio 4. Three oligopolists operate in a market with inverse demand given by $P(Q) = a - Q$, where $Q = q_1 + q_2 + q_3$ and q_i is the quantity produced by firm i. Each firm has a constant marginal cost of production, c, and no fixed cost. The firms choose their quantities as follows: (1) firm 1 chooses $q_1 \geq 0$; (2) firms 2 and 3 observe q_1 and then simultaneously choose q_2 and q_3, respectively. What is the subgame-perfect Nash equilibrium?


1.a
B
2.a
A
(3, 1)
C
D
1.c
1.b
F
E
F
E
(0, 0)
(4, 2)
(2, 4)
(0, 0)