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AIND: Heuristic Analysis

I played a bit with different strategies such as: getting the center move when both either player1 and player2, basic reflection (1st ply only), favoring edge movements in the beginning and avoiding those towards the end, favoring the mid 3x3 spaces, avoiding corners at all costs and enticing the player to play more defensively by using the defensive heuristic weighted scores.

Custom_1 has a ~5% improvement on the ID improved, and ~10% improvement on both Custom_2 and Custom_3.

Custom_1 favors the center and the edges for the first half of the game, avoids the edges and corners towards the end of the game, and then uses the defensive play heuristic for the remaining moves.

Custom2 has all the above, plus reflection for the 1st ply.

Custom3 is just used as a baseline that uses the defensive heuristic to better understand the improvements on the bare weighted scores.

After playing several matches, **I recommend using Custom_1**. We see that there is ~5% improvement on the AB_Improved agent and ~5%-10% on Custom_2 and Custom_3.

It was also noticed that even though Custom_2 has a bit more computations it didn't result in any gains over either Custom_3 or AB_Improved (which both use a weighted score approach).

However, we can note that by simply favoring edges in the begin game, avoiding corners and favoring the middle 3x3 spaces, we can see a significant result over the baselines. Avoiding corner moves makes sense because it would result in fewer future moves, and favoring the mid

3x3 would lead to increase mobility for the player, which turns out that is the winning strategy in isolation games.

Match #	Opponent	AB_Improved	AB_Custom	AB_Custom_2	AB_Custom_3
		Won Lost	Won Lost	Won Lost	Won Lost
1	AB_Improved	39 of 41	45 of 35	33 of 47	42 of 38
2	AB_Improved	30 of 50	45 of 35	42 of 38	31 of 49
3	AB_Improved	44 of 36	43 of 37	35 of 45	40 of 40
4	AB_Improved	43 of 37	46 of 34	36 of 44	40 of 40
5	AB_Improved	43 of 37	37 of 43	40 of 40	34 of 46
Win Rate		49.8%	54.0%	46.5%	46.8%

Match #	Opponent	AB_Improved	AB_Custom	AB_Custom_2	AB_Custom_3
		Won Lost	Won Lost	Won Lost	Won Lost
1	AB_Improved	41 39	45 35	42 38	45 35
2	AB_Improved	40 40	51 29	41 39	40 40
3	AB_Improved	47 33	43 37	42 38	46 34
4	AB_Improved	36 of 44	46 34	32 48	30 50
5	AB_Improved	36 of 44	37 43	44 36	39 41
Win Rate		50.0%	54.5%	50.2%	50.0%