Peg Duotaire - A Competitive Graph Parameter

Robert A. Beeler*, East Tennessee State University

Peg solitaire is a table game played since the Seventeenth century. Traditionally, pegs are in every hole but one and the player jumps over pegs along rows or columns (as in checkers) to remove them. Usually, the goal of the player is to leave only one peg. In a 2011 paper, this game is generalized to graphs.

When the game is played between two players (i.e., duotaire), the players alternate moves with the goal of being the last person to jump a peg. However, we consider a variation played between two players, the *maximizer* and the *minimizer*. The goal of the maximizer is to make the terminal set as large as possible, while the minimizer seeks to make it as small as possible. If both players make optimal moves, then the cardinality of this terminal set is fixed. This results in a *competitive graph parameter* such as those introduced by Phillips and Slater. In this talk, we give the competitive graph parameter associated with duotaire for several well-known families of graphs. We also give several surprising results based on these families. Finally, we give a number of open problems as possible avenues for further research.

Keywords: peg solitaire, peg duotaire, games on graphs, competitive graph parameters