

Big Assumptions of Game Theory

Utility: Each player has a utility function and the only objective of the players is to maximize his/her utility.

Rationality / selfishness: players only want to maximize his/her utility.

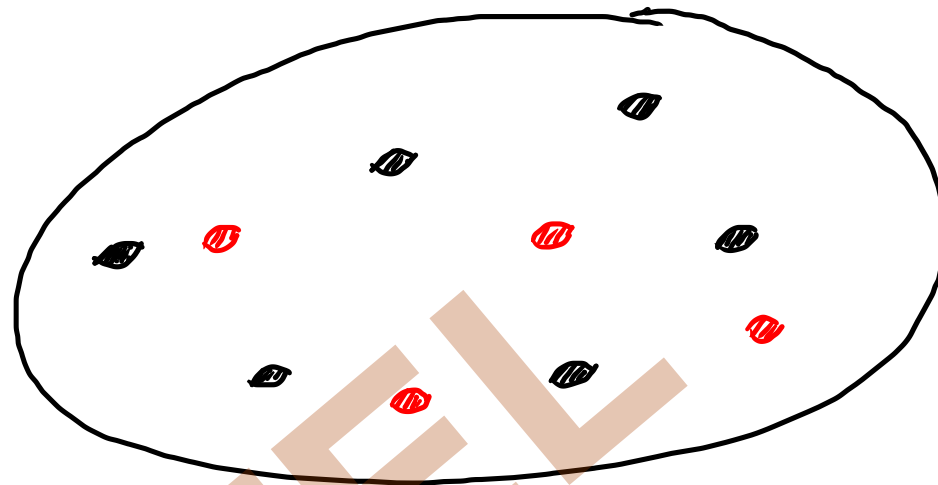
Intelligence: players have infinite computational power.

Common Knowledge: The game, i.e. the set of players, the strategy set of each player, and the utility function of each player is "common knowledge"

Some information I is a common knowledge of the players means each player knows I , each player knows that each player knows I , ... ("each player knows that") ^{i} each player knows I .

Puzzle:

50 black-eyed people
50 red-eyed people.
no reflecting surface.



"there is at least one red-eyed people in the island".

Solution: On the 50-th day, all 50 red-eyed people will
suicide.

Ex: (Battle of Sexes)

player 1
(husband)

		player 2 (wife)	
		A	B
A		2, 1	0, 0
B		0, 0	1, 2

(Coordination games.)

Ex:

		A	B
A		10, 10	0, 0
B		0, 0	1, 1

"Anti-coordination game" / Zero sum game / Strictly competitive game

Ex: Matching Pennies

	A	B
A	1, -1	-1, +1
B	-1, +1	1, -1

Sum of utilities of the players in each strategy profile is zero.

Ex: Rock-paper-Scissors

	Rock	Paper	Scissor
Rock	0, 0	-1, 1	1, -1
Paper	1, -1	0, 0	-1, 1
Scissor	-1, 1	1, -1	0, 0