

Isolation Heuristics

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	8	2	10	0
2	MM_Open	8	2	8	2	6	4	10	0
3	MM_Center	8	2	9	1	8	2	10	0
4	MM_Improved	7	3	9	1	10	0	6	4
5	AB_Open	5	5	6	4	6	4	6	4
6	AB_Center	7	3	7	3	7	3	6	4
7	AB_Improved	4	6	7	3	7	3	5	5
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Win Rate:		68.6%		80.0%		74.3%		75.7%	

Heuristic 1:

```
own_moves = game.get_legal_moves(player)
opp_moves = game.get_legal_moves(game.get_opponent(player))
own_total_moves = float(sum([len(game._Board__get_moves(move)) for move in own_moves]))
opp_total_moves = float(sum([len(game._Board__get_moves(move)) for move in opp_moves]))

return own_total_moves - opp_total_moves + len(own_moves) - len(opp_moves)
```

The most promising heuristic was stepping through each move, getting the available moves on the board, and then summing these values. By doing this for both the agent and the opponent and subtracting the total values and then adding it to the “improved” heuristic (subtracting the opponent’s moves from the agent’s moves), we get a heuristic that works better than the “improved” heuristic alone. This is because we are taking more of the board state into consideration when we combine the two heuristics.

Heuristic 2:

```
own_moves = len(game.get_legal_moves(player))
opp_moves = len(game.get_legal_moves(game.get_opponent(player)))

return float(1.5 * own_moves - 0.5 * opp_moves)
```

This heuristic is a variation of the “improved” heuristic, but with different weights applied to the moves. The idea was that it would make differences more pronounced, especially if the values were the same and would otherwise return 0.

Heuristic 3:

```
own_moves = len(game.get_legal_moves(player))
opp_moves = len(game.get_legal_moves(game.get_opponent(player)))

if len(game.get_blank_spaces()) > 6:
```

```
        return float(own_moves - opp_moves)
    else:
        return float(own_moves)
```

This heuristic was my attempt to implement different heuristics at different stages of the game. I attempted to use the number of blank spaces left on the board in order to determine how early into the game we were. In the beginning, we are using the “improved” score heuristic, later on, we switch over to just the measure of own moves.