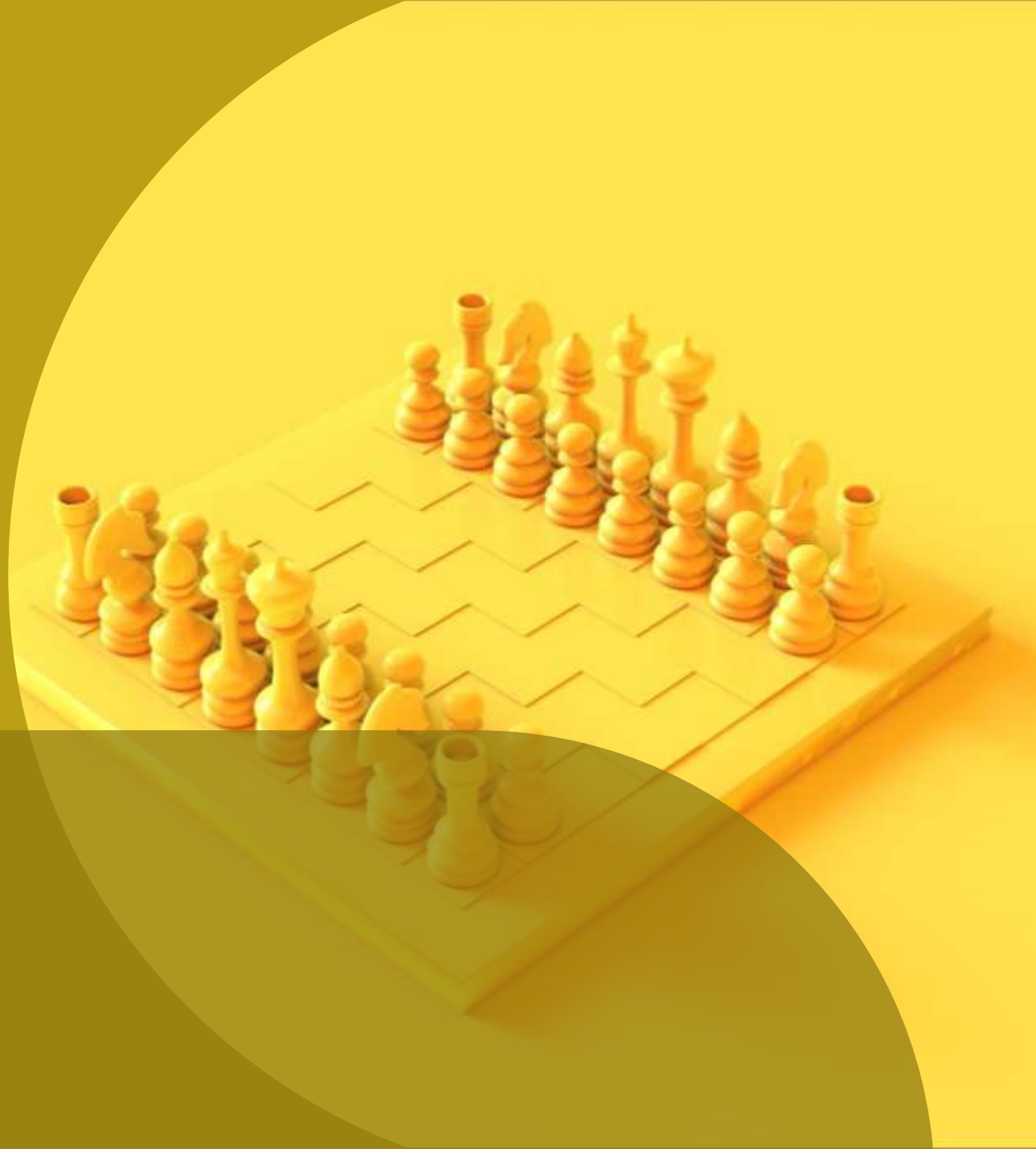
Monster Chess – Creating a Human - Level Engine



ADITYA GUPTA – EPQ ARTEFACT

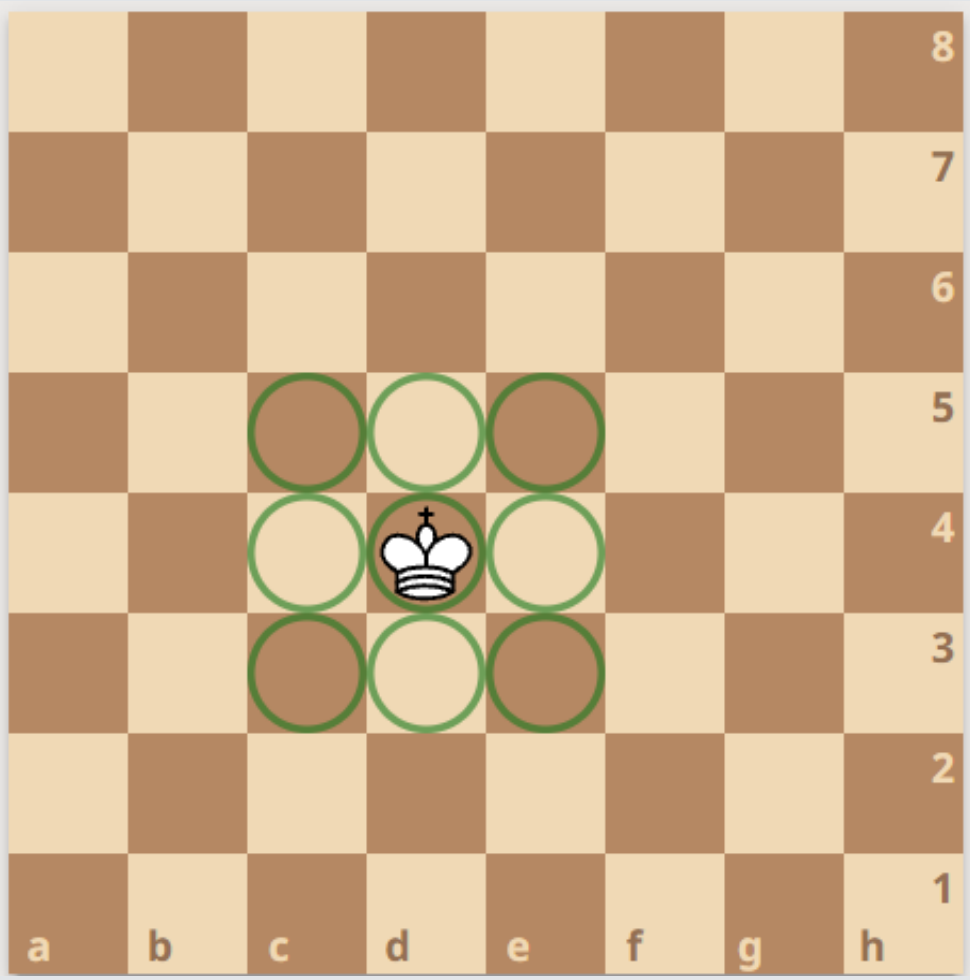
What is Monster Chess?

- Variant of Chess
- Material Imbalance
- 2 White Moves : 1 Black Move

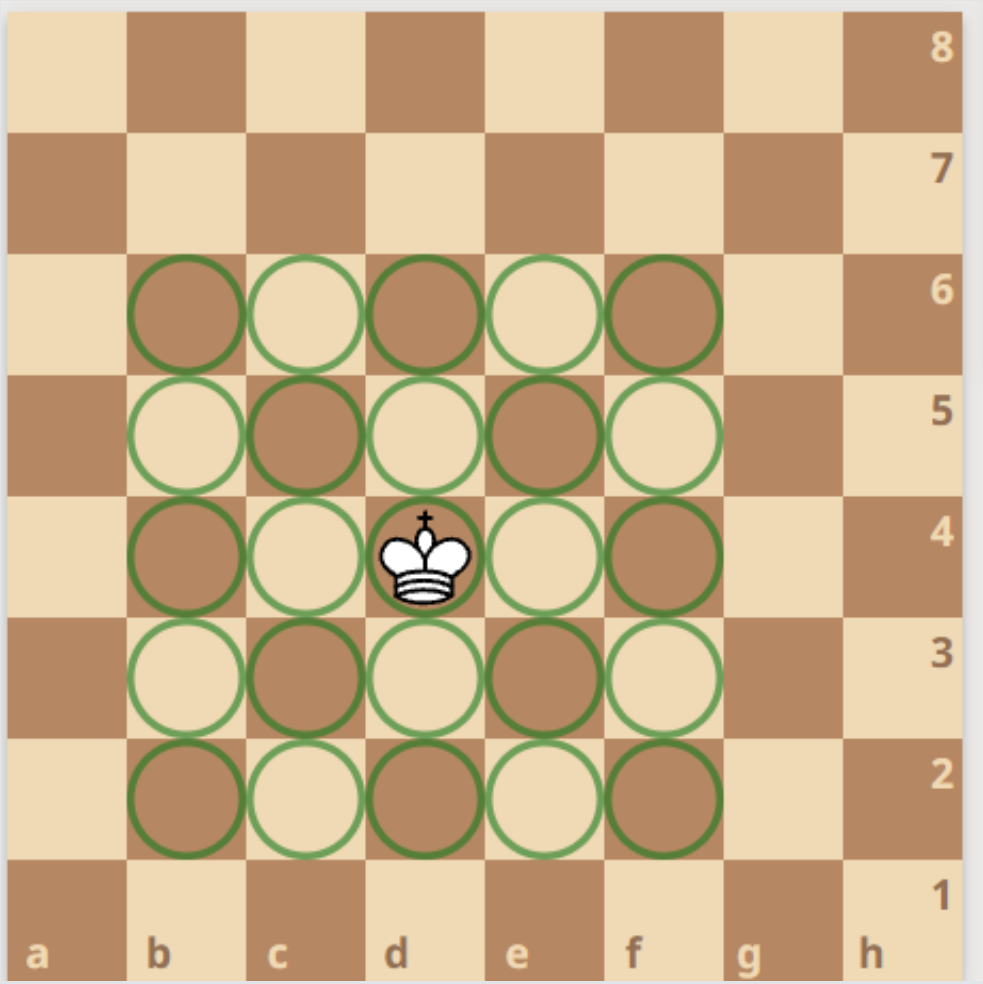
Classical Chess

Monster Chess

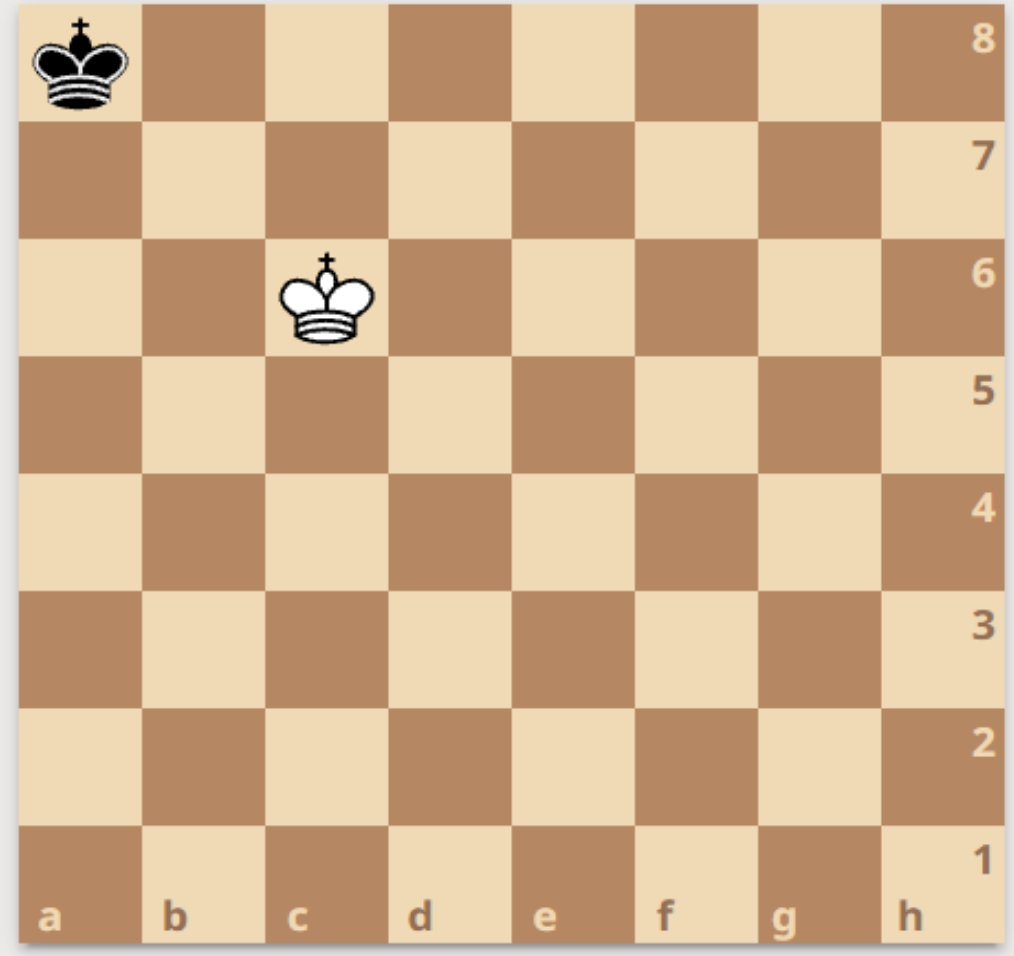
Classical Chess

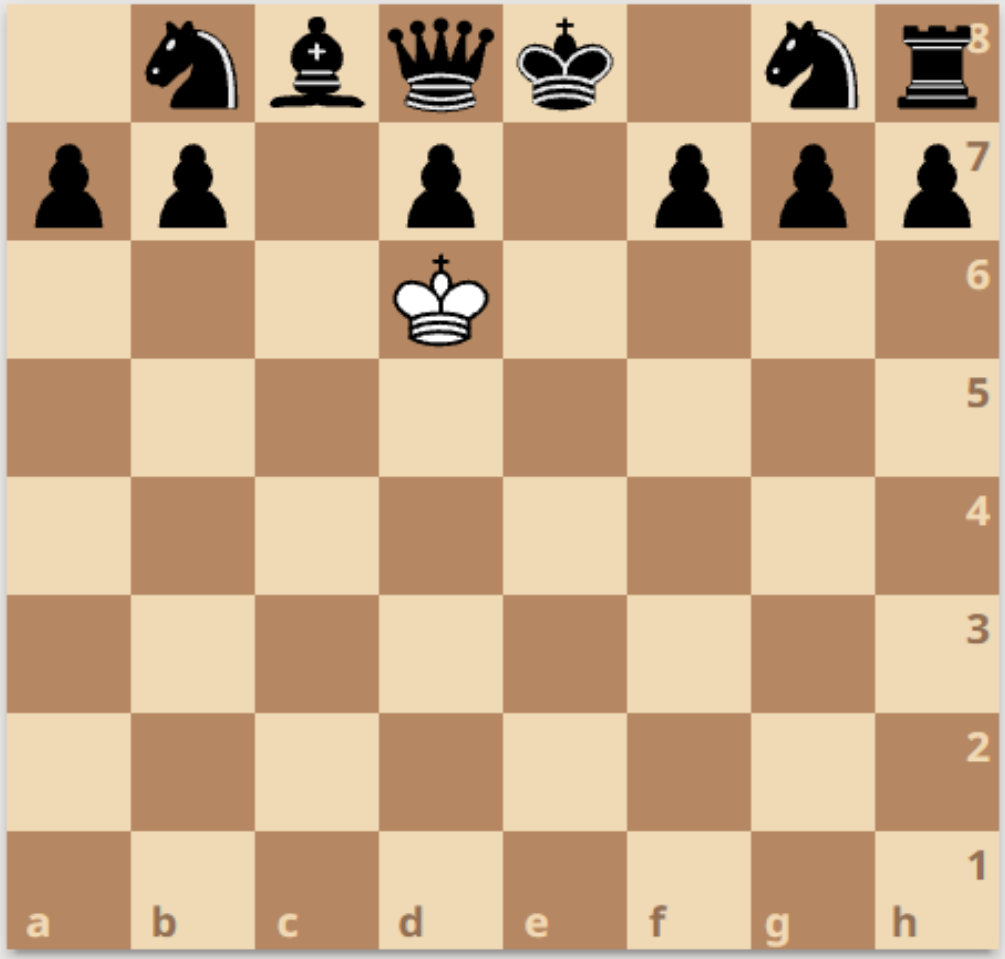


Monster Chess

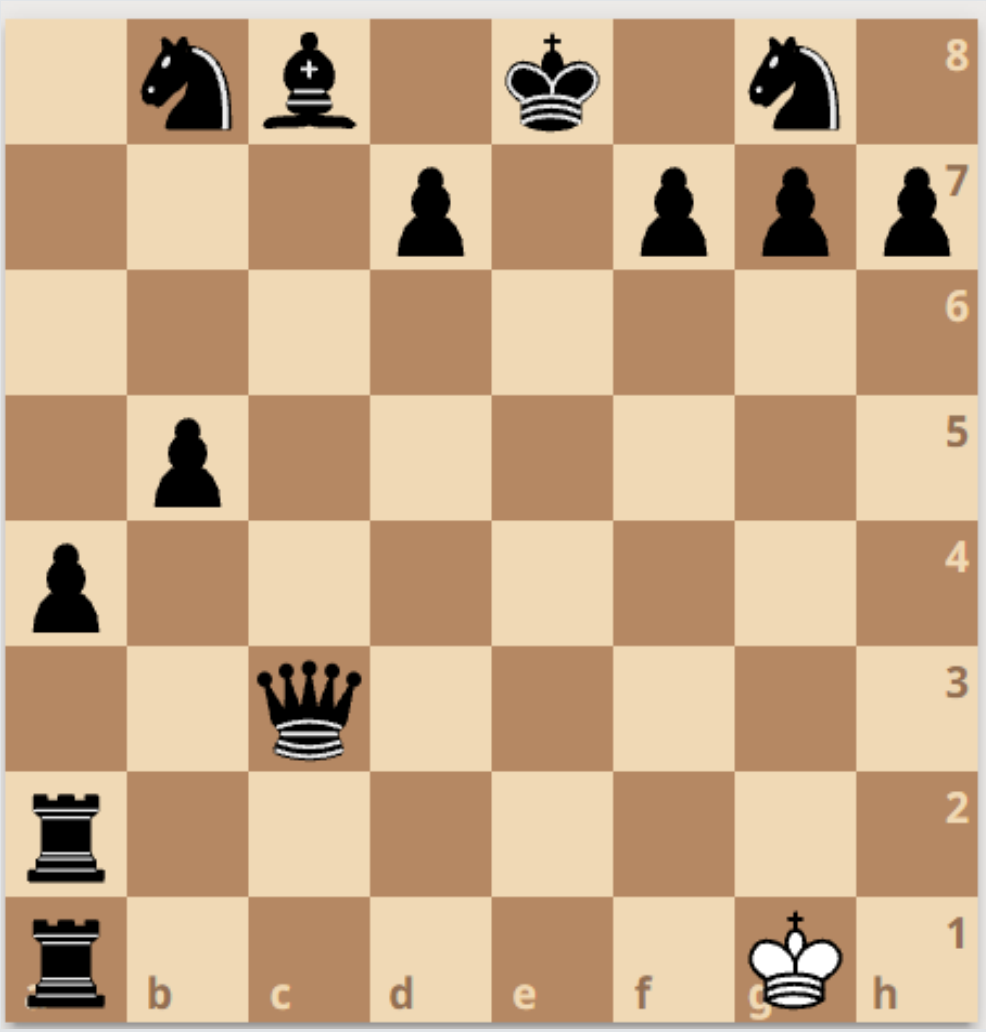


Examples of White Checkmating Black

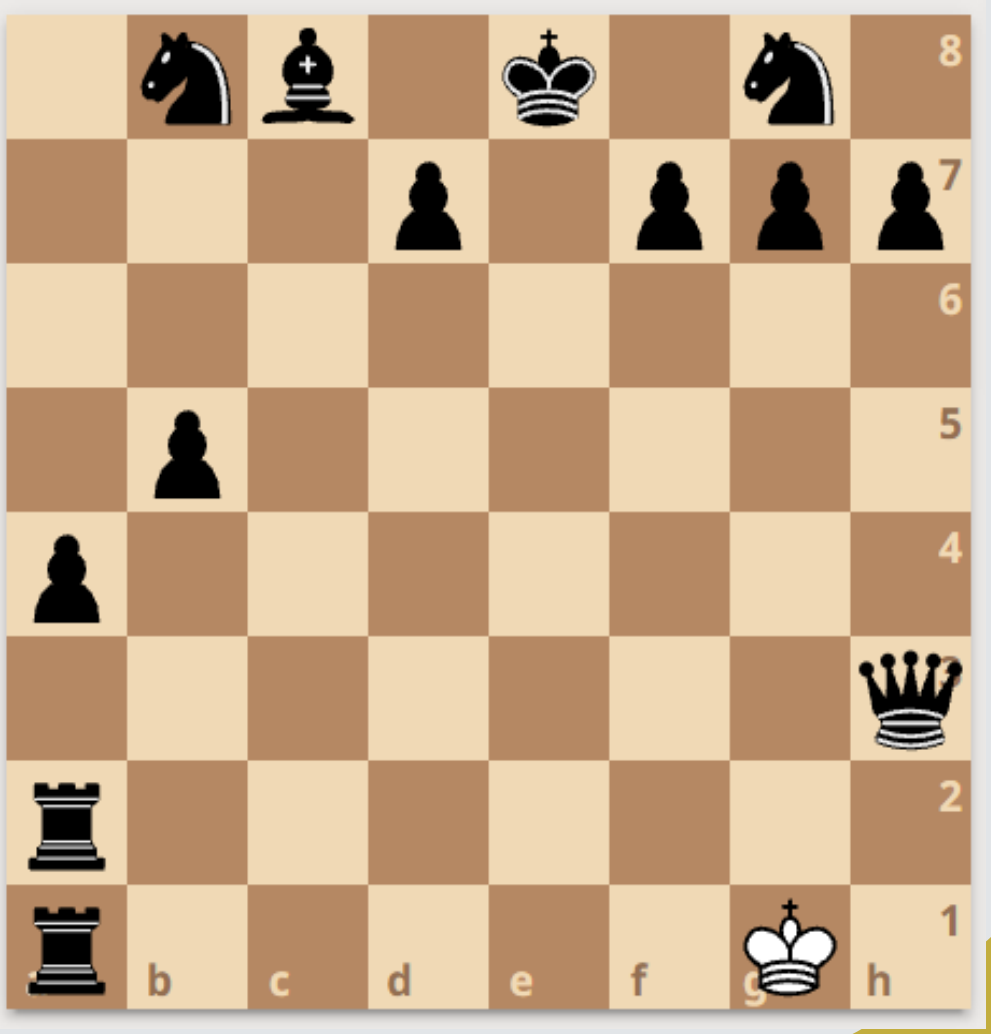




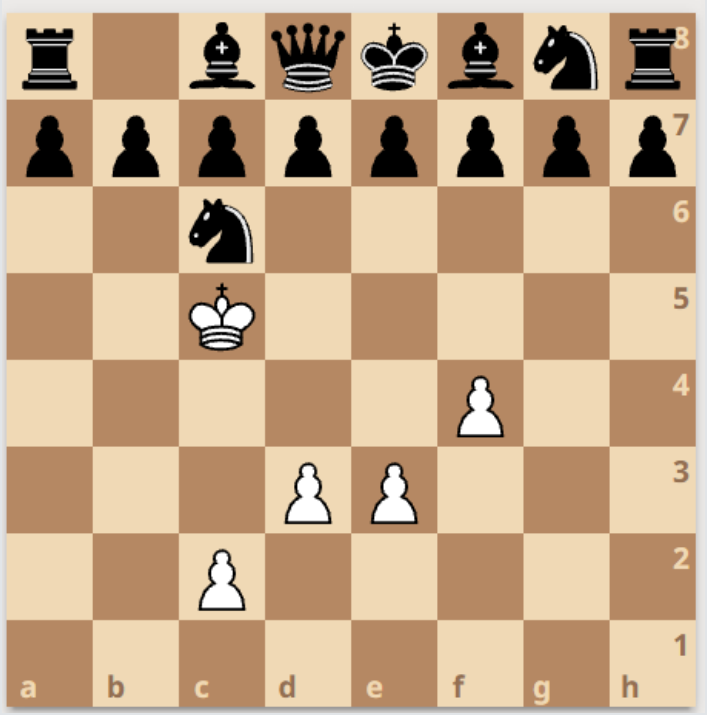
Monster King Checkmated



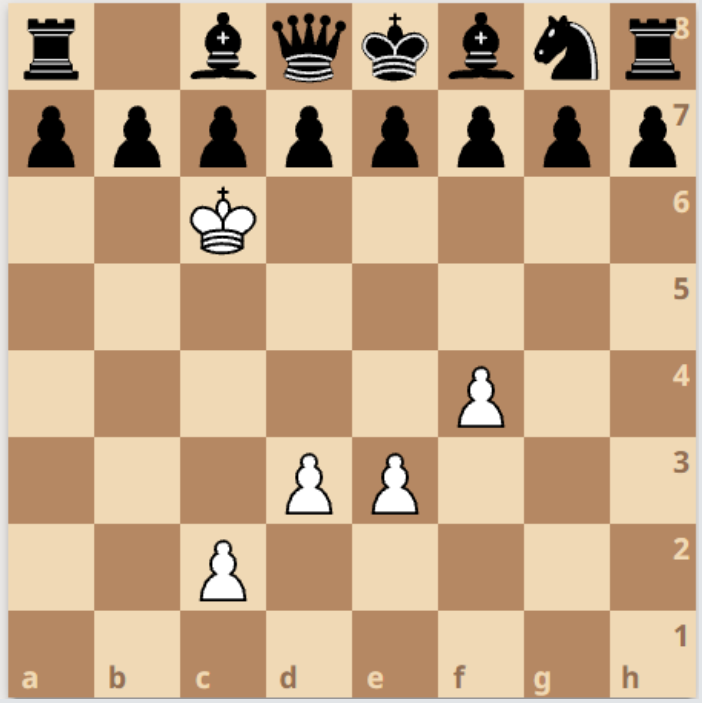
Not Checkmate – The Monster can capture the Black Queen



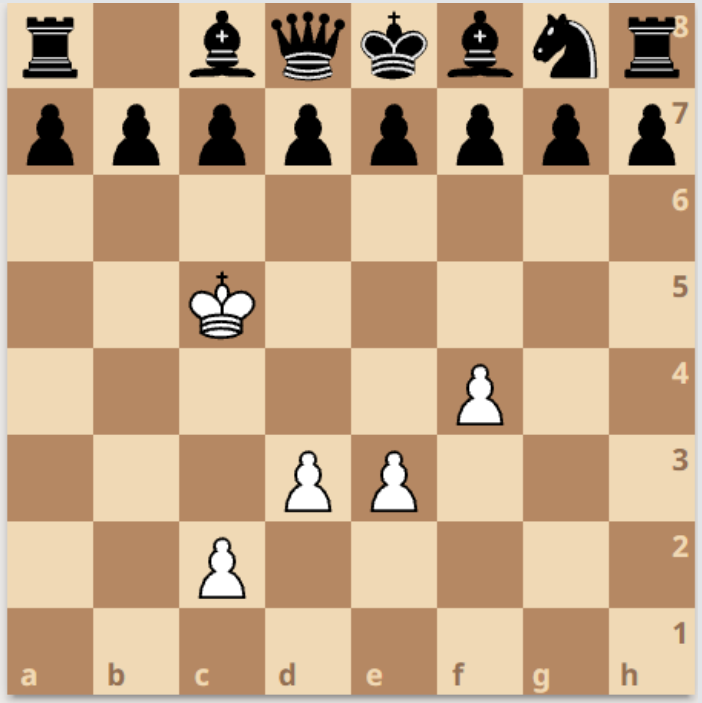
White to Move



White's 1st Move of their Turn, Capturing the Knight



White Moves back, out of Check, on their 2nd Move



Motivation

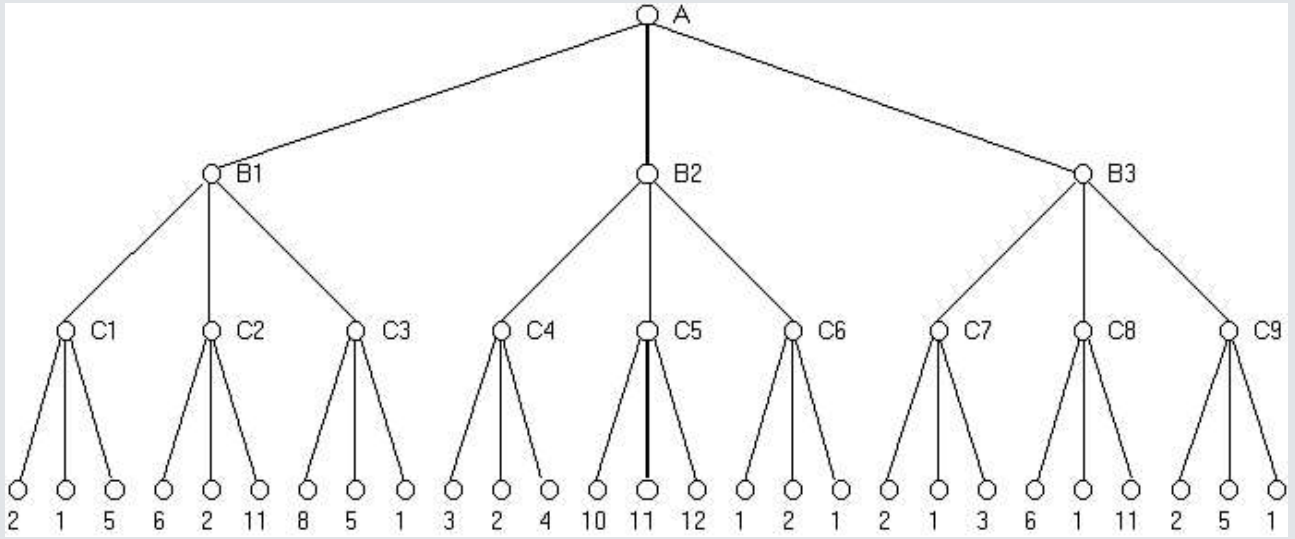
- Explore adversarial programs
- Maintain a large codebase
- Beat my dad!

How do traditional chess algorithms work?

Move Generation

Move Selection

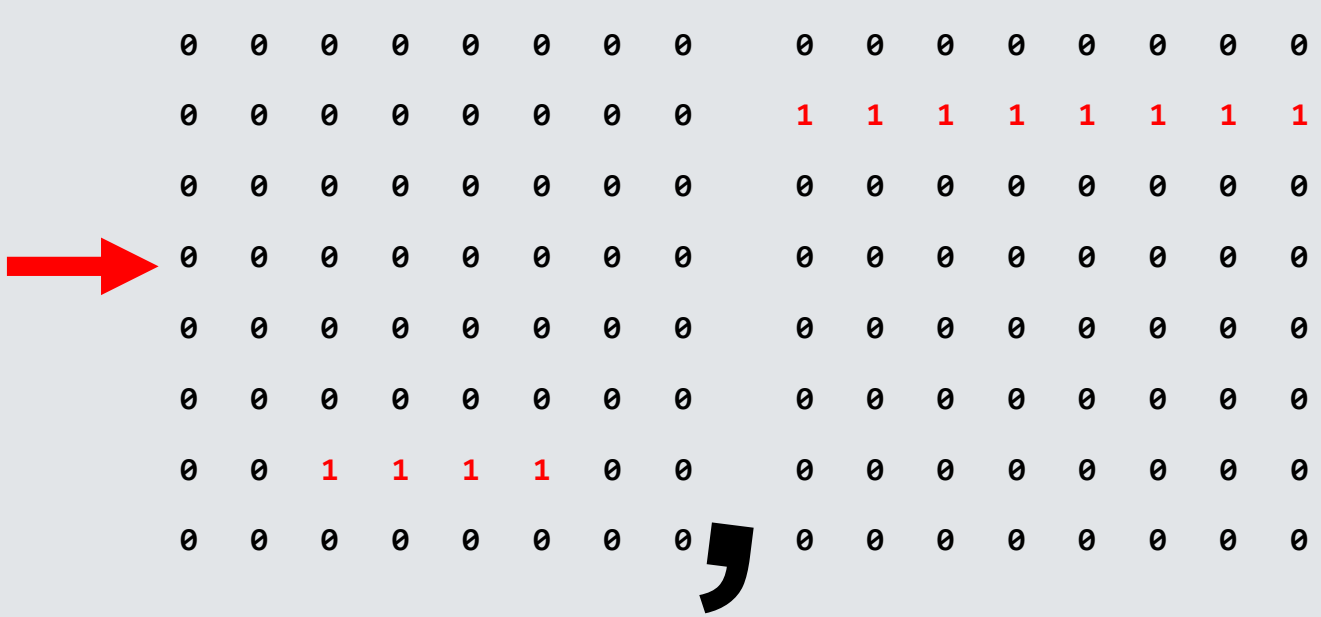
Exponential growth – why speed is important



- Number of possible positions increases very quickly as you search further along in the future
- Speed is essential for a strong engine

Move Generation

- Classical, simple approach:
  - Lots of for loops
  - Represent each piece separately as an object
- Bitboards

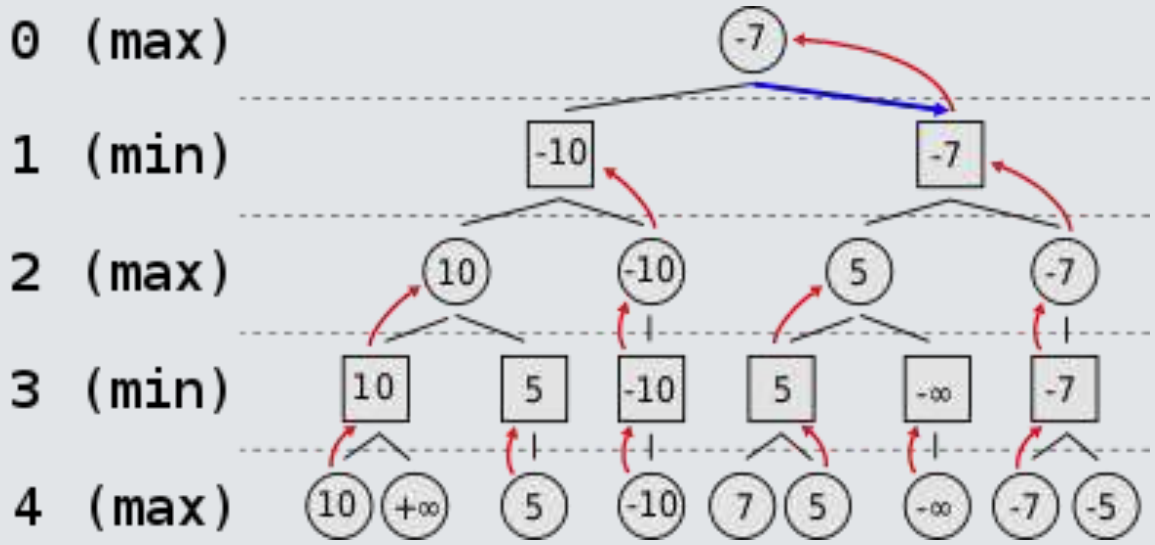


etc

Move Selection - The Minimax Algorithm

- Static evaluation – who's winning if game was paused?

Move Selection - The Minimax Algorithm



- If we knew opponent's best move, what do we play?
- Work out opponent's best move in a recursive manner
- More depth = stronger engine

Optimizations

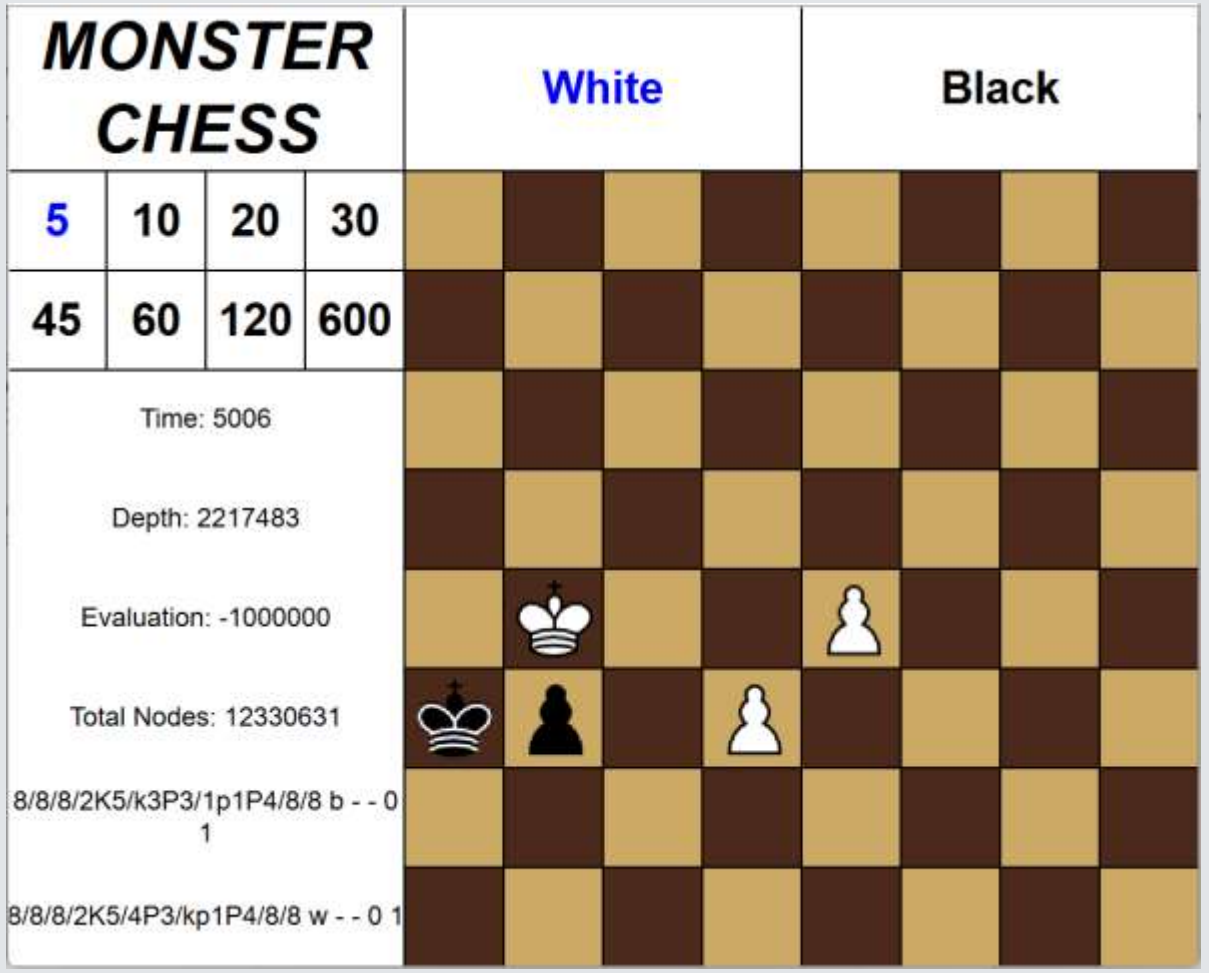
- Alpha-beta pruning – hacking branches
- Transposition Tables
- Iterative Deepening

Weirdest Bugs

King teleportation

Horizon effect

Let's Play the Engine!



Any Questions?