HEURISTIC ANALYSIS

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For AIND-ISOLATION, Udacity.

HEURISTIC 1: custom_score

The main idea for creating the heuristic to prioritize the scenario if the number of own moves is greater than opponent moves and scenario with maximum own_moves. Below is the snippet of the custom_score heuristics.

```
if own_moves-opp_moves>0:
    return float((own_moves-opp_moves)*own_moves)
else:
    return float(own_moves - opp_moves)
```

If number of own move is less than number of opposite move then we don't have to prioritize the move to we will return the score as the difference between number of own_moves and opp_moves.

HEURISTIC 2: custom_score_2

Below is the code snippet of the custom_score_2 heuristic.

```
if opp_moves >= 2 and my_moves > 3:
    return float(my_moves*2)
elif opp_moves<2 and my_moves >2:
    return float(my_moves*5)
elif opp_moves <1 and my_moves >= 1:
    return float(my_moves*10)
else:
    return float(my_moves-opp_moves)
```

The main idea behind this heuristic is to defend and reduce the number of moves for the opponent. By increasing the score by 10 times if opponent has less than one move even current player is left with one move. This heuristic helps in taking risky and critical decision.

HEURISTIC 3: custom_score_3

```
if opp_moves > 2:
    return float(own_moves*0.5)
else:
    return float(own_moves*0.7)
```

This Heuristic mainly focus on defending. Based on the number of opponents move will try to reduce the score my multiplying the factor 0.5 or 0.7 with the number of current own move.

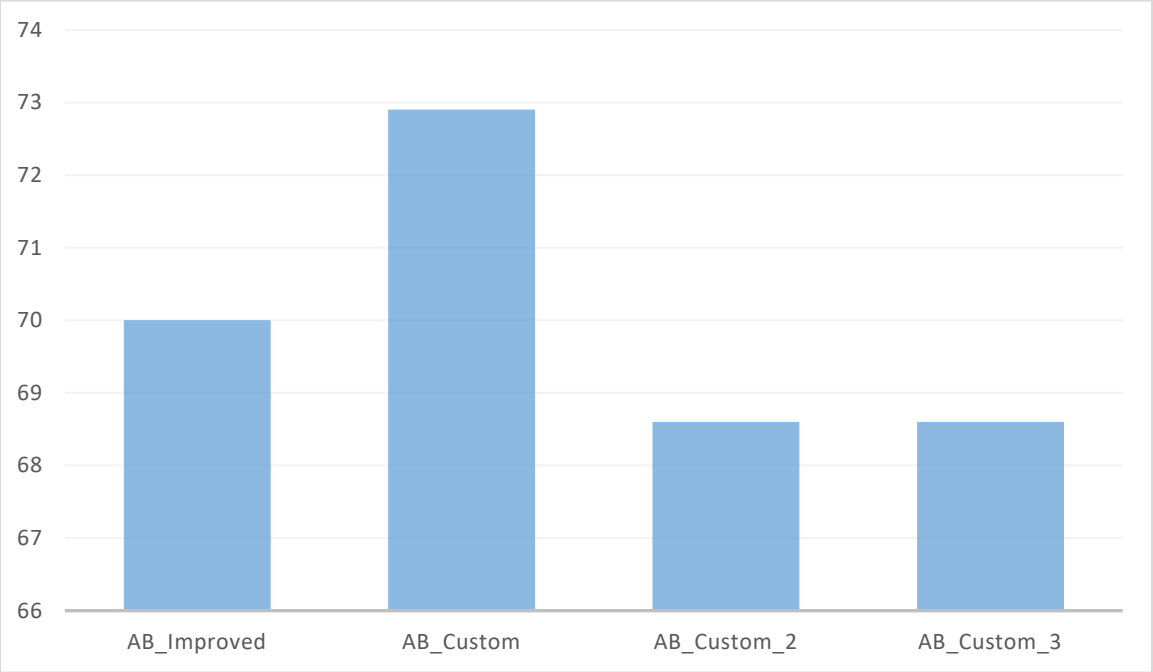
CONCLUSION:

The below is the score achieved by the heuristics explained above

```
                    **************************
                         Playing Matches
                    **************************

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     10  |  0     9  |  1
   2       MM_Open     7  |  3      8  |  2      8  |  2     8  |  2
   3      MM_Center    8  |  2      9  |  1      8  |  2     9  |  1
   4     MM_Improved   8  |  2      8  |  2      7  |  3     7  |  3
   5       AB_Open     5  |  5      4  |  6      5  |  5     4  |  6
   6      AB_Center    7  |  3      5  |  5      4  |  6     6  |  4
   7     AB_Improved   5  |  5      7  |  3      6  |  4     5  |  5
------------------------------------------------------------------------
         Win Rate:      70.0%        72.9%        68.6%        68.6%
```

custom_score VS custom_score_2 VS custom_score_3



As per the above diagram its clearly proven that AB_Custom has performed better than AB_Improved.