# OTHELLO ASSIGNMENT REPORT

Team : 9

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# 1 To code a bot to play the game of Othello:

## Methodology:

- **Search algorithm** used for Othello game is 6-ply alpha beta pruning.

- **Evaluation function** used for game is :
Rather into just the conceptual value of each feature. Each of the features are given a weight in the final heuristic sum.[4]

  1. Piece Difference
  It is numerically calculated as the percent of total pieces that are of the maximizing color (black) or the minimizing color (red). It is returned as a positive number for black, and a negative for white in accordance with this trend. It equals 0 when there are equal numbers of pieces of each color.[1, 2, 3]

  2. Corner Occupancy
  It is almost impossible for a player to lose if he/she controls all four corners. Therefore, corner occupancy is given the highest weight in the sum of the heuristic.[1, 2, 3]

  3. Corner Closeness
  The positions next to empty corner spaces are considered the worst positions in the game. Taking a position next to an empty corner potentially gives your opponent the ability to take the corner immediately, if not later on in the game. Therefore spaces next to a corner are given a strong negative weight.[1, 2, 3]

  4. Mobility
  Mobility is an important factor in Othello strategy because if mobility is restricted at a given point, the opponent can force the other player into taking unfavorable moves or passing the turn. Mobility is measured by number of available moves in the given board. Mobility has a positive weight in the final sum of the heuristic.[1, 2, 3]

  5. Final Sum
  The final heuristic is taken as the sum of each of these features multiplied by their individual weights. These weights were determined experimentally by both research groups. The final weighting places the greatest emphasis on corner occupancy (positively), and next-to-corner occupancy (negatively).[1, 2, 3]

# Bibliography

[1] Michael. Korman, "Playing Othello with Artificial Intelligence", 2003.

[2] Steve. MacGuire, "Strategy Guide for Reversi and Reversed Reversi", Samsoft, April 2011.

[3] Vaishnavi Sannidhanam, Annamalai. Muthukaruppan, "An Analysis of Heuristics in Othello", 2004.

[4] Arvind Vijayakumar, "Developing an artificial intelligence bot for Othello", 2015.