

# Heuristic analysis

By Daniel Yovchev

---

The following three heuristics were used to test my game agent in `tournament.py`:

## Heuristic 1

*AB\_Custom*

I really like the simplicity of the AB\_Improved evaluation function that's why I decided to use as my first custom function this more aggressive version, by multiplying the opponent moves by a factor of 2 `float(own_moves - (2 * opp_moves))` our game agent becomes more aggressive this improves the win rate drastically.

## Heuristic 2

*AB\_Custom\_2*

In my second custom heuristic function I used combination of my first heuristic and the center strategy to keep the ai agent as close to the center as possible as this will give him better advantage over the opponent.

## Heuristic 3

*AB\_Custom\_3*

In this heuristic I tried to apply the three strategies discussed in the lectures by combining the score from my custom and custom\_2 heuristic and applying the open move strategy.

## Examine the results

I performed 2 tournaments with 100 matches each the AB\_Custom had the best score with average of 63.05% win rate unfortunately the mixed strategy approach I used in the rest of my heuristic functions did not perform that well a way to improve them will be to apply each strategy at different level of the game because each different heuristic performs better based on the moves left in the game.

\*\*\*\*\*

Playing Matches

\*\*\*\*\*

Match #	Opponent	AB_Improved		AB_Custom		AB_Custom_2		AB_Custom_3	
		Won	Lost	Won	Lost	Won	Lost	Won	Lost
1	Random	169	31	168	32	161	39	154	46
2	MM_Open	123	77	134	66	120	80	123	77
3	MM_Center	149	51	154	46	158	42	150	50
4	MM_Improved	126	74	123	77	114	86	113	87
5	AB_Open	102	98	106	94	94	106	96	104
6	AB_Center	110	90	106	94	96	104	108	92
7	AB_Improved	91	109	102	98	88	112	97	103

-----  
Win Rate:            62.1%            63.8%            59.4%            60.1%

\*\*\*\*\*

Playing Matches

\*\*\*\*\*

Match #	Opponent	AB_Improved		AB_Custom		AB_Custom_2		AB_Custom_3	
		Won	Lost	Won	Lost	Won	Lost	Won	Lost
1	Random	164	36	163	37	163	37	160	40
2	MM_Open	125	75	126	74	124	76	117	83
3	MM_Center	150	50	145	55	150	50	148	52
4	MM_Improved	111	89	120	80	120	80	110	90
5	AB_Open	101	99	109	91	86	114	93	107
6	AB_Center	108	92	112	88	101	99	99	101
7	AB_Improved	102	98	97	103	85	115	89	111

-----  
Win Rate:            61.5%            62.3%            59.2%            58.3%