

Heuristic Analysis

First of all, here is the result I got when I run the tournament.py file:

***** Playing Matches *****										
Match #	Opponent	MM_Improved		MM_Custom		MM_Custom_2		MM_Custom_3		
		Won	Lost	Won	Lost	Won	Lost	Won	Lost	
1	Random	10	0	9	1	10	0	7	3	
2	MM_Open	3	7	4	6	7	3	1	9	
3	MM_Center	9	1	10	0	8	2	5	5	
4	MM_Improved	5	5	6	4	3	7	1	9	
5	AB_Open	6	4	6	4	5	5	3	7	
6	AB_Center	2	8	4	6	4	6	3	7	
7	AB_Improved	6	4	5	5	6	4	3	7	

Win Rate:		58.6%		62.9%		61.4%		32.9%		
[Finished in 238.2s]										

Here are my analysis on the following 3 custom_score() function.

- custom_score(): From here I use $\text{float}(\text{own_moves}^{**2} - \text{opp_moves}^{**2} * 1.5)$. This function has a 62.9% winning rate. We can see that when the opponent plays in MM_Center, the opportunity of winning is very high. But it seems not doing very well in MM_Open and AB_Center. Even if all that, it seem that this function can do better than MM_Improved as the number of winning match is higher on almost every type of opponent.
- custom_score_2(): It is using $\text{float}(\text{own_moves} - 2 * \text{opp_moves})$, which is recommended in the tutorial. And it gives quite a good result of 61.4% winning rate. It also performs very well compared to MM_Improved. and if opponents are playing MM_Open, the winning rate is very high also when we use this function. From my observations, it seems that this function gives similar result to custom_score().
- custom_score_3(): It is using $\text{float}(\text{opp_moves}^{**2} / \text{own_moves}^{**2})$. From the result we can see that this function did not perform very well (32.9% winning rate) and compared to all types of opponents with MM_Improved, it loses in all situations also. It is not recommended to use this.