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My Heuristic Analysis Function

Code:

```python
def my_custom_heuristic(game, player):
    if game.is_loser(player):
        return float("-inf")

    if game.is_winner(player):
        return float("inf")

    my_moves = len(game.get_legal_moves(player))
    opponent_moves = len(game.get_legal_moves(game.get_opponent(player)))

    non_blank_spaces = 49 - len(game.get_blank_spaces())

    center_spaces = [(3, 3)]

    if non_blank_spaces == 3:
        if game.get_player_location(player) in center_spaces:
            return float("inf")

    return float(my_moves - opponent_moves - non_blank_spaces * 0.01)
```

Explanation:

The player tends to have positional advantages at the center when the number of movable spaces is less as it can reach more spaces around it. So, in my heuristic function, I will force the player to move to the center of the board which is position (3, 3) when the number of movable spaces is 3, else, the heuristic functions will choose the step which will lead to lesser opponent's moves and lesser movable spaces.

Result Analysis:

Below are the scores of the heuristic function developed by my team members. My heuristic function managed to achieve an average winning rate of 66.00% after 25 rounds of play.

****
 Evaluating: ID_Improved
****

Playing Matches:

  Match 1: ID_Improved vs   Random   Result: 82 to 18
  Match 2: ID_Improved vs   MM_Null   Result: 70 to 30
  Match 3: ID_Improved vs   MM_Open   Result: 54 to 46
  Match 4: ID_Improved vs MM_Improved   Result: 39 to 61
  Match 5: ID_Improved vs   AB_Null   Result: 62 to 38
  Match 6: ID_Improved vs   AB_Open   Result: 62 to 38
  Match 7: ID_Improved vs AB_Improved   Result: 54 to 46

Results:

ID_Improved   60.43%

****
Evaluating: Student Robinson
****

Playing Matches:

  Match 1: Student Robinson vs   Random   Result: 84 to 16
  Match 2: Student Robinson vs   MM_Null   Result: 70 to 30
  Match 3: Student Robinson vs   MM_Open   Result: 58 to 42
  Match 4: Student Robinson vs MM_Improved   Result: 53 to 47
  Match 5: Student Robinson vs   AB_Null   Result: 70 to 30
  Match 6: Student Robinson vs   AB_Open   Result: 66 to 34
  Match 7: Student Robinson vs AB_Improved   Result: 62 to 38

Results:

Student Robinson   66.14%

****
Evaluating: Student Jun Shou
****

Playing Matches:

  Match 1: Student Jun Shou vs   Random   Result: 84 to 16
  Match 2: Student Jun Shou vs   MM_Null   Result: 74 to 26
  Match 3: Student Jun Shou vs   MM_Open   Result: 59 to 41
  Match 4: Student Jun Shou vs MM_Improved   Result: 55 to 45
  Match 5: Student Jun Shou vs   AB_Null   Result: 71 to 29
  Match 6: Student Jun Shou vs   AB_Open   Result: 70 to 30
  Match 7: Student Jun Shou vs AB_Improved   Result: 60 to 40

Results:

Student Jun Shou   67.57%

****

Evaluating: Student Hao Siong
****

Playing Matches:

  Match 1: Student Hao Siong vs   Random   Result: 86 to 14
  Match 2: Student Hao Siong vs   MM_Null   Result: 77 to 23
  Match 3: Student Hao Siong vs   MM_Open   Result: 55 to 45
  Match 4: Student Hao Siong vs MM_Improved   Result: 51 to 49
  Match 5: Student Hao Siong vs   AB_Null   Result: 68 to 32
  Match 6: Student Hao Siong vs   AB_Open   Result: 66 to 34
  Match 7: Student Hao Siong vs AB_Improved   Result: 59 to 41

Results:

Student Hao Siong   66.00%

****
Evaluating: Student Marina
****

Playing Matches:

  Match 1: Student Marina vs   Random   Result: 87 to 13
  Match 2: Student Marina vs   MM_Null   Result: 65 to 35
  Match 3: Student Marina vs   MM_Open   Result: 52 to 48
  Match 4: Student Marina vs MM_Improved Result: 40 to 60
  Match 5: Student Marina vs   AB_Null   Result: 70 to 30
  Match 6: Student Marina vs   AB_Open   Result: 58 to 42
  Match 7: Student Marina vs AB_Improved Result: 57 to 43

Results:

Student Marina   61.29%