

# Introduction to Game Theory

## Basics and Related Algorithms

### 1. What is Game Theory?

Game theory is the study of mathematical models of strategic interaction among rational decision-makers. It is used in various fields such as economics, political science, and psychology.

### 2. Key Terms in Game Theory

- Players: The decision-makers in the game.
- Strategies: The possible actions each player can take.
- Payoffs: The outcomes or rewards received by players based on the strategies chosen.

### 3. Classic Games

- Prisoner's Dilemma: A scenario where two individuals act in their own self-interest but achieve a worse outcome than if they had cooperated.
- Nash Equilibrium: A situation in a game where no player can gain by unilaterally changing their strategy.

### 4. MinMax Algorithm

The MinMax algorithm is used in two-player games to minimize the possible loss for a worst-case scenario. It involves building a game tree, evaluating possible moves, and selecting the optimal strategy.

### 5. Alpha-Beta Pruning

Alpha-Beta pruning is an optimization technique for the MinMax algorithm. It reduces the number of nodes evaluated by pruning branches that cannot possibly affect the final decision.

### 6. Applications of Game Theory

Game theory is applied in economics to model market behavior, in politics for strategy formation, and in computer science for algorithm design, such as AI in games.