Exercise session #7

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Problem 1 (Bertrand price competition)

Assume the following game: two producers in the market simultaneously name their prices p_1 and p_2. Given that $MC_1 = MC_2 = c$, define and find the Nash equilibrium.

Problem 2 (Cournot quantity competition)

Given the demand function $p(q)$ and $MC = c$, firms simultaneously decide on quantities, q_1 and q_2.

1. Recall the assumptions on the demand function.
2. Define the Nash equilibrium here.
3. Show that the resulting price $p^* > p^{pc}$, where p^{pc} is the perfect competition price.
4. Show that $q_1^* + q_2^* > q^m$, where q^m is the monopoly quantity.
5. For $p(q) = A - Bq$ find q_1^*, q_2^*, p^*, π_1^* and π_2^*.

Problem 3 (Prisoner's dilemma)

You are given the following one-shot game:

	L	R
L	2 2	5 0
R	0 5	1 1

1. Find the Nash equilibrium. Is it the maximum payoffs the players can get?
2. Suppose that this game is played repeatedly. Incorporate the possibility of cooperation and compute the payoffs from playing (L, L) and (R, R)?
3. Change the payoffs of this game to generate the possibility of retaliation (tit-for-tat strategy). Under what conditions is playing (L,L) sustainable when the game is played infinitely?

Problem 4 (Repeated interaction in duopoly)

Find such values of σ, for which playing the Nash reversion strategy in Problem 2 is sustainable for both players.