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# Functional Parallel Programming Final Project Proposal

**Overview:**

For my final project, I plan on building a parallelized algorithm to play Connect Four. The player would play against the AI in the terminal.

**Background:**

Connect Four is a two player turn-based game played on a 6 by 7 grid where the goal of the game is to have four consecutive tokens, either vertically, horizontally, or diagonally. Each player chooses one of the seven columns to place their token, and that token will occupy the lowest row in that column not already inhabited by another token.

**Implementation:**

The algorithm that underlies my implementation will be a minimax algorithm with alpha-beta pruning. The algorithm considers every possible move at each turn and chooses the most optimal move assuming that the other player is also playing optimally. The data structure underlying this algorithm is a decision tree, where each level in the tree alternates between maximizing and minimizing, and where the leaves are the terminal positions of the game. Alpha-beta pruning is used to reduce the search space by ignoring branches that cannot impact the decision, and this ensures that the

result is still always accurate. The parallelization comes into play because each separate node can be evaluated in its own thread.

**References:**

https://courses.cs.washington.edu/courses/cse332/17wi/documents/games.pdf