Solving European Peg Solitaire with Constraint Programming

Descriptions, Objectives, Ethics, and Resources

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Description

Peg solitaire is a popular, one-player board game that is played worldwide in many variations. Devising a solution to the game can prove difficult, despite it's simple rules. Two of the most popular variations are English, or Standard, peg solitaire and European peg solitaire. These are illustrated in Figures 1 and 2 below:

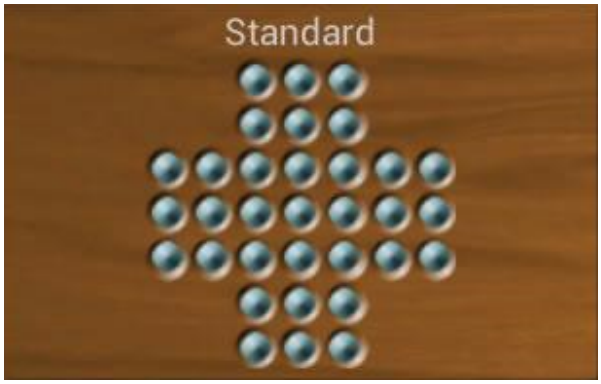

Figure 1

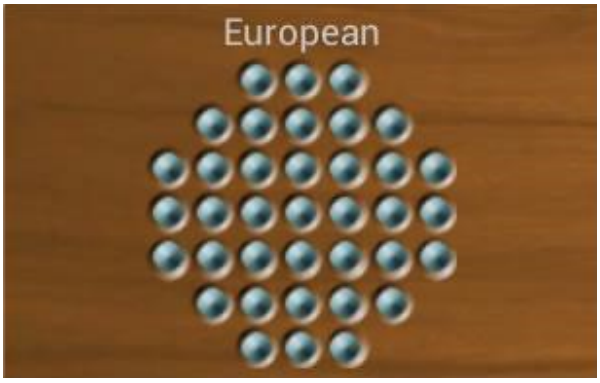

Figure 2

A single peg is removed from the configurations shown, and subsequent pegs are removed by making draught style 'jumps'. The game continues until no possible moves remain, or a goal configuration is achieved.

Peg solitaire has been widely studied, including a solution of English peg solitaire using constraint programming in [1]. This project will look at modelling the European variation of the game using constraint programming, and analysing these constraint models.

Objectives

The objectives for this project are as follows:

1. To devise constraint programming models of the European peg solitaire game
2. To solve the game with these models using SavileRow and Minion
3. To perform empirical evaluation of the solution, and compare different models

Ethics

The pre-assessment form will be uploaded for this project, as it does not involve research with human subjects or require external funding.

Resources

The resources that will be used for this project are the Minion constraint solver, and the SavileRow constraint modelling tool.

References

[1] C. Jefferson, A. Miguel, I. Miguel, A. Tarim. Modelling and Solving English Peg Solitaire. *Computers and Operations Research* 33(10), pages 2935-2959, 2006.