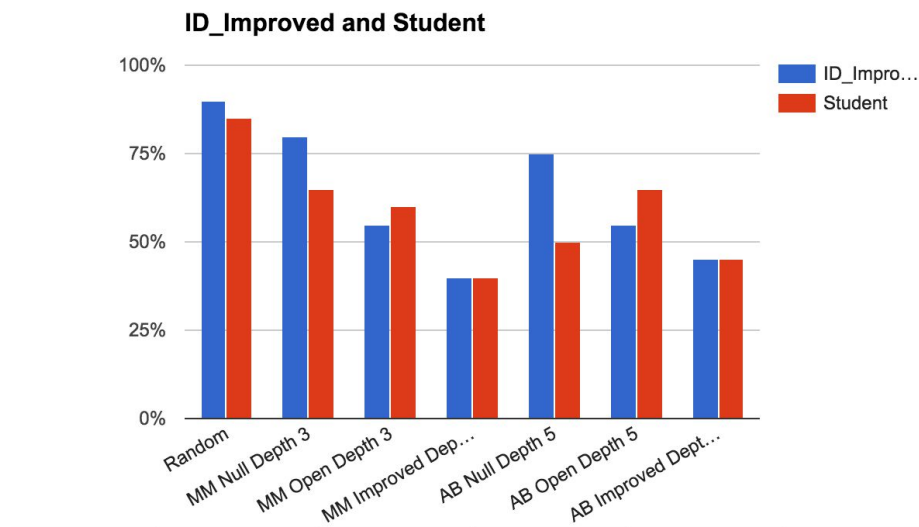


Heuristics

Open-Move Score

I wanted a base line so I first played with the basic functions provided and got these scores:

Evaluating	Method	Opponent	Results		Sanity check	Sucesses	
			Player	Opponent		Success per game	Success per player
ID_Improved	AB Iterative Improved Score	Random	18	2	20	90%	62.86%
		MM Null Depth 3	16	4	20	80%	
		MM Open Depth 3	11	9	20	55%	
		MM Improved Depth 3	8	12	20	40%	
		AB Null Depth 5	15	5	20	75%	
		AB Open Depth 5	11	9	20	55%	
		AB Improved Depth 5	9	11	20	45%	
Student	AB Iterative OpenScore	Random	17	3	20	85%	58.57%
		MM Null Depth 3	13	7	20	65%	
		MM Open Depth 3	12	8	20	60%	
		MM Improved Depth 3	8	12	20	40%	
		AB Null Depth 5	10	10	20	50%	
		AB Open Depth 5	13	7	20	65%	
		AB Improved Depth 5	9	11	20	45%	

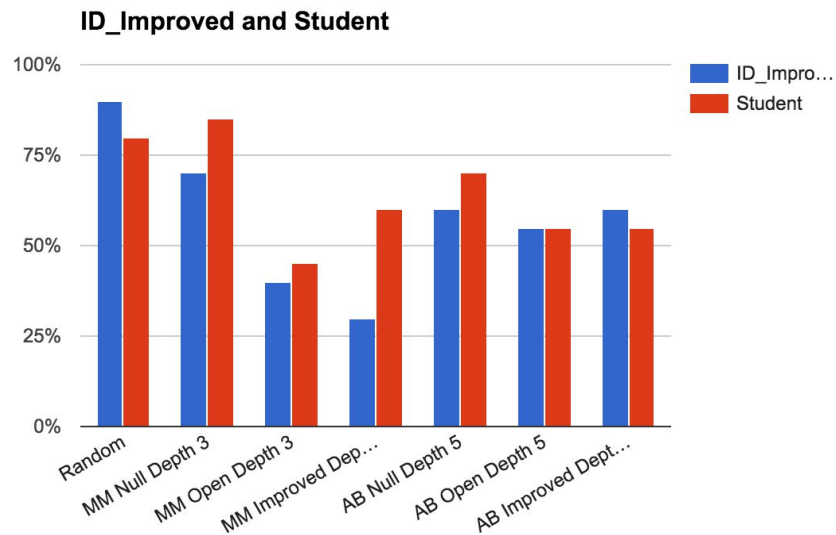


The ID_Agent using difference of open movements count and alphabeta pruning was beating Student by 4.29% successes.

Toe-Stepper

Toe-Stepper is an improvement on the Improved score function. The idea is to add an incentive to games where the player moved to a position that caused the opponent to lose a movement.

Evaluating	Method	Opponent	Results		Sanity check	Sucesses	
			Player	Opponent	Total Games	Success per game	Success per player
ID_Improved	AB Iterative - Improved Score	Random	18	4	22	90%	57.86%
		MM Null Depth 3	14	5	19	70%	
		MM Open Depth 3	8	7	15	40%	
		MM Improved Depth 3	6	9	15	30%	
		AB Null Depth 5	12	9	21	60%	
		AB Open Depth 5	11	8	19	55%	
		AB Improved Depth 5	12	10	22	60%	
Student	AB Iterative - Improved Toe Stepper - Score 2	Random	16	4	20	80%	64.29%
		MM Null Depth 3	17	3	20	85%	
		MM Open Depth 3	9	11	20	45%	
		MM Improved Depth 3	12	8	20	60%	
		AB Null Depth 5	14	6	20	70%	
		AB Open Depth 5	11	9	20	55%	
		AB Improved Depth 5	11	9	20	55%	



Toe Stepper was now beating ID_Agent by 6.43%.

Common-Sense

This function builds on the others, it is composed by 3 weights:

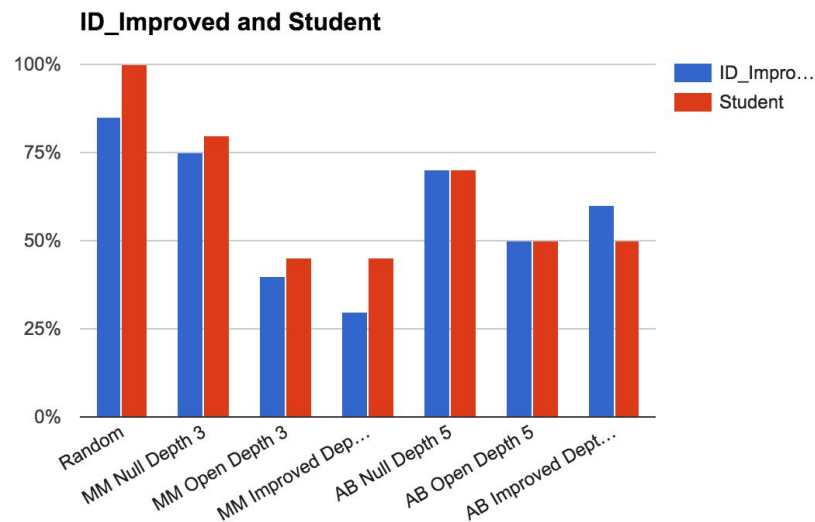
- Toe Stepper, giving an incentive to games that reduce an opponent's movements.
- Improved Score, giving a value to a game based on the difference of open movements.
- Block an opponent, move to positions that would reduce the opponent's next move open movements.

The tournament shows that Player only beats ID_Improved player by 4.29%. This has been my favorite evaluation functions because depending on how we play with the weights the results may change.

The following results started playing with the idea of:

- #num-open-moves
- Plus 2 if the player takes an opponent's position
- Plus 2 if the player takes an opponent's next turn position

Evaluating	Method	Opponent	Results		Sanity check	Sucesses	
			Player	Opponent	Total Games	Success per game	Success per player
ID_Improved	AB Iterative - Improved Score	Random	17	3	20	85%	58.57%
		MM Null Depth 3	15	5	20	75%	
		MM Open Depth 3	8	12	20	40%	
		MM Improved Depth 3	6	14	20	30%	
		AB Null Depth 5	14	6	20	70%	
		AB Open Depth 5	11	11	22	50%	
		AB Improved Depth 5	12	8	20	60%	
Student	AB Iterative - Common sense - Multiples scores weights	Random	20	0	20	100%	62.86%
		MM Null Depth 3	16	4	20	80%	
		MM Open Depth 3	9	11	20	45%	
		MM Improved Depth 3	9	11	20	45%	
		AB Null Depth 5	14	6	20	70%	
		AB Open Depth 5	10	10	20	50%	
		AB Improved Depth 5	10	10	20	50%	



After these results I tried to give a better meaning to the weights:

- A weighted-move value will be $\frac{1}{8}$ multiplied by 10 and rounded.
- #num-open-moves, it will be the most important so it has a predominant weight by multiplying it by 20.
- Taking an opponent's position, will be worth two weighted-moves
- Takes an opponent's next turn position, will be worth two weighted-moves

This was reflected in a 8.57%.

Evaluating	Method	Opponent	Results		Sanity check	Sucesses	
			Player	Opponent		Success per game	Success per player
ID_Improved	AB Iterative Improved Score	Random	16	4	20	80%	55.00%
		MM Null Depth 3	12	8	20	60%	
		MM Open Depth 3	6	14	20	30%	
		MM Improved Depth 3	8	12	20	40%	
		AB Null Depth 5	14	6	20	70%	
		AB Open Depth 5	10	10	20	50%	
		AB Improved Depth 5	11	9	20	55%	
Student	AB Iterative - Common Sense - Score 2	Random	18	2	20	90%	63.57%
		MM Null Depth 3	15	5	20	75%	
		MM Open Depth 3	11	9	20	55%	
		MM Improved Depth 3	9	11	20	45%	
		AB Null Depth 5	14	6	20	70%	
		AB Open Depth 5	10	10	20	50%	
		AB Improved Depth 5	12	8	20	60%	

ID_Improved and Student

