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I have explored 3 heuristics.

1) ***custom_score_3()****:* The first heuristic is simply returning the number of legal moves that our agent has *minus* the number of moves the opponent has. This value is +ve if our agent has more moves than opponent, -ve if less, and 0 if same. This is an amateurish heuristic which relies on an assumption that the more moves our agent has, the better. This heuristic is ignorant of the board positions or good moves. This can give you surpsising good results at times, but is not reliable.

2) ***custom_score_2()****:* In this heuristic, I am playing with the euclidean distance of the agent and the opponent from the center. The nearer any participant is to the center, the better. Because it has more directions to move to compared to edges. The score in this case is the distance of agent *minus* the distance of opponent (from the center). On paper this seems to have an advantate over the previous heuristic (more closer to the game's rules), but the information is not enough to judge which board is better. The tournament simulations infact did not grade this heuristic any better than the 1st one.

3) ***custom_score()****:* In this approach which is my proposed approach:
    - Divide the isolation grid into 3 layers: Outer layer, Middle layer, and Inner region.
    - Get the legal moves of agent (current) player
    - Calculate a 'score' by giving more weightage to the moves in Inner region, less weightage to the moves in Middle layer, and least weightate to the moves in Outer layer. The rational being that moves near to the center are more valuable since it results in more available options (as discussed in lecture). This gives the heuristic positional intuition about the current board.
    - Similarly calculate a similar 'score' for the opponent.
    - The resultant score that is returned is (a) + (b) where:
        - a = (difference in 'score' of agent and opponent)
        - b = (difference in number of moves between agent and opponent)
    - (a) is +ve if agent has higher score, -ve otherwise.
    - The rational to add (b) is to add one more differentiator if the 'score' tends to 0. Also from other heuristics, I have observed that this plays well, since more moves means more options available (obviously)

Here are 3 runs of the tournament, with custom_score() getting best accuracy.

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                                 *************************
                                      Playing Matches
                                 *************************

 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     7  |   3     8  |   2
    2        MM_Open       5  |   5     7  |   3     4  |   6     7  |   3
    3       MM_Center      6  |   4     9  |   1     8  |   2     7  |   3
    4      MM_Improved     7  |   3     8  |   2     4  |   6     4  |   6
    5        AB_Open       6  |   4     5  |   5     3  |   7     6  |   4
    6       AB_Center      5  |   5    10  |   0     3  |   7     7  |   3
    7      AB_Improved     4  |   6     2  |   8     4  |   6     5  |   5
--------------------------------------------------------------------------
           Win Rate:        58.6%        72.9%        47.1%        62.9%


                                 *************************
                                      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    8  |   2
    2         MM_Open       4  |   6    7   |   3    5  |   5    6  |   4
    3        MM_Center      6  |   4    10  |   0    6  |   4    7  |   3
    4       MM_Improved     6  |   4    8   |   2    7  |   3    6  |   4
    5         AB_Open       3  |   7    5   |   5    4  |   6    7  |   3
    6        AB_Center      6  |   4    6   |   4    6  |   4    6  |   4
    7       AB_Improved     6  |   4    4   |   6    5  |   5    5  |   5
--------------------------------------------------------------------------
             Win Rate:        55.7%       71.4%        58.6%        64.3%
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                                 *************************
                                      Playing Matches
                                 *************************

 Match #     Opponent     AB_Improved   AB_Custom   AB_Custom_2  AB_Custom_3
                           Won | Lost   Won | Lost   Won | Lost   Won | Lost
    1         Random        8  |   2    9   |   1    8  |   2    8  |   2
    2         MM_Open       6  |   4    7   |   3    5  |   5    5  |   5
    3        MM_Center      6  |   4    8   |   2    6  |   4    8  |   2
    4       MM_Improved     8  |   2    6   |   4    5  |   5    6  |   4
    5         AB_Open       6  |   4    6   |   4    5  |   5    8  |   2
    6        AB_Center      6  |   4    5   |   5    5  |   5    6  |   4
    7       AB_Improved     7  |   3    4   |   6    5  |   5    3  |   7
--------------------------------------------------------------------------
             Win Rate:        67.1%       64.3%        55.7%        62.9%
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