LECON2112 Advanced Microeconomics II

– Assignment 1 –

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Deadline: Monday, February 12, 2024 at 5pm.

Instructions: To be submitted via Moodle as a single file (including your name and NOMA).

Exercises[1]

7D1. In a game where player i has N information sets indexed $n = 1, ..., N$ and M_n possible actions at information set n, how many strategies does player i have?

8B2. **(a)** Argue that if a player has two weakly dominant strategies, then for every strategy choice by his opponents, the two strategies yield him equal payoffs.

(b) Provide an example of a two-player game in which a player has two weakly dominant pure strategies but his opponent prefers that he plays one of them rather than the other.

8B3. Consider the following auction (known as a *second-price*, or *Vickerey*, auction). An object is auctioned off to I bidders. Bidder i's valuation of the object (in monetary terms) is v_i. The auction rules are that each player submits a bid (nonnegative number) in a sealed envelope. The envelopes are then opened, and the bidder who has submitted the highest bid gets the object but pays the auctioneer the amount of the *second-highest* bid. If more than one bidder submits the highest bid, each gets the object with equal probability. Show that submitting a bid of v_i with certainty is a weakly dominant strategy for bidder i. Also argue that this is bidder i's unique weakly dominant strategy.

8Bd. Consider the following game. There are five players, three male singles 1, 2 and 3, and two female singles, a and b. The preferences $\succ_1$, $\succ_2$, $\succ_3$, $\succ_a$ and $\succ_b$ of those five players vis-à-vis a partner from the other gender and remaining single (which is denoted $\emptyset$) are as follows:

$$b \succ_1 a \succ_1 \emptyset \qquad\qquad 1 \succ_a 2 \succ_a 3 \succ_a \emptyset$$
$$a \succ_2 b \succ_2 \emptyset \qquad\qquad 2 \succ_b 1 \succ_b 3 \succ_b \emptyset$$
$$a \succ_3 b \succ_3 \emptyset$$

[1]Source: Mas-Colell, Whinston, & Green, 1995. "Microeconomic Theory," Oxford University Press.

In stage 1, players 1, 2 and 3 propose the name of one female player, a or b. In stage 2, each player among a and b, if she got two or three propositions in stage 1, chooses one of them. Then, couples are formed. In case one female player did not get any proposition, she remains single. If she gets one proposition, she is married to the player having made the proposition. If she gets several propositions, she is married to the proposition she has chosen in stage 2.

(a) What is the strategy set of a male player?

(b) What is the strategy set of a female player?

(c) Does player 1 have a weakly dominated strategy? A dominant strategy? Motivate your answer.

(d) Does there exist a strategy profile of weakly *undominated* strategies whose outcome is that 3 gets married with a? If yes, give one such strategy profile, otherwise, explain. (Note: An undominated strategy is a strategy that is not dominated.)