

Heuristic Analysis

I tried several versions of heuristics when trying to beat the Tournament.py test. The first one I tried attempted to maximize the number of moves remaining for the current player, ie a defensive heuristic. This did relatively well against most agents. It had a losing record against the AB_Center agent. This heuristic had a higher win percentage than the AB_Improved.

Next, I tried minimizing the number of opponent moves, an offensive heuristic. This heuristic did well against all the minimax agents but either went 50/50 or a losing record against all the alpha-beta agents. Unfortunately, this performed the worst out of the heuristics tried.

Next, I tried combining the heuristics into one that maximized the number of available moves while minimizing the number of opponent moves, ie a balanced heuristic. This performed very well in most games. It could win all games against the random, MM_Open, and MM_Center agents. This heuristic struggled with the alpha-beta agents but did go 50/50 with the AB_Improved and ended up having the same win percentages as the AB_Improved.

I tweaked the last heuristic to weight the opponents move more and tried weighting the available moves more. Both allowed the test to perform better on some test and worse on other. Ultimately, all three heuristics performed the same over all matching the AB_Improved win rate.