

Analysis of the Heuristics

Following heuristics were chosen and implemented

- **H1** (AB_Custom): # of player's moves – 2 x # of opponent's moves
- **H2** (AB_Custom_2): # of player's moves - # of opponent's moves
- **H3** (AB_Custom_3): Center score of the player (Square of the distance of the player's location from the center of the board).

The results of the tournament with these heuristics are as follows:

Table 1 Results of the Tournament

***** Playing Matches *****									
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	10	0	8	2
2	MM_Open	10	0	10	0	10	0	10	0
3	MM_Center	10	0	10	0	10	0	9	1
4	MM_Improved	10	0	10	0	10	0	10	0
5	AB_Open	4	6	6	4	2	8	6	4
6	AB_Center	5	5	9	1	6	4	6	4
7	AB_Improved	4	6	6	4	8	2	2	8

Win Rate:		74.3%		87.1%		80.0%		72.9%	

As it can be seen **H1** performed quite well, as it aggressively tries to minimize opponent's available moves (hence the factor 2). **H2** is trying to do something similar but player's and opponent's available moves are equally important. Hence the win-rate is somewhat lower. One can observe that **H1** performs satisfactorily against even AB_Improved.

Table 1 shows **H3** does not perform well against AB_Improved, which Alpha-Beta with iterative deepening. As it is same with AB_Center, the expectation would have been 50%-50% with AB_Center. Although they are close, **H3** is slightly better.

Overall, **H1** seems to be the best heuristic, as it is trying to maximize the available moves for player 1 and aggressively minimize (x2) the available moves of the opponent.