COMP1110 - wed18i

u6079329 - u6609337 - u6406312

James Frampton Reid - Feier Xiao - Lachlan McVicar

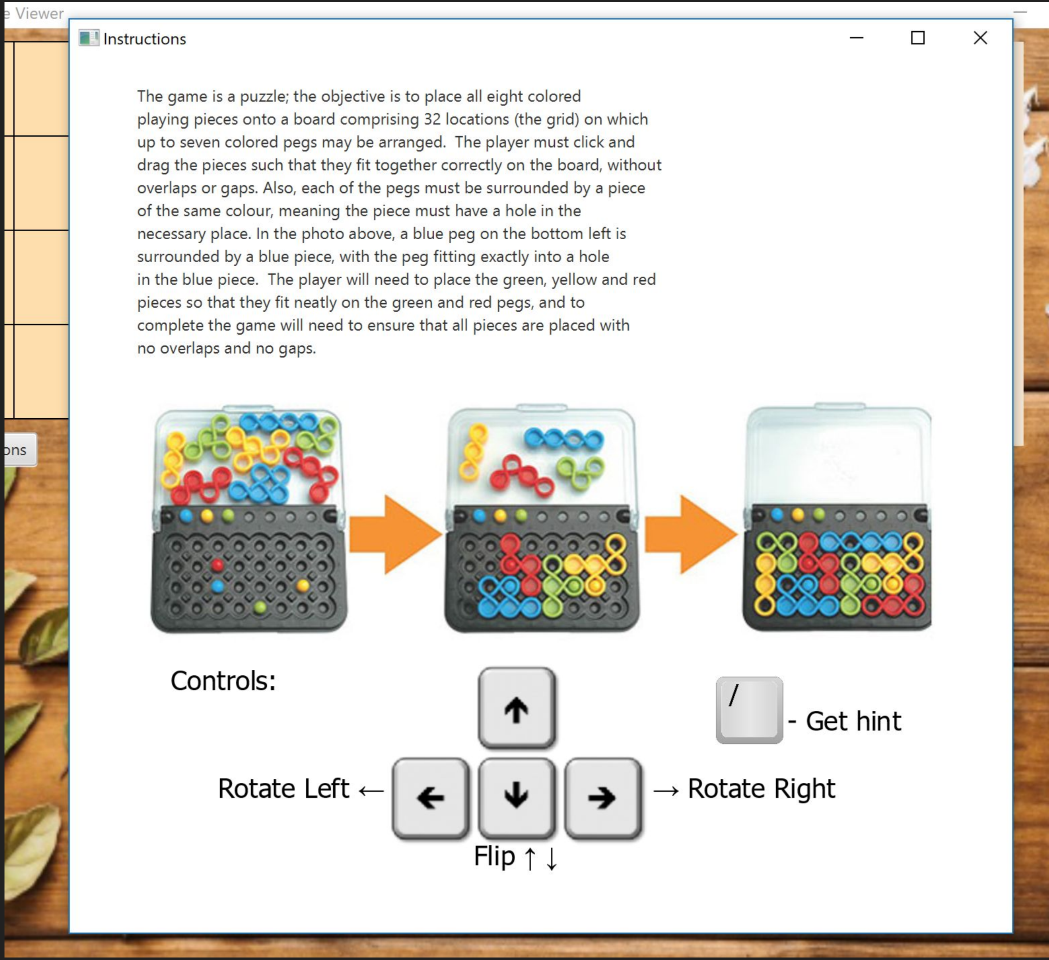
Instructions

Click on ‘Instructions’ button to bring up a new window that displays instructions

This is a whole new scene and was executed from within a scene.

Sceneception

The largest image is sourced from the IQ twist website



The game is a puzzle; the objective is to place all eight colored playing pieces onto a board comprising 32 locations (the grid) on which up to seven colored pegs may be arranged. The player must click and drag the pieces such that they fit together correctly on the board, without overlaps or gaps. Also, each of the pegs must be surrounded by a piece of the same colour, meaning the piece must have a hole in the necessary place. In the photo above, a blue peg on the bottom left is surrounded by a blue piece, with the peg fitting exactly into a hole in the blue piece. The player will need to place the green, yellow and red pieces so that they fit neatly on the green and red pegs, and to complete the game will need to ensure that all pieces are placed with no overlaps and no gaps.

Controls:

/ - Get hint

Rotate Left ← → Rotate Right

Flip ↑ ↓

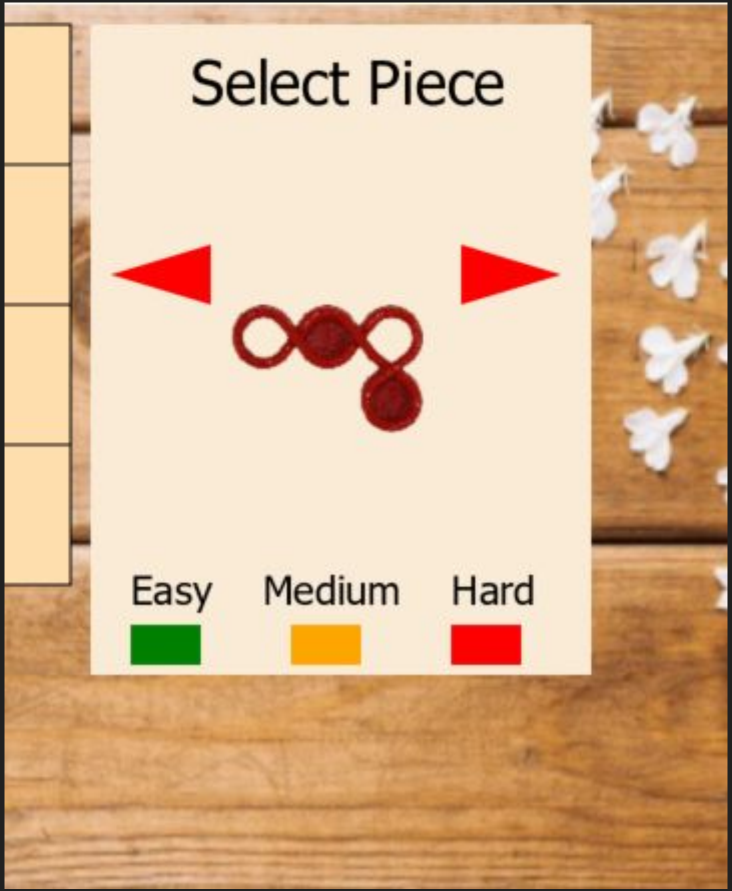
Selecting Pieces

Pieces are selected through this interface clicking on a arrow facing right will change the selected piece to the next piece and clicking on the left will change it to the previous piece.

This was done by analysing the dimensions of the image and basing the order in regards to the size of the image

When hovering over the piece the mouse changes to a hand symbol.

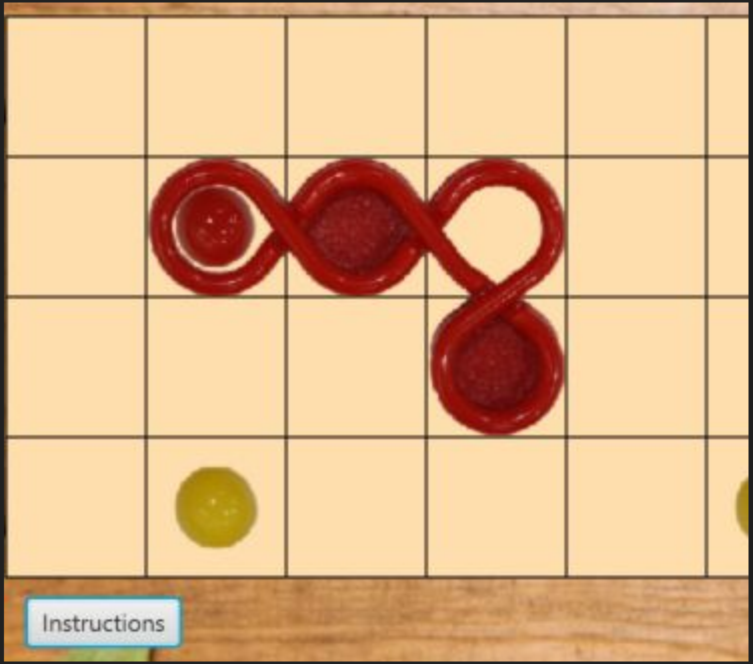
Selecting duplicate pieces is impossible as it analyses the board state and skips pieces already on the board.



Snap to position

Pieces snap to position with respect to other pieces and pegs.

If they fail at snapping the piece disappears and can be reselected from the selection interface



Score

Added ability to keep track of score.

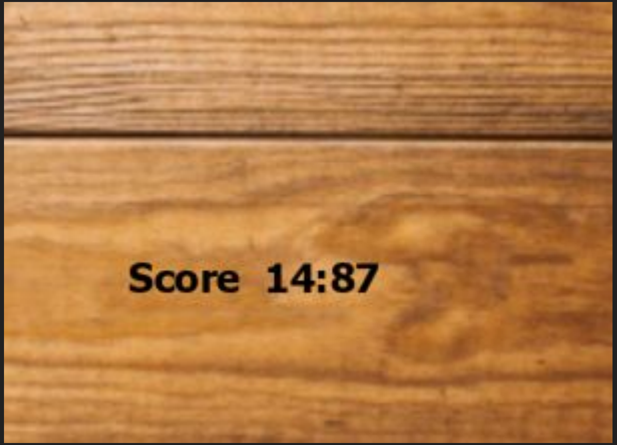
Pauses and turns green upon completion of the puzzle

Only starts once the puzzle has been generated

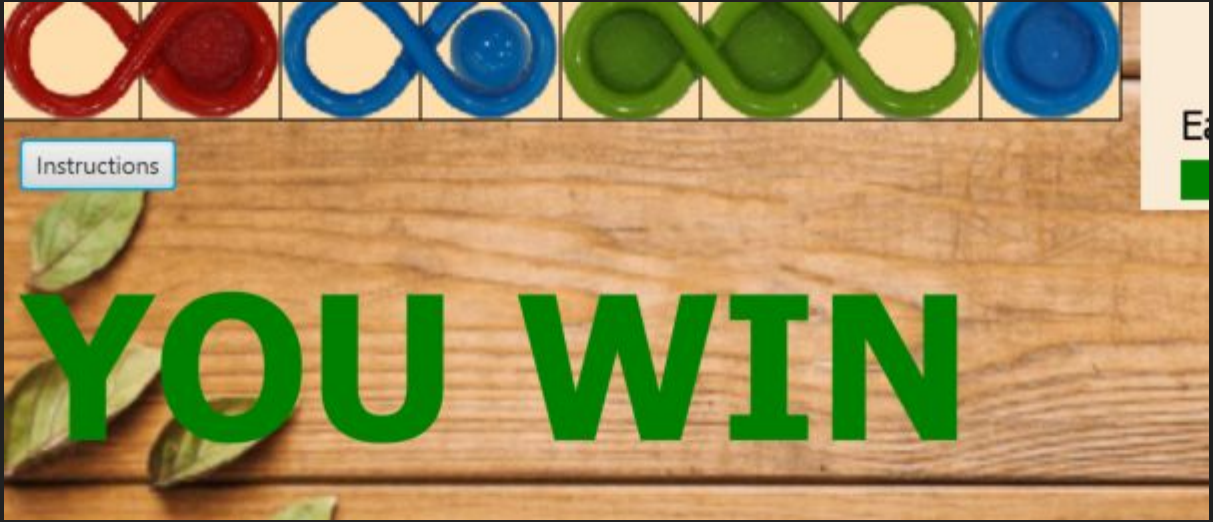
Resets upon creating a new puzzle

Is actually an invisible rectangle hurtling at the speed of light

Why? It was more economical in regards to the animation



Victory



Celebrate your hard won victory with a congratulatory message.

This message appears once the puzzle is completed

It does this by checking if the boardstate has all pieces on it

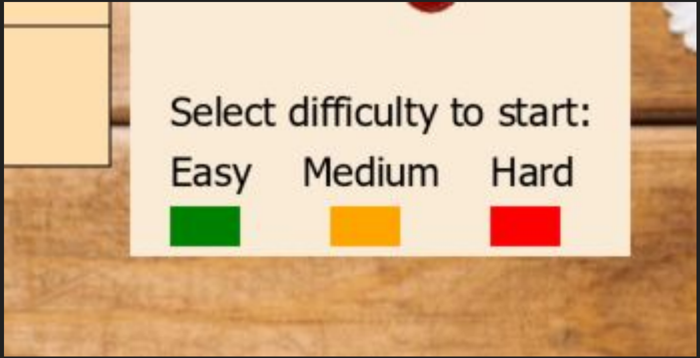
Difficulty levels

Selecting easy generates a puzzle with 6 pegs

Medium generates 4 pegs

Hard generates 3 pegs

All generated puzzles have a unique solution

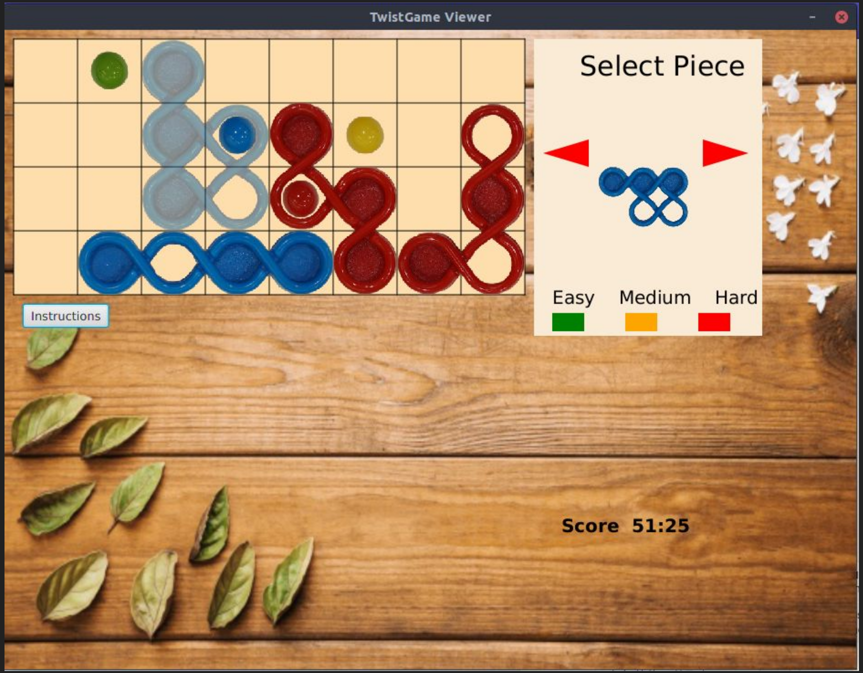


GetHint

Generate and toggle spooky ghost hints with the ‘/’ key

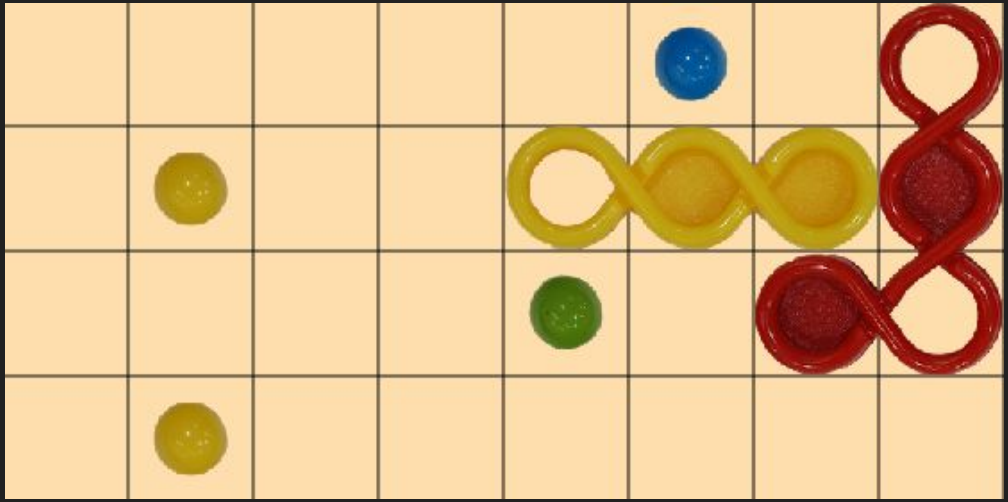
Each solution is unique to each generated challenge

These spectral pieces allow you to see the pegs underneath



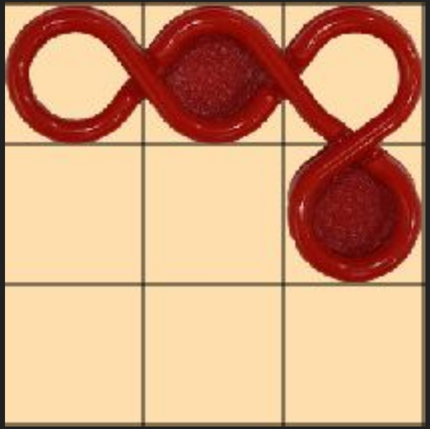
Solving a Board State

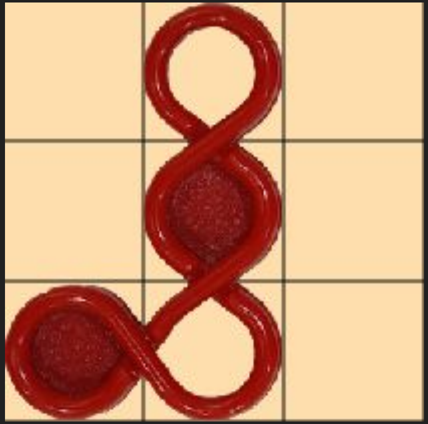
- Use Recursion to place pieces
- Use a blackList to ensure a placement is only checked ONCE
- Up to 720x faster
- Other Minor Optimisations, try to front load the work

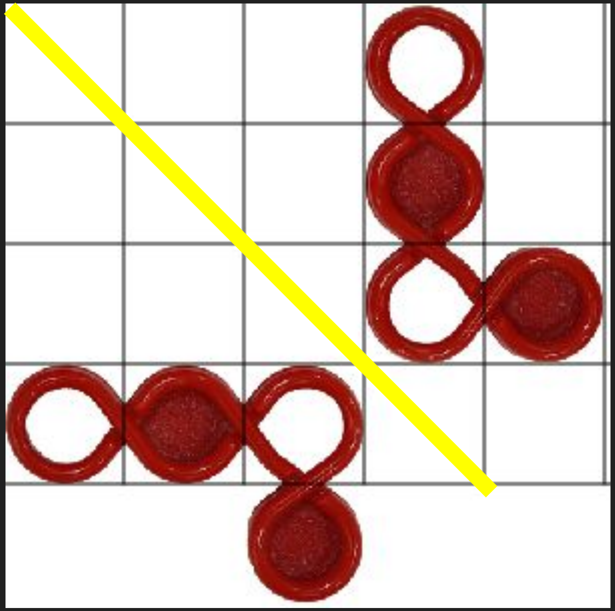


Rotating Pieces

- No obvious function
- Reflection -> Flip -> Translation







Dictionary

At the beginning, we tried to iterate all possible initiate peg placement, and put it into the getSolutions function to check whether it will return only one solutions.

But no matter how we optimized our project, we couldn’t run through them. There are too much possibilities.

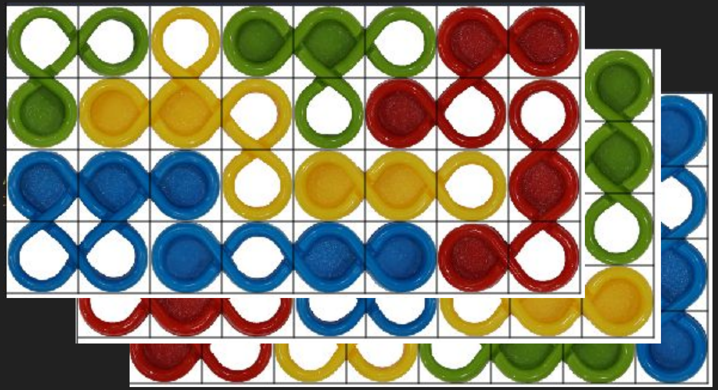
Then we changed the way we look at this problem

Dictionary

1. Get all the possible solutions without any pegs

   Send “” to the getSolutions function

   5992 possible solutions

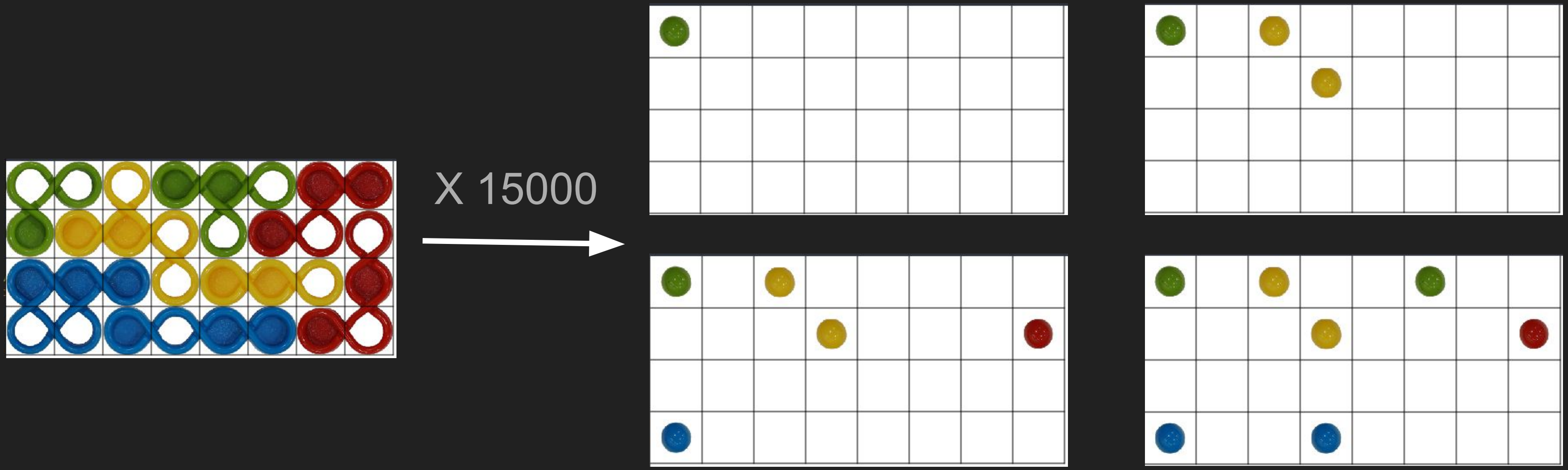


X 5992

Dictionary

2. Put pegs on that solution (Get the possible combinations of the pegs)

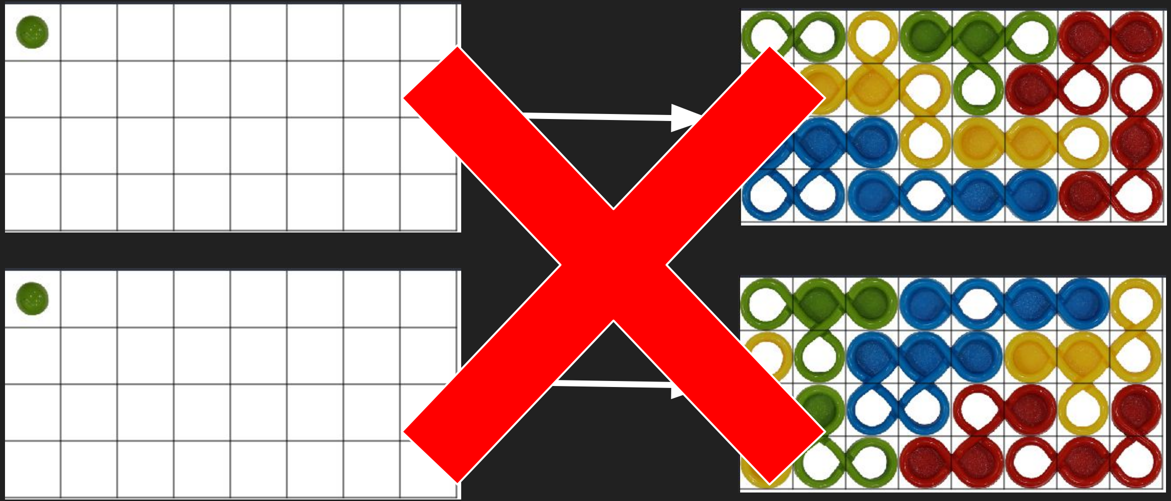
   15000 possible peg placements for every possible solutions



Dictionary

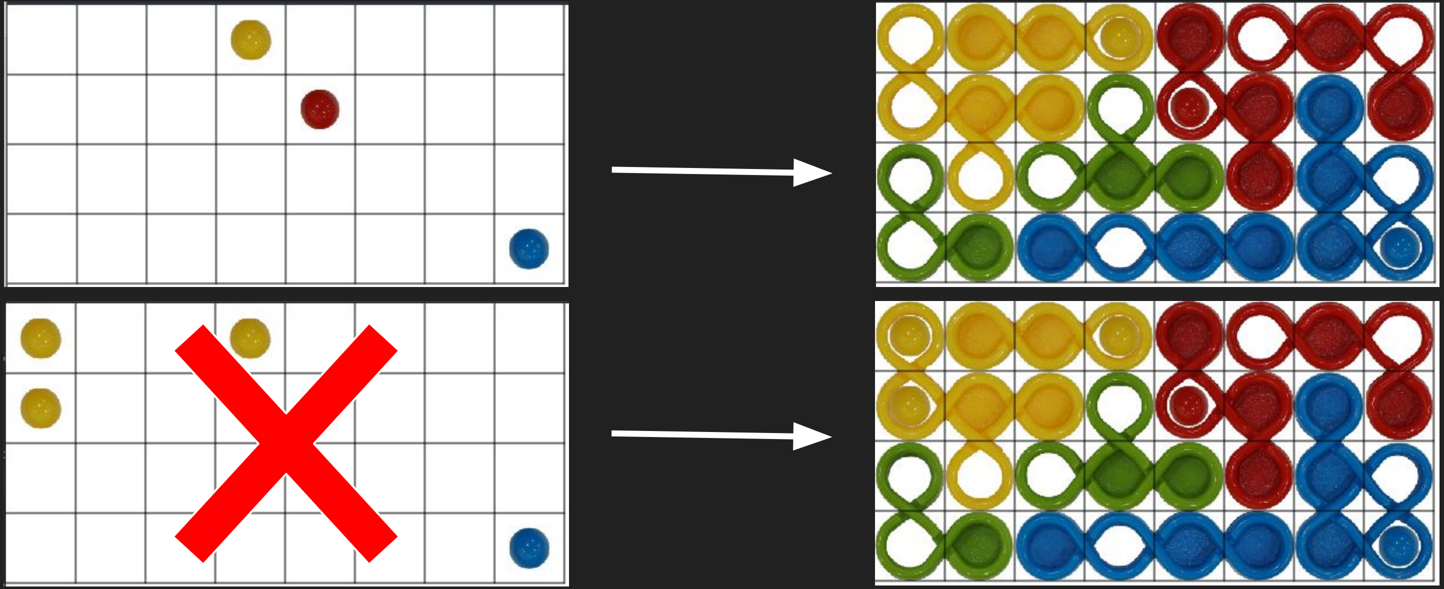
3. Get rid of the peg placement if it is existed in the key of the HashMap, so that the peg placement will have a unique solution

   26 MILLION !!!



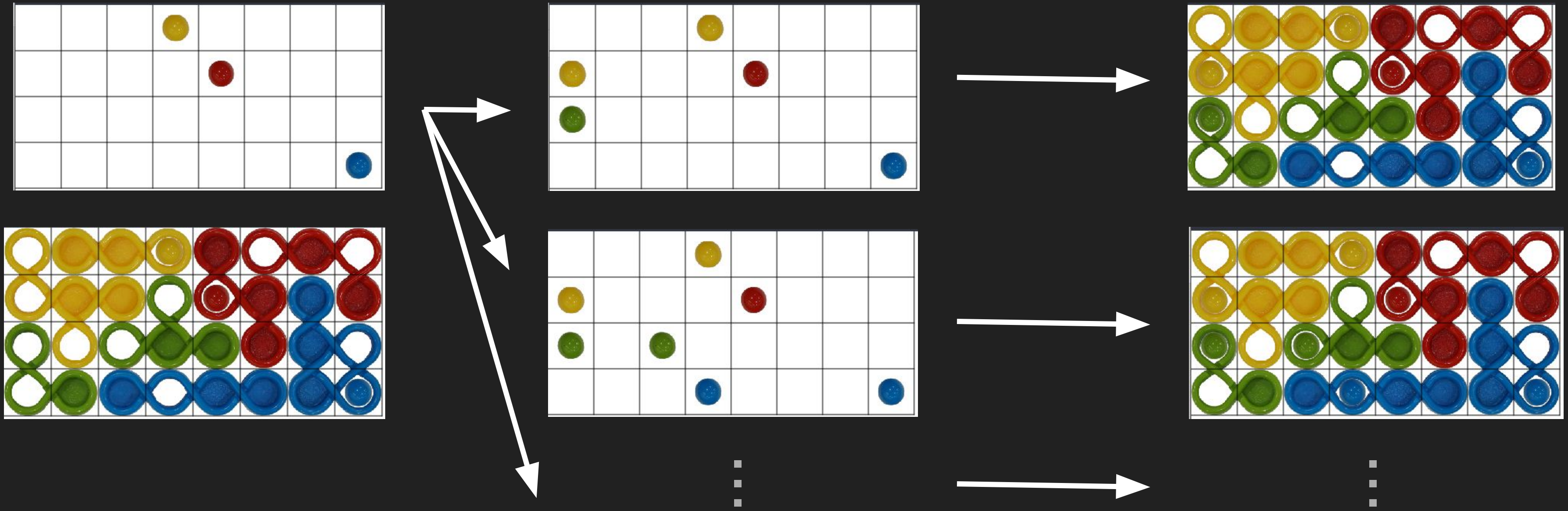
Dictionary

Unfortunately, we couldn't process the 26 million of data using Java, which will throw an out of memory exception, otherwise we can reduce the size of the dictionary, by getting the minimal subset.



Dictionary

Then we found out all the three peg placements and add more pegs (according to the difficulty selected) to form a new placement during the game. If we can have the minimal subset, it would be complete and perfect



Thank you for listening !