Game Playing Agent Analysis

This document shows three heuristics that reached better performance compared to ID_Improved agent. Each function has different levels of complexity in terms of their implementation and computation.

Heuristic center moves

This function tries to make as many moves as possible in the center. In order to increase the game's outcome. It subtracts center moves of the opponent from those available for the player.

Heuristic center moves with blanks

This function is similar to the previous one. However, it scales to the available blank squares. It can be implemented by calling the previous function then dividing its results by the number of blank squares.

Ultimate heuristic

This function rewards the player more generously by when there are more available moves; as well as, center moves compared to the opponent. Then, the result is scaled considering the player's remaining moves.

Evaluation

In order to evaluate the performance of this agent, the script tournament.py was used three times for each heuristic. The following table summarizes the results:

Heuristic function	ID Win	ID Win %	Student Win	Student Win %
Center moves	347 / 420	82.6 %	330 / 420	78.6 %
Center moves with blanks	346 / 420	82.3 %	333 / 420	79.2 %
Ultimate	348 / 420	82.8 %	363 / 420	86.4 %

Conclusion

Based on the previous evaluation, we can conclude that the ultimate heuristic function tends to perform better than the ID_Improved agent. In fact, it performs better than all the other ones. Therefore, it is recommended to use it because of these reasons:

1. This heuristic outperforms the sample agent and all other ones.
2. It is composed of the other two heuristic functions, which includes their predictive power.
3. Despite being a complex heuristic, its performance is not affected.