Heuristic Analysis

Below are the results of different agents using different heuristic functions to evaluate position value.

Match	Opponent	**AB_Improved**	**AB_Custom_1**	**AB_Custom_2**	**AB_Custom_3**
		won/lost	won/lost	won/lost	won/lost
1	Random	9/1	7/3	7/3	7/3
2	MM_Open	5/5	6/4	5/5	7/3
3	MM_Center	6/4	10/0	8/2	6/4
4	MM_Improved	4/6	5/5	4/6	5/5
5	AB_Open	5/5	6/4	4/6	5/5
6	AB_Center	7/3	6/4	7/3	6/4
7	AM_Improved	5/5	5/5	6/4	4/6
Win Rate:		**58.6%**	**64.3%**	**58.6%**	**57.1%**

The AB_Custom_1 has the highest win rate at 64.3%. A losing position is attributed a value of negative infinity and winning one of infinity. The strategy is to limit the number of opponent's move and increase the agent's own number of moves. If the game hasn't ended resulting in a winning og losing player, this heuristic function returns 10 * agent_moves / opponent_moves * 10.

AB_Custom_2 uses similar values when evaluating wins and loses. But is more determined to limit the opponent's moves. This more aggressive strategy results in a win rate of 58.6%. The heuristic attributes a large negative weight to opponent's moves (-10) and tries to limit the opponent's available moves. The weight associated with increasing it's own possible moves is smaller and the agent is much more offensive.

AB_Custom_3 uses a similar approach to AB_Custom_2, but priorities defence over offense. It attributes the same values to wins and loses, but priorities increasing it's own number of moves compared to limiting the opponent. This less aggressive but greedy strategy results in a win rate of 57.1%.

AB_Custom_1 seems to have the best heuristics in evaluating the agents moves. With a win rate of 64.3% it seems to play the game of Isolation better than any other agent. The heuristic is fairly easy and fast to compute, since the calculation of number of moves (opponent and agent) is easy to calculate from the game state.
The win rate improvements attained by changing heuristics seems to diminish at a certain point. The trade-offs between having a better but more complex heuristic vs a

simpler but faster one, seems to oppose each other and reach some mean performance. To further improve the Game Playing agent we have to improve other areas such as Search as well.