Recitations 17

[Definitions used today]

- Weak and Strict Dominance,IESDS, Rationalizability

Question 1

Find all the solutions obtained by IESDS.

	L	R
T	3,0	0,1
M	0,0	3,1
B	1,1	1,0

Question 2

Find all the solutions using IESDS and IEWDS

a)

	L	R
T	1,2	2,2
B	1,2	1,1

b)

	L	R
T	1,1	0,0
B	0,0	0,0

c)

	L	C	R
T	4,3	5,1	6,2
M	2,1	8,4	3,6
B	3,0	9,5	2,6

Question 3

Show that following three statements are equivalent:

$$u^i\left(s^i, a^{-i}\right) > u^i\left(a^i, a^{-i}\right) \quad \forall a^{-i} \in A^{-i}$$
$$u^i\left(s^i, s^{-i}\right) > u^i\left(a^i, s^{-i}\right) \quad \forall s^{-i} \in S^{-i}$$
$$u^i\left(s^i, \mu^{-i}\right) > u^i\left(a^i, \mu^{-i}\right) \quad \forall \mu^{-i} \in \Delta\left(A^{-i}\right)$$

Question 4

Let C_T be the outcome of a complete IESDS and let R be the unique maximal rationalizable set. Show that $C_T = R$

Question 5 [~ Midterm 2020]

Guess the average game goes as follows:

- Each player $i \in I$ picks simultaneously an integer x_i between 1 and 999. Hence, $A_i = \{1, \dots, 999\}$.
- Given $x = (x_1, \dots, x_n) \in \{1, \dots, 999\}^n$, let

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

- $\theta \in (0, 1)$ and ket $\theta = \frac{2}{3}$
- The winners are those players whose ballots are closest to $\theta\bar{x}$. If there is a tie they share equally.

1. for $n = 3$ use **one shot deviation** to find NE.
   One shot deviation principle is based on following observation: A strategy profile is a Nash equilibrium if no player has incentive to deviate from his strategy given that the other players do not deviate. [1]
2. solve it for any n using IESDS
3. Does the value of θ matter, and if so how?
4. How solution of IESDS changes if we change rule that if a tie happens no one gets anything?

[1] The one-shot deviation principle is fundamental to the theory of extensive games. It was originally formulated by David Blackwell (1965) in the context of dynamic programming. As the strategy of other players induces a normal maximization problem for any one player, we can formulate the principle in the context of a single-person decision tree