

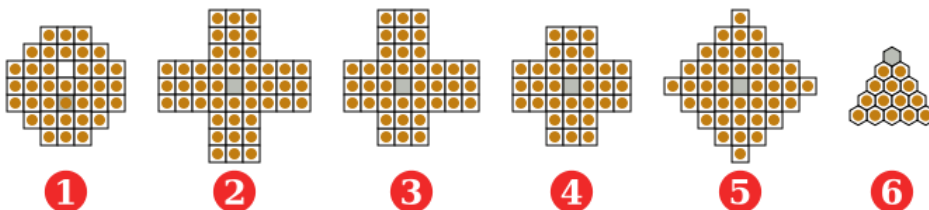
Candidate Research/Programming Projects

Proposal Two: Peg Solitaire Learning Machine

Peg solitaire is a board game in which one player moves a set of pegs on a board with holes. A standard game fills the entire board with pegs except for the central hole. The objective is to empty the entire board except for a single peg in the central hole. To remove a peg, the player must move a peg orthogonally over an adjacent peg into a hole two positions away, then the jumped peg is removed (think jumping over an opponent's piece in checkers). If a legal move is no longer possible (or the objective is met), the game ends.

This project involves creating a learning machine that can complete a game of peg solitaire. The game comes in a variety of board shapes, but this project will likely focus on one, notably the plus (+) shaped board. Structurally, the project may use the Tic-Tac-Toe learning machine exercises as an example.

Wikipedia cites many examples of studies on the game, such as the shortest possible solution, brute force attacks, and even functions such as the *pagoda function* which helps the player determine if the next set of moves would work or not.¹ There are also specific strategies for different boards which have been presented.



Common peg solitaire board shapes (Source: Wikipedia)



A man playing peg solitaire at a Cracker Barrel restaurant (Source: Wikipedia)

¹ <https://www.cs.york.ac.uk/aig/projects/IMPLIED/docs/Solitaire.ppt>