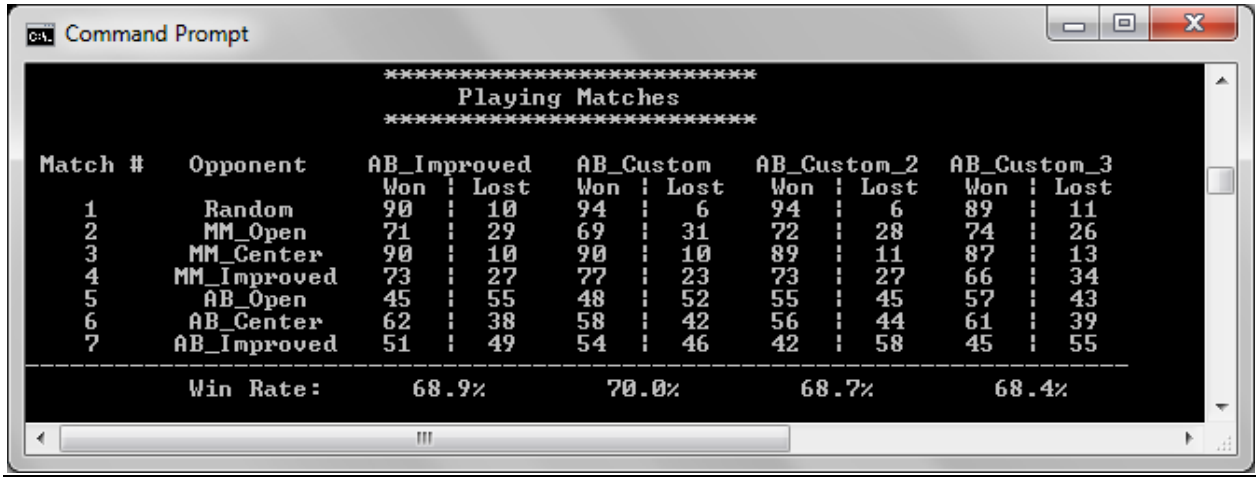
Udacity AIND Dec 2017 cohort **Author: Rohit Jain** **March 20, 2018**

Isolation Heuristics

- **custom_score:**
  - *Evaluation* - Calculates the heuristic value of a game state as the difference between available player moves and twice the available opponent moves
  - *Strategy* - Offensive game play with constant double weight age to negative of opponent moves ensures that the player is choosing moves with a goal of limiting opponent's moves.
- **custom_score_2:**
  - *Evaluation* - Calculates the heuristic value of a game state as the % game complete weighted difference of available player moves and square of available opponent moves
  - *Strategy* - Dynamic scaled game play with offensive ramp up based on increased weightage to negative of square of opponent moves as game progresses. Player starts with defensive moves, ramps up the offensive moves and becomes completely offensive towards the completion of game.
- **custom_score_3:**
  - *Evaluation* - Calculates the heuristic value of a game state as the difference between player moves and twice the available opponent moves minus the scaled distance from center.
  - *Strategy* - Offensive game play with constant double weightage to negative of opponent moves with built in check to reduce the distance from center to ensure that the player does not drift to peripheries of the board and that the player is choosing moves with a goal of limiting opponent's moves.

Performance of Agents



Match #	Opponent	AB_Improved Won	AB_Improved Lost	AB_Custom Won	AB_Custom Lost	AB_Custom_2 Won	AB_Custom_2 Lost	AB_Custom_3 Won	AB_Custom_3 Lost
1	Random	90	10	94	6	94	6	89	11
2	MM_Open	71	29	69	31	72	28	74	26
3	MM_Center	90	10	90	10	89	11	87	13
4	MM_Improved	73	27	77	23	73	27	66	34
5	AB_Open	45	55	48	52	55	45	57	43
6	AB_Center	62	38	58	42	56	44	61	39
7	AB_Improved	51	49	54	46	42	58	45	55
	Win Rate:	68.9%		70.0%		68.7%		68.4%	

In comparison to **ID_Improved** Agent - **AB_Custom** has better performance for both MM_Improved & AB_Improved. **AB_Custom_2** is performing at par with MM_Improved only and **AB_Custom_3** is not performing better than the ID_Improved agent.

Recommendation:

I would recommend the evaluation function **AB_Custom** over all the implemented evaluation functions because of reasons stated below.

- **Win Rate** – It has the highest win rate among all the custom evaluation functions and is also beating ID_Improved agent in overall win rate as well as the wins for MM_Improved and AB_Improved.

- **Computation Complexity** – It has a very low computation complexity since very few calculations are required in evaluation thus allowing more time for iterative deepening to explore deeper.

- **Heuristic prediction** – This evaluation results into offensive game play with constant double weight age to negative of opponent moves. It ensures that the player is choosing every move with a goal of limiting opponent's moves throughout the game.