

Problem Set 1

- 1) Represent the following situation using the normal form representation. Find all Nash equilibria.

Two individuals are working on a join project. They can devote it either high effort or low effort. If both devote high effort the outcome of the project is of high quality and they each one receives 100\$. If one or both devote low effort, the outcome of the project is of low quality and each one will receive 50\$. The opportunity cost to provide high effort is 30. The opportunity cost to provide low effort is 0.

- 2) Consider the following game:

| | | Player 2 | |
|----------|---|----------|------|
| | | L | R |
| Player 1 | T | 1, 1 | 2, 0 |
| | B | 0, 2 | 2, 2 |

- a) Find all Nash Equilibria and say if they are strict or not
- b) Show that Iterated elimination of no strictly dominated strategies eliminates a Nash equilibrium

- 3) In the following normal form game find the set of rationalizable strategies? What are the Nash equilibria?

| | L | C | R |
|---|------|------|------|
| T | 2,0 | 1, 1 | 4, 2 |
| M | 3,4 | 1, 2 | 2, 3 |
| B | 1, 3 | 0, 2 | 3, 0 |

- 4) Two players (1 and 2) have to divide £10 between themselves using the following procedure:

Each player names a integer number between 0 and 10. Denote by a_1, a_2 the number stated respectively by player 1 and 2.

If $a_1 + a_2 \leq 10$, they get a_1, a_2 .

If $a_1 + a_2 > 10$ and $a_1 \leq 5$, player 1 gets a_1 and player 2 gets $10 - a_1$.

If $a_1 + a_2 > 10$ and $a_2 \leq 5$, player 2 gets a_2 and player 1 gets $10 - a_2$.

If $a_1 > 5$ and $a_2 > 5$, they both get 5.

- a) Determine the best response of each player to each of the other player's actions
- b) Plot the best responses of both players in a diagram where a_1 is on the horizontal axis and a_2 is on the vertical axis.
- c) Find all Nash equilibria.