Evaluation of Heuristics

Its apparent that we need good strategies to win the game of isloation. There are two components of the good strategy : Offensive and Defensive

The offensive behaviour is trying to obstruct the opponent's game by occupying what would appear to be the best cell for the opponent.

The defensive behaviour is trying to keep as many options as possible open, which results in a general gravitation of the moves towards the center of the board, which is where one has more moves available as opposed to the sides of the board.

The Following are Heuristic Functions that I have employed:

1. Heuristic – (H1) : MINIMIZING OPPONENT'S MOVES

The heuristic is based on the logic that opponent's moves should be minimized. It can be mathematically expressed as:

(Number of my available moves) − α* (Number of opponents available moves) , *where* $\alpha \in (1, \infty)$

2.Heuristic – (H2) : MAXIMIZING PLAYER'S MOVES

The heuristic is based on the logic that player's moves should be maximized. It can be mathematically expressed as:

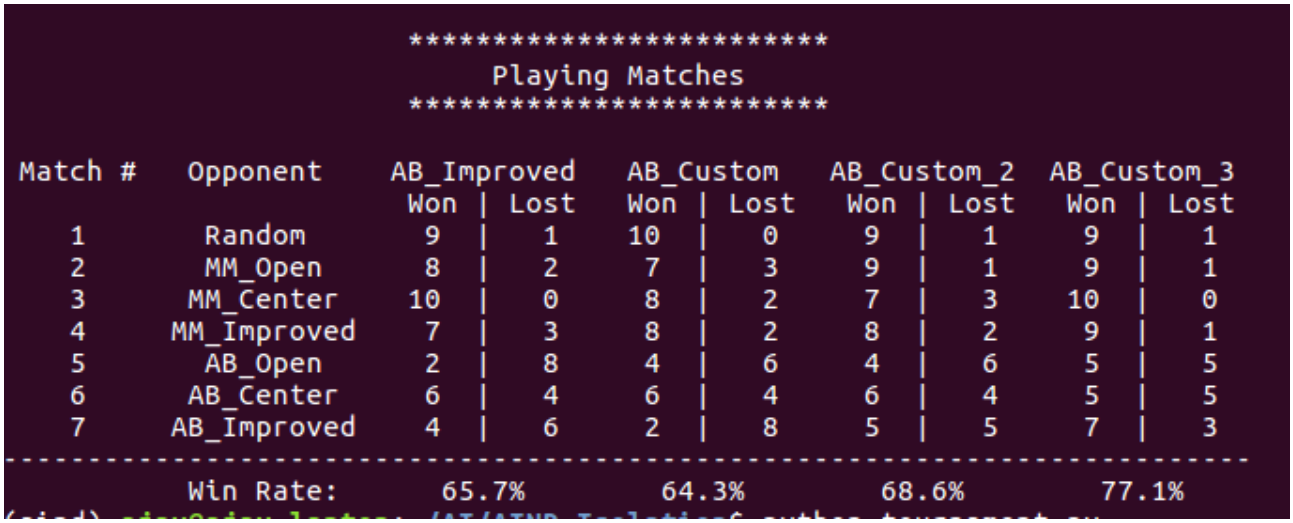
α *(Number of my available moves) − (Number of opponents available move), *where* $\alpha \in (1, \infty)$

3. Heuristic – (H3) : SQUARING THE PLAYER'S AND OPPONENT'S MOVES AND MAXIMIZING PLAYER'S MOVES

([Number of my available moves]^2) - α *([Number of opponents available move]^2), *where* $\alpha \in (1, \infty)$

Upon seeing various results for the heuristics, I have found that Heuristics 3(H3) was best one for α = 3(emperically). It takes much more to complete than H1 and H2 as it enable the search to go deeper than the H1 and H2.

α = 3



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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      9  |   1    10  |   0    9  |   1    9  |   1
    2       MM_Open     8  |   2     7  |   3    9  |   1    9  |   1
    3      MM_Center   10  |   0     8  |   2    7  |   3   10  |   0
    4     MM_Improved   7  |   3     8  |   2    8  |   2    9  |   1
    5       AB_Open     2  |   8     4  |   6    4  |   6    5  |   5
    6      AB_Center    6  |   4     6  |   4    6  |   4    5  |   5
    7     AB_Improved   4  |   6     2  |   8    5  |   5    7  |   3
--------------------------------------------------------------------------
          Win Rate:      65.7%        64.3%        68.6%        77.1%
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We could so say that H3 is the difference between ratio of the player's move and oppopents move and ratio of oppoents move and players move.

(Number of my available moves/Number of opponents available move) - α(Number of opponents available move/Number of my available moves)*

Better Ratio means better chance to win .If increase the chances of the player to win along with decrease in the chance of opponent,then player will have much greater chances when H3 is employeed as compared to H1(player is focused only on minimizing the chances of opponent) and H2(player is focused only on maximizing its chances).