Developing and Analyzing Strategies in a Two-Player Domino Tiling Game

Macris, Griffin

Game Theory is a branch of mathematics that models situations that involve conflict of interest. It provides realistic simulations of the decisions made by humans in economics. Competing companies can use game theoretic methods to plan their actions and minimize loss. With an increasing amount of automation across all industries, Game Theory's range of applications is vast. The purpose of my project is to find a strong strategy to win a simple domino tiling game. The game is played on a square board. Players take turns placing a 1x2 domino on the board. The last player to be able to make a move on the board wins. I hypothesized that the game would be biased towards one of the players for all board sizes. I also believed that, for each board size, there would at least one strategy for one of the two players that would always win. For each pair of algorithms playing the game, my program generates data that describes the ratio of wins to total games played, as well as the equilibrium solution, in a set of 500 games. When analyzing my data, I found that it supported my hypothesis, as the equilibrium solutions for each game favored one player over the other. The 3x3 and 2x2 games are easily won by player two. I believe, however, that for some board sizes, player one has a winning strategy. This is supported by the fact that, for some of my output, the equilibrium solution favored player one.

Awards Won: