Heuristic Analysis

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The goal of this project is to create an agent that will play the Isolation game. The key task is to implement the minimax and alphabeta methods. The next step is implement a few different heuristic functions. In this paper I present my analysis of the three heuristics I have created. Performance is presented in the summary table in the end of this analysis.

The first heuristic does not take into account the opponent. It only estimates the number of available moves for the player. The second heuristic returns weighted delta of available moves. It takes improved score with weighted opponent moves. The goal is to blocking opponent's move. The space occupied by the opponent is unavailable. In the third heuristic we tested the situation when the score is equal to the difference in the number of moves available to the both players. However, players have different parameters. The goal is to maximize the number of available moves and minimize the opponent's number of available moves.

Time of deepening search time depends on the hardware. Search depth gave different results for each heuristics. The test showed that of the three heuristic, number 3 has higher win rate than the other heuristic. It tries to minimize the opponent's number of available moves, so that the opponent has always less moves than player. The lower number of opponent's available moves gave better results. According to the results, I recommended to use this heuristic to improve the win rate.

Summary table

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	9	1	9	1
2	MM_Open	7	3	7	3	9	1	8	2
3	MM_Center	9	1	10	0	9	1	9	1
4	MM_Improved	8	2	6	4	6	4	8	2
5	AB_Open	5	5	6	4	6	4	6	4
6	AB_Center	4	6	5	5	5	5	8	2
7	AB_Improved	3	7	6	4	7	3	6	4
	Win Rate:	65.7%		71.4%		72.9%		77.1%	