Heuristic analysis for the second project on a Game Playing agent. Analysis by Jang Woo Park

Heuristics for custom_score: Penalties and rewards are given for the end of the game through the state of the game. The moves for the maximizing player are penalized at the corner. The moves for the minimizing player are rewarded at the corner. It outputs a score equal to the difference of the number of moves available to both.

Heuristics for custom_score2: The distance between the player and its opponent is minimized. The player runs towards its opponent. It rewards smaller absolute differences with higher scores by returning the negative of the absolute difference between the sum of the location vectors.

Heuristics for custom_score3: As the opposite to custom_score2, the distance between the player and its opponent is maximized. The player runs away from its opponent. As the differences get larger, the scores get higher by returning the difference between the sum of the location vectors. After passing all test cases in PA, the tournament is as follows.

Match #	Opponent	AB_Improved Won | Lost	AB_Custom Won | Lost	AB_Custom_2 Won | Lost	AB_Custom_3 Won | Lost
1	Random	10 | 0	10 | 0	6 | 4	9 | 1
2	MM_Open	5 | 5	4 | 6	4 | 6	0 | 10
3	MM_Cente	9 | 1	7 | 3	7 | 3	5 | 5
4	MM_Improved	3 | 7	5 | 5	2 | 8	4 | 6
5	AB_Open	4 | 6	6 | 4	2 | 8	2 | 8
6	AB_Center	9 | 1	7 | 3	5 | 5	5 | 5
7	AB_Improved	4 | 6	5 | 5	3 | 7	2 | 8
	Win Rate:	62.9%	62.9%	41.4%	38.6%

Over all AB_Improved and AB_Custom performed best equally against all opponents. AB custom 2 and 3, playing towards and away from opponents are not winning strategies. When MM center is playing, all AB players do well. When AB center plays, all AB do at least a tie. When AB is playing against AB custom, the AB custom player ties the score.

It is recommended to use the AB improved or custom heuristics for its overall performance against each opponent. The AB improved and custom heuristics win 100% against a random player, and the next performances are AB custom 3 and 2 respectively. The AB custom has the best won to lost games, and after it, comes AB improved. When depth = 3 for opponents, AB improved and AB custom win better than the rest. AB improved ties with AB custom and wins against custom 2 and 3 by big margins.