ECE 457A TUTORIAL 07: GAME THEORY

30-Oct-2023

Danial Sadrian Zadeh,
Department of Electrical and Computer Engineering

UNIVERSITY OF WATERLOO | FACULTY OF ENGINEERING

Strategies To Solve Examples

- Dominant Strategy
  - It yields the best payoff for the player, regardless of other players' strategies.
- Iterated-Dominance (Dominated) Strategy
  - There is another strategy that performs at least as good, regardless of other players' strategies.
- Nash Equilibrium
  - A strategy profile is NE if no player wants to unilaterally deviate to another strategy, given other players' strategies.
  - No player can gain by deviating alone, i.e., by changing his or her strategy single-handedly.

Example 1 (Prisoner's Dilemma) - DS

		Prisoner 2: Confess	Prisoner 2: Deny
Prisoner 1	Confess	-10, -10	-1, -25
	Deny	-25, -1	-3, -3

Example 1 (Prisoner's Dilemma) - IDS

		Prisoner 2: Confess	Prisoner 2: Deny
Prisoner 1	Confess	-10, -10	-1, -25
	Deny	-25, -1	-3, -3

Example 1 (Prisoner's Dilemma) - NE

		Prisoner 2: Confess	Prisoner 2: Deny
Prisoner 1	Confess	-10, -10	-1, -25
	Deny	-25, -1	-3, -3

Example 2 - DS

		Alice	
		Run	Stop
Bob	Run	1, 1	-1, -3
	Stop	2, -1	2, 3

Example 2 - IDS

		Alice	
		Run	Stop
Bob	Run	1, 1	-1, -3
	Stop	2, -1	2, 3

Example 2 - NE

		Alice	
		Run	Stop
Bob	Run	1, 1	-1, -3
	Stop	2, -1	2, 3

Example 3 - DS

		Player 2	
		X	Y
Player 1	A	5,2	4,2
	B	3,1	3,2
	C	2,1	4,1
	D	4,3	5,4

Example 3 - IDS

		Player 2	
		X	Y
Player 1	A	5,2	4,2
	B	3,1	3,2
	C	2,1	4,1
	D	4,3	5,4

Example 3 - NE

		Player 2	
		X	Y
Player 1	A	5,2	4,2
	B	3,1	3,2
	C	2,1	4,1
	D	4,3	5,4

Example 4 - DS

		Player 2		
		L	C	R
Player 1	U	1, 10	3, 20	40, 0
	M	10, 20	50, -10	6, 0
	D	2, 20	4, 40	10, 0

Example 4 - IDS

		Player 2		
		L	C	R
Player 1	U	1, 10	3, 20	40, 0
	M	10, 20	50, -10	6, 0
	D	2, 20	4, 40	10, 0

Example 4 - NE

		Player 2		
		L	C	R
Player 1	U	1, 10	3, 20	40, 0
	M	10, 20	50, -10	6, 0
	D	2, 20	4, 40	10, 0

References

- https://www.tayfunsonmez.net/wp-content/uploads/2013/10/E308SL4.pdf
- http://www.smallparty.com/yoram/classes/principles/nash.pdf