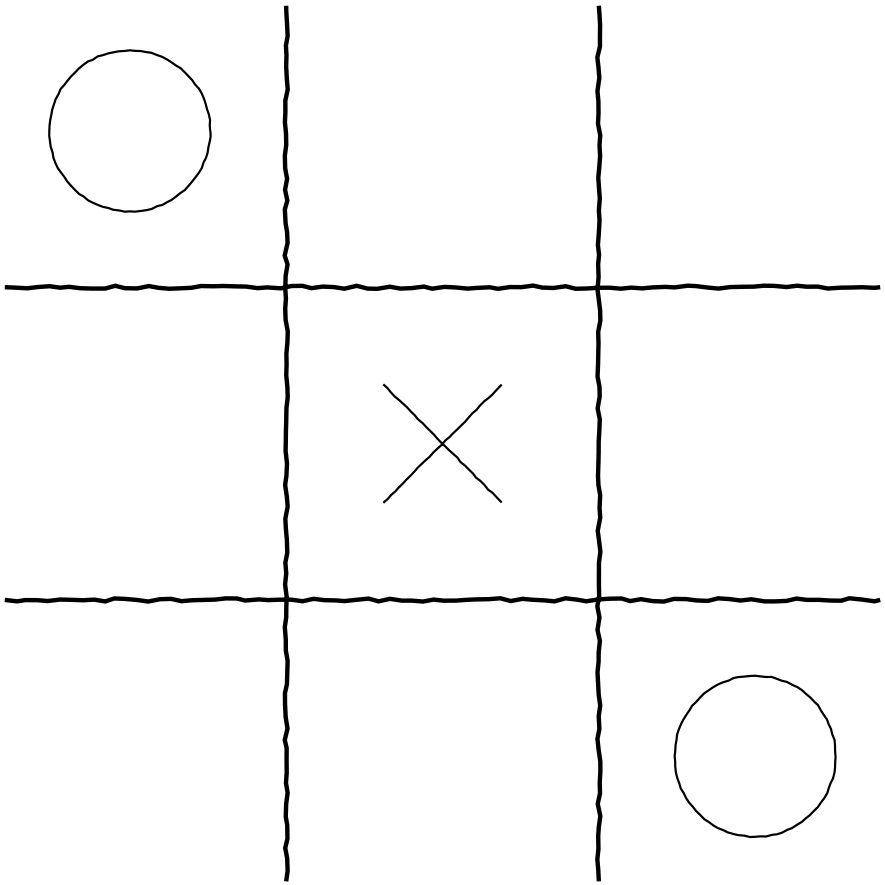
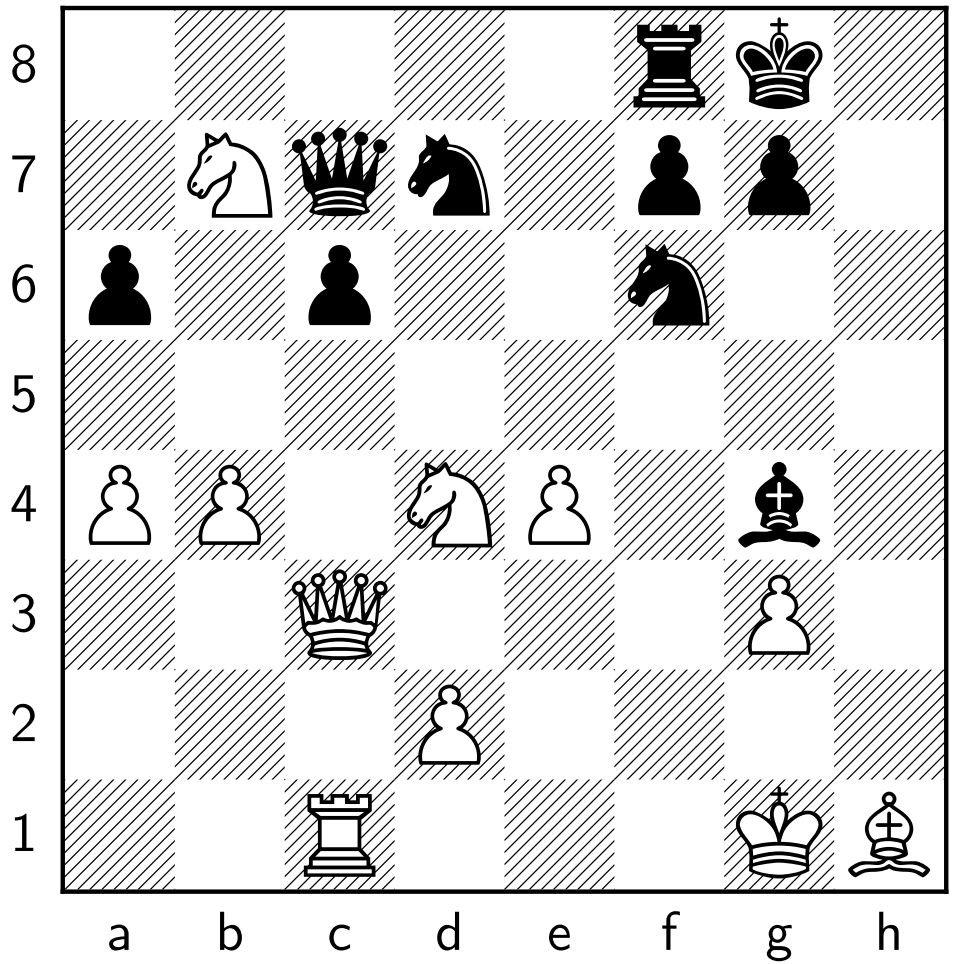
Deep Blue chess algorithm

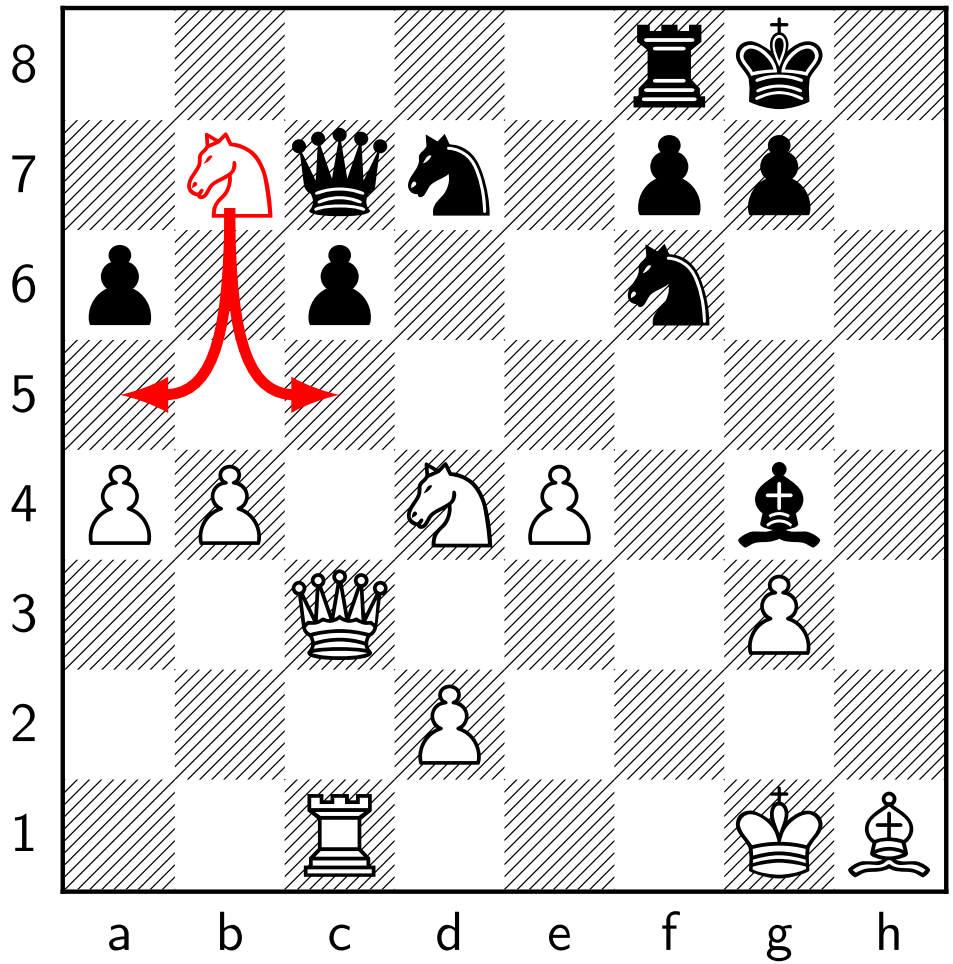
Murray Campbell, A. Joseph Hoane Jr.,
Feng-Hsiung Hsu,
Deep Blue
Artificial Intelligence (2002) 57-83

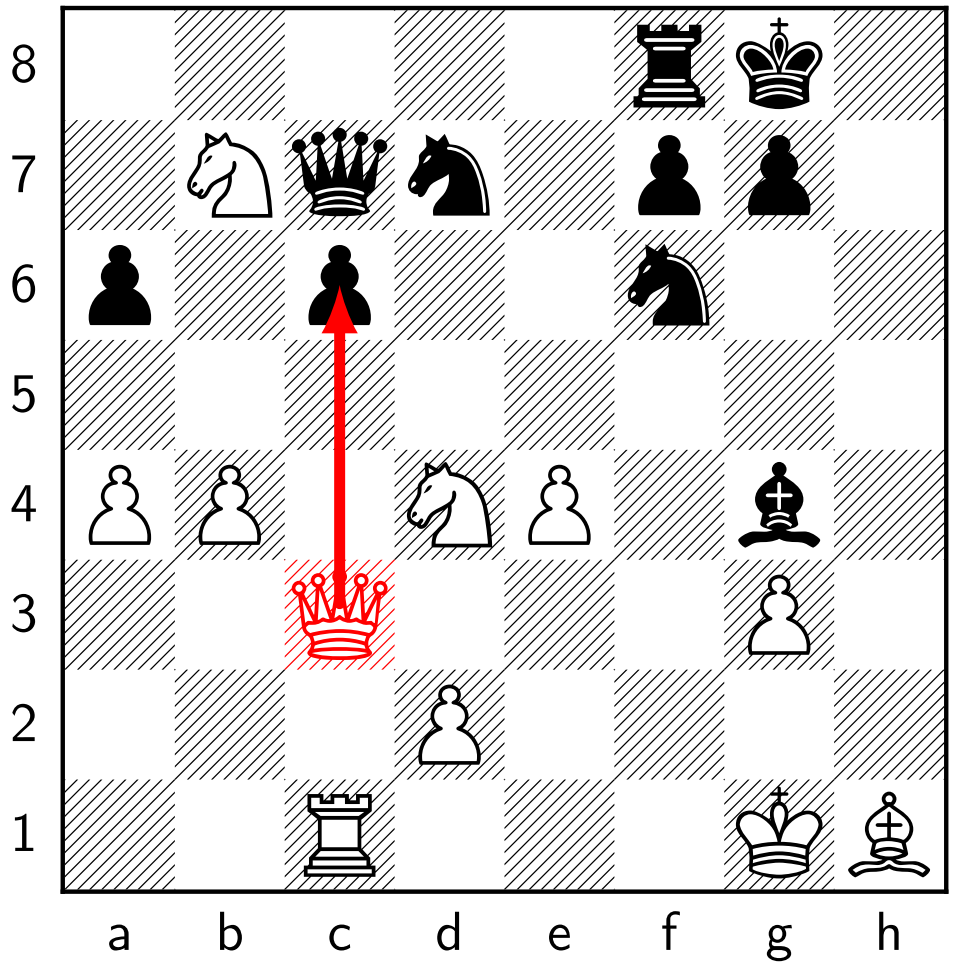

IBM
GARRY
KASPAROV
DEEP
BLUE

Chess vs. Noughts and Crosses




8
7
6
5
4
3
2
1
a b c d e f g h


8
7
6
5
4
3
2
1
a
b
c
d
e
f
g
h


8
7
6
5
4
3
2
1
a
b
c
d
e
f
g
h

Evaluation Function

Evaluation function

Define an evaluation function:
Estimation of the current state of the game: who is most likely to win.

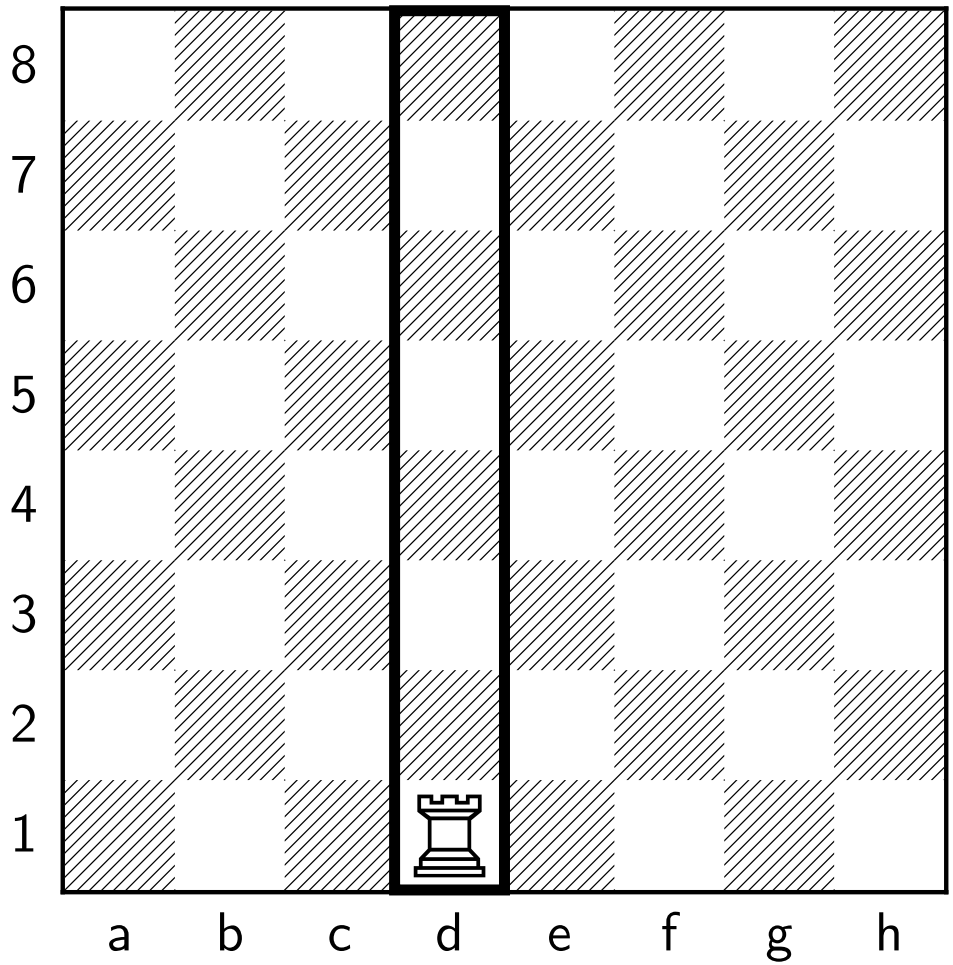
Search through moves and pick the “best” one.

Evaluation function

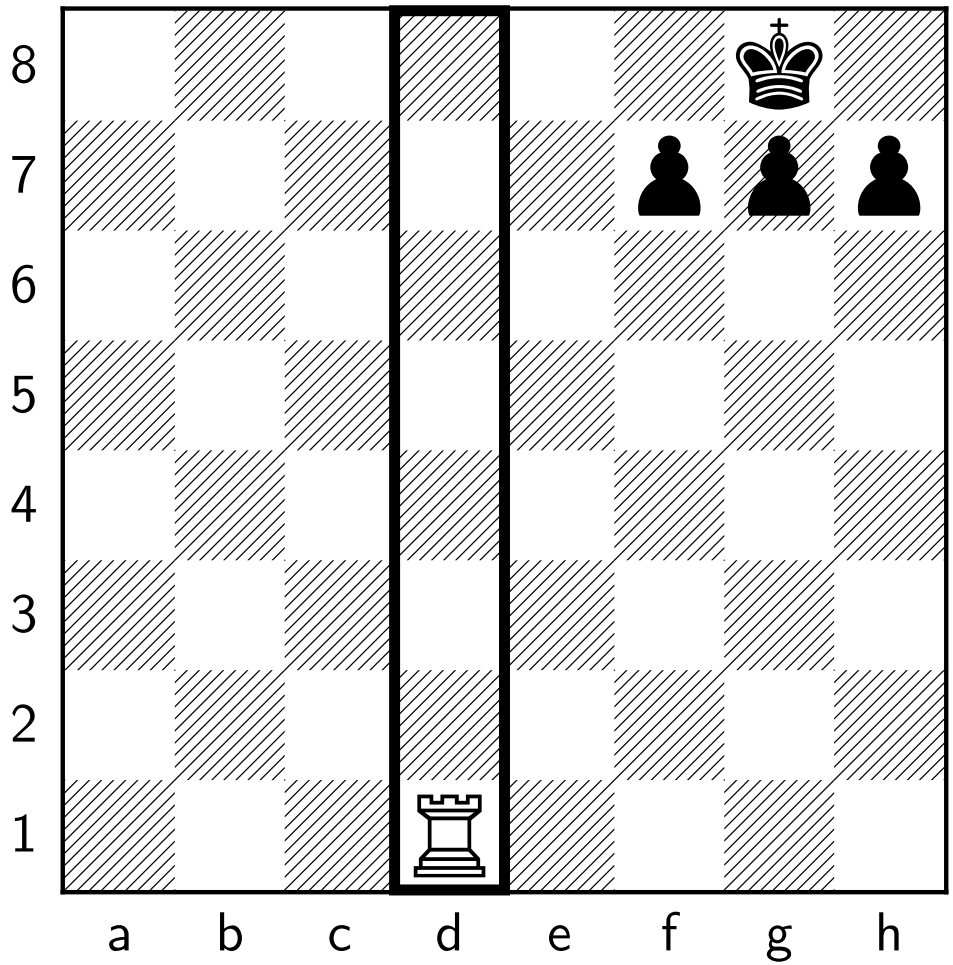
Fast Evaluate the total value of the pieces of each of the players, weighted by the squares they are on.

Complete Include additional positional features.

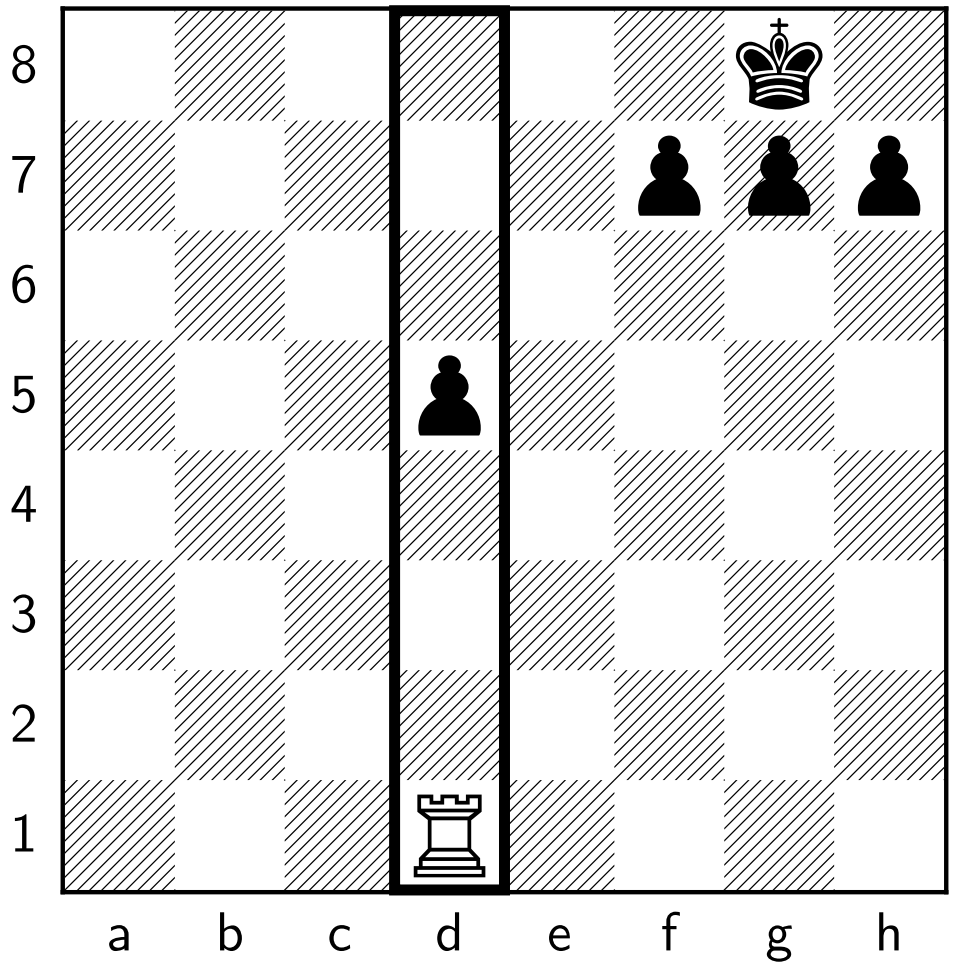
Positional features: "Rooks on files"



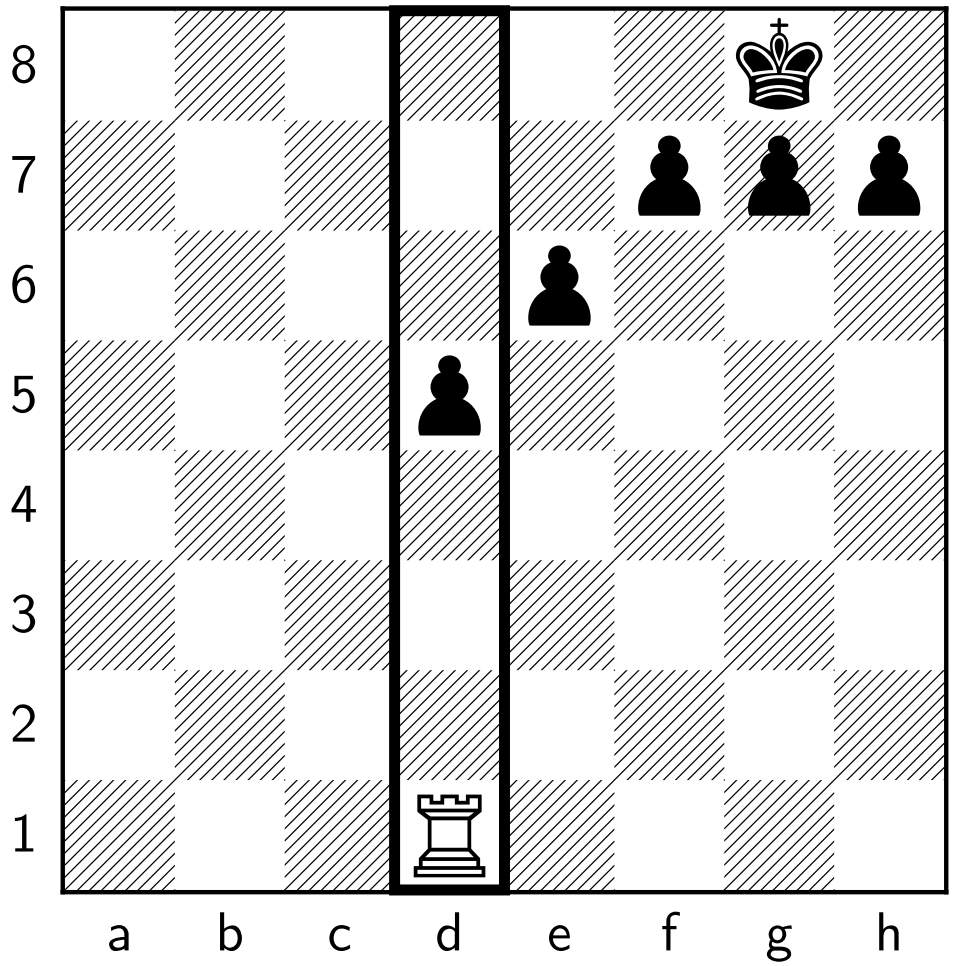
Positional features: "Rooks on files"



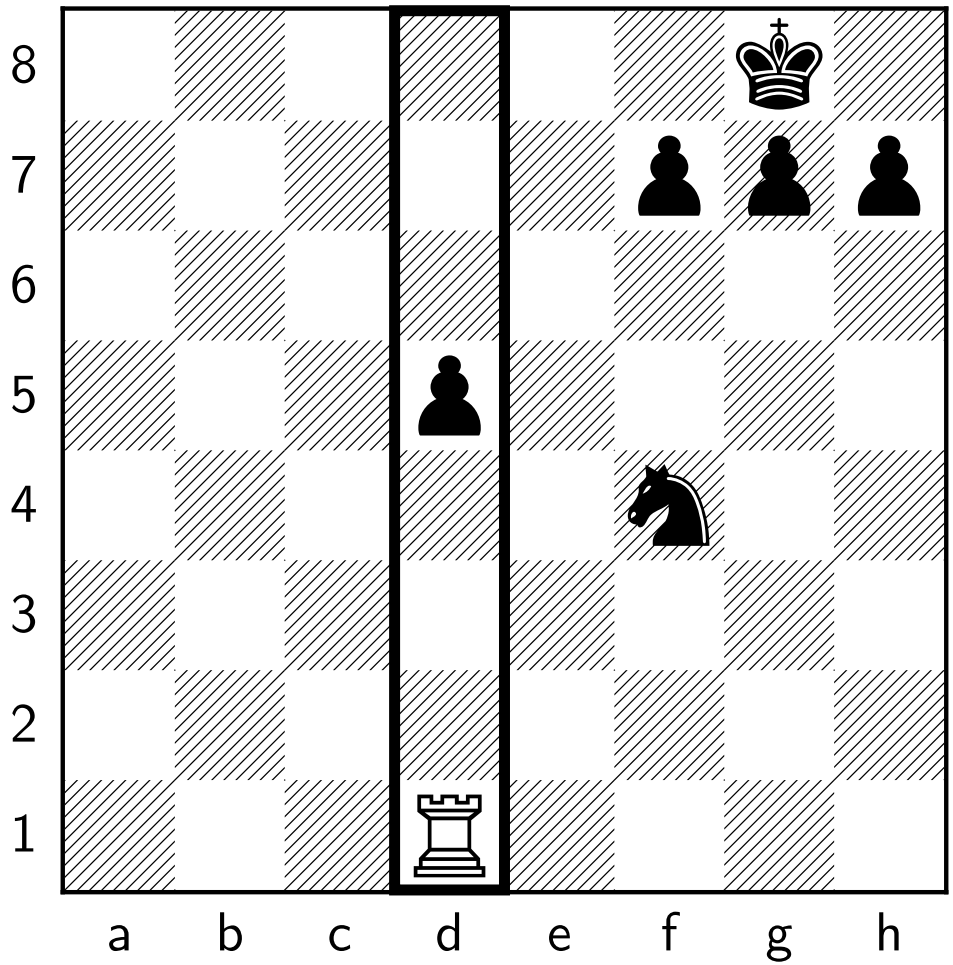
Positional features: "Rooks on files"



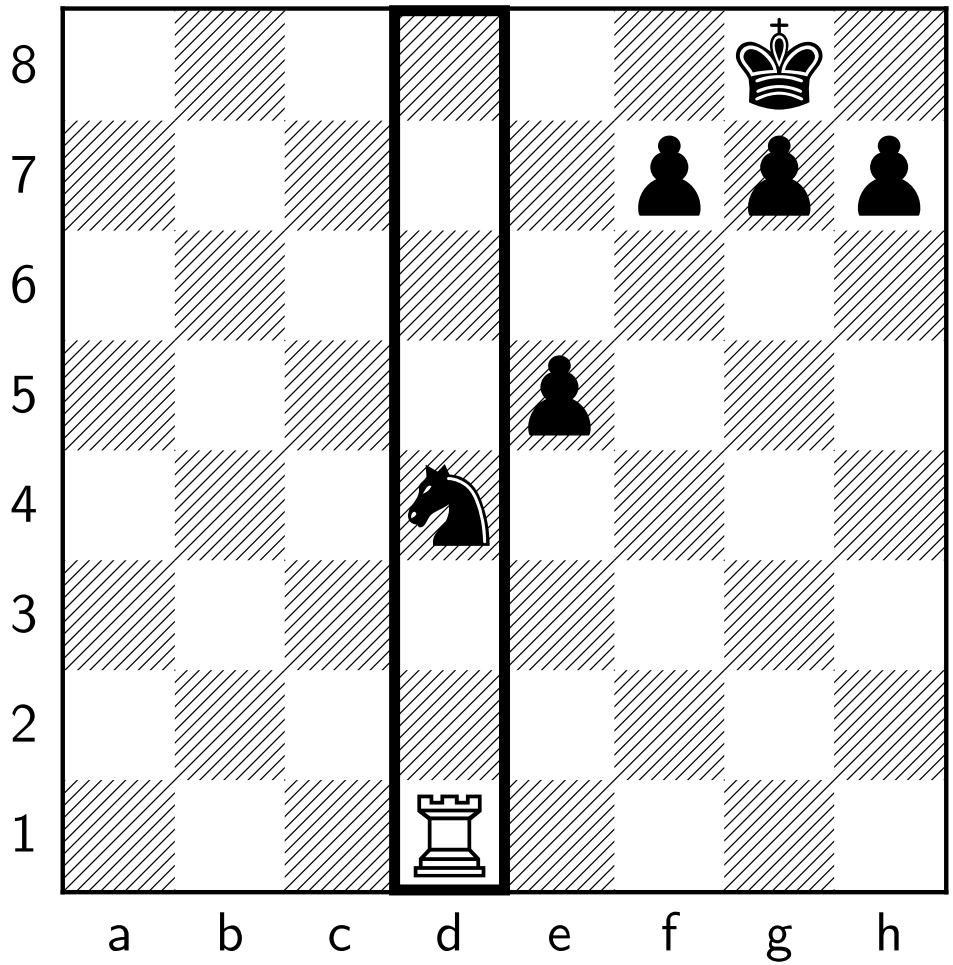
Positional features: “Rooks on files”



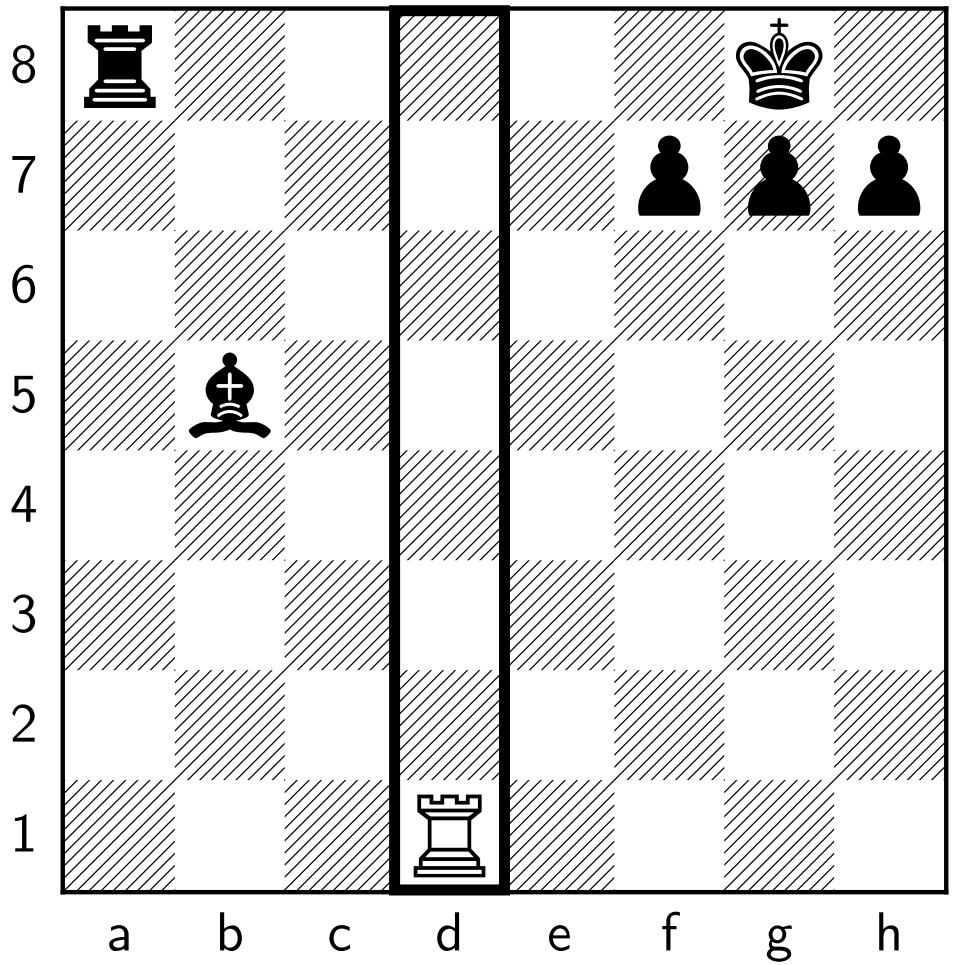
Positional features: "Rooks on files"



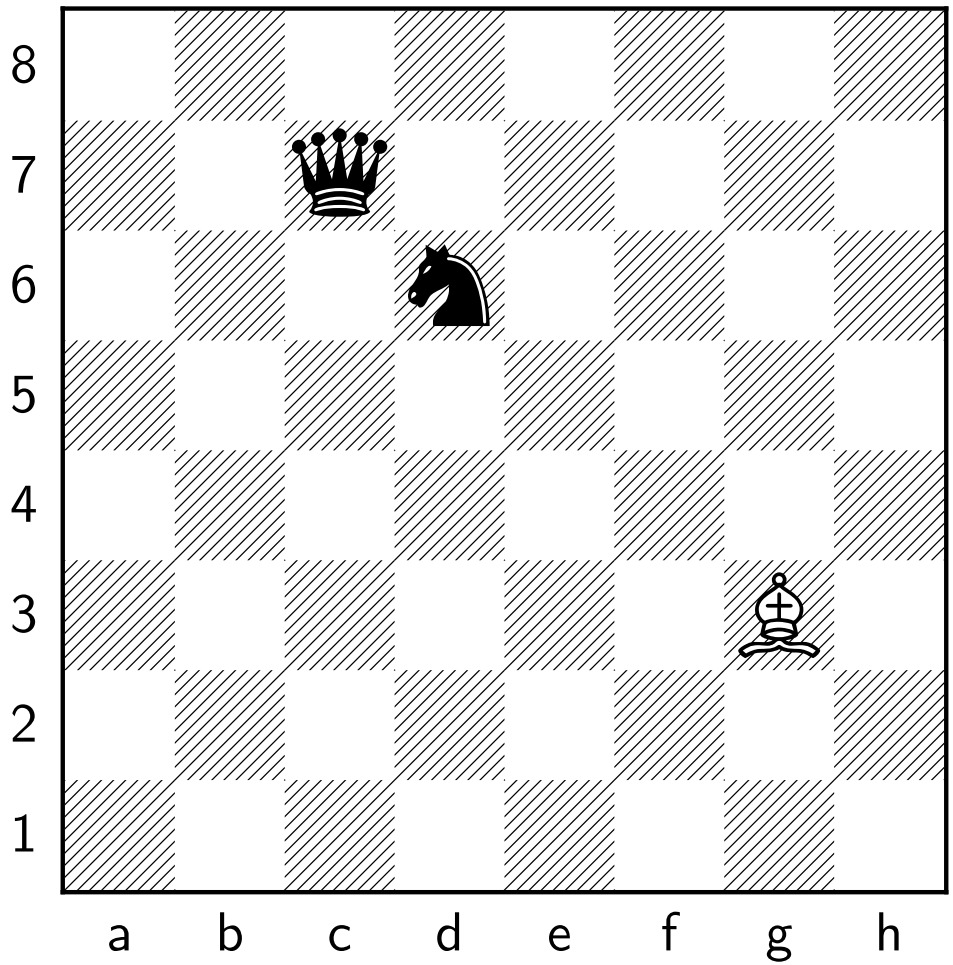
Positional features: "Rooks on files"



Positional features: "Rooks on files"



Positional features: “Pins”



Evaluation function: Miscellaneous

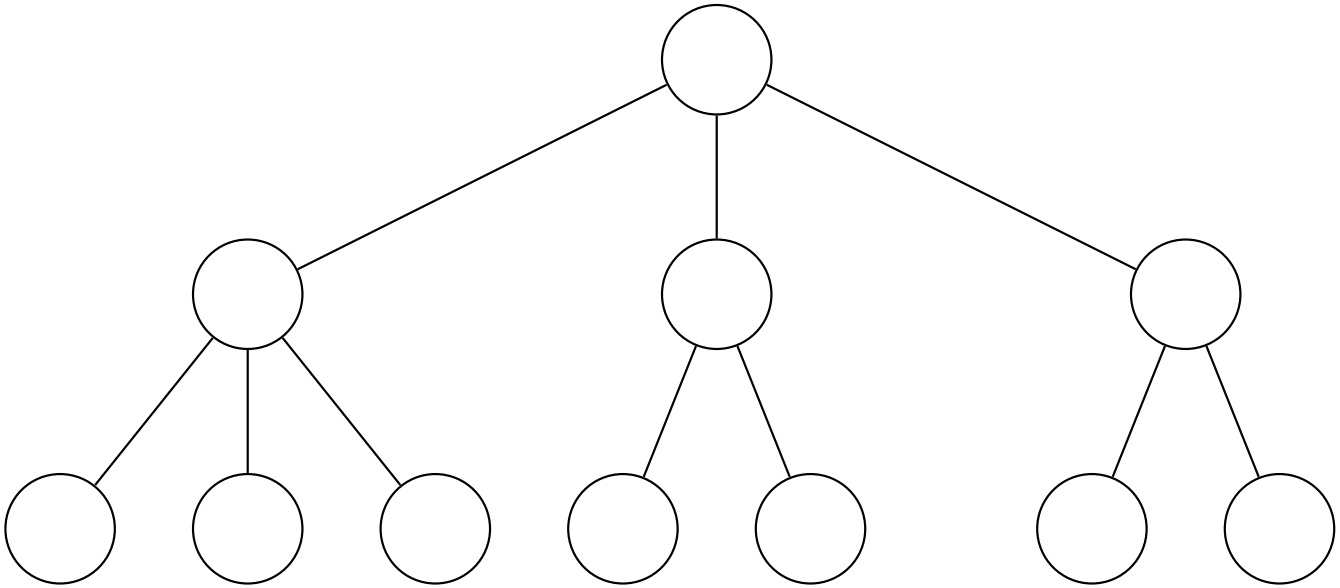
Opening Database of opening moves

Endgame Database of all positions with five or fewer pieces

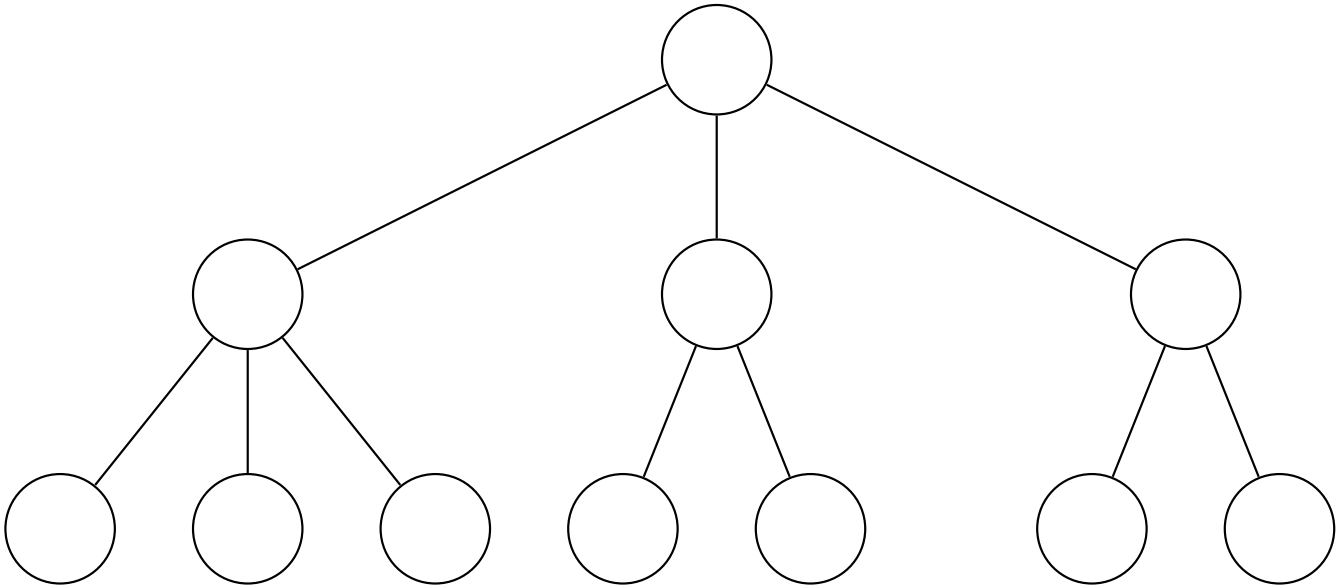
Weights Weights tuned by hand, with some optimisation in specific cases

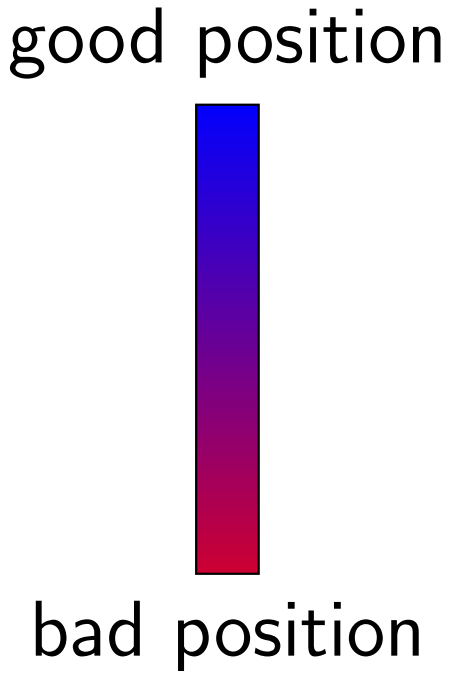
Searching Algorithm

Minimax searching

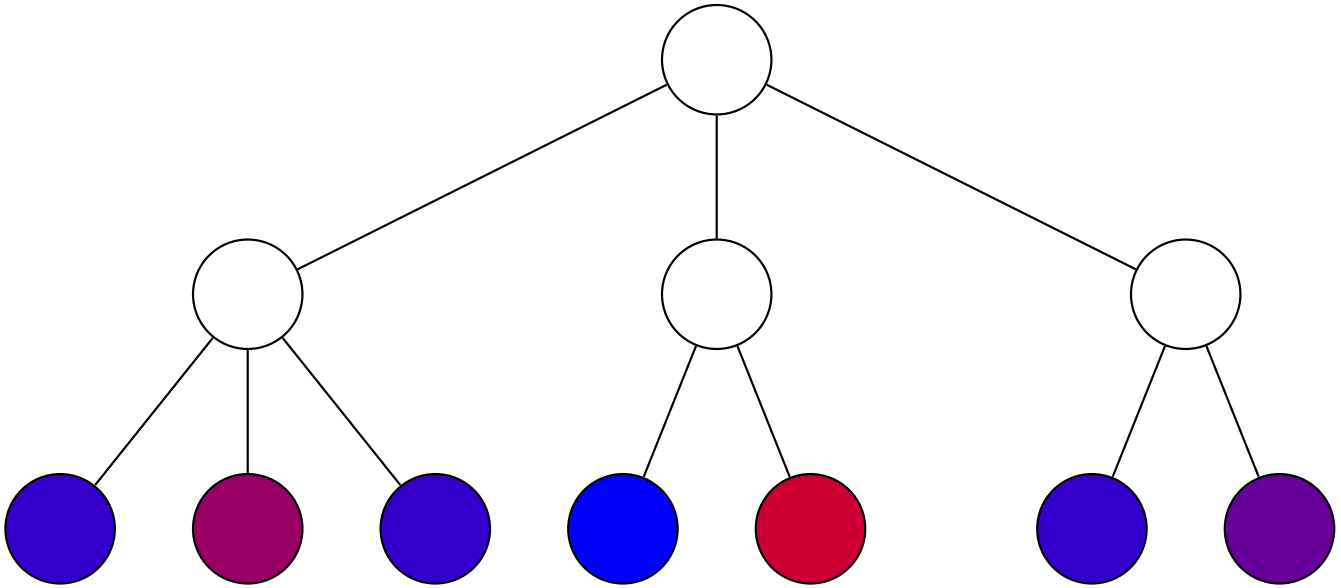


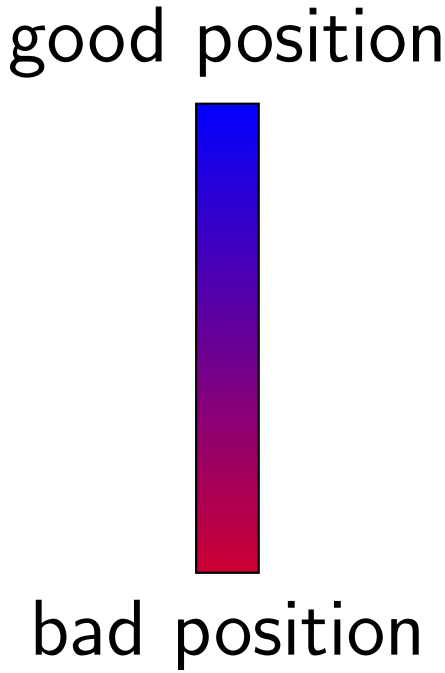
Minimax searching



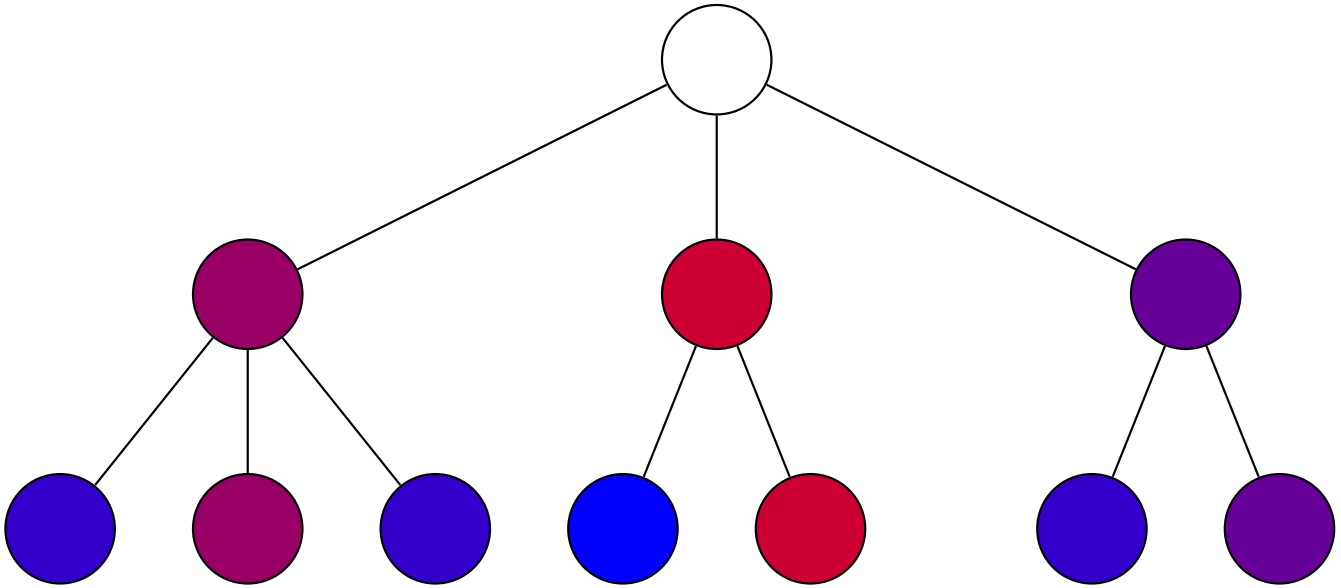


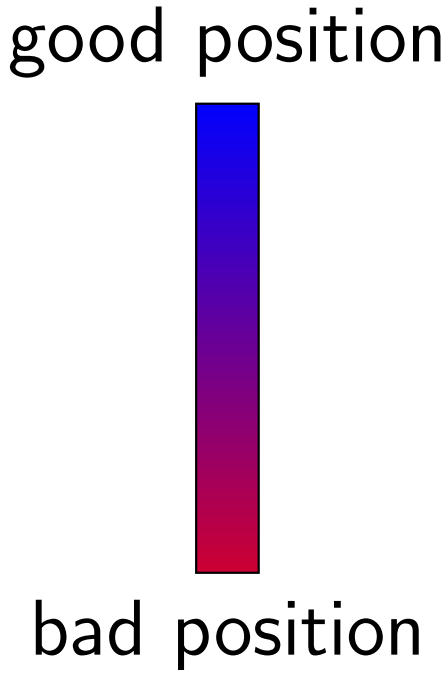
Minimax searching



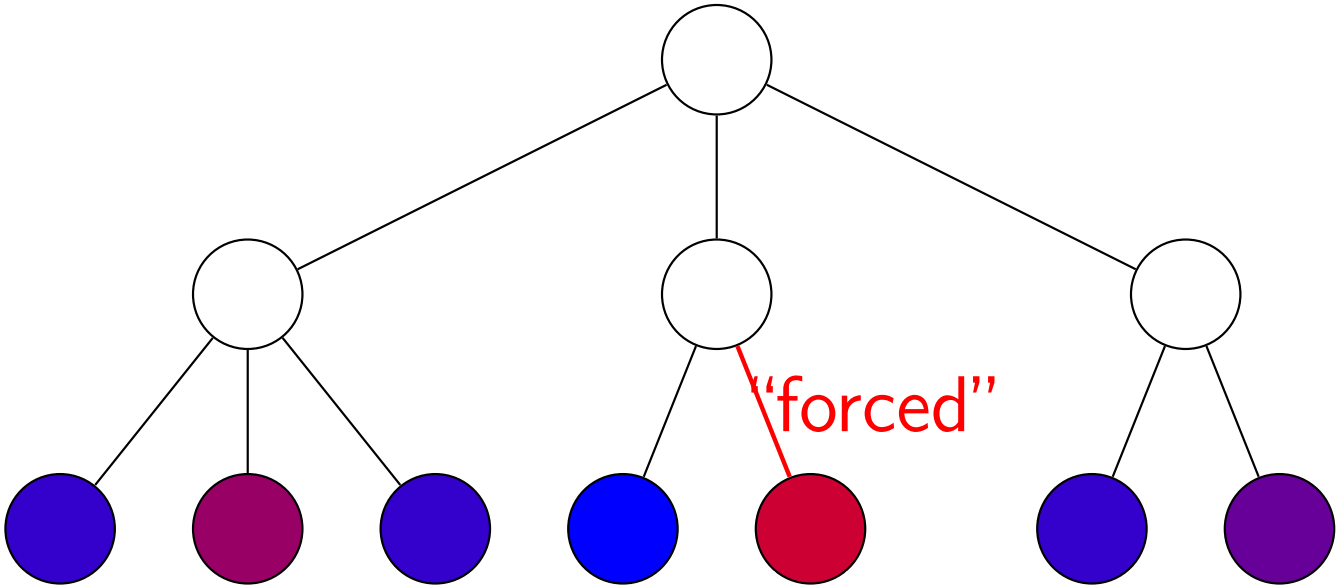


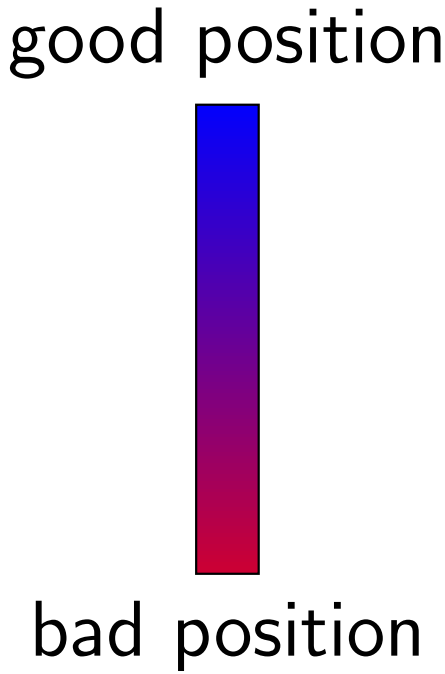
Minimax searching



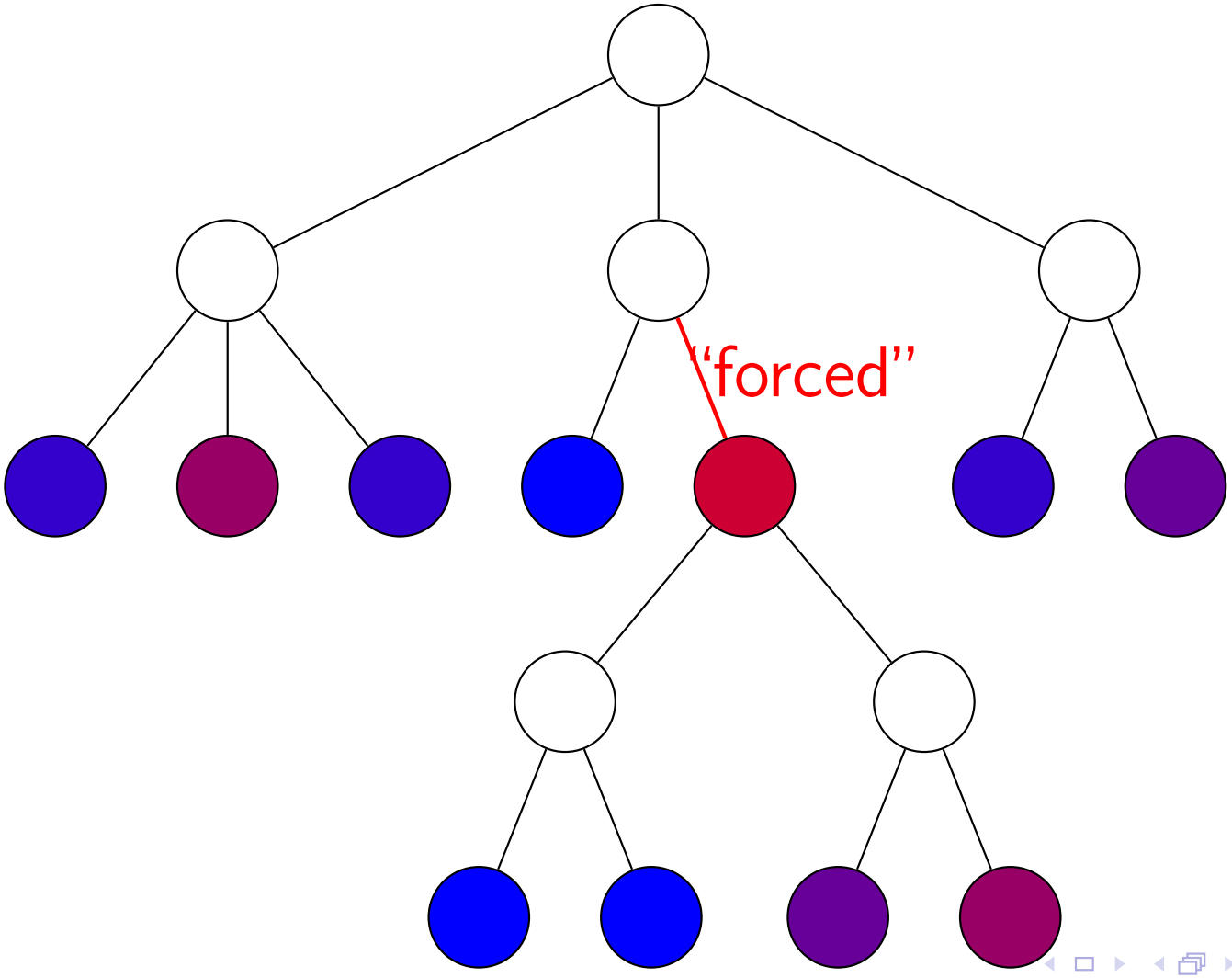


Improving on Minimax





Improving on Minimax



good position

bad position

Thank you for listening!