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Part 1:

MinMaxOpening:

Case1:

Input: xxxxxxxxxxWxxWxxxxBxB
Output: xxxxxxxxxxxWxxWxxWXxXxBWB

Depth: 5

Positions Evaluated: 1219368

Static Estimate: 1

Case2:

Input: xxxxxxxxxxxxxWxWxxxxBxB
Output: xxxxxxxxxxxxxWWWxxxxxB

Depth: 5

Positions Evaluated: 1399404

Static Estimate: 2

MinMaxMidgameEndgame:

Case1:

Input: WBWxBxBWWWBxBxxBWBWxx
Output: WBxWBxBWWWBxBxxBWBWxx

Depth: 5

Positions Evaluated: 13553

Static Estimate: -6

Case2:

Input: BBxWBxBWWBWxBxxWWBWxx
Output: BBWxBxBWWBWxBxxWWxWxx

Depth: 5

Positions Evaluated: 45577

Static Estimate: 1994

Part 2:

ABOpening:

Case1:

Input: xxxxxxxxxxWxxWxxxxBxB
Output: xxxxxxxxxxXWxxWxxxxBWB

Depth: 5

Positions Evaluated: 133590 (90% savings over MinMaxOpening)

Static Estimate: 1

Case2:

Input: xxxxxxxxxxxxXWxWxxxBxB
Output: xxxxxxxxxxxXWWWxxxxxB

Depth: 5

Positions Evaluated: 135597 (90% savings over MinMaxOpening)

Static Estimate: 2

ABMidgameEndgame:

Case1:

Input: WBWxBxBWWWBxBxxBWBWxx
Output: WBxWBxBWWWBxBxxBWBWxx

Depth: 5

Positions Evaluated: 1374 (90% savings over MinMaxMidgameEndgame)

Static Estimate: -6

Case2:

Input: BBxWBxBWWBWxBxxWWBWxx Output: BBWxBxBWWBWxBxxWWxWxx

Depth: 5

Positions Evaluated: 1509 (95% savings over MinMaxMidgameEndgame)

Static Estimate: 1994

Part 3:

MinMaxOpeningBlack:

Case1:

Input: xxxxxxxxxxBxxBxxxxWxW
Output: xxxxxxxxxxxxBxxBxxxxWBW

Depth: 5

Positions Evaluated: 1219368

Static Estimate: 1

Case2:

Input: xxxxxxxxxxxxxBxBxxxxWxW
Output: xxxxxxxxxxxxxBBBxxxxxW

Depth: 5

Positions Evaluated: 1399404

Static Estimate: 2

MinMaxMidgameEndgameBlack:

Case1:

Input: BWBxWxWBBBWxWxxWBWBxx Output: BWxBWxWBBBWxWxxWBWBxx

Depth: 5

Positions Evaluated: 13553

Static Estimate: -6

Case2:

Input: WWxBWxWBBWBxWxxBBWBxx Output: WWBxWxWBBWBxWxxBBxBxx

Depth: 5

Positions Evaluated: 45577 Static Estimate: 1994

Part 4:

MinMaxOpeningImproved:

Case1:

Input: BxWBxBWxBxxxxBBxWxxBW

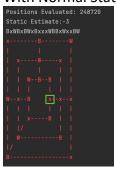
Improved Static Output: BxWBxBWxB<mark>Wxxx</mark>BBxWxxBW Normal Static Output: BxWBxBWxBxxxWBBxWxxBW

Depth: 5

Positions Evaluated: 248720

Static Estimate: 296

With Normal Static:



With Improved Static:



Normal static output, in this example could not close the mill for a potential mill. Normal static function is at times missing the closing of the black mill, as it only directly compares (White-Black) without making sense of where the pieces are. But with improvised static, we have successfully stopped a Black mill from forming, by assigning credits for stopping a mill from closing and for finding out potential mills which can be formed using millCount(), potentialMill(), potentialCloseMill() functions.

<u>MinMaxMidgameEndgameImproved:</u>

Case1:

Input: WBxBxWxWWWBBxxxxxxxxB

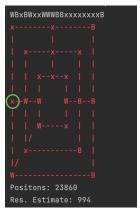
Improved Static Output: xBxxxWWWWWBBxxxxxxxxB
Normal Static Output: WBxBWxxWWWBBxxxxxxxxB

Depth: 5

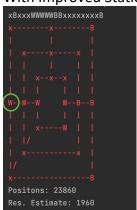
Positions Evaluated: 23860

Static Estimate: 1960

With Normal Static:



With Improved Static:



In the above example, we can see that the Normal MiniMax Midgame Endgame is not closing the mill, instead it is moving the 'W' piece from '5' to '4' location, where a mill can be formed but it needs another move to form the mill. But it is not evaluating the case, where there are already 2 W's waiting to form a mill.

Now with the new improved static, we are closing the mill and removing a black piece.