

# Isolation Game

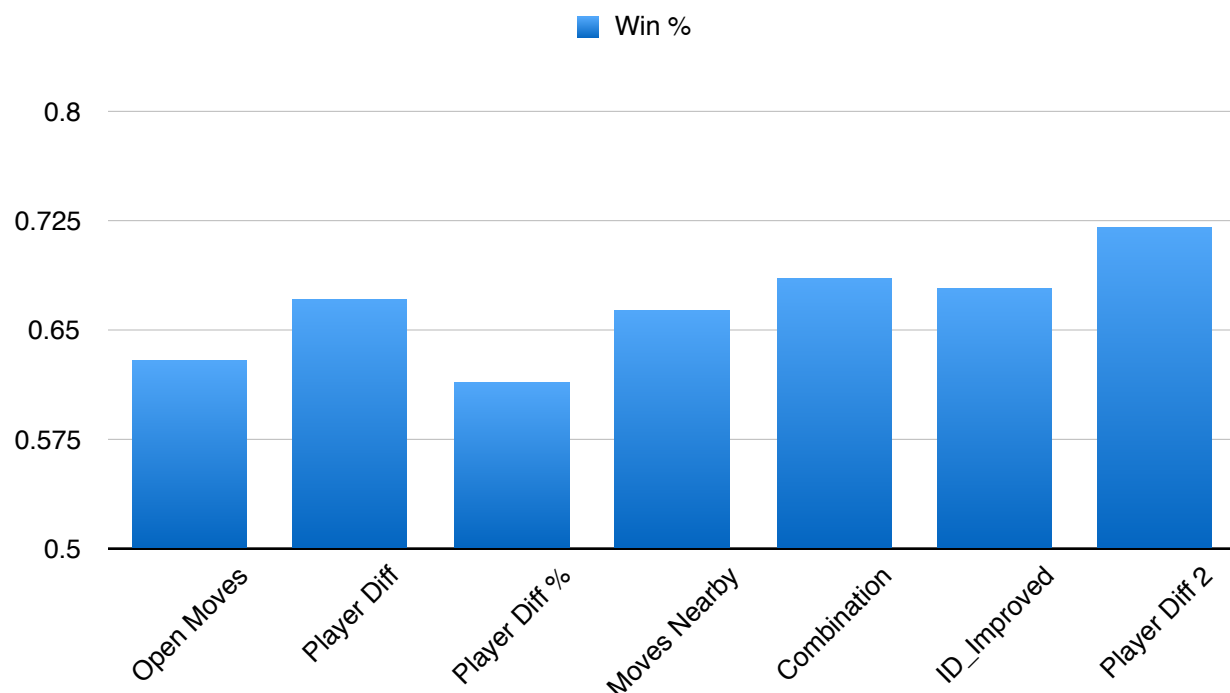
## Heuristics

I used six different heuristics to evaluate the scores of a board position.

The heuristics I tried were:

- Open moves available to player (open moves)
- The difference between my players open moves and the opponents open moves (player diff)
- Same as player diff, but adding a bias to penalize opponent open moves over my players open moves (player diff 2). So the equation is basically my moves minus opponent moves multiplied by 5. In the code, this function is called "*custom\_score*".
- Difference in players moves, as a percentage of total blank spaces still available (player diff %)
- Opened moves nearby, only checking the squares around my players location compared to the open squares around the opponents location (moves nearby)
- Combination of other heuristics (combination)

*You can see the performance of each one in the graph and tables below.*



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	Open Moves	Player Diff	Player Diff %	Moves Nearby	Combina- tion	ID_Improved	Player Diff 2
Win %	62.86%	67.14%	61.43%	66.43%	68.57%	67.86%	72%

All heuristics performed similar. Most scores were between 60% and 70%, with the exception of **Player Diff 2**. The best one was the **Player Diff 2** followed by **Combination** scoring function.

**Player Diff 2** seems to work best given that it penalizes my opponent having moves more than my player having open moves. This actually makes sense given that the objective of the game is to eliminate the possible spaces the opponent player can move, more than maximizing my own spaces. So it is 5 times more important to reduce my opponents moves compared to having more open spaces for my player.

Although **Combination** was second best, it was only marginally better than **ID\_Improved** (it could be random noise). **Combination** uses a combination of **Player Diff** and **Moves Nearby**. When blank spaces left are less than 30% of the total available squares, the heuristic changes from **player diff** to **moves nearby**. The idea behind trying out different combinations is that a different heuristic might be more useful in the opening, mid or endgames. This is an idea borrowed from chess, where there are generally better opening strategies, mid-game and also endgame strategies.