

Game Theory Fundamentals

Game Theory · Answer Key · 21 Questions

1. Who is widely considered the 'father of modern game theory' and co-authored 'Theory of Games and Economic Behavior' with Oskar Morgenstern?

- A) John Nash
- B) John von Neumann**
- C) Leonid Kantorovich
- D) Herbert Simon

2. In what year was the seminal work 'Theory of Games and Economic Behavior' by John von Neumann and Oskar Morgenstern first published?

- A) 1944**
- B) 1951
- C) 1947
- D) 1955

3. What is the name of the mathematical concept, crucial to game theory, that John Nash proved the existence of in 1950?

- A) Pareto Optimality
- B) Bayes' Theorem
- C) Nash Equilibrium**
- D) Correlated Equilibrium

4. The 'Prisoner's Dilemma' is a classic example in game theory. Approximately how many years did the original formulation of the Prisoner's Dilemma suggest for each prisoner's sentence if both confess?

- A) 5 years
- B) 10 years
- C) 8 years**
- D) 2 years

5. What year did John Nash receive the Nobel Memorial Prize in Economic Sciences for his work on game theory and its applications?

- A) 1994**
- B) 1982
- C) 2001
- D) 1970

6. The concept of a 'zero-sum game' implies that the total gains of the participants are equal to the total losses. Which of these is a prominent mathematician associated with early work on zero-sum games?

- A) Amartya Sen
- B) Emil Borel**
- C) Daniel Kahneman
- D) Kenneth Arrow

7. What is the minimum number of players required for a game to be considered a 'n-player game' in game theory?

- A) 3
- B) 2**
- C) 4
- D) 1

8. In a 2x2 matrix game, if player A has two strategies and player B has two strategies, how many cells are there in the payoff matrix?

- A) 4**
- B) 2
- C) 8
- D) 6

9. The 'Shapley Value', a concept in cooperative game theory, assigns a unique distribution of a coalition's payoff among its members. Who developed this concept?

- A) Lloyd Shapley**
- B) Reinhard Selten
- C) John Harsanyi
- D) John von Neumann

10. What year did Reinhard Selten, John Harsanyi, and John Nash share the Nobel Memorial Prize in Economic Sciences for their work on game theory?

- A) 1994**
- B) 1982
- C) 2001
- D) 1970

11. In the context of game theory, a 'pure strategy' is one where a player chooses a specific action with probability 1. How many pure strategies does a player have if they can choose between two distinct actions?

- A) 1
- B) 2**
- C) 4
- D) 0

12. The 'Berkeley Gas Station Game' is a classic example illustrating competitive pricing. It demonstrates how firms might engage in price competition, often leading to lower prices for consumers. Approximately how many gas stations were in the original scenario analyzed?

- A) 50**
- B) 100
- C) 20
- D) 75

13. What is the term for a game where players have imperfect information, meaning they don't know all previous moves of other players?

- A) Cooperative Game
- B) Perfect Information Game
- C) Imperfect Information Game**
- D) Zero-Sum Game

14. The Nobel Prize in Economics was awarded to Daniel Kahneman and Vernon Smith in 2002. While Kahneman is known for behavioral economics, Smith's work heavily utilized game theory principles, particularly in what type of experimental setting?

- A) Simulations
- B) Field Experiments
- C) Laboratory Experiments**
- D) Theoretical Modeling

15. In a two-player game, the 'minimax theorem' guarantees the existence of optimal strategies for players whose objectives are to minimize their maximum possible loss. This theorem was primarily developed by which mathematician?

- A) John Nash
- B) John von Neumann**
- C) Oskar Morgenstern
- D) Emil Borel

16. What is the minimum number of players for a game to be considered a 'cooperative game' where binding agreements are possible?

- A) 1
- B) 2**
- C) 3
- D) 4

17. The concept of 'correlated equilibrium' was introduced by which game theorist in 1973?

- A) John Harsanyi
- B) Robert Aumann**
- C) Reinhard Selten
- D) Roger Myerson

18. In game theory, a 'rational agent' is assumed to make decisions that maximize their own utility. What is the typical time frame assumed for a rational agent's decision-making in many standard game theory models?

- A) Infinite time horizon
- B) Short-term only
- C) Single decision event**
- D) Immediate gratification

19. The 'Hawk-Dove game' is a simple game theory model used to study conflict and cooperation. What is the common payoff for each player if both choose the 'Dove' strategy?

- A) $V/2$**
- B) 0
- C) V
- D) $V/4$

20. The Nobel Prize in Economics was awarded to Eric Maskin, Leonid Hurwicz, and Roger Myerson in 2007 for their work on 'mechanism design'. This field is closely related to game theory and involves designing the rules of a game to achieve a desired outcome. Leonid Hurwicz was the oldest Nobel laureate to receive a prize at the time of his award. In what year was he born?

- A) 1917**
- B) 1925
- C) 1930
- D) 1920

21. In game theory, a 'Nash bargaining solution' provides a unique outcome for negotiations between two players. It is based on the product of the players' gains from agreement. Who is credited with developing this solution?

A) John Nash

B) John von Neumann

C) Lloyd Shapley

D) John Harsanyi