# Microeconomics for Business
# Practice Session 1

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## Exercise 1

In the following normal-form game, what strategies survive iterated elimination of strictly dominated strategies? What are the pure-strategy Nash equilibria?

| | $L$ | $C$ | $R$ |
|---|---|---|---|
| $T$ | $2,0$ | $1,1$ | $4,2$ |
| $M$ | $3,4$ | $1,2$ | $2,3$ |
| $B$ | $1,3$ | $0,2$ | $3,0$ |

## Exercise 2

Anne and Bob are trying to decide on an evening's entertainment. In particular, they must choose to attend either the opera or a prize fight. Both players would rather spend the evening together than apart, but Bob would rather prefer they be together at the prize fight while Anne would rather prefer they be together at the opera, as represented in the payoff matrix below. Let Anne be the row player, and Bob the column player. What are the Nash equilibria of this game?

| | *Opera* | *Fight* |
|---|---|---|
| *Opera* | $2,1$ | $0,0$ |
| *Fight* | $0,0$ | $1,2$ |

## Exercise 3

Consider the following situation: one Euro should be divided between two players (player 1 and player 2). Player 1 makes an offer which specifies how much of the euro he is willing to give to player 2. Player 2, without observing the offer made by player 1, defines the minimum amount she is willing to accept. For both players, the admissible offers are: 0, 0.25, 0.50, 0.75 e 1 Euro. If player 1 offers at least the amount player 2 is willing to accept, then an agreement is achieved and the Euro is divided according to the offer made by player 1. Otherwise no agreement is achieved and both players get nothing.
Represent this game in strategic form. In addition, what are the Nash equilibria of this game?

## Exercise 4

In a market there are only two firms (let's denote them as firm 1 and firm 2). For both firms the cost function is $C(q_i) = cq_i$ for $i = 1, 2$ and $c = 10$; while the inverse demand function is:

$$P(Q) = \begin{cases} a - bQ & \text{if } Q \leqslant \frac{a}{b} \\ 0 & \text{if } Q > \alpha \end{cases}$$

where $a = 50$, $b = 2$, and $Q = q_1 + q_2$.
Suppose that the two firms want to maximize their joint profits. Which is the quantity that each firm should produce in order to achieve such objective? Denote with $Q^m$ the level of production that maximizes the joint profits.
Now consider the same economy but with the two firms that compete à la Cournot. Show that in the equilibrium of the Cournot game, the individual profits for each firm are lower than the ones obtained in case each firm produces $\frac{1}{2}Q^m$. Why can't $\left(\frac{1}{2}Q^m, \frac{1}{2}Q^m\right)$ be a Nash equilibrium?