Choose a baseline search algorithm for comparison (for example, alpha-beta search with iterative deepening, etc.). How much performance difference does your agent show compared to the baseline?

Alpha-Beta pruning and Minimax are the two used strategies in this project. As a recursive algorithm, the Minimax select the next move in a n-player game where in this project a two-player game was presented. Each player attempts to maximize the minimum value of the other player on each move. On the other hand, as a search algorithm, alpha-beta pruning focuses on decreasing the number of evaluated nodes by the minimax algorithm. Furthermore, alpha-beta pruning ignores search trees that have no impact on the final selection.

The best heuristic function was custom score 1, which is a combination of both custom score 2 and custom score 3 explained below. In this function, the heuristic is weighted linear while the opponent moves is double times more relevant than the agent moves. Hence, it prioritizes the agent's moves in order to win by minimizing opposition moves.

The custom score 2 shows that the opponents' moves as double times more relevant than the agents moves. Hence, it minimizes the moves from the opponent prior to maximizing its moves.

The custom score 3 gives priority to opponent to examines the agent performance.

The analysis's results are shown below:

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	10	0	3	7
2	MM_Open	3	7	8	2	8	2	4	6
3	MM_Center	5	5	9	1	9	1	5	5
4	MM_Improved	5	5	4	6	6	4	5	5
5	AB_Open	8	2	4	6	6	4	5	5
6	AB_Center	8	2	6	4	4	6	7	3
7	AB_Improved	3	7	6	4	4	6	7	3
	Win Rate	57.1%		67.1%		64.3%		51.4%	

Why do you think the technique you chose was more (or less) effective than the baseline?

Depth First Search Minimax with Alpha-Beta pruning is not effective in comparison to AlphaGo that uses MCTS. For example, AlphaGo uses Deep CNs (intuition and refection) to outperform human experts and those relying solely on intuition or reflections. Therefore, AlphaGo won 80% of games using only RLPN against its SLPN.