

## Summary

I chose three functions that are inspired from hints given in the course lectures.

**AB\_Custom:** This is a variation of the improved score function where the player is rewarded for not being on the edge of the board and rewarded for the opponent player being on the edge. While not quite a strict definition of centrality to the board, it is based on the fact that you limit the amount of moves you have when you move to the edge and there are greater ways of the opponent boxing you in on subsequent moves.

**AB\_Custom\_2:** This is another variation of improved score where the player is penalized for the number of opponent moves left but the penalty is increased as the game board fills up.

**AB\_Custom\_3:** This variation rewards the player for being more central to the board. It is similar to Custom Score 0 except that it's a stricter definition of centrality.

## tournament.py Results

***** Playing Matches *****									
Match #	Opponent	AB_Improved		AB_Custom		AB_Custom_2		AB_Custom_3	
		Won	Lost	Won	Lost	Won	Lost	Won	Lost
1	Random	8	2	8	2	6	4	7	3
2	MM_Open	3	7	1	9	3	7	1	9
3	MM_Center	6	4	3	7	6	4	6	4
4	MM_Improved	2	8	3	7	3	7	2	8
5	AB_Open	5	5	4	6	5	5	8	2
6	AB_Center	3	7	4	6	7	3	4	6
7	AB_Improved	6	4	7	3	7	3	5	5
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Win Rate:		47.1%		42.9%		52.9%		47.1%	

## Conclusion

Before running the results, I would have guessed AB\_Custom\_3 to be the best at winning but it turned out to be AB\_Custom\_2. The reason for my guess is the discussion around mirroring and centrality that was presented. However, it turned out that it made no different in the win rate. For AB\_Custom, it actually reduced the win rate to rely on edge positions.

There are three possible reasons for the improved win rate of AB\_Custom2

1. AB\_Custom2 conceptually was trying to achieve the same thing as AB\_Custom and AB\_Custom\_3 in that its best to reduce the number of available opponent's positions but

by purely relying on a factor to penalize the player for having more available opponent positions towards the end of the game, it seems to have increased its win rate.

2. Computation cost of AB\_Custom2 is smaller compared to the others which may be resulting in the algorithm searching deeper in the tree
3. AB\_Custom3 only rewarded the player's centrality and didn't penalize the opponent's centrality so in games where the opponent is also central to the board, the score is no different than improved score. This gives AB\_Custom2 the edge because it always penalizes the opponent in the end game.