

NEA Project

Jayden Gill

Chess Engine

UTC Reading

NEA – Chess Engine

Contents

[Section 1: Analysis 2](#_Toc150978515)

[Project Description 2](#_Toc150978516)

# Section 1: Analysis

## Project Description

Chess is not a solved game, by any means. After just three moves, there are over one hundred and twenty million possibilities. So at this point in time, we don’t possess the processing power, or memory, to compute every single possibility in chess. However, we can look moves into the future, using computers to find the ‘best move’. Now using this computer, we can improve ourselves further, by using it to check our games, or playing against it. Therefore in my project, I will be creating a ‘Chess Engine’ that gives evaluations of positions and output the ‘best move’, as well as being able to play different difficulties of the engine. You will also be able to play against other people on your network, access a leaderboard and many other features.

## Background and Research

The top three chess engines in the world are Stockfish, Komodo Dragon and Fat Fritz (Champion, Top 5 Chess Engines, n.d.). So I will delve into how stockfish has been coded, and see different techniques that have been used.

### Stockfish

Stockfish uses something called ‘Bitboards’. As a chessboard is made up of 64 sqaures, the positions of a given piece can be stored in a 64 bit variable. Every bit corresponding to a square. Therefore if it is set to 1, then a piece is present. This is how stockfish can “see” the board, and intereact (via binary shifts etc). It will then use these bitboards to find ‘candidate’ moves, and store them all in a list.S

Now it has a list of ‘candidate’ moves, it can through them and find which leads to the best evaluation by using a minimax algorithm, (which I will delve deeper into later). So we must have an evaluation function which we want to maximise. So we must hardcode different chess concepts into the engine, giving ‘rewards’ (points) for good moves and taking away points for bad ones.

So some basic concepts involve, material, strategy and space. However I will go more into depth with this later on.

# References

Champion, A. (n.d.). *Stockfish in Depth*. Retrieved from https://towardsdatascience.com/dissecting-stockfish-part-1-in-depth-look-at-a-chess-engine-7fddd1d83579

Champion, A. (n.d.). *Top 5 Chess Engines*. Retrieved from https://royalchessmall.com/en-gb/blogs/blog/5-best-chess-engines