

Project Title: Reversi (Othello)
Type of Project: Game Tree Search

Project Description:

The intention of our project is to play the game Reversi by its standard rule set. Reversi is a two player game and is played on a 8x8 gridded board. Each player is given black or white stones to be used in play. In the board's initial state, four pieces occupy the middle four board spaces, with two black pieces and two white pieces lying on diagonals from each other. A play consists of a stone being placed in such a position that there exists at least one straight (horizontal, vertical, or diagonal) occupied line of the opposing colour between the new piece and another friendly piece. Once a play is made, all opposing pieces between the two friendly pieces are exchanged for the same colour as the friendly piece. The game is over when no valid moves are left and the player with the most stones on the board wins. This project is suited well for a game tree search since it is a two player deterministic game with perfect information and zero-sum mechanics. Each move in Reversi updates instantaneous "score" of how many tiles of respective colors are on the board, which will allow us to calculate possible state values for each play. In combination with the instantaneous score for a given state, the analysis of future moves is also crucial in calculating the optimal move for a player. By evaluating the value of states and their descendants we will be able to anticipate and calculate optimal moves.

Evaluation Plan:

The backbone of our search will be depth first search, as we will want to examine the best possible scores by seeing the final states of a board. Through the use of alpha-beta pruning, we will be able to drastically reduce the number of nodes that we need to expand upon and cover more pertinent cases. We will develop heuristics specific to Reversi that will enable us to further prune the game tree to further reduce the search space.