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# Game Theory: A Comprehensive Introduction

## 1. Players

Players are the individuals or entities who participate in the game. They are represented by the set  $N$ , where  $n \in N$  represents a player. Each player has a set of strategies available to them.

## 2. Strategy

A strategy is a plan of action that a player follows throughout the game. It specifies the player's choice of action at every information set they reach. A strategy profile is a collection of strategies, one for each player.

## 3. Payoff

A payoff is the outcome for a player at the end of the game. It is represented by a vector of values, where each value corresponds to a player's payoff. The payoff function maps strategy profiles to payoff vectors.

## 4. Nash Equilibrium

- A Nash equilibrium is a strategy profile where no player can improve their payoff by unilaterally changing their strategy. In other words, each player's strategy is a best response to the strategies of the other players.
- There may be multiple Nash equilibria in a game, or there may be none at all.
- The Nash equilibrium is a fundamental concept in game theory, as it provides a way to predict the outcome of a game.

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