Ball Sort Puzzle

Heuristic Search Methods for One Player Solitaire Games

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Specification

The objective of the Ball Sort Puzzle is to sort the colored balls in the tubes until all balls with the same color stay in the same tube.

The player can only move a ball at the top of a tube to:

- an empty tube;

- another tube that has a ball with the same color on top and has enough space;

The player can also undo his moves if he finds himself without moves

Related work

- [Link to the Google Play page](#);
- [Link of all existing levels](#);

Formulation of the problem as a search problem

State Representation:

- Ball: [1..∞]

- Tube: [Ball, Ball, Ball, Ball] or []

- Game: [Tube,Tube,...]

Initial State:

- Game: [Tube,Tube,...], where every Tube doesn't contain 4 equal numbers

Obejctive State:

- Game: [Tube,Tube,...], where every Tube either contains 4 equal numbers or is empty

Operators:

- Move(X,Y):
  - PreCond: Tube Y must be empty or have a Ball just like the one that is moved
  - Effect: move Ball from Tube X to Tube Y
  - Cost: 1 is the general case, it represents a move; C2, evaluation of the number of wrongly placed Balls, based on the Ball at the bottom of a Tube

Implementation work already carried out

Programming language: Python with visualization using pygame package

Development environment: VSCode/IntelliJ

Data Structures:

- Lists, for representing the Tubes and the Game

- Nodes and Graphs

File Structure: The Project's directory contains 4 files (ui – graphical interface; solver – search methods; tube – contains the Tube and Game classes, graph – contains Node and Graph classes) and a subdirectory for images

Implemented Work: All known to man algorithms; Many levels; Such graphical interface