

Three questions with subquestions. Maximum score is 70 points. Please provide answers that are short and to the point. Irrelevant text will reduce your score. Calculators can be used but they are by no means necessary.

Question 1. During the lectures we listened a clip from the documentary “Fair Fight in the Market Place” about the Lysine cartel that took place in the early 1990s. The firms in the cartel fixed prices of lysine (an animal feed additive) that is for example used to feed chickens. In the documentary, an egg producer is interviewed about the consequences of the cartel. He says “If my costs go up, I have little choice but exert pressure in the market place I am selling into”, meaning that if his costs of growing chickens go up by a certain amount, he will promptly increase the price of eggs that he is selling by the same amount.

- A) Does this quote indicate that the egg producer’s market power is very larger or very small? Please justify your answer by using **at most three sentences**.
(10 points)

- B) We may assume that egg production is a homogenous product industry. But based on the aforementioned information, would you model the egg-production industry by using a Bertrand-competition model or a Cournot-competition model or a monopoly model? Please justify your answer by using **at most three sentences**.
(10 points)

Question 2. Consider a game depicted by Table 1. The strategy sets are $S_1 = \{\text{UP}, \text{DOWN}\}$ and $S_2 = \{\text{LEFT}, \text{RIGHT}\}$. Each cell shows the players' payoffs to each strategy profile as follows: (Player 1's payoff, Player 2's payoff). E.g., if Player 1 chooses UP and Player 2 chooses LEFT, Player 1's payoff is $u_1(\text{UP}, \text{LEFT})=3$ and Player 2's payoff is $u_2(\text{UP}, \text{LEFT})=1$.

A) Please list all Nash equilibria of the game. (20 points)

B) Suppose now that Player 2 (he) is a naïve, non-strategic player who just chooses his strategy by using some rule of thumb. In terms of the k-level model introduced to us by Ari Hyytinen in his guest lecture of behavioral game theory, Player 2 is a level-0 player. Player 1 (she) knows that Player 2 behaves non-strategically (is a level-0 player) but she cannot predict his choice. Player 1 must assume that Player 2 chooses his strategy purely accidentally. In other words, Player 1 is a level-1 player.

In this kind of context, what is the optimal strategy of Player 1? Please briefly justify your answer by using calculations or by using **at most three sentences** (10 points)

TABLE 1: A 2x2 game.

		Player 2	
		LEFT	RIGHT
Player 1	UP	(3,1)	(0,0)
	DOWN	(0,0)	(1,3)

Question 3. Please choose a whole number in the set $\{1, 2, 3, \dots, 100\}$.

- A) Five (5) exam points are awarded to 10 students participating in this exam that guess the closest to $3/2$ (i.e. 1.5) of the average of the chosen numbers of all participants in this exam. In case of a tie all students get 5 points (i.e., if, for example, 10th and 11th choices closest to $3/2$ of the average are the same number, 5 points will be awarded to 11 students. Note that you have to restrict your answer in the set $\{1, 2, 3, \dots, 100\}$, i.e., if you think that the $3/2$ of the average lies outside of the set $\{1, 2, 3, \dots, 100\}$, you should choose the closest number in the set.
(5 points)
- B) What is the unique pure strategy Nash equilibrium in the game that you just played in part A) of Question 3? (10 points)
- C) Was the game that you just played in part A) of the Question 3 a simultaneous move game or a sequential move game? Please justify your answer by using **at most two sentences** (5 points)