Solution (sketch only) sample 2

Pb #1 :

1 - Cournot competition. Firm 1 $\max_{q_1} (40-q_1-q_2)q_1 - 10q_1$

so $BR_1(q_2) = 15 - \frac{q_2}{2}$. similarly $BR_2(q_1) = 15 - \frac{q_1}{2}$

Nash is $q_1^* = q_2^* = 10$ then $p^* = 20$

$\pi_1^* = \pi_2^* = 100$

2 - Bertrand. $BR_1(p_2) = p_2 - \varepsilon$ $BR_2(p_1) = p_1 - \varepsilon$

so Nash is $p_2 = p_1 = 10$ and total quantity is 30

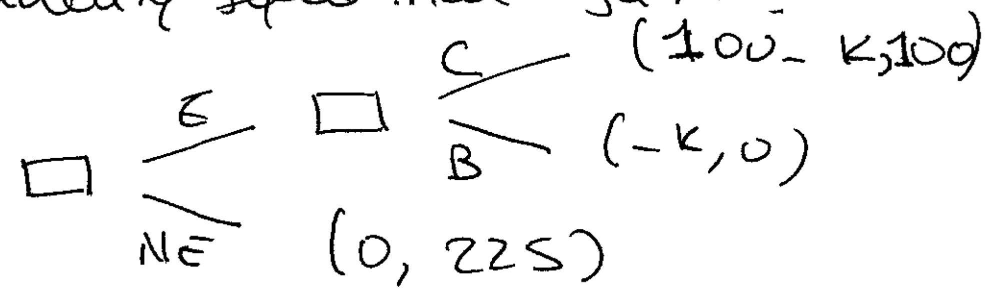
$\pi_1 = \pi_2 = 0$

3 - Collusion $\max_{q} (40-q)q - 10q \Rightarrow q^M = 15$

$p^M = 25$ Joint profit is 225

4 - see class notes.

Pb #2 : use profits from Pb #1. This is the following sequential game



if $100 - K > 0 \Rightarrow$ entry and Cournot

if $100 - K < 0 \Rightarrow$ no entry.

Pb #3 : use profits from Pb #1 in question 2 –

1 – At stage 2, $\max_{q_1} (40 - q_1 - q_2) \times q_1 - w q_1$ and

$BR_1(q_2) = \frac{40-w}{2} - \frac{q_2}{2}$. Similarly $BR_2(q_1) = \frac{40-w}{2} - \frac{q_1}{2}$

Nash is $q_1^* = q_2^* = \frac{40-w}{3}$

At stage 1, $\max_{w} 2\, \frac{40-w}{3} \times (w - 10) \Rightarrow w = 25$

$q_1^* = q_2^* = 5 \quad p^* = 30$

2 – If integration, then $\max_{q} (40-q) \times q - 10q \Rightarrow q^{\eta} = 15$

$p^{\eta} = 25$

Pb #4

1 – $p + x^2 = p + (x - k)^2$ @ $x^* = \frac{k}{2}$

demand for firm 1 is x^*

demand for firm 2 is $1 - x^*$

2 – Firm 2 $\max_{k>0} (1 - \underbrace{x^*}_{=\frac{k}{2}}) \times p - 10 \times k \Rightarrow k = \varepsilon$

0 ε

3 – more travel if $(0, \varepsilon)$ than $(0, 1)$: less efficient –