German University in Cairo
Media Engineering and Technology
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Concepts of Programming Languages, Summer term 2019
Project Description
“Peg Solitaire”
Deadline: 29/9/2019

The aim of the project is to use Prolog to solve the Peg-Solitaire puzzle. Peg-Solitaire is a one-player board game. The aim is to move marbles on the board till only one marble is left.

There are different variations and sizes of the boards for Peg Solitaire. The one that should be used fr the project is shown in Figure 1

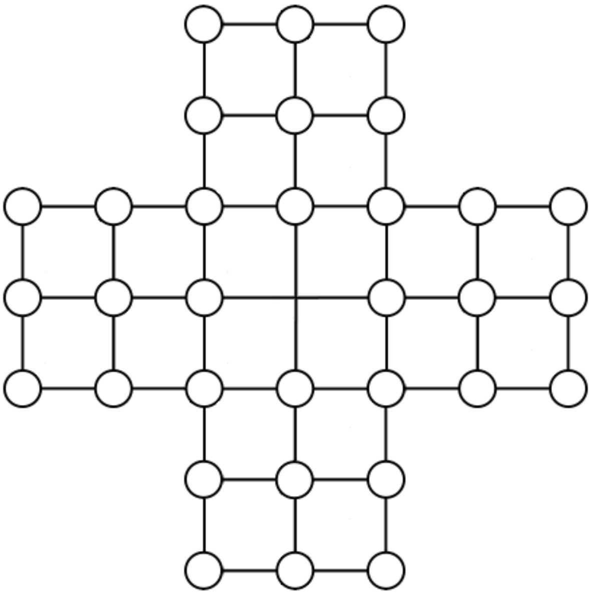
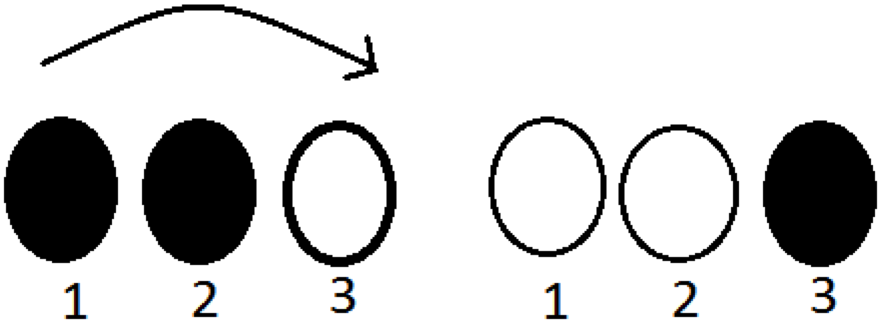


Figure 1: Peg Solitaire Board

Some of the holes contain marbles. A valid move could be done horizontally or vertically. A marble can only move to a en empty hole.

The marble has to move across another marble. The marble in the middle is removed from the board as a result. An example is shown below where marble at position 1 is moved to position 3. That results in the marble in position 2 being automatically removed from the boards.



Data structures

The board should be represented by a list of 49 elements representing the 7-by-7 board. The 4 positions at top-left, top-right, bottom-left and bottom-right should be disregarded. Every marble is bound to the value 1. Every hole is represented with a 0.

Predicates to be Implemented

same_row/2

The predicate `same_row(I1,I2)` should return true only if the two indeces I1 and I2 are on the same row in the board. Indeces are zero-based.

same_col/2

The predicate `same_col(I1,I2)` should return true only if the two indeces I1 and I2 are on the same column in the board. Indeces are zero-based.

valid_move(I1,I2,Board)

The predicate `valid_move(I1,I2,Board)` should be true only if the movement from I1 to I2 is a valid movement on the board `B`.

copy_rest(B1,B2)

The predicate `copy_rest(B1,B2)` should be true only if any non-bound element is B2 is unified with the element at the same position in B1..

execute_move(I1,I2,Board,New Board2)

The predicate `valid_move(I1,I2,Board,Board2)` should be true only if Board2 i sthe board resulting from the doing the valid movement from I1 to I2 on the board `B`.

peg_s(B)

The predicate solves the peg-puuzzle for the initial board B.

Submission Guidelines

- Each team should submit a single *.pl* file, via the MET website submission link, containing the team's full project implementation. The submitted file **must** abide by the following rules:
  a) The file should be named according to your team's *Team Name* (from the posted teams list).
  b) You should include a clear documentation per implemented predicate. You should write each predicate's documentation above the predicate's implementation.
- It is the team's full responsibility to successfully submit a valid .pl file before the project's deadline.