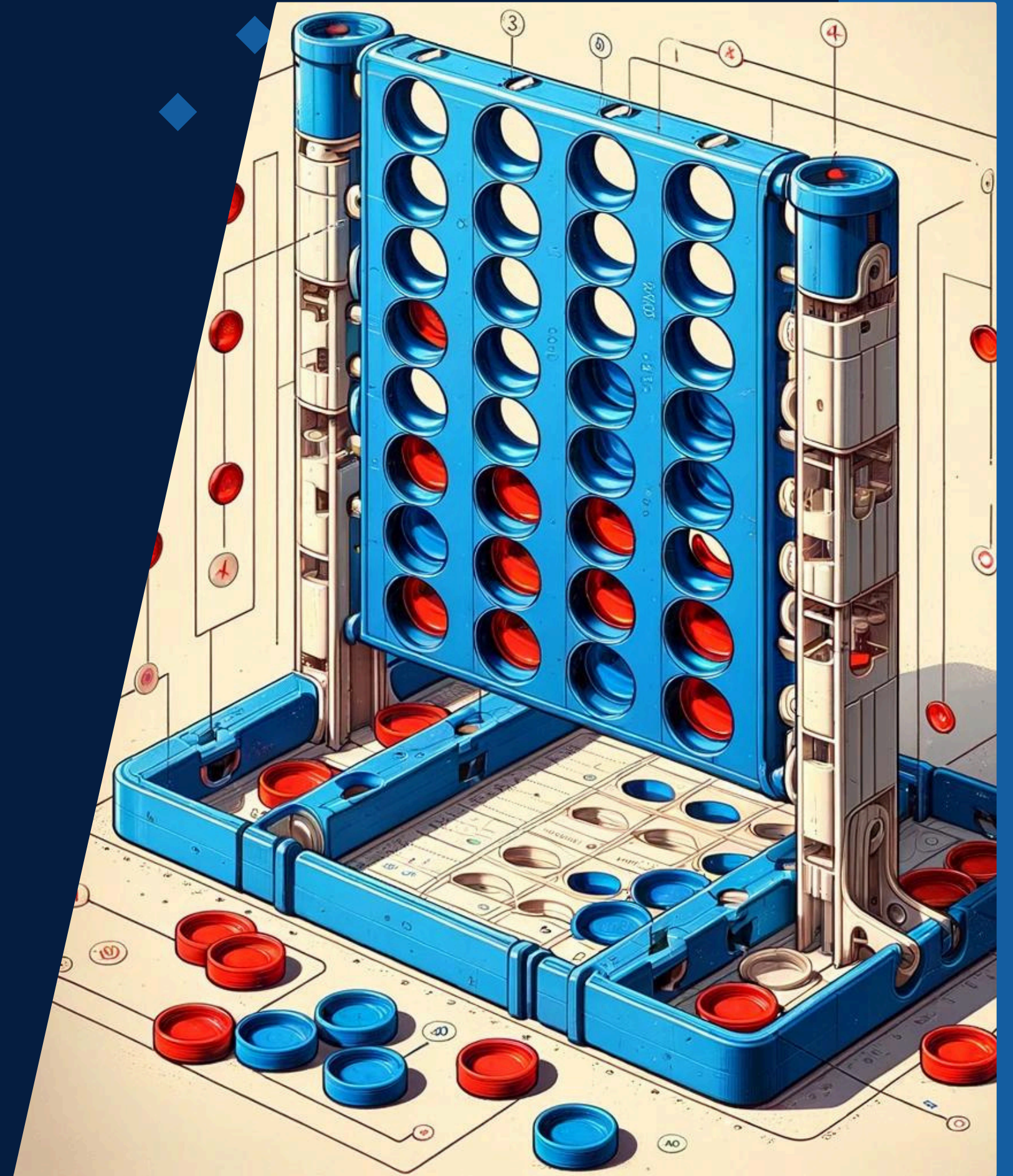


GROUP 10

# CONNECT FOUR

AI PROJECT

IIT'Dh  
2024



# PROBLEM FORMULATION

## WISE MOVE

Since our childhood, we've been losing to our elder siblings in the game of Connect 4. Now that we have a chance to build an AI model which takes the most optimal moves, we think we've got a chance to finally pay back!

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## RANDOM WALK

In Maths, a random walk, sometimes known as a drunkard's walk, is a random process that describes a path that consists of a succession of random steps on some mathematical space. We'll try to verify this theory with our random moves

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# QUICK LITERATURE SURVEY

In recent years, artificial intelligence (AI) has significantly advanced gameplay experiences by training AI agents to make optimal and random moves in various games. Researchers have employed reinforcement learning, Monte Carlo Tree Search, deep learning, and hybrid approaches to improve AI player performance. This literature survey highlights the strategies, game-specific implementations, ethical considerations, and real-world applications of AI-enhanced gameplay. As AI continues to evolve, it has the potential to reshape the gaming industry and find applications in diverse domains beyond entertainment, making it essential to understand the current state of research in this field.

# METHOD

## Understanding

1> Ensure a clear grasp of the Minimax algorithm for two-player games, where the AI aims to maximize its advantage while minimizing the opponent's gain.

## Game State

2> Define a concise and comprehensive representation of the game state that captures all essential information.

## Implementation

3> Create a recursive Minimax function that explores possible moves for both players while incorporating alpha-beta pruning for efficiency.

## Evaluation

4> Develop an evaluation function to assign numerical values to game states, aiding decision-making in the Minimax algorithm based on game rules and objectives.

## Testing

5> Thoroughly test and fine-tune your Minimax-based AI, adjusting the evaluation function and parameters to improve performance and balance optimal and random moves as needed for player experience.



# CONCLUSION.

## Strategic Fusion

We combine Minimax with stochastic elements, using random moves to validate the theory of random walk in gaming, resulting in a versatile approach.

## Balanced Optimal Play

Our AI maintains equilibrium between Minimax's optimal strategies and random moves for empirical validation, enriching both the gaming experience and game theory.

## Iterative Improvement

Through iterative testing and parameter tuning, we achieve dynamic gameplay while advancing our understanding of random walk theory in gaming.