ECE 469 Artificial Intelligence Project I
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Project I Write-up

This project — AI in Checker Game is implemented in Java. The main function is in Test.java, and the user could simply run this file and play the checker game.

Usage

When running the program, it will firstly prompt the user three questions. The first question have three options — the user could choose to play against AI and choose the green side (the upper side), or play against AI in the red side, or watch the AI play against itself. The second question asks whether the user want to do a default start of the game or load a board from txt file. The text file format is exactly the same as the samples on Prof. Sable's faculty page, where 0, 1, 2, 3, and 4 represent an empty square, a regular piece for player 1, a regular piece for player 2, a king for player 1, and a king for player 2, respectively. The last two rows are the turns and the time limit in second. The third question asks the time limit for AI. If choosing to load a txt file, the third question will not appear.

Implementation

I build the following classes: Piece, Board, Move, Step, GetvalidMove, HumanPlayer, and AI. My heuristics basically contains the following features:

1. If one player has no pieces, set it to positive infinity or negative infinity
2. The number of regular pieces. The king weighs 1.5 times of the regular piece.
3. The position of each piece. The kings will be considered at a good position if sitting on the main diagonal, whereas pawns are good when closing to the opponent base.
4. If leading, add a factor to encourage trading
5. If leading, add a factor to encourage pieces getting closer
6. If both players have less than three pieces, the position for the king mentioned in 3 and the distance between pieces mentioned in 5 are weighted more.