MICROECONOMICS II.I – PROBLEM SET 3

NEW YORK UNIVERSITY, A.Y. 2012-2013

EXERCISE 1

Consider a roll-call vote with three players 1, 2 and 3 and three alternatives A, B and C. Player 1 casts a vote for some alternative, 2 votes after observing 1's vote and 3 votes after seeing the votes of 1 and 2. An alternative wins if it receives two or more votes. If there is a tie, the alternative preferred by Player 1 wins. Assume no player is indifferent over any two alternatives.

(a). Can this game be solved by backward induction? Explain.

(b). Now assume there is a Condorcet cycle (that is, no two players have the same alternative ranked first, no two players have the same alternative ranked second and no two players have the same alternative ranked third)

i. Show that voter 1 always gets her second-ranked alternative.

ii. Can player 2 ever get his worst alternative? Can player 3 ever get his worst alternative?

EXERCISE 2: HOTELLING ON A CIRCLE

A unit mass of consumers are spread evenly around a circle of circumference 1. There are three sellers that simultaneously choose locations on the circle (one point on which is labeled zero, for your convenience). Consumers buy from the closest seller; if two sellers locate in the same place, they split evenly the demand generated by that location.

(a). Find at least 2 Nash equilibria in pure strategies.

(b). What can we say about seller 1's payoff in different pure strategy NE?

EXERCISE 3

Consider two oligopolistic firms with identical constant marginal costs $c > 0$, facing a market inverse demand function $p = a - q_1 - q_2$, with $a > c$. The firms play the following three-stage game Γ. In stage one, Firm 2 costlessly chooses $K \in \mathbb{R}_+$, that we interpret as an upper bound on Firm 2's capacity to produce. In stage two, Firm 1, having observed 2's choice of K, chooses output $q_1 \geq 0$. In stage three, having observed q_1, Firm 2 chooses $q_2 \in [0, K]$. Firm i realizes profits $u_i = (a - q_1 - q_2 - c)q_i$. To summarize, stages two and three comprise a standard Stackelberg model, except that Firm 2 must respect the capacity constraint it chose earlier. We are interested in the subgame perfect solutions of Γ.

Due on Feb 25th by 7pm in Jacopo's mailbox (19W4 6th floor).

(*a*). Will Firm 2 do at least as well as in a standard Stackelberg game (one without stage one)? Will Firm 2 choose K large enough that it is not a binding constraint in equilibrium?

(*b*). How do Firm 1's equilibrium output and profits compare to those in the standard Stackelberg model? Explain carefully.