Heuristic Analysis

Analysis

In this project analysis, 3 custom score functions are implemented.

1 - Opponent's move subtracted from own (players) move.

2- Distance between player and opponent.

3- Addition of blank move and moves available of a player.

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	10	0	10	0
2	MM_Open	7	3	8	2	6	4	9	1
3	MM_Center	9	1	10	0	8	2	9	1
4	MM_Improved	6	4	7	3	9	1	8	2
5	AB_Open	5	5	6	4	3	7	2	8
6	AB_Center	6	4	6	4	5	5	7	3
7	AB_Improved	6	4	5	5	4	6	3	7
	Win Rate:	70.0%		74.3%		64.3%		68.6%	

In the given output-

All of the custom functions implemented are able to beat MM_Improved whereas for AB_Improved first custom function performs better than others, second custom function stands second against AB_Improved. According to the results there is a difference of about 10% from first and second custom function, 14% difference between first and third custom function.

Performance Data

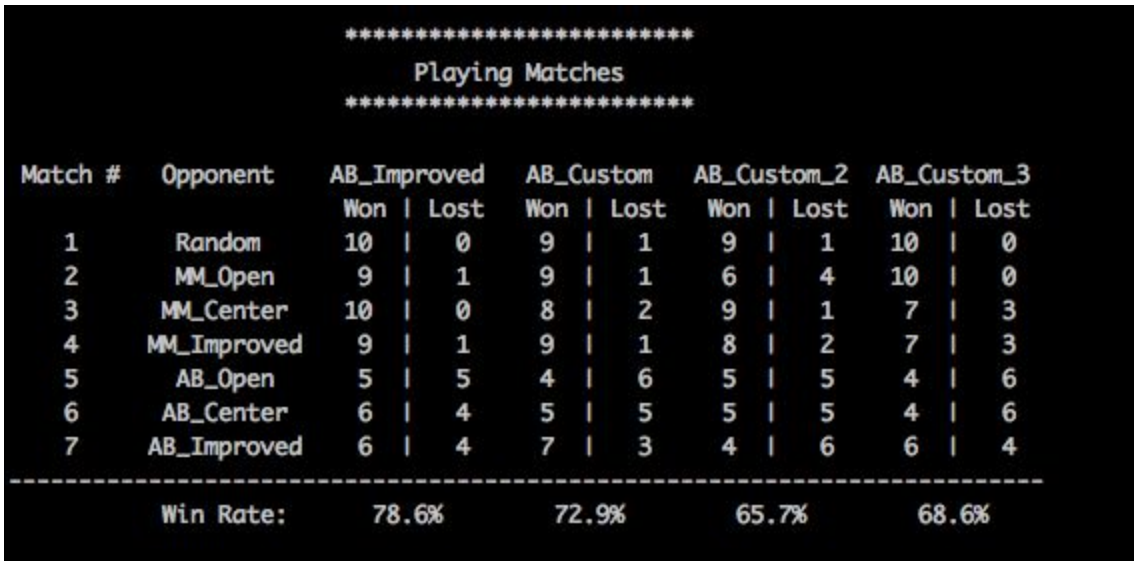
While evaluating the perfect weight for the first custom function, different weight values tested from 1.1 to 1.9, As a result the different data values got while test shows 1.6 is the perfect value for weight.

FIRST TEST

```
                    *************************
                        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     8   |  2     9   |  1     10  |  0
   2       MM_Open     7   |  3     5   |  5     8   |  2      7  |  3
   3      MM_Center    9   |  1     8   |  2     9   |  1     10  |  0
   4     MM_Improved   8   |  2     7   |  3     6   |  4      5  |  5
   5       AB_Open     7   |  3     6   |  4     4   |  6      5  |  5
   6      AB_Center    4   |  6     6   |  4     8   |  2      5  |  5
   7     AB_Improved   7   |  3     4   |  6     1   |  9      5  |  5
----------------------------------------------------------------------
          Win Rate:      72.9%        62.9%        64.3%        67.1%
```

SECOND TEST



```
                    *************************
                        Playing Matches
                    *************************

Match #   Opponent    AB_Improved   AB_Custom   AB_Custom_2  AB_Custom_3
                      Won | Lost   Won | Lost   Won | Lost   Won | Lost
   1       Random      10  |  0     9  |  1     9  |  1     10  |  0
   2       MM_Open      9  |  1     9  |  1     6  |  4     10  |  0
   3      MM_Center    10  |  0     8  |  2     9  |  1      7  |  3
   4     MM_Improved    9  |  1     9  |  1     8  |  2      7  |  3
   5       AB_Open      5  |  5     4  |  6     5  |  5      4  |  6
   6      AB_Center     6  |  4     5  |  5     5  |  5      4  |  6
   7     AB_Improved    6  |  4     7  |  3     4  |  6      6  |  4
-------------------------------------------------------------------
          Win Rate:      78.6%        72.9%        65.7%        68.6%
```

From the above test cases of weight I found the overall win rate is higher in weight 1.6.

Recommendation

As first function works better than others, and third function stands second overall hence in my opinion first custom function is recommended function.

1. This function is able to beats Random and AB_Improved.
2. This has the higher win rate (72.9%).
3. This heuristic is simple and hence its more optimized and better for deep traversal.