Part 1: Heuristic Analysis

The result of the tournament evaluation is as follows

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             *************************
                  Playing Matches
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Match #    Opponent    AB_Improved    AB_Custom    AB_Custom_2    AB_Custom_3
                       Won | Lost    Won | Lost    Won | Lost    Won | Lost
   1        Random      8  |  2      10  |  0       8  |  2       9  |  1
   2        MM_Open     7  |  3       7  |  3       7  |  3       7  |  3
   3       MM_Center    8  |  2       9  |  1       8  |  2       6  |  4
   4      MM_Improved   6  |  4       8  |  2       5  |  5       6  |  4
   5        AB_Open     3  |  7       6  |  4       4  |  6       6  |  4
   6       AB_Center    3  |  7       4  |  6       6  |  4       4  |  6
   7      AB_Improved   5  |  5       2  |  8       7  |  3       6  |  4
------------------------------------------------------------------------------
          Win Rate:      57.1%         65.7%         64.3%         62.9%
```

Your ID search forfeited 161.0 games while there were still legal moves available to play.

custom_score3

The simplest of all possible heuristics is just using the number of legal moves. If the player has more legal moves than his opponent this is considered as a good choice. The player does not trap himself into a possible death end.

With this approach the win rate was above 60% in every try. However if you look carefully the win rate goes hardly above 6 out of 10.

custom_score2

On the basis of custom_score3 the sum of the distances of every legal move to the centre of the board is added to the heuristic. This approach has been chosen to give more weight to the number of legal moves and the distance to the centre.

In most tries this approach was over 60% as well, but not always. Id seems to have it difficulties mostly against the *AB_Open*

custom_score

Again on the basis of custom_score3 the difference of the diagonal of the board to the distance of the move of the player to the centre is added. So the closer to the centre

the better. For the opponent instead we add the distance, so a move is better if it is far from the centre.

Despite that, the win rate is quite high with over 65%, *AB_Center* and *AB_Improved* have been able to win in most cases against this approach.

Summarising

The most impact to the result can be achieved using the difference of the players legal moves and the one of the opponent. The distance to the centre can be used to improve it, but not significantly. Knowing that it might be better to increase the weight on this difference in moves.