Final Project Proposal

Checkmatr - The DSA Chess Engine

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About the Project

This is an implementation-based project for the Olin College Spring 2021 Data Structures and Algorithms class. This project will attempt to create a strong and efficient chess engine using dynamic programming and properties of game trees explored in the class.

This project will use the `chess` library in Python for finding legal moves and otherwise moving the pieces for the algorithm. Custom functions, which will attempt to evaluate a chess position based on multiple factors, will be used to determine the best move at any given time. These functions will be determined from background research and chess intuition.

To test the strength of this algorithm, it will play against Stockfish's API at varying rating levels to determine the engine's theoretical rating.

Timeline

MVP

- Install dependencies and set up environment **Done**
- Create an extended chess board class with precalculated evaluations of static positions (so that it can be quickly updated at each move instead of recalculated) **April 12**
- Create a first pass breadth first search algorithm **April 15**

First Stretch

- Modify this algorithm with more complex analysis **April 22**
- Test with Stockfish and determine rating **April 25**

Second Stretch

- Create multiple levels of difficulty (more depth, etc) which can be configured on demand **May 2**

- Allow a user to play the engine from the command line **May 2**

Third Stretch (Mostly Optional, Dates Not Applicable)

- Create a GUI or web server for playing the engine
- Convert it to JavaScript for client side playing
- Allow it to continuously search deeper and display an ongoing prediction of its best lines

References

A Step-by-step Guide to Making a Chess AI (link)
This has some basic information on how to evaluate a static position based only on the position of the pieces. It's pretty trash but a good first pass algorithm.

AI Chess Algorithms (link)
This is a more in-depth analysis of a chess engine done by a Cornell graduate student. The more complex features of chess positions this takes into account can be used to make a more powerful chess engine.