

# Game Theory

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# Game Theory

## Intro

### Oskar Morgenstern & John von Neuman

*Theory of Games and Economic Behavior (1944)*

*Morgenstern : Economics part*

*Neuman : Theoretical part*



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# Game Theory

Intro

## Game Theory

: Mathematical theory of interdependent and rational decision making

: When an individual or business does something, it pursues behavior that is in its best interest

: When the result is determined not only by itself but also by the actions of other participants

: as in the game

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# Game Theory

## Key Concept

A game consist of

1. several participants (actors)
2. actions (strategy) that participants can perform
3. payoff of participants who are subject to a combination of strategies

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## Game Theory

Key Concept

According to the GAME FORMS

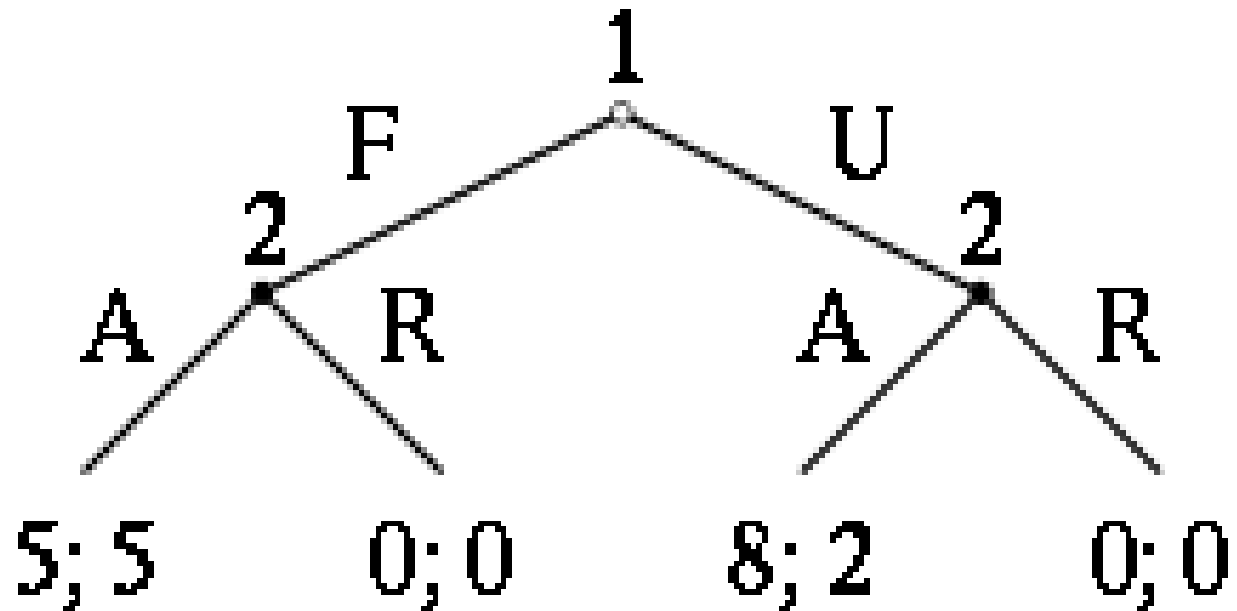
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# Game Theory

## Key Concept

### Extensive form

- Formalized games with order
- Each point (node) represents a point of choice for one participant



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# Game Theory

## Key Concept

Normal form

- Strategy games
- Represented by a matrix that displays participants, strategies, and rewards
- Participant's rewards corresponding to a possible combination of each action

	참가자2 왼쪽 선택	참가자2 오른 쪽 선택
참가자1 위쪽 선택	4, 3	-1, -1
참가자1 아래쪽 선택	0, 0	3, 4

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# Game Theory

## Key Concept

Characteristic function form

- Transferable utility
- No rewards are given to each individual
- Characteristic determines the compensation of each union
- Basic assumption is that an empty union gets a zero reward



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## Game Theory

Key Concept

According to the GAME TYPES

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# Game Theory

## Key Concept

### Zero-sum game

- The sum of the benefits of two people is zero
- When two people play, one person wins the game and gets one (+1) and the other person inevitably loses one (-1)

### Non-Zerosum Game

- doesn't add up to zero

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# Game Theory

## Key Concept

### Symmetric Game

→ Changing the player's position does not change the pay for the strategy

	<i>X</i>	<i>Y</i>
<i>X</i>	a, a	b, c
<i>Y</i>	c, b	a, a

### Asymmetric Game

→ Do not give participants the same strategy

→ Participants have different strategies for the opponents