Exam in ECON3220/4220, Fall 2021- postponed

Problem 1 (Microeconomic theory). Weights are as specified.

Part A (30%):

Philip has the following expenditure function:

$$e(p_1, p_2, u) = u(p_1 + p_2).$$

A1 (7%): Derive Philip's Hicksian demands of the goods x_1 and x_2.

A2 (8%): How does the demand of Philip change with prices? Discuss in terms of complementarity/substitutability between the goods.

A3 (8%): Philip's preferences are such that $(x_1, x_2) \succsim (x_1', x_2')$ if and only if $\min\{x_1, x_2\} \geq \min\{x_1', x_2'\}$. Draw the indifference curves and show that these preferences satisfy completeness and transitivity.

A4 (7%): What is the deadweight loss of taxing one of the goods that Philip consumes? Relate your answer to the inverse elasticity rule.

Part B (20%):

A price-taking firm produces books with capital K and labor L. The production function is

$$F(K, L) = K^{\frac{1}{4}} L^{\frac{1}{4}}.$$

B1 (8%): Assume the firm has an order for 5 books and that capital and labor have unit prices $r = w = 30$. Find the optimal levels of labor and capital and determine the cost for the firm of producing 5 books.

B2 (6%): Show that the production function is decreasing returns to scale.

B3 (6%): Compute the elasticity of substitution between inputs.

Problem 2 (Game theory and the economics of information)

Part A: Rationalizable strategies and mixed-strategy Nash equilibrium

Weight: 16% *(with equal weight = 8% on each subproblem)*

Consider the following normal form game.

	L	C	R
U	3, 2	0, 2	1, 3
M	0, 3	0, 1	4, 0
D	1, 0	4, 1	2, 3

(a) What strategies are rationalizable for each of the two players?

(b) The game has a unique Nash equilibrium, in mixed strategies. Find the mixed strategies that the players use in this Nash equilibrium.

Part B: Auction under incomplete information

Weight: 10%

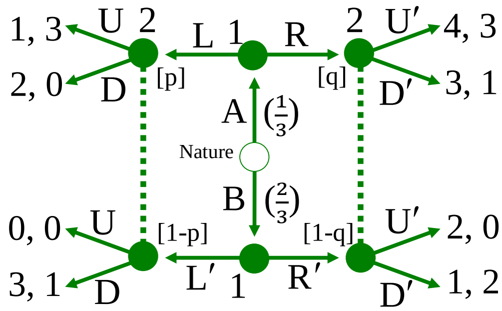
Consider a private value first-price sealed-bid auction with two bidders who both are risk-neutral, have valuations that are uniformly distributed on the interval $[0, 1]$ and can submit bids in the interval $[0, 1]$. In a private value first-price sealed-bid auction the bidders are first informed of their valuations, they then submit their bids, the item is assigned to the bidder with the highest bid (and with equal probability to each if the two bids are equal), and the winner pays the highest bid (i.e., his own bid). The utility of the winner equals his/her valuation minus the payment, while the other bidder has zero utility.

Find a Bayesian Nash equilibrium of this game. How do the bidders bid in this equilibrium? Why do they bid less than their valuations?

Part C: Perfect Bayesian equilibrium

Weight: 24% *(with equal weight = 8% on each subproblem)*

Consider the following extensive form game, where the first number is the payoff of player 1 and the second number is the payoff of player 2. Notice that the probability that player 1 is of type A is $\frac{1}{3}$, and the probability that player 1 is of type B is $\frac{2}{3}$.



(a) Show that this game has a separating Perfect Bayesian equilibrium.

(b) Show that this game has a pooling Perfect Bayesian equilibrium.

(c) Is one of these Perfect Bayesian equilibria more reasonable than the other?