EC3322
Industrial Organization I
Semester 1, 2015-2016
Tutorial #7

SOLUTIONS

2. Cournot since in the short run Nintendo was not able to satisfy quantity demanded at the new price.

3. (a) A Nash equilibrium is $p_1^* = 10, p_2^* = 10, p_3^* > 10$. Neither firm 1 nor firm 2 can increase profit by raising price while decreasing price would reduce profits. Firm 3 chooses a price that results in zero sales. Output is $Q^* = 120 - 4 * 10 = 80$, which firm 1 and 2 split. Profits are $\pi_1^* = \pi_2^* = -40, \pi_3^* = -50$.

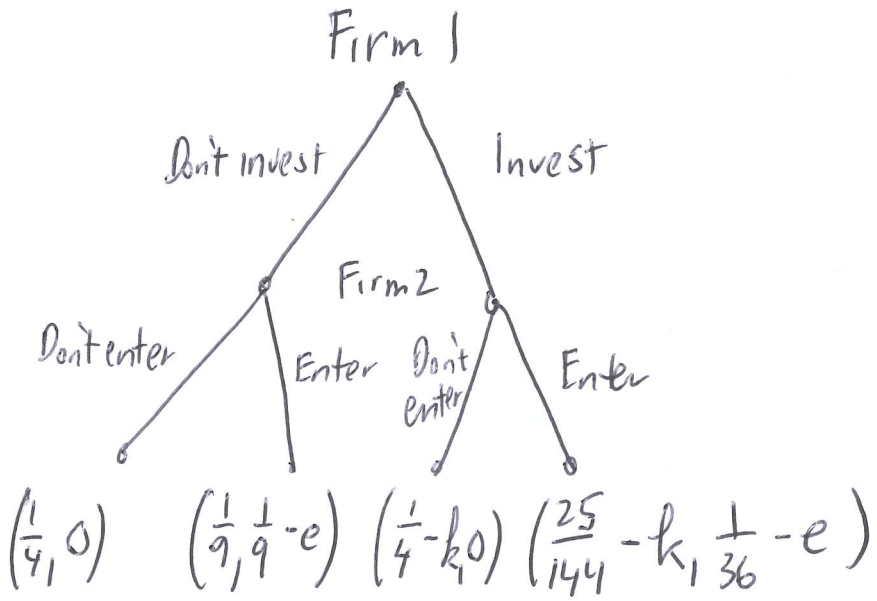
   (b) Firm 1 can capture the entire market at the monopoly price 20 since firm 3's marginal cost is 25. So the Nash equilibrium is $p_1^* = 20$ and $p_3^* > 20$. Output is $Q^* = 120 - 4 * 20 = 40$, all supplied by firm 1. Profits are $\pi_1^* = 20 * 40 - 10 * 40 - 40 = 360$ and $\pi_3^* = -50$.

4. (a) The equilibrium price is $p^* = 3$. This is the price that clears the maximum output the firms can produce, 6.

   (b) The residual demand curve of either firm is $MR = 6 - 2q$, which equals MC for $q = 3$. Decreasing price lowers profit because output does not increase and revenue is lower. Increasing price lowers profit since $MR > MC$ for $q < 3$. Therefore, neither firm has an incentive to deviate and $p_1 = p_2 = 3$ is the Nash Equilibrium.

   (c) The residual demand of firm 1 if firm 2 produces 3 units is $q_2 = 6 - p$ and marginal revenue is $MR_2 = 6 - 2q_2$. For $q_2 = 5$, $MR_2 = -4 < MC$, indicating that firm 2 should increase price. Therefore, $p_1 = p_2 = 1$ is not the Nash Equilibrium.

5. The game can be written in a game tree as:



(a) Set $k = 0$ in the game tree and then use backwards induction to see that firm 1 invests and firm 2 enters in the equilibrium. Firm 1 sells $q_1^* = \frac{5}{12}$ units and firm 2 sells $q_2^* = \frac{1}{6}$ at price $p^* = \frac{5}{12}$. Firm 1 earns profits of $\pi_1^* = \frac{25}{144}$, and firm 2 earns profits of $\pi_2^* = \frac{1}{36} - e$.

(b) Firm 2's dominant strategy is to enter. So firm 1 is comparing a payoff of $\frac{25}{144} - k$ (invest) to $\frac{1}{9}$ (don't invest). Thus, firm 1 does not invest if $k > \frac{1}{16}$.