SOLUZIONE PROBLEM SET 4

1)

$s_1 = (T, B)$

$s_2 = (R, L)$

(x, y) means x if $t=1$, y if $t=2$

a) Player 1 plays B when $t_1 = 2$
Player 2 plays R when $t_2 = 1$

$$P_2(B, R) = P_2(t_1 = 2, t_2 = 1) = \frac{3}{4} \cdot \frac{3}{4} = \frac{9}{16}$$

b) Player 1 plays B when $t_1 = 2$
Player 2 plays L when $t_2 = 2$

$$P_2(B, L) = P_2(t_1 = 2, t_2 = 2) = \frac{3}{4} \cdot \frac{1}{4} = \frac{3}{16}$$

c) $$E_2(s_1, s_2) = \frac{3}{16} \cdot 0 + \frac{1}{16} \cdot 1 + \frac{9}{16} \cdot 1 + \frac{3}{16} \cdot 0 = \frac{5}{8}$$

d) $$P_2(B, R) = \frac{1}{10}$$

$$P_2(B, L) = \frac{4}{10}$$

$$E_2 = \frac{4}{10} \cdot 0 + \frac{1}{10} \cdot 1 + \frac{1}{10} \cdot 1 + \frac{4}{10} \cdot 0 = \frac{1}{5}$$

Ex 2

	L L		L R		R L		R R	
T T	~~20~~ 16	31/16	15/16	24/16	5/16	7/16	0	0
T B	8/16	7/16	15/16	12/16	29/16	10/16	36/16	15/16
B T	12/16	24/16	10/16	20/16	6/16	9/16	4/16	5/16
B B	0	0	10/16	8/16	~~30~~ 16	12/16	38/16	20/16

TWO BAYESIAN NASH EQUILIBRIA

Eq 1: $s_1 = (T, T)$ $s_2 = (L, L)$

Eq 2: $s_1 = (B, B)$ $s_2 = (R, R)$

Ex 3

highest if high demand q_{1H} q_2

if low demand q_{1L} q_2

problem of firm 1 when demand is high

$$\max_{\{q_{1H}\}} \; q_{1H}\left(100 - q_{1H} - q_2 - 1\right)$$

problem of firm 1 when demand is low

$$\max_{\{q_{1L}\}} \; q_{1L}\left(50 - q_{1L} - q_2 - 1\right)$$

problem of firm 2

$$\max_{\{q_2\}} \; \frac{1}{3} q_2\left(100 - q_{1H} - q_2 - 1\right) + \frac{2}{3} q_2\left(50 - q_{1L} - q_2 - 1\right)$$

USING FIRST ORDER CONDITIONS

$$q_{1H} = \frac{99 - q_2}{2}$$

$$q_{1L} = \frac{49 - q_2}{2}$$

$$q_2 = \frac{65,\bar{6} - \frac{1}{3} q_{1H} - \frac{2}{3} q_{1L}}{2}$$

$$q_2 = 23$$

$$q_{1H} = 38$$

$$q_{1L} = 13$$

EX 4)

a)

$S_1 = \{T, M, B\}$

$S_2 = \{(L,L), (L,C), (L,R), (C,L), (C,C), (C,R), (R,L), (R,C), (R,R)\}$

b)

	LL	LC	LR	CL	CC	CR	RL	RC	RR
T	2 0	1,5 0.5	2 0	1.5 0.5	1 1	1,5 0.5	3 1	2,5 1,5	3 1
M	3, 4	2 , 3	2,5 3,5	2 3	1 2	1.5 2.5	2.5 3,5	1.5 2.5	2 3
B	1, 3	0.5 2.5	2 1.5	0.5 2.5	0 2	1.5 1	2 1.5	1,5 1	3 0

TWO BAYESIAN NASH EQUILIBRIA

1) $S_1 = T$ $S_2 = (RC)$

2) $S_1 = M$ $S_2 = (LL)$