Checkers AI With Minimax and Alpha-Beta Pruning

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We plan to create a checkers game and AI that a human can play against. We plan to have different levels of AI that differ in how sophisticated their decision making algorithm is. The most basic AI will simply make moves at random. The next will use a heuristic search to make the best move possible (e.g. take a piece if possible, promote a piece if possible). If a good move according to the heuristic is not found, the AI will make a move at random. We will use the minimax algorithm with alpha-beta pruning for our most sophisticated AI. We will experiment with different search depths but we ultimately plan to just select one search depth to use.

To evaluate our AI models, we plan to make them play each other. The most sophisticated AI using minimax with alpha-beta pruning should beat the other AI on average. Similarly, the AI using heuristics should beat the AI playing randomly on average. We decided against playing the AI ourselves because to get an accurate portrayal of the AI's skill, we would have to play hundreds of games to get a sufficient sample size.

Our tentative timeline looks like this:

October 20 - Framework for playing checkers as a human (GUI, checkers game logic)

October 27 - Implement Random AI and Heuristic AI

November 3 - Implement Minimax AI with Alpha-Beta Pruning

November 10 - Testing, fine tuning (e.g. experiment w search depths, AIs play each other)

November 17 - Finish presentation