Heuristic Analysis

Description of heuristic Functions

Custom Score

Activate Player will try to chose the most aggressive move. It calculate the number of my moves and opponent player moves. It weights the number of oppenent player moves with the factor of 2

Code :

```
return float(my_moves - 2*opp_moves)
```

Custom Score 2

It calculates the difference between the number of my prayer and opponent player moves, its weight the number of opponent player move with factor of 3 for first half of the game and by factor of 2 in second half of game.

Code :

```
if first_half:
        return float(my_moves-3*opp_moves)
else:
        return float(my_moves-2*opp_moves)
```

Custom Score 3

This Code Inproves Centor score, It calculates the difference between own player distance and opponent distance from center.

Comparison

```python
import tournament
tournament.main()
```

```
    This script evaluates the performance of the custom_score evaluation
    function against a baseline agent using alpha-beta search and iterative
    deepening (ID) called `AB_Improved`. The three `AB_Custom` agents use
    ID and alpha-beta search with the custom_score functions defined in
    game_agent.py.

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

     Match #   Opponent    AB_Improved   AB_Custom   AB_Custom_2  AB_Custom_3
                            Won | Lost   Won | Lost   Won | Lost   Won | Lost
        1       Random      10  |   0    10  |   0    10  |   0    10  |   0
```

```
        2       MM_Open      7  |   3     9  |   1     7  |   3     8  |   2
        3      MM_Center     8  |   2     9  |   1    10  |   0    10  |   0
        4     MM_Improved    9  |   1     9  |   1     8  |   2     6  |   4
        5       AB_Open      5  |   5     6  |   4     6  |   4     5  |   5
        6      AB_Center     6  |   4     7  |   3     4  |   6     5  |   5
        7     AB_Improved    3  |   7     3  |   7     6  |   4     4  |   6
    ------------------------------------------------------------------------
-
               Win Rate:      68.6%        75.7%        72.9%        68.6%
```

Your ID search forfeited 100.0 games while there were still legal moves available to play.

Heurisitic Function Recommendation in my three function

From the analysis and comparison of the results of different heuristic function we can clearly make clarification the Custome_score is the leader and can be picked as strongest oppenent among the other heuristics.
I recommend the Custom_score heuristic Based on plaer results:

- its easy to Implement and involves merely a few operations
- if we would like imporve the function, we could tune using grid search.