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#### Black Heuristics

Piece Metric: number of white (rescaled) minus number of black pieces King Surrounded: number of blacks, throne and citadels surrounding king King Freedom: number of opponents along the four directions from king position King Support: number of whites in the 3x3 window around the king King Good Squares: goodness of the king position in the board



Piece Metric







King Freedom



King Support



King Good Squares

### White heuristics (early game)

Piece Metric: number of white (rescaled) minus number of black pieces King Surrounded: number of blacks, throne and citadels surrounding king King Good Squares: goodness of the king position in the board Free Cross: number of free positions in the cross passing through throne



Piece Metric







Free Cross

### White heuristics (endgame)

Piece Metric: number of white (rescaled) minus number of black pieces King Surrounded: number of blacks, throne and citadels surrounding king King Freedom: number of opponents along the four directions from king position King Support: number of whites in the 3x3 window around the king Free Cross: number of free positions in the cross passing through throne











King Surrounded

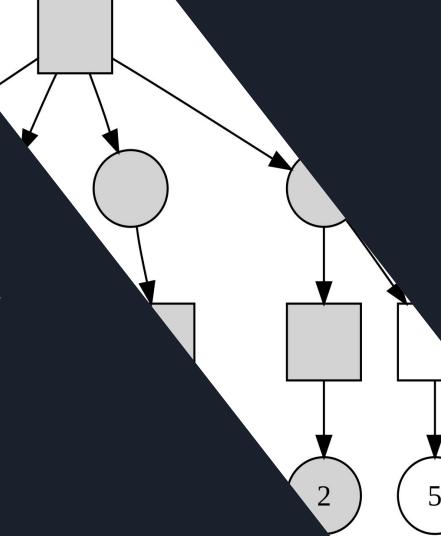
King Freedom

King Support

Free Cross

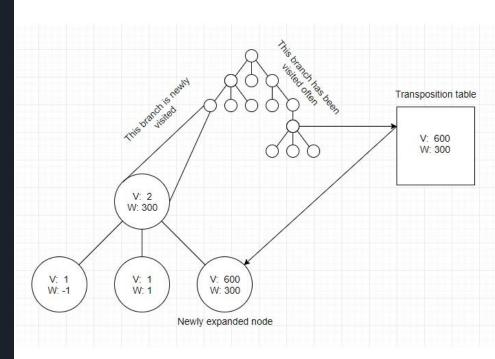
#### Search Algorithm

MinMax with alpha-beta pruning and iterative deepening has been used in order to explore as much of the tree as possible before the time allocated for the player runs out.



## Transposition tables

Zobrist hashing is used to implement transposition tables, a special kind of hash table that is indexed by a board position and used to avoid analyzing the same position more than once.



# THANKS FOR YOUR ATTENTION

WALKOVER