Final Project Report
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Introduction

The problem we were trying to solve was to win the tic-tac-toe game by using an adversarial search called minimax.The minimax method takes into consideration the opposition's goal. The max player plays to maximize potential to win the game and the Min player plays to minimize the Max player's potential to win the game. The minimax algorithm assumes that both players play at their maximum potential to win the game, therefore, the max player picks the most maximizing action it can take after the Min player makes the most minimizing action.

Methods

In our minimax algorithm, we incorporated iteration, recursion, and selection implementations. For iterations, we implemented for loops, which allows the program to loop through all available action in its current state, making variables such as the "frontier" and "visited" unnecessary. Along with the for loops, we incorporated recursive implementations by making the helper functions call each other in the for loops. The recursive implementation let the AI "look ahead" and pick the best actions by testing each available action before selecting the action to take. For selections, we implemented if statements which allows the program to return the best value of the program only when the for loops reach the terminal state.

Results

While the system ran for both the tic tac toe and connect 4, it has some flaws. The minimax algorithm works very fast for the tic tac toe game, but when it comes to connect 4, it takes much more time to compute the next move. The undesirable run time makes the minimax algorithm not fit for the connect 4 game.

Discussion

The minimax algorithm we coded was coded with the appropriate methods and choices. Next time, if we had more time and wanted to play connect 4 more efficiently, we would code the alpha_beta algorithm and the alpha_beta_cutoff algorithm on top of the minimax algorithm. The alpha_beta algorithm helps with abolishing the need to sort through abundant sections of data.There are no direct ethical implications in our system that others should be aware of, however, if this system is developed into a larger more influential system, ethical implications may arise. For example, if military organizations built robots with these systems to fight against humans, it can become very dangerous.