Othello Specification

This implementation of the assignment allows users to play the board game Othello in a page on a web browser, via HTML and CSS for the frontend and JavaScript for the backend. Users can play human-vs-human games by alternating turns, and also human-vs-computer games against three AI algorithms. The one labeled Easy randomly picks moves, the Medium AI greedily tries to capture the most pieces at every step, and the Hard AI runs a minimax algorithm with alpha-beta pruning, and looks ahead by 4 moves each turn. To study strategy or the game's rules, users can also pit AI algorithms against each other (but a Hard AI vs Hard AI game may run slowly).

In the beginning, a form is displayed that asks users to specify who will be playing which side.

The application provides a GUI that allows users to click on squares on a displayed board to pick their moves. Valid moves are marked with a colored circle (the color of the circle also indicates whose turn it is). If there are no moves available, users can click on the Pass button to yield their turn. If the user attempts to break a rule, the GUI displays messages explaining that the given move can not be performed, and does not proceed.

Undo and redo buttons are provided. They follow a simple linear history – every move adds a position to the history; undo moves backwards; redo moves forward, and moving differently after an undo follows a new path in the history, discarding the old history. No matter who is playing, the undo button always undoes exactly one move; this is to avoid surprising users who might have their mental models broken if the button behaved differently depending on whether AIs were playing. The GUI will display a message if the user accidentally undoes an AI move and then tries to change it on behalf of the AI, telling them to hit undo again or redo the AI move. There is a use case for undoing AI moves – it allows users to study game strategy by seeing how the AI moves in certain positions.

The game can be restarted by hitting the restart button, which returns to the game start form to allow the specification to change. Users can abort the game by closing the browser tab, or hitting restart and not filling out the form until they are ready to play again.