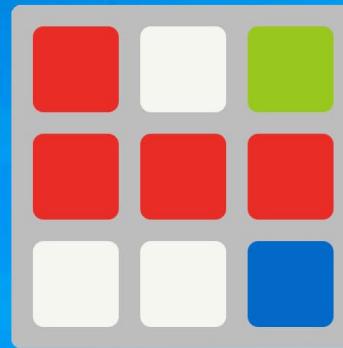
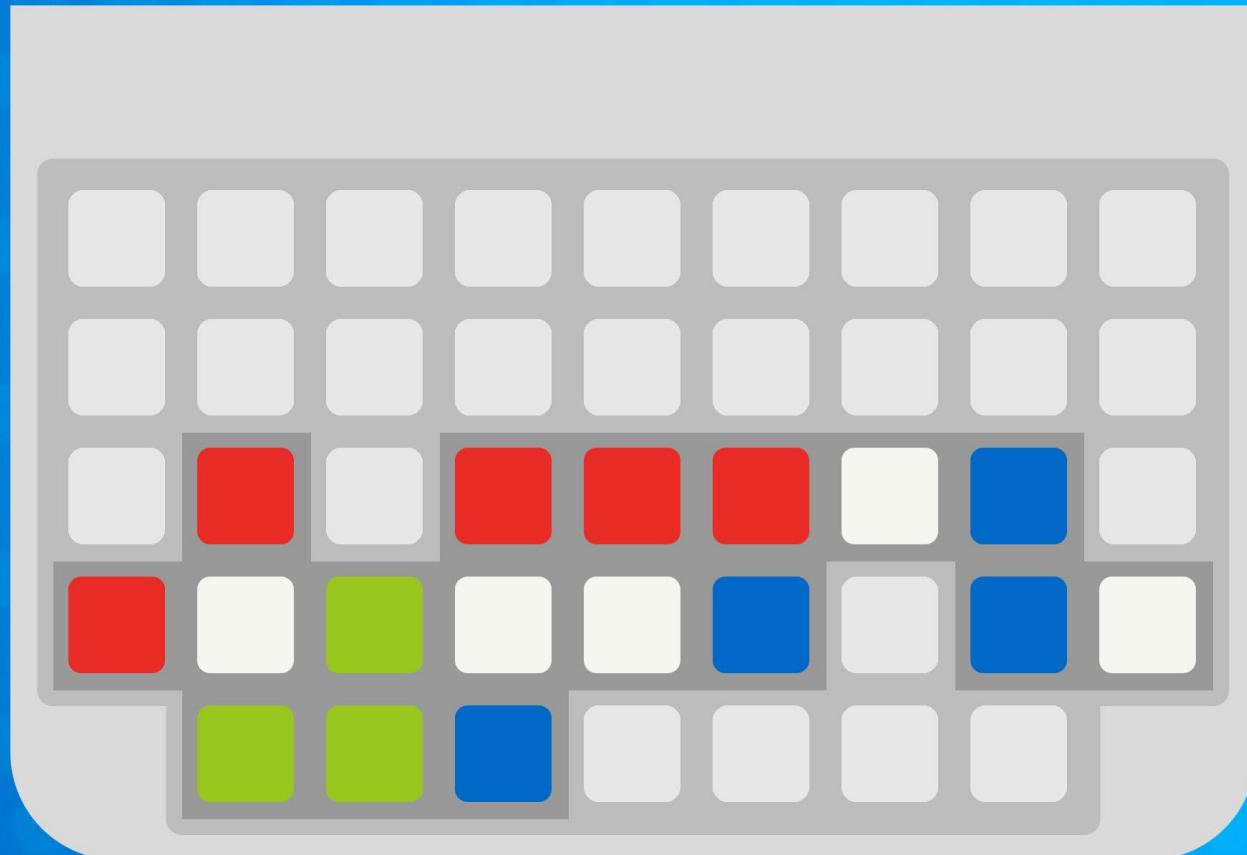


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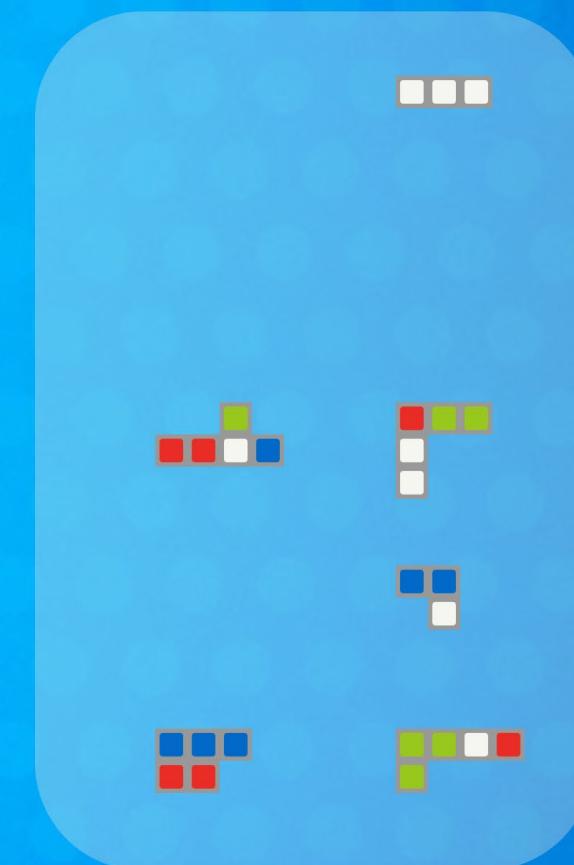


Select Difficulty Level

Easy ▾

Start New Game

Hint



Close Lid

Finish Game

Rotate

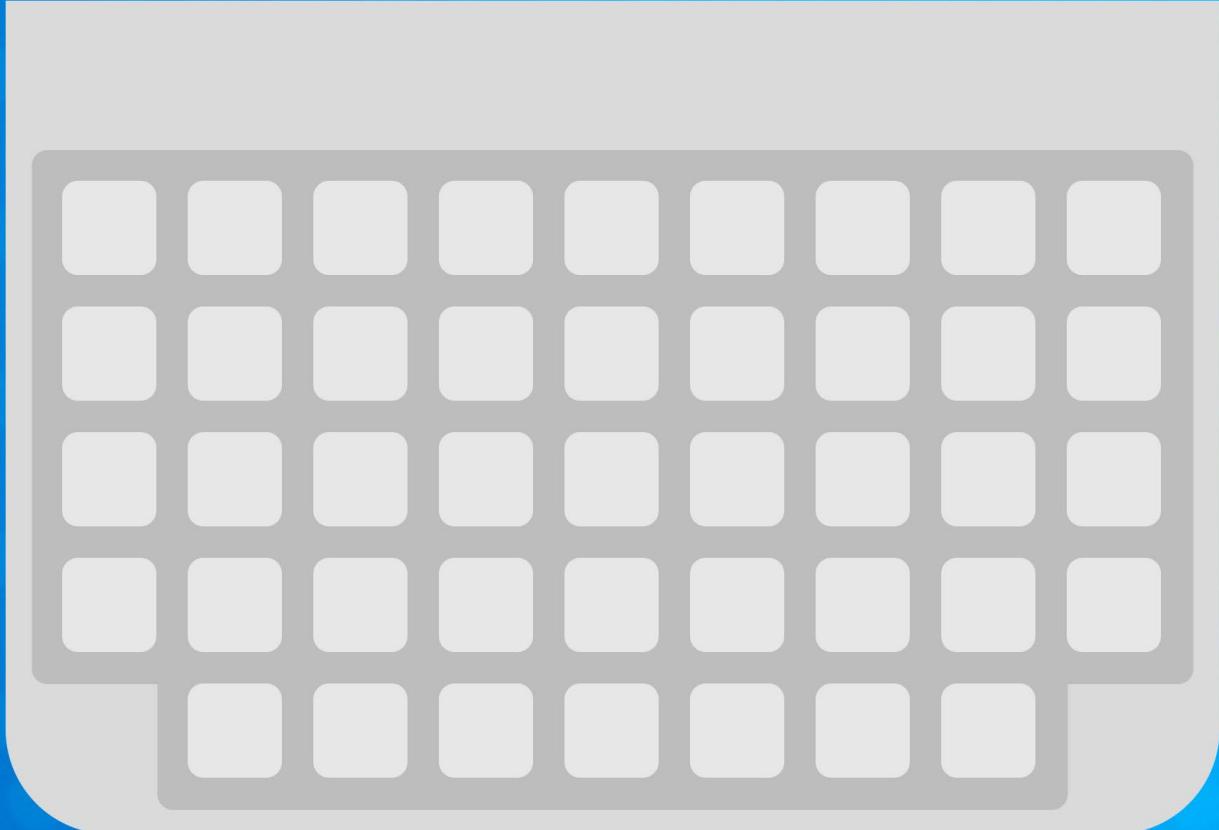
Structured Programming
COMP 1110
IQ Focus

Ra Mugattarov u6650903

Yubeng Liang u6192835

Baoyu Ma u6918231

??

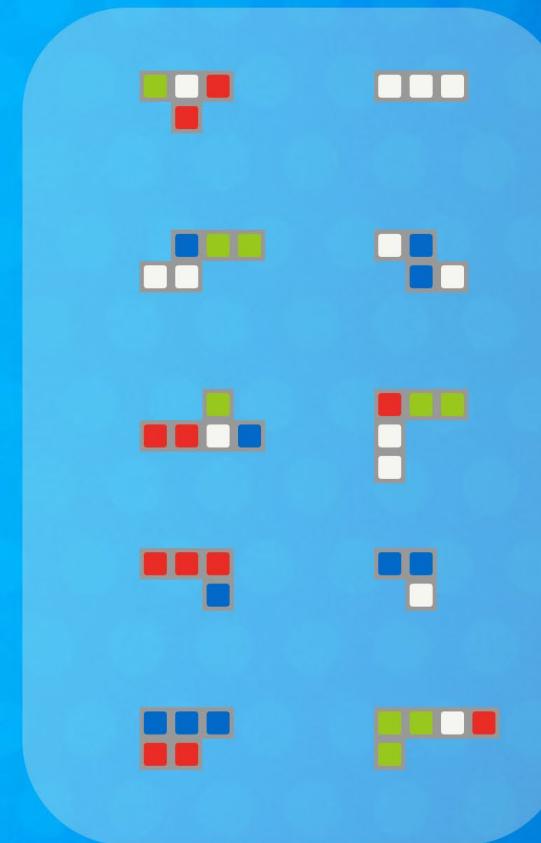


Select Difficulty Level



Start New Game

Hint

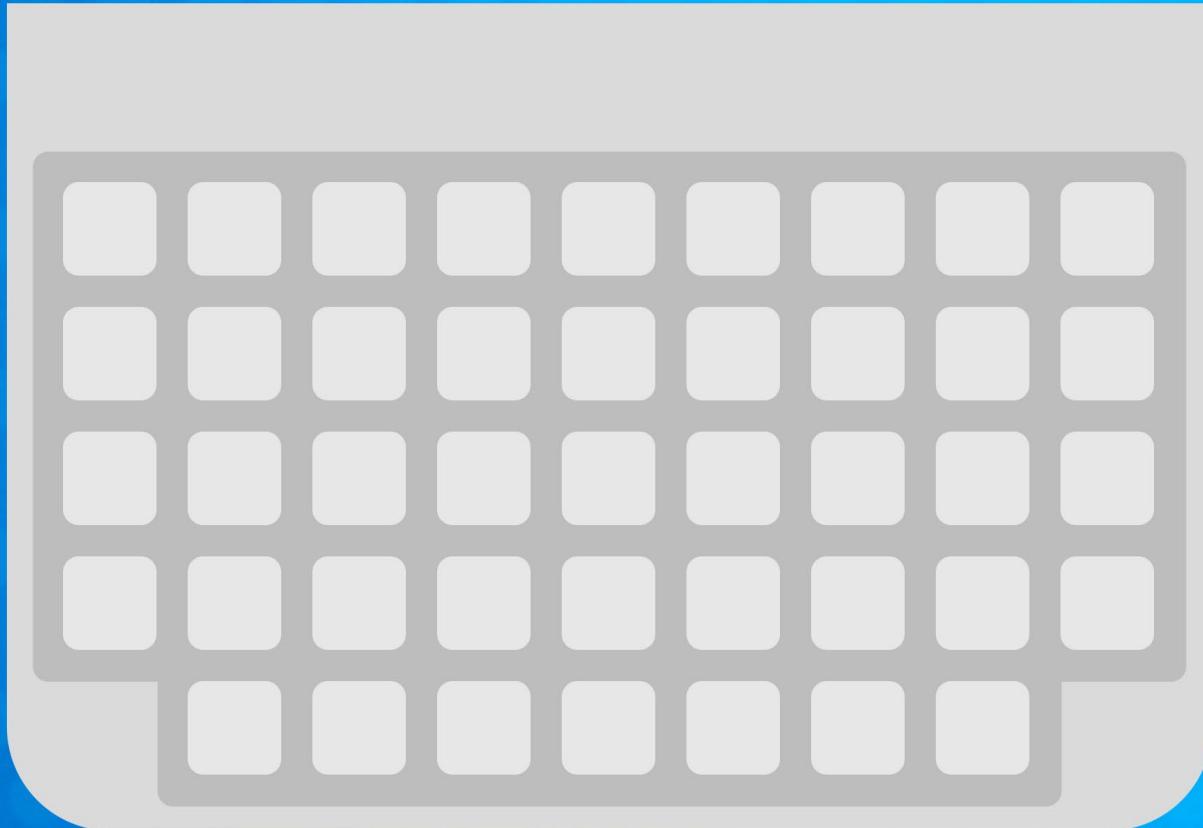


Close Lid

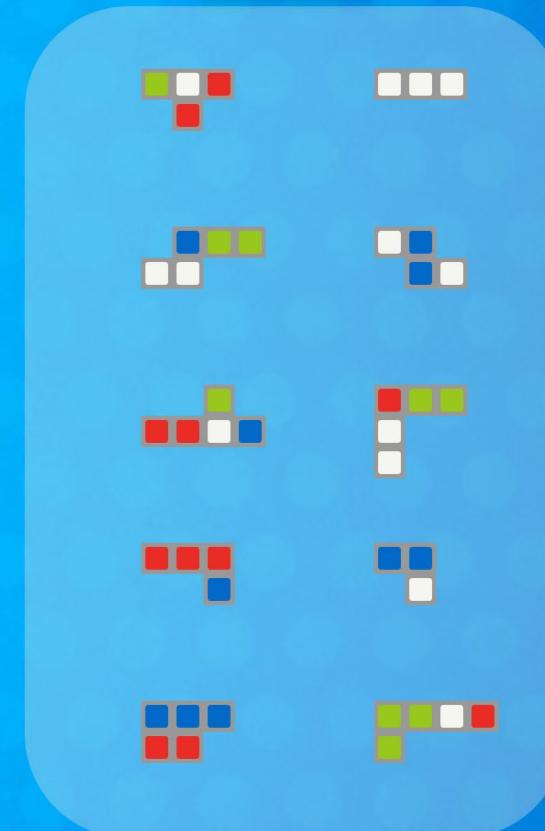
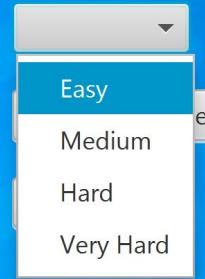
Finish Game

Rotate

??



Select Difficulty Level

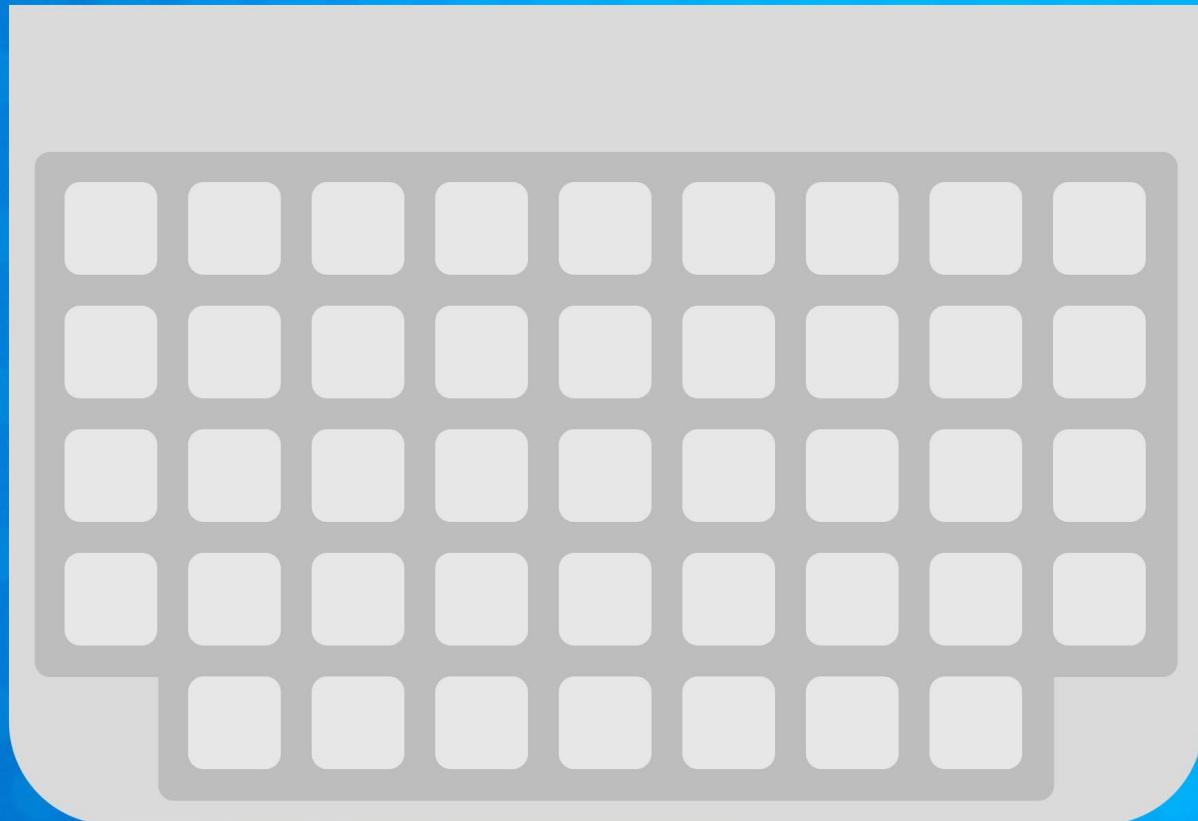


Close Lid

Finish Game

Rotate

??

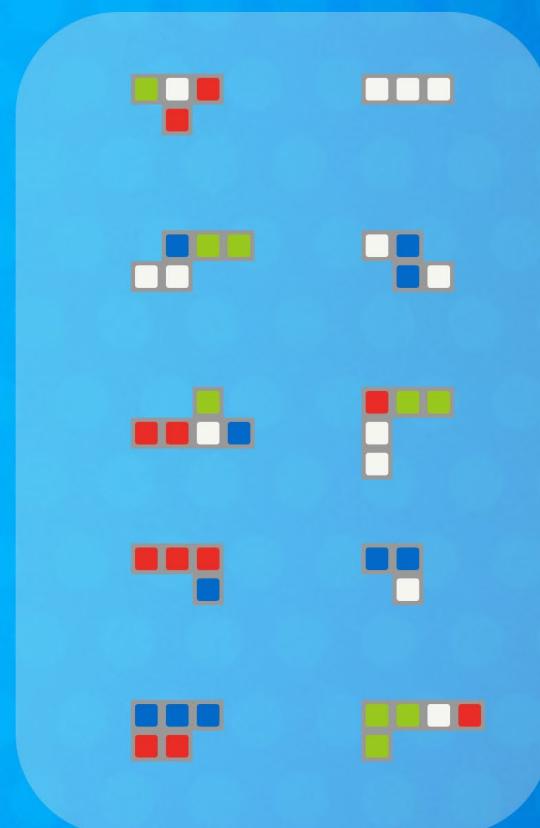


Select Difficulty Level

Easy ▾

Start New Game

Hint

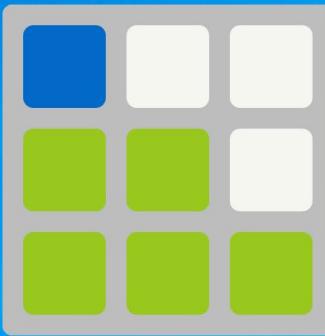


Close Lid

Finish Game

Rotate

??

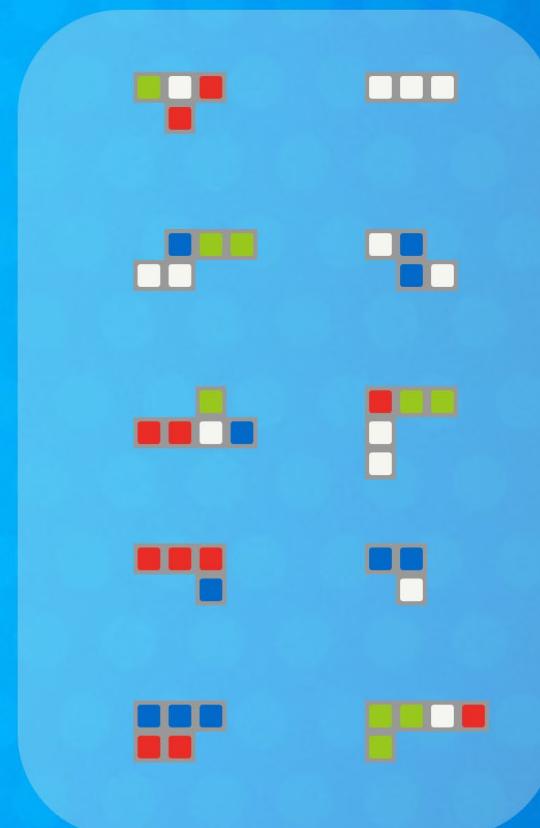
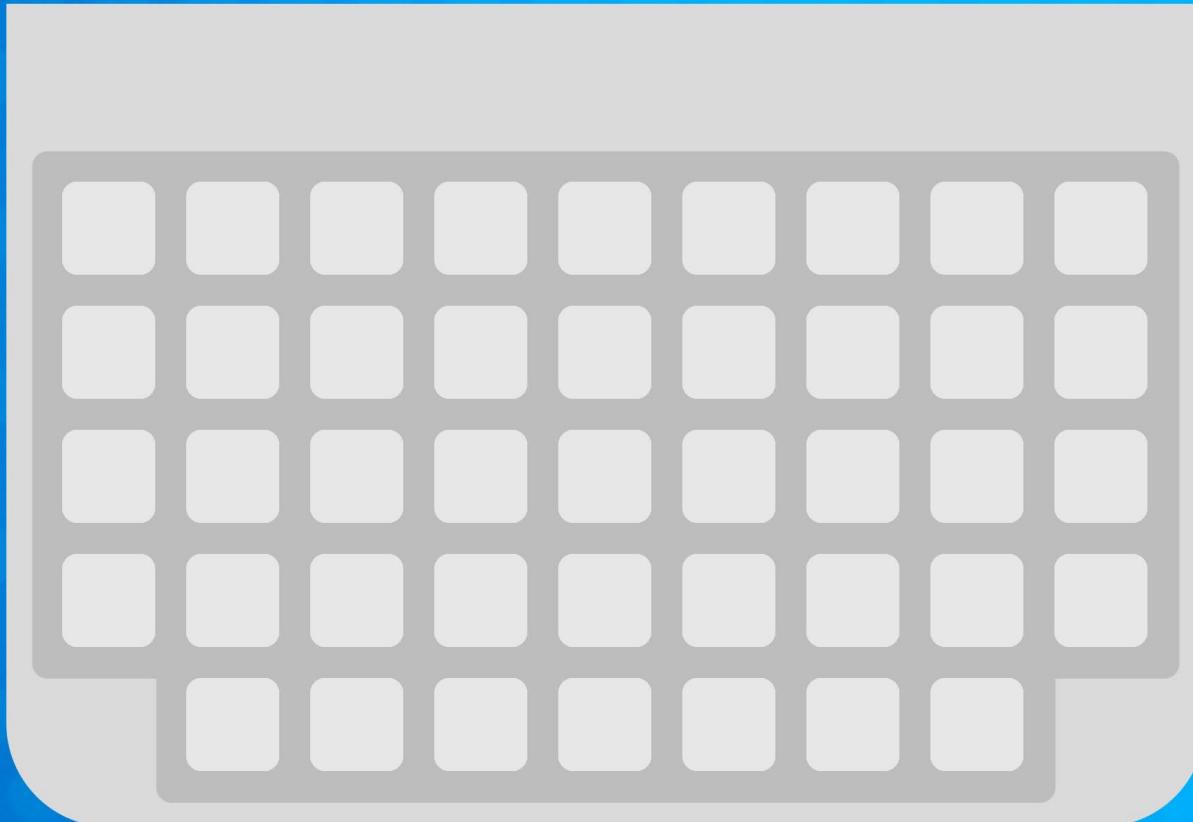


Select Difficulty Level

Easy ▾

Start New Game

Hint

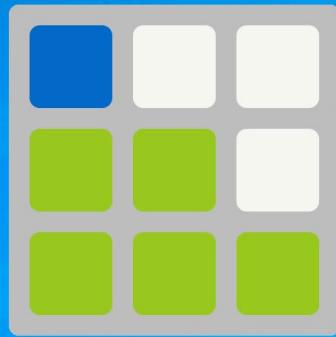


Close Lid

Finish Game

Rotate

??

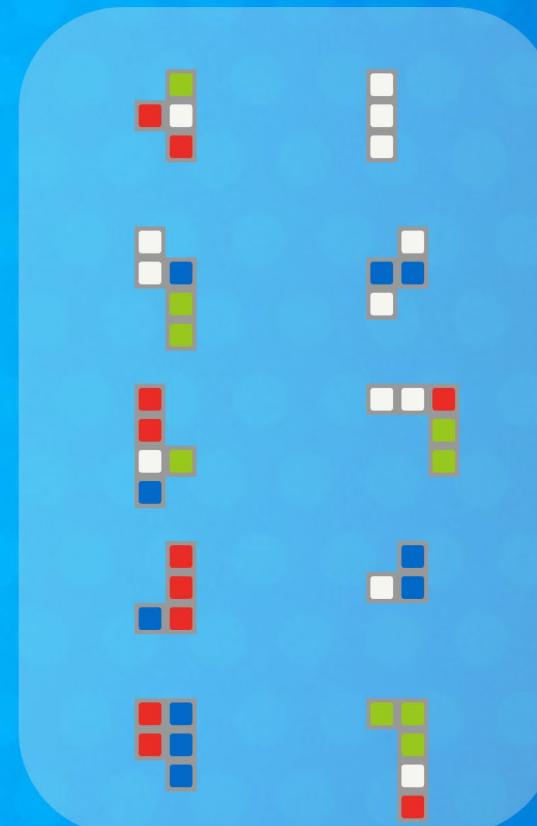
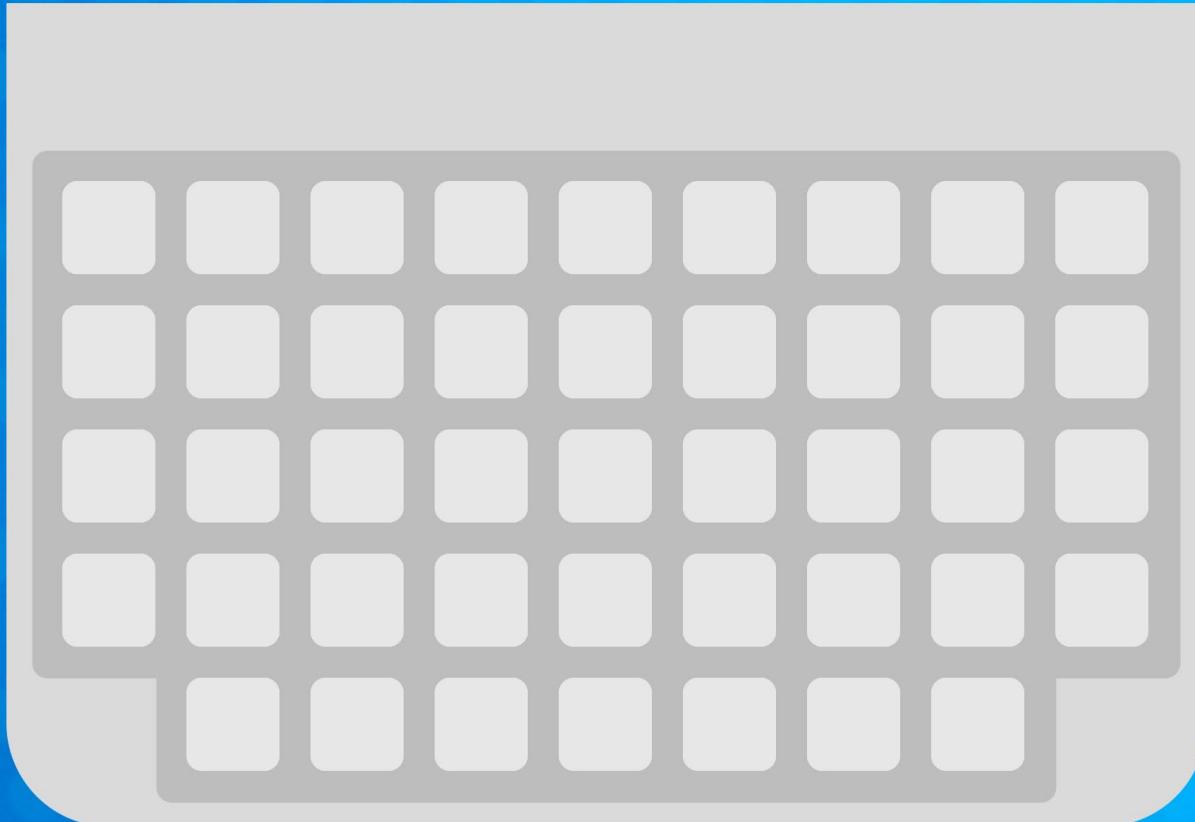


Select Difficulty Level

Easy ▾

Start New Game

Hint

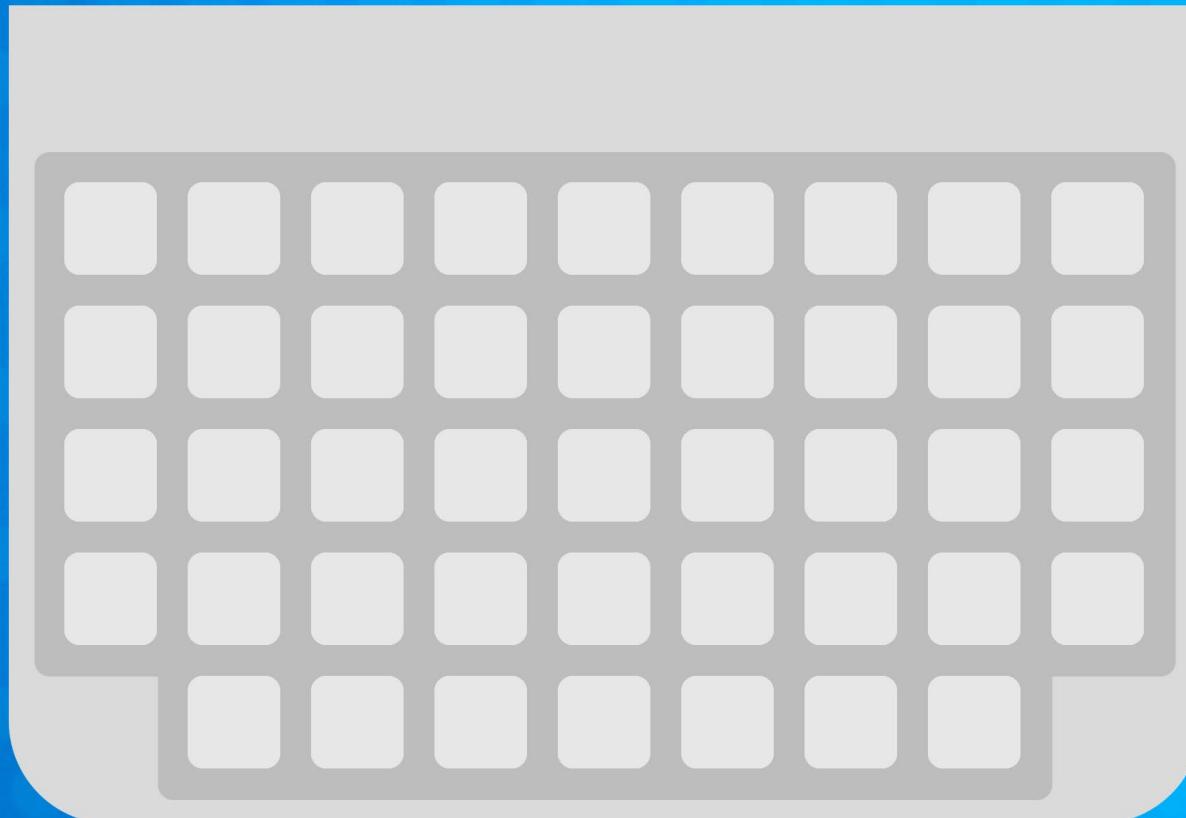
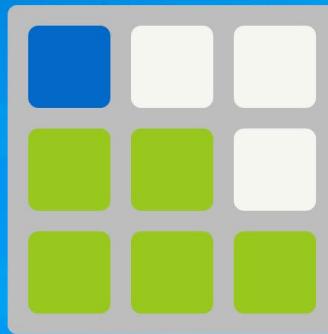


Close Lid

Finish Game

Rotate

??

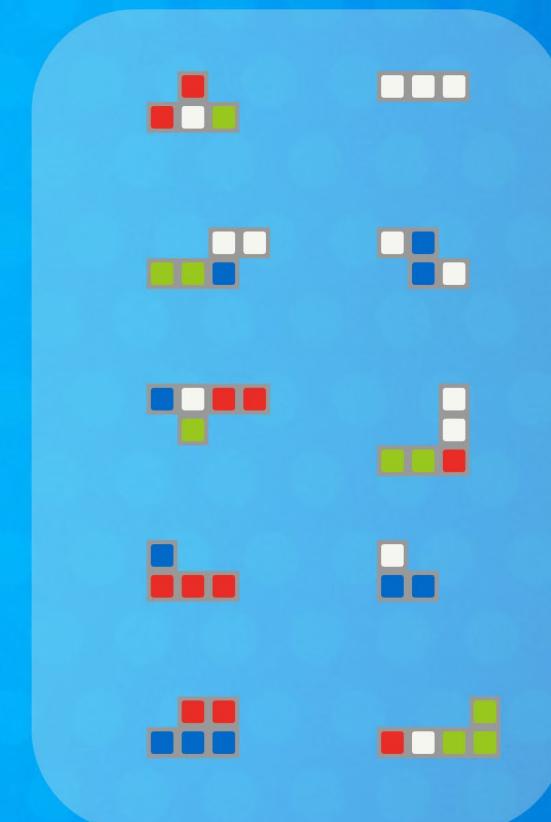


Select Difficulty Level

Easy ▾

Start New Game

Hint

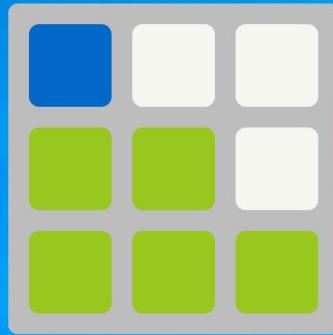


Close Lid

Finish Game

Rotate

??

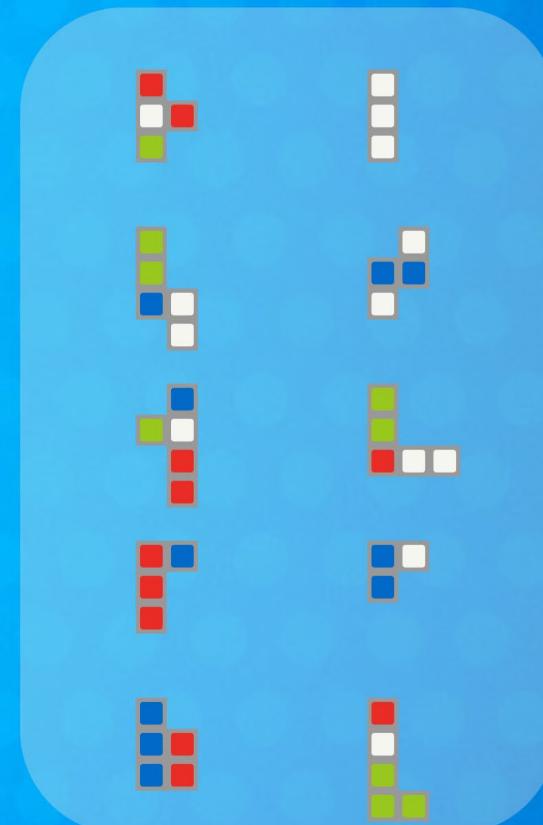
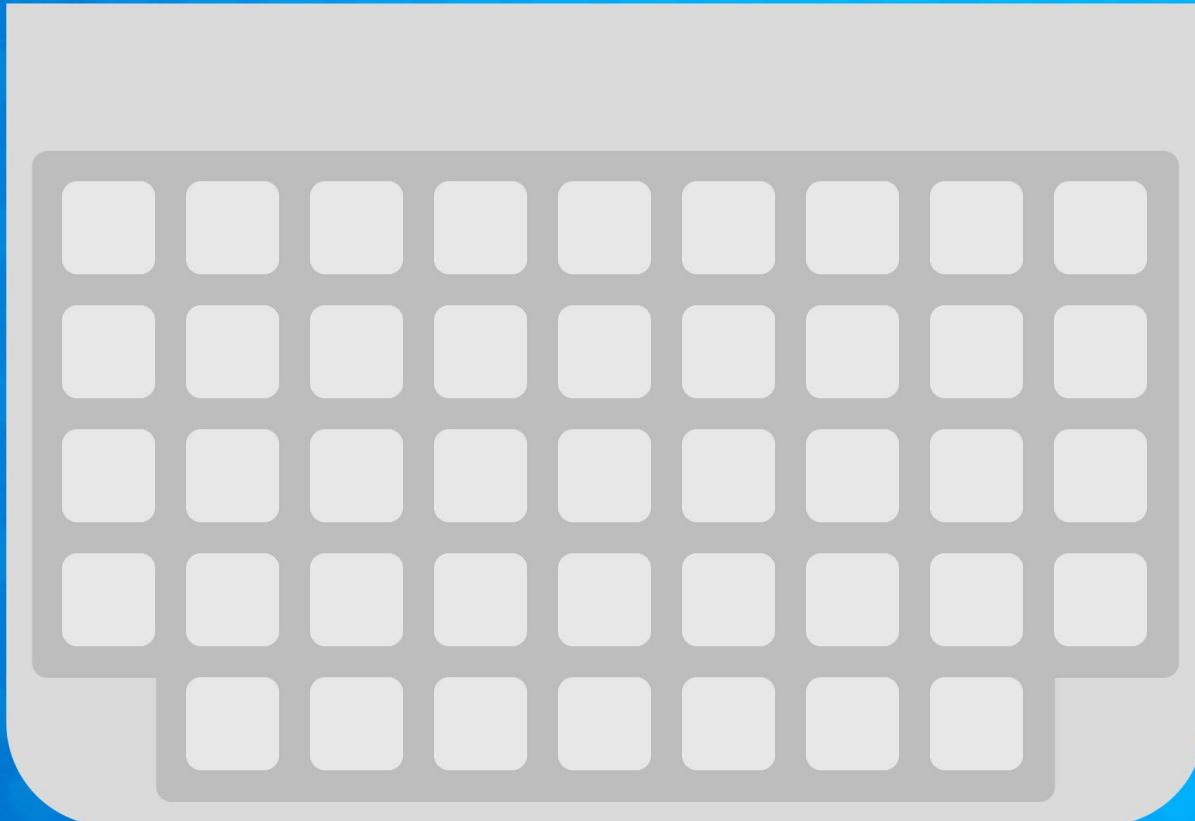


Select Difficulty Level

Easy ▾

Start New Game

Hint

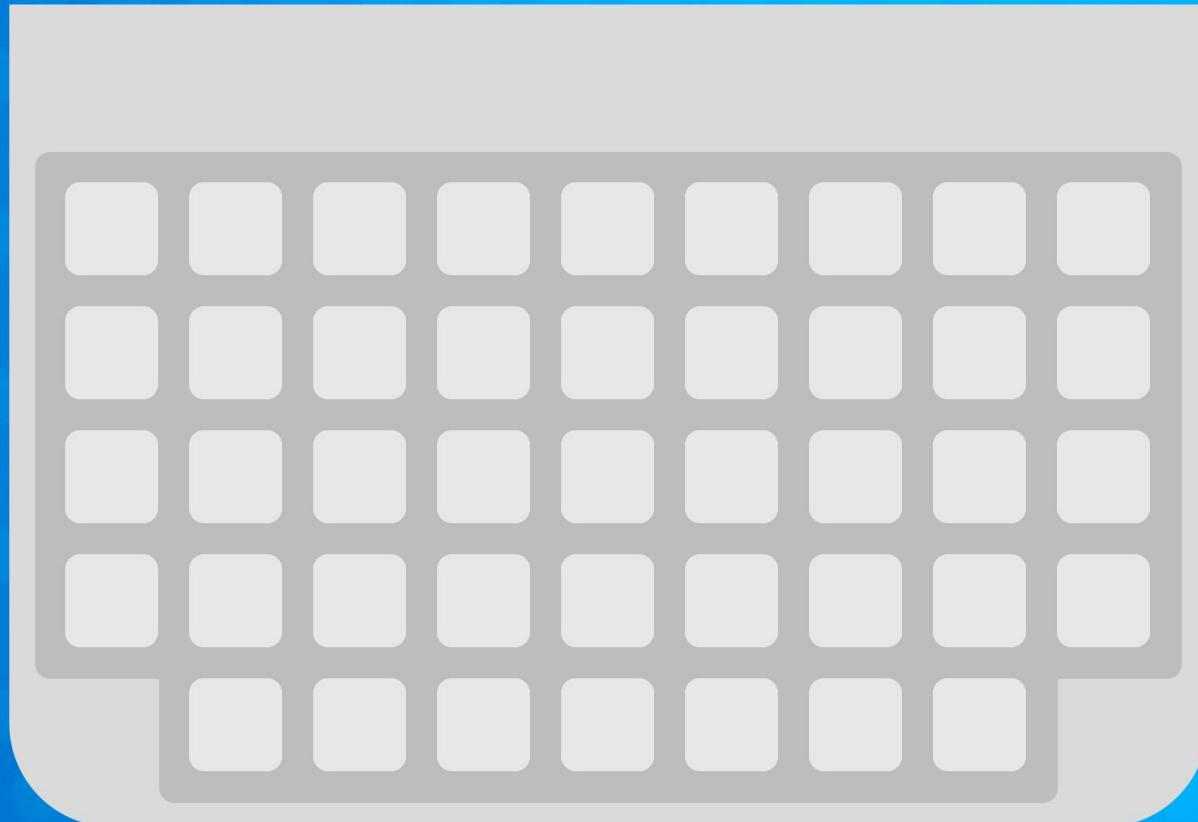
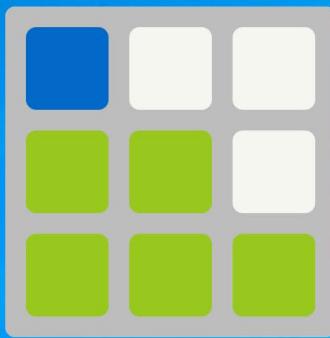


Close Lid

Finish Game

Rotate

??

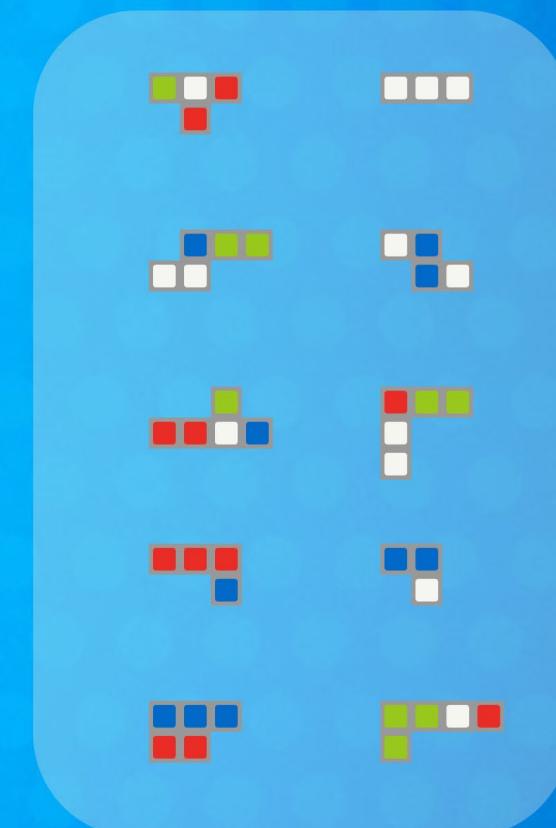


Select Difficulty Level

Easy ▾

Start New Game

Hint

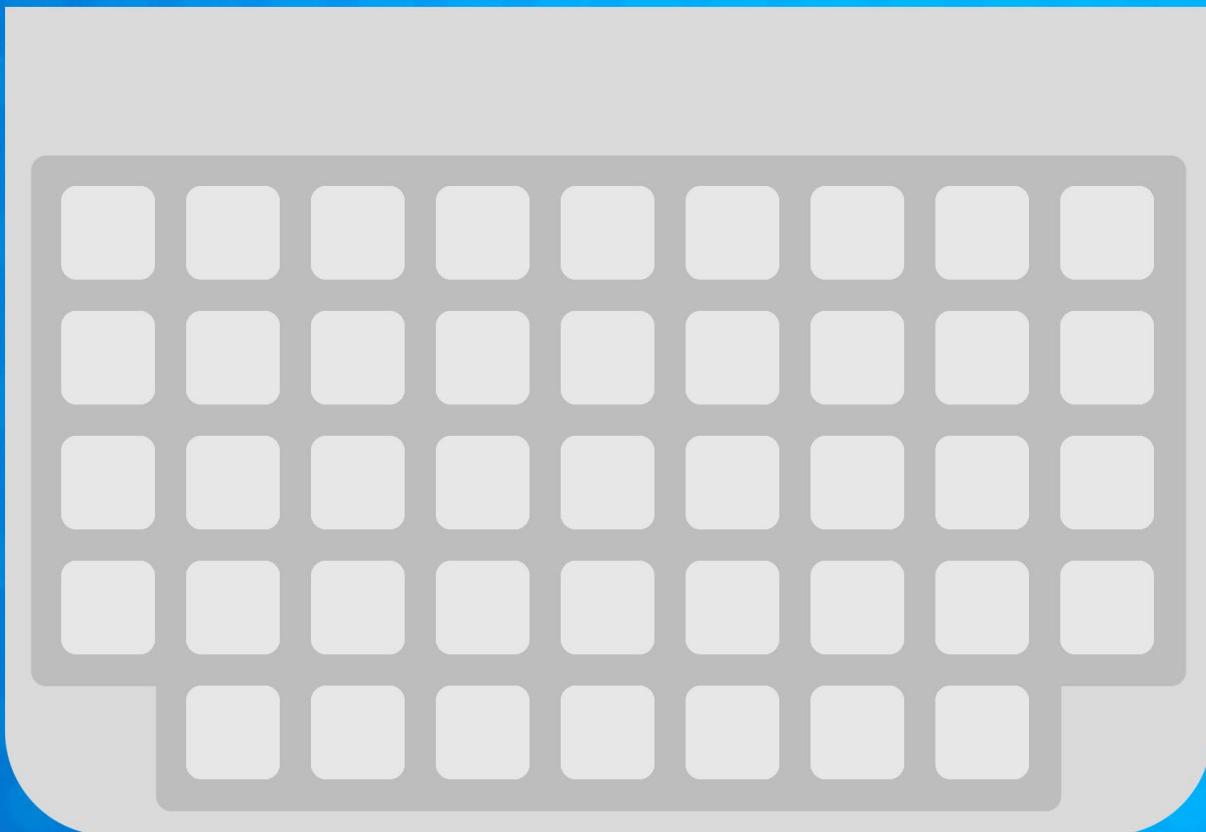
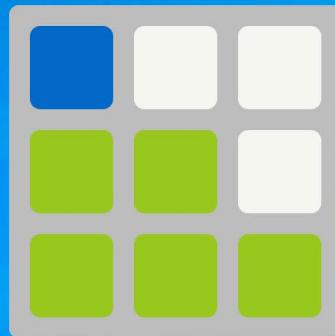


Close Lid

Finish Game

Rotate

??

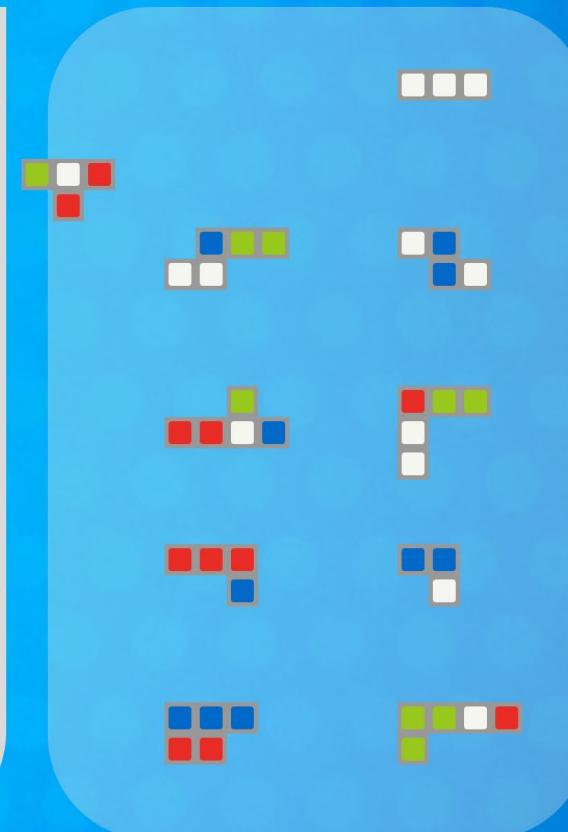


Select Difficulty Level

Easy ▾

Start New Game

Hint

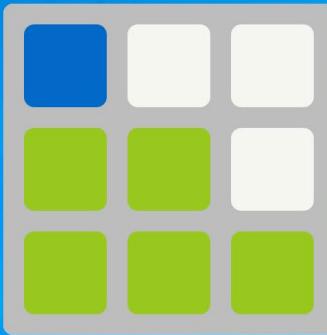


Close Lid

Finish Game

Rotate

??

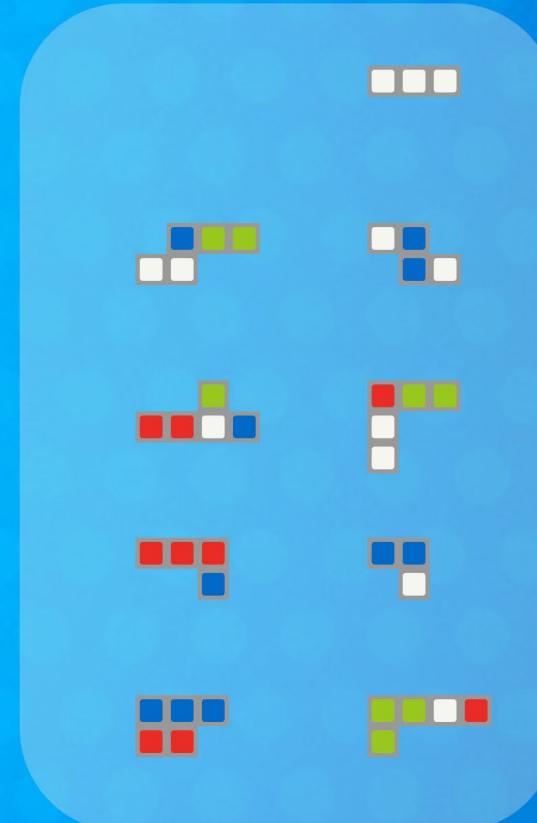
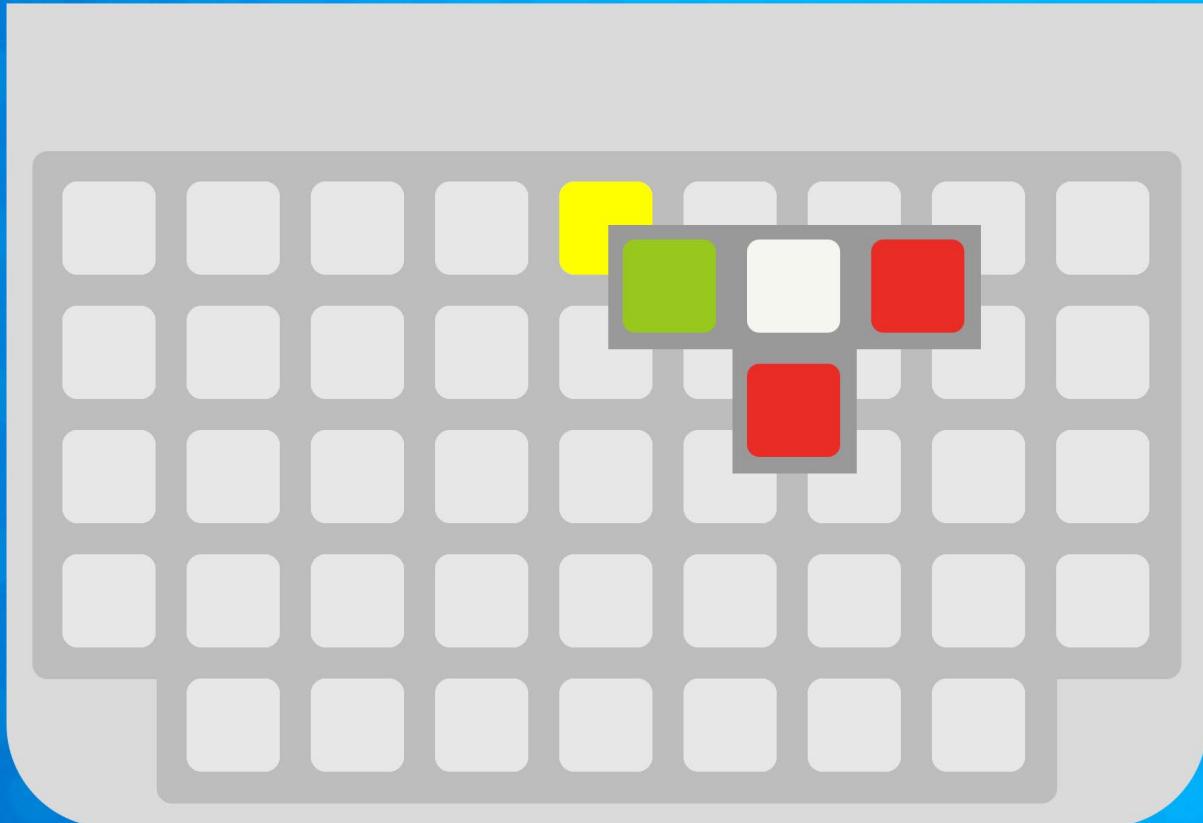


Select Difficulty Level

Easy ▾

Start New Game

Hint

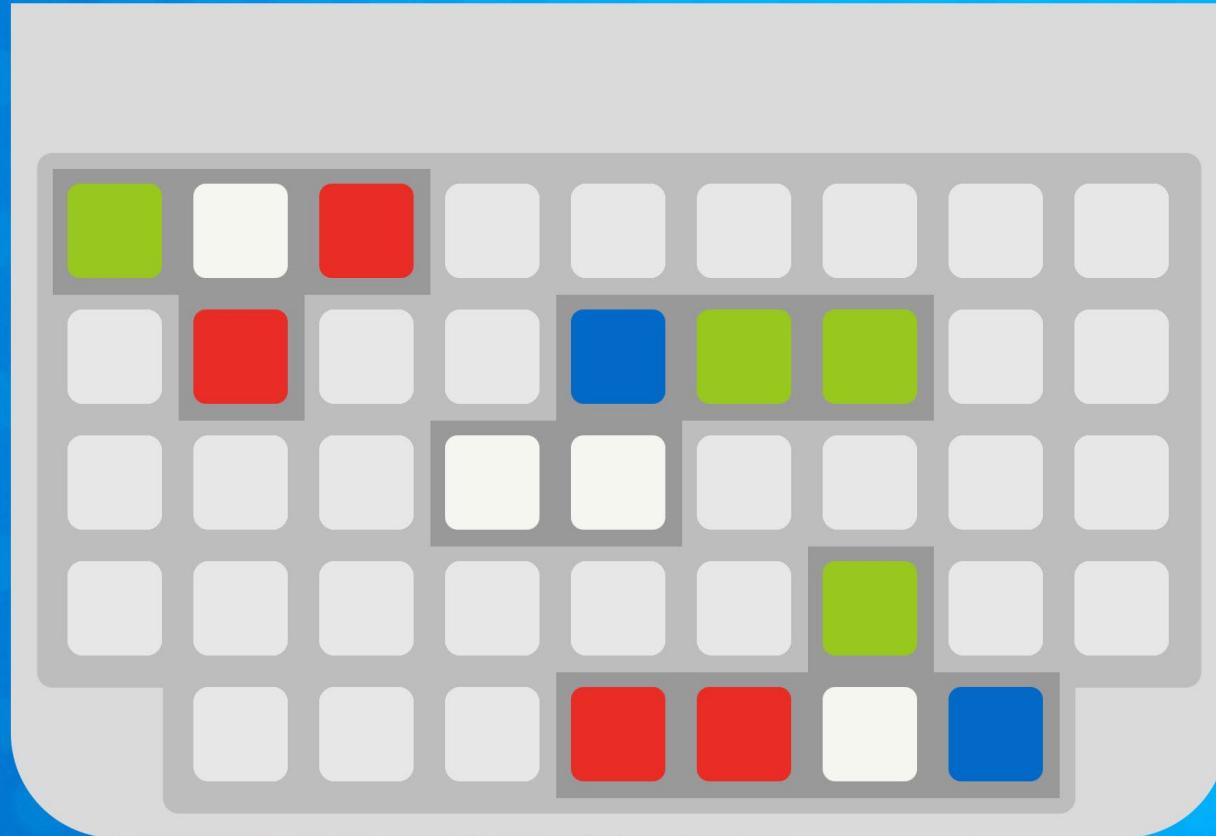
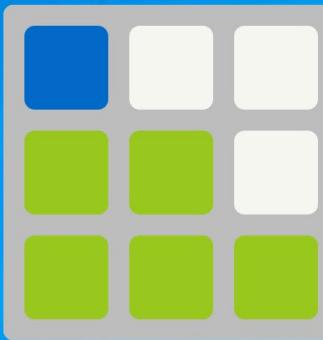


Close Lid

Finish Game

Rotate

??

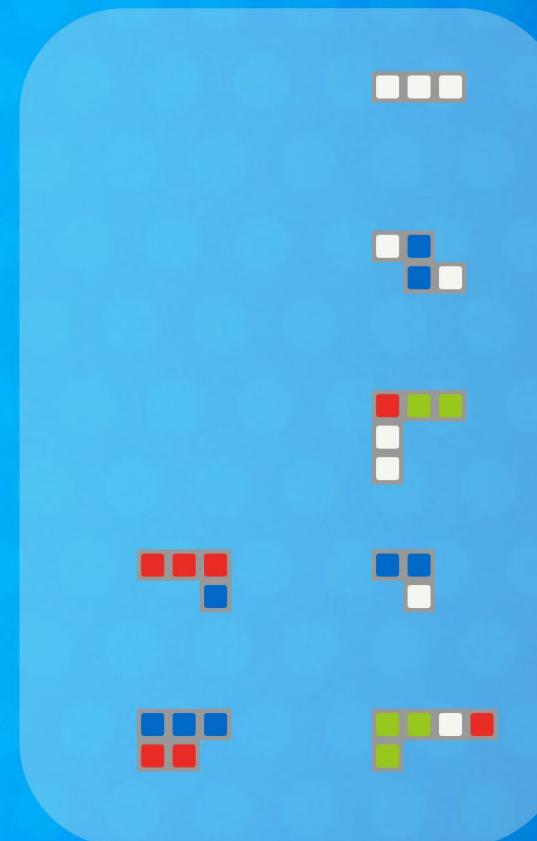


Select Difficulty Level

Easy ▾

Start New Game

Hint

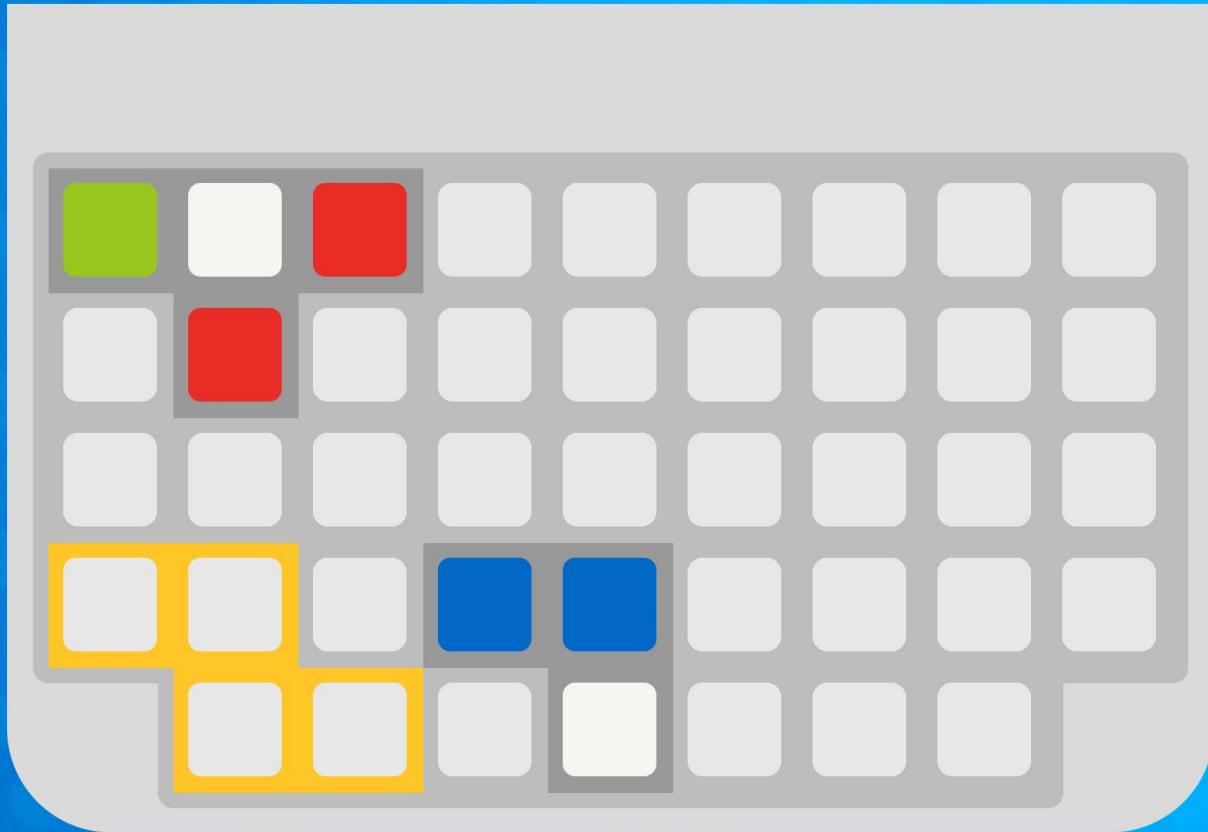
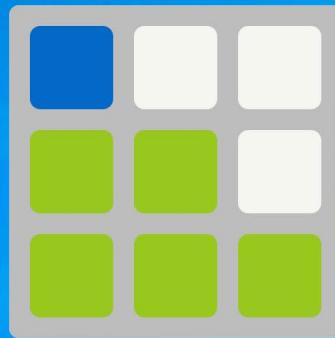


Close Lid

Finish Game

Rotate

??

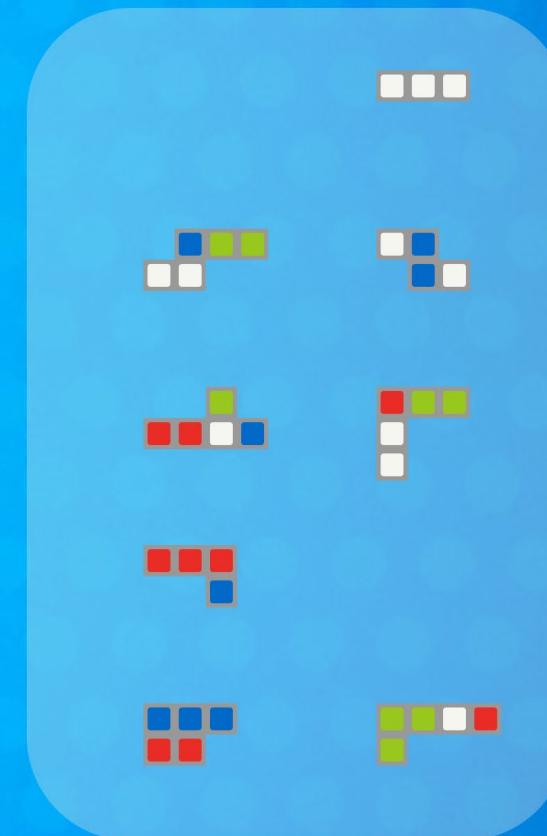


Select Difficulty Level

Easy ▾

Start New Game

Hint

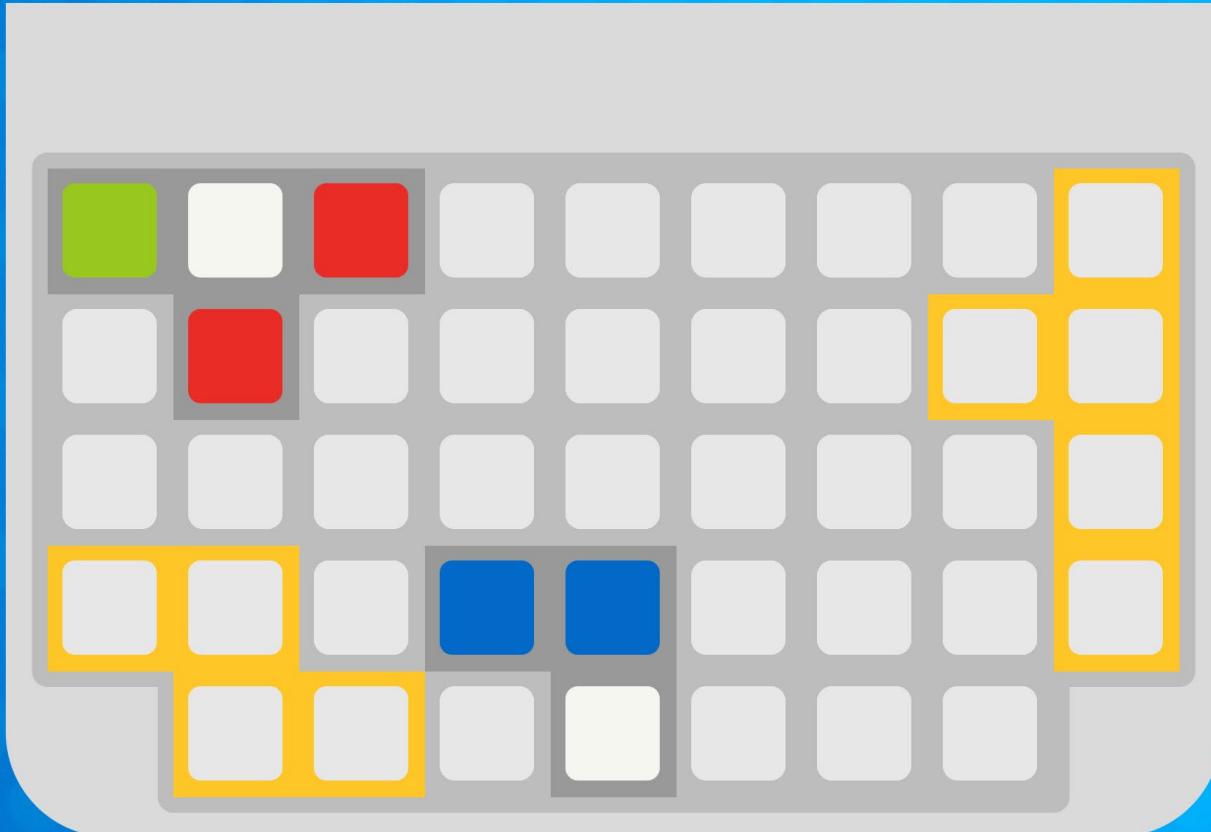
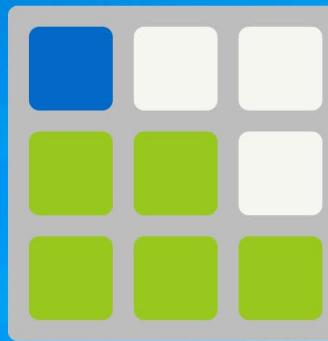


Close Lid

Finish Game

Rotate

??

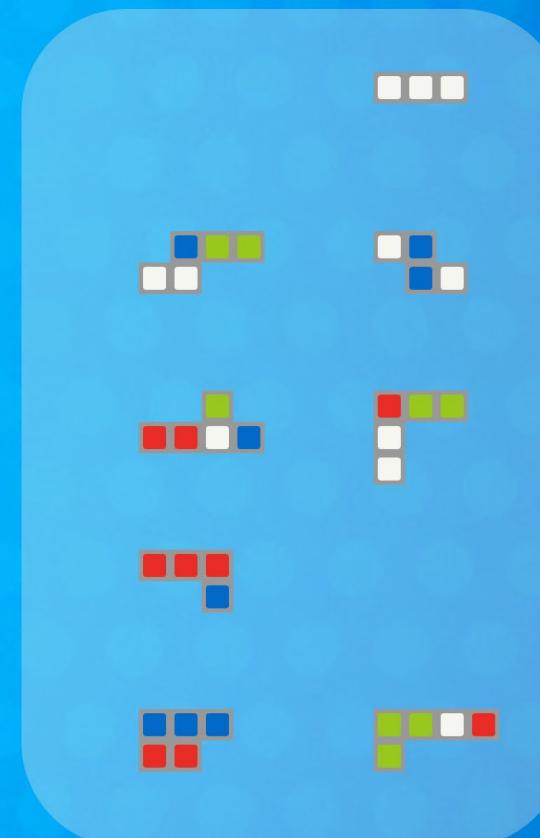


Select Difficulty Level

Easy ▾

Start New Game

Hint

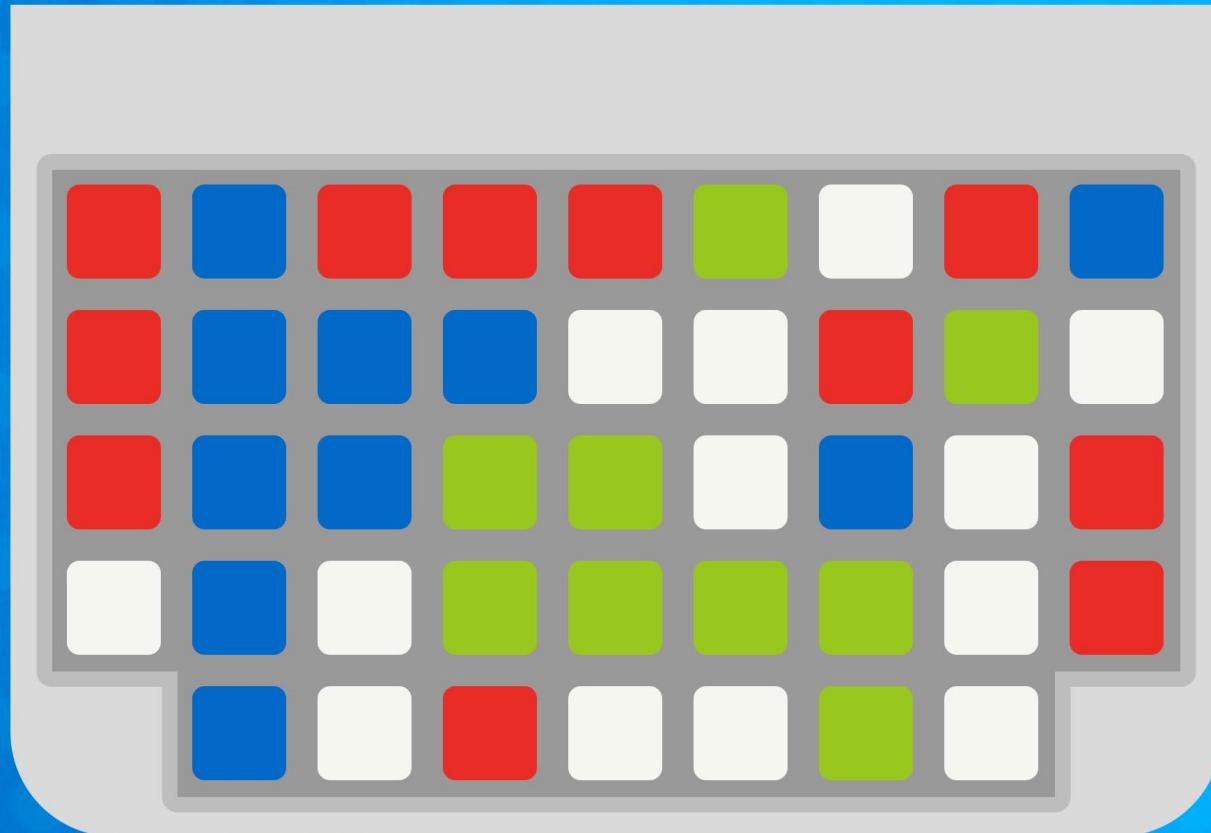
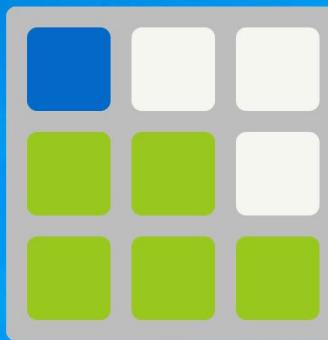


Close Lid

Finish Game

Rotate

??



Select Difficulty Level

Easy ▾

Start New Game

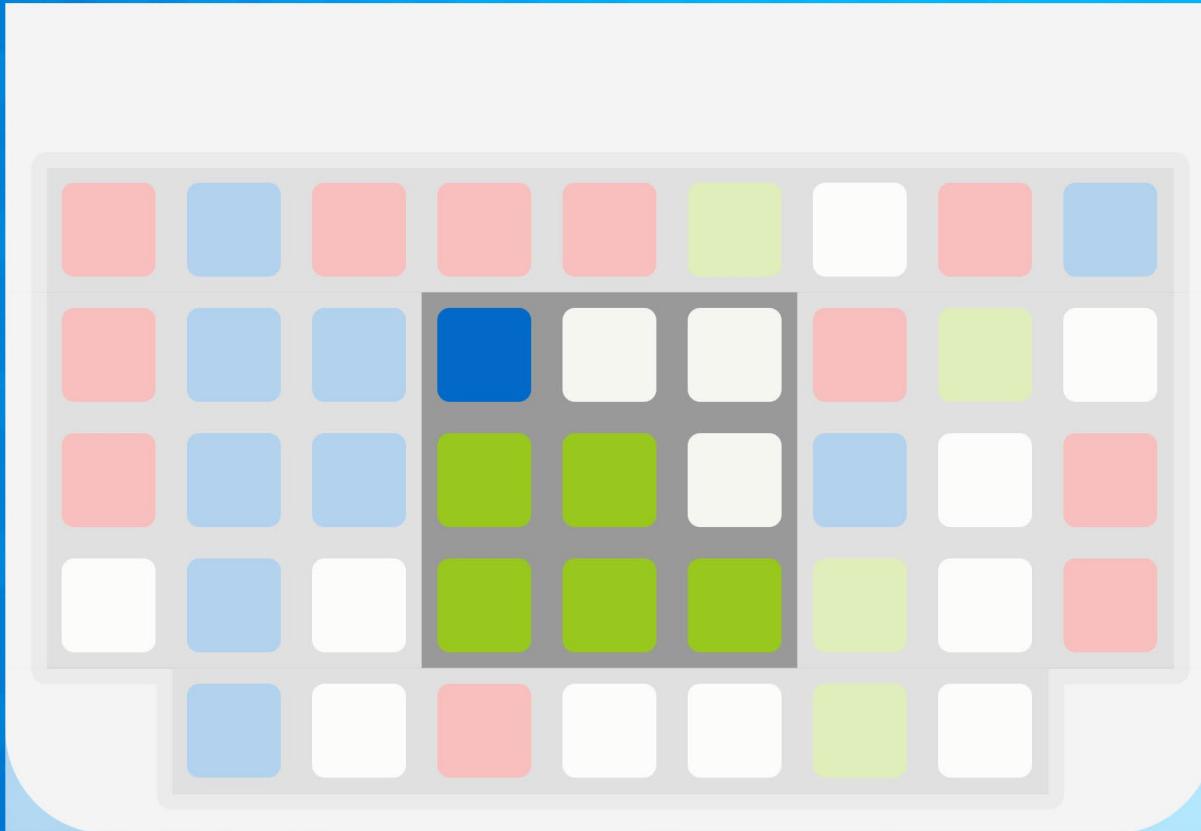
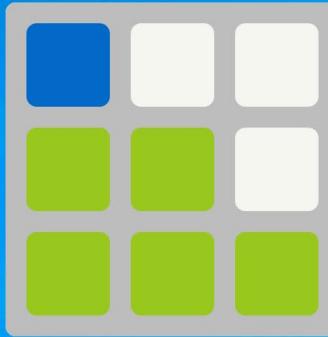
Hint

Close Lid

Finish Game

Rotate

??



Select Difficulty Level

Easy ▾

Start New Game

Hint

Open Lid

Finish Game

Rotate

??

Select Difficulty Level

Easy

Start New Game

Hint

WIN!



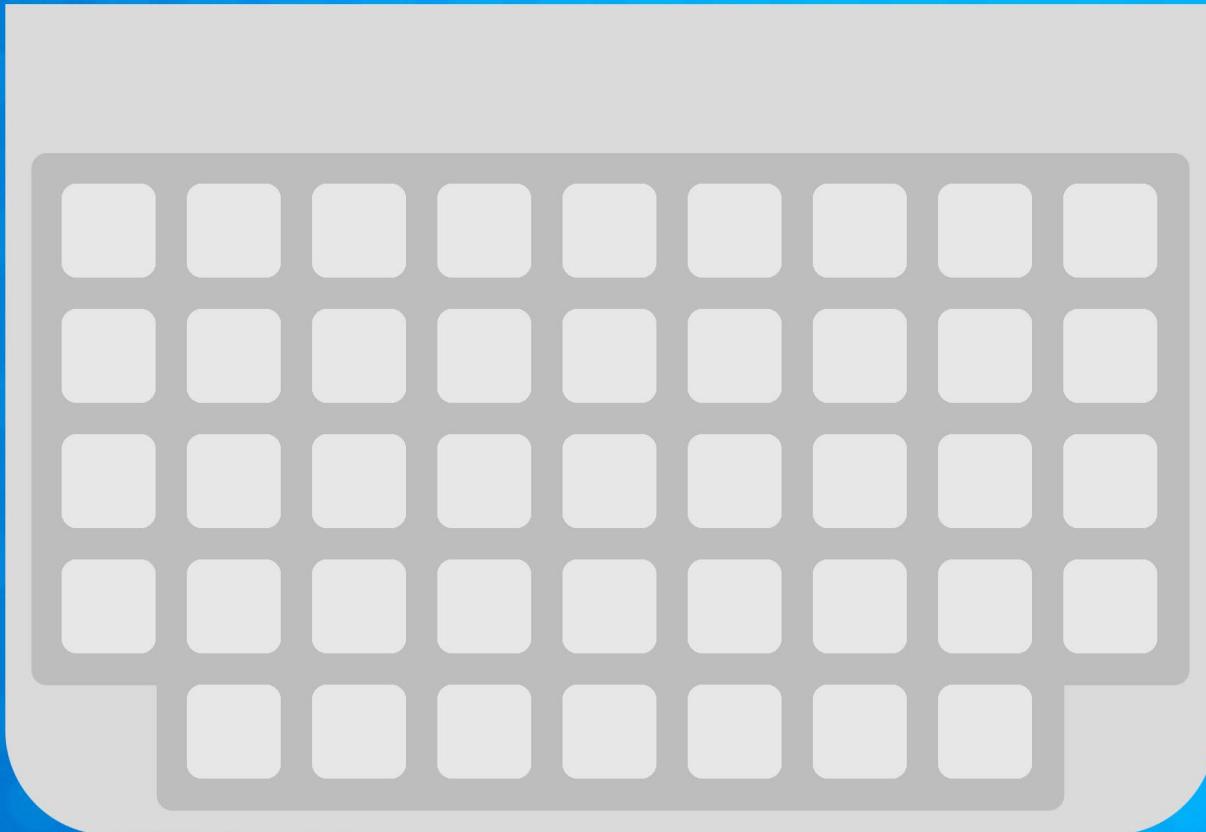
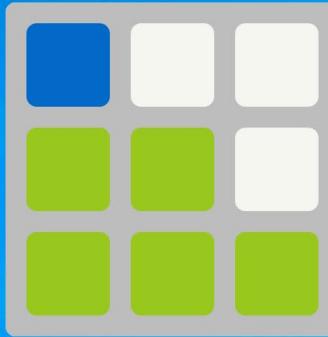
Play More

Close Lid

Finish Game

Rotate

??

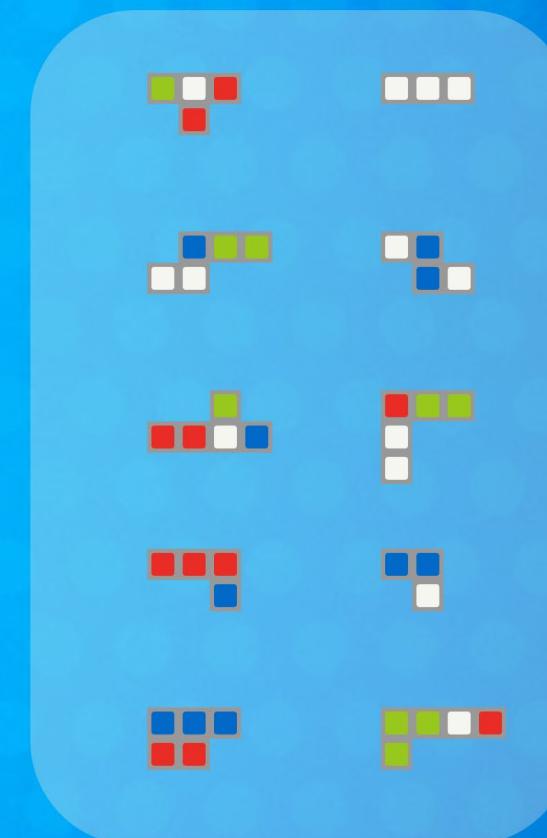


Select Difficulty Level

Easy ▾

Start New Game

Hint



Close Lid

Finish Game

Rotate

Manual

1. Select a level challenge in the selector box and click 'Start New Game' button.

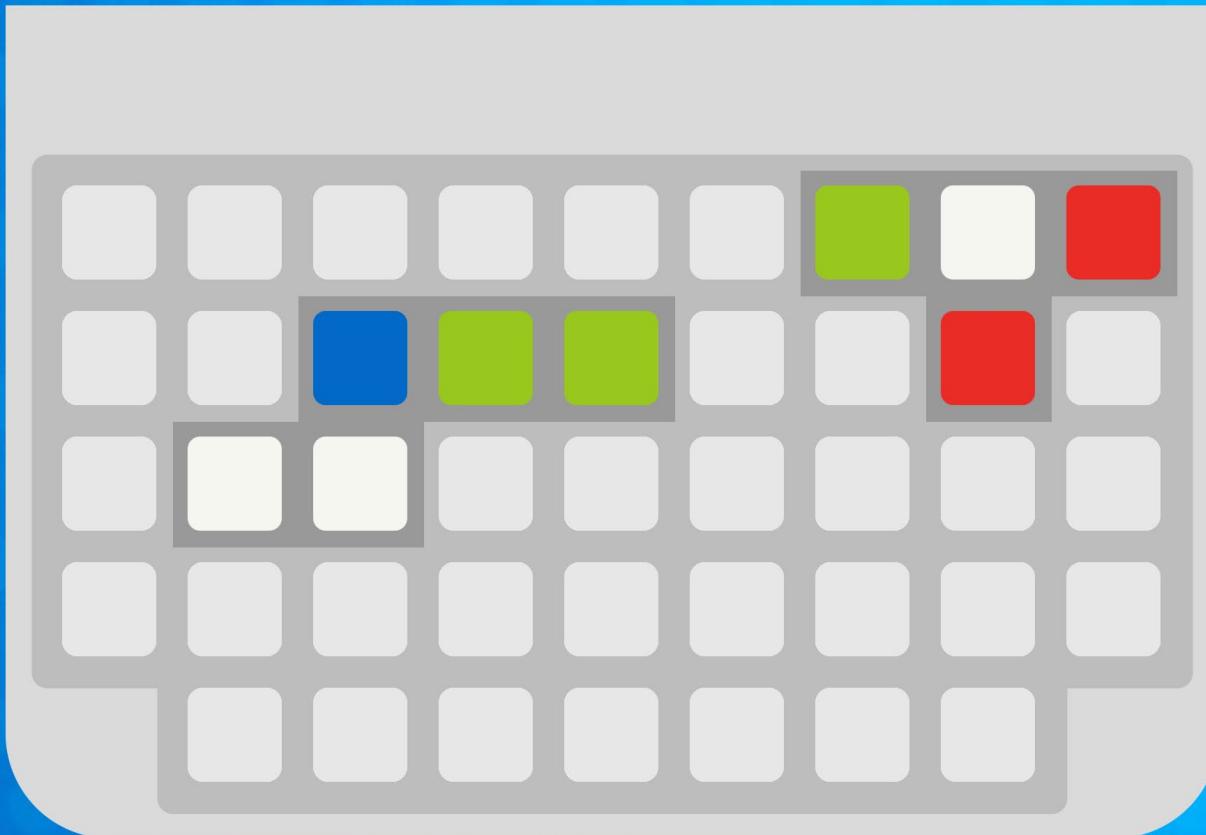
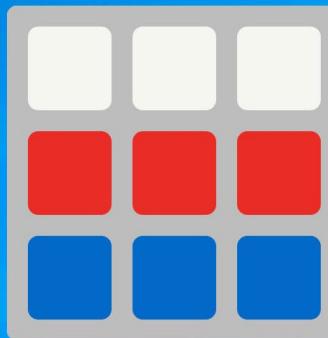
2. The object of the game is to fit all the pieces on the game board so that the colors of the 9 central squares match what is shown in the challenge.

You are free to press 'Hint' button or hold '/' on keyboard to get what's the next pieces going to be placed.

3. When all puzzle pieces fit on the game board, close the lid to check if the color placements in the central 3x3 area match the challenge.

Now, you can press 'Finish Game' to check whether you succeed.

??

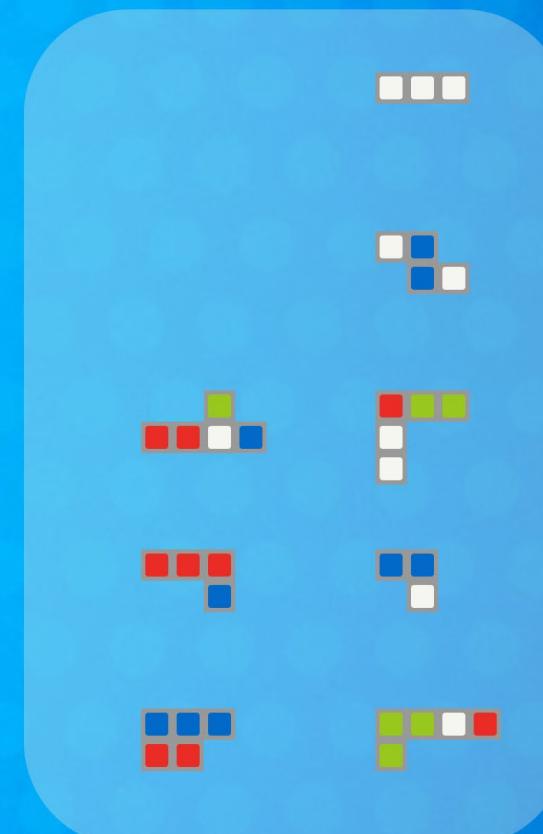


Select Difficulty Level

Medium ▾

Start New Game

Hint



Close Lid

Finish Game

Rotate

How it works?

file.csv
wwwwww
:
~6000

to store



Map 1
www
~6000

to hint

Map 2
1
2 - 6
7 - 11
> 12

to play

Levels:

Map 2	
1	
2 - 5	
6 - 9	
> 9	

Random

Very Hard

Random

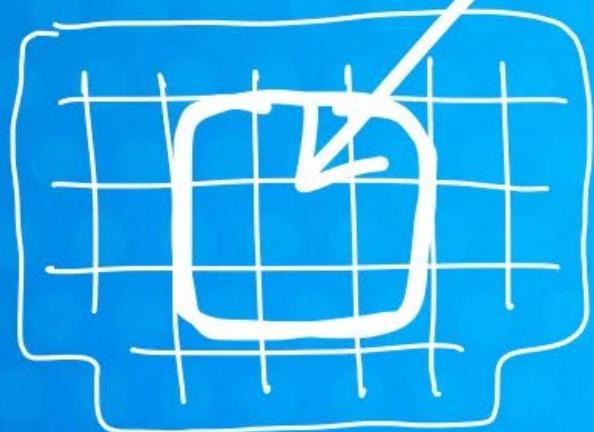
Hard

Random

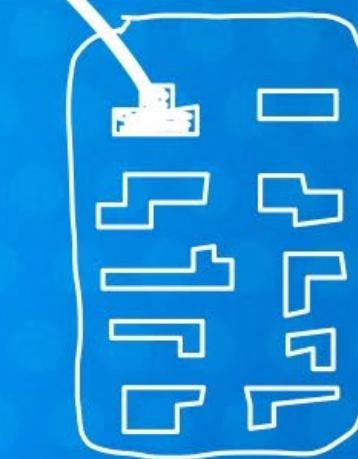
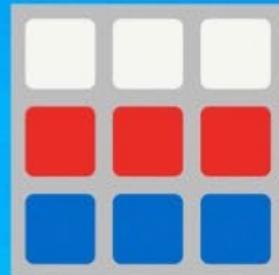
Medium

Random

Easy

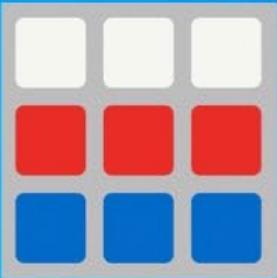
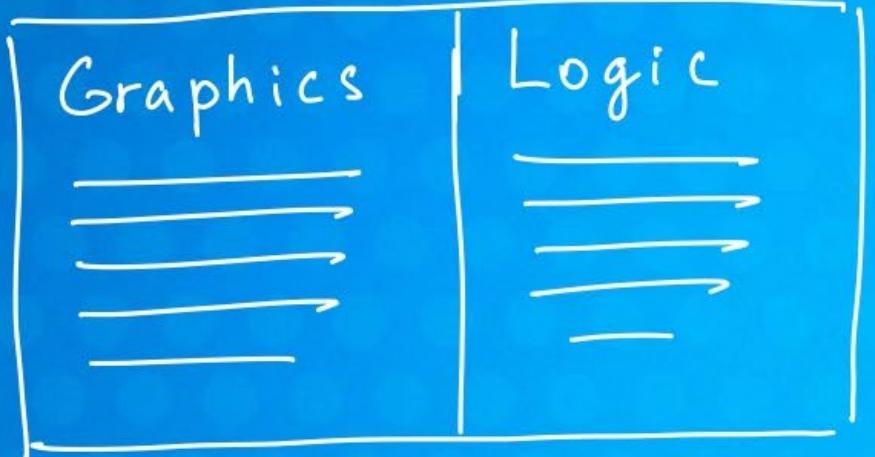


Play field

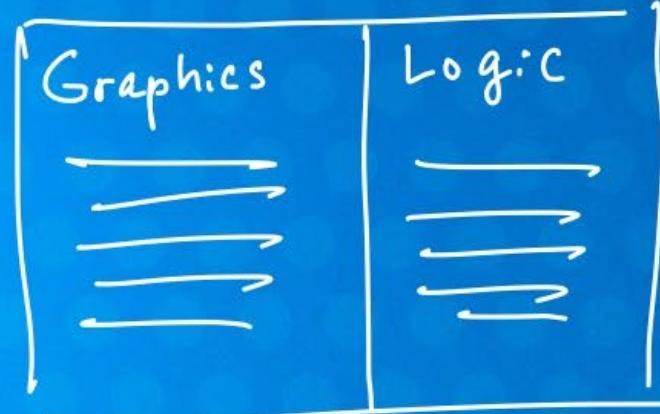


Tile shop

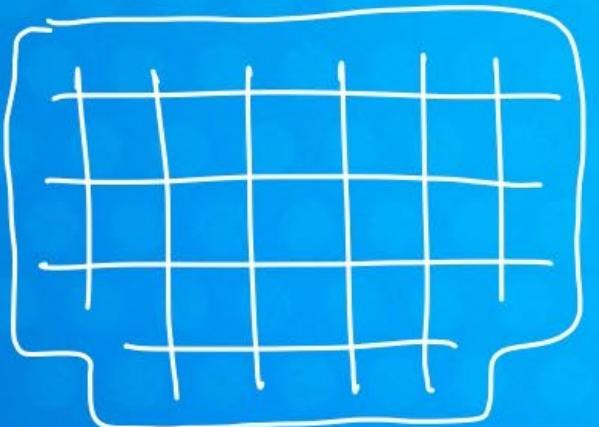
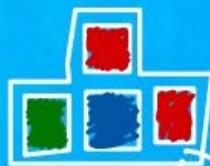
Play field



Tile shop



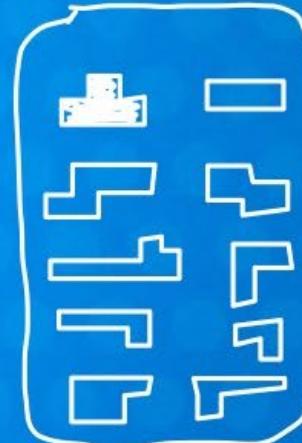
Registration



play field



Tile obj

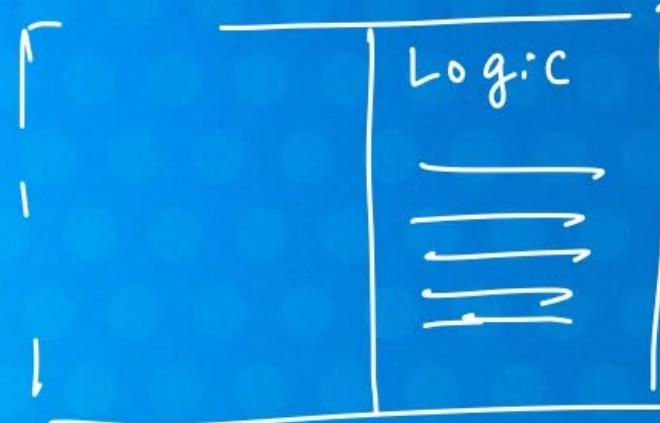


tile shop

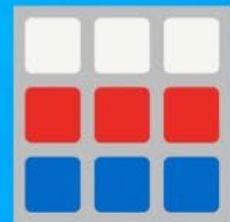
Play field



Tile Shop



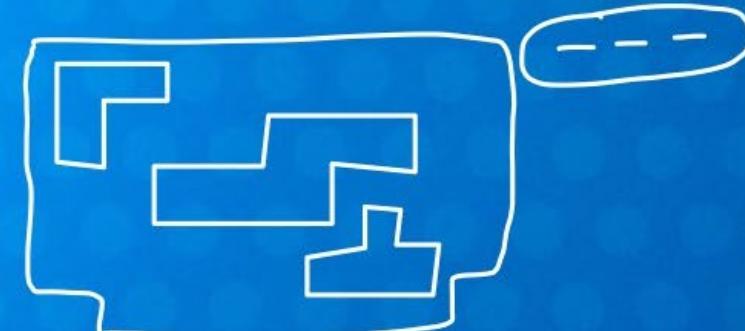
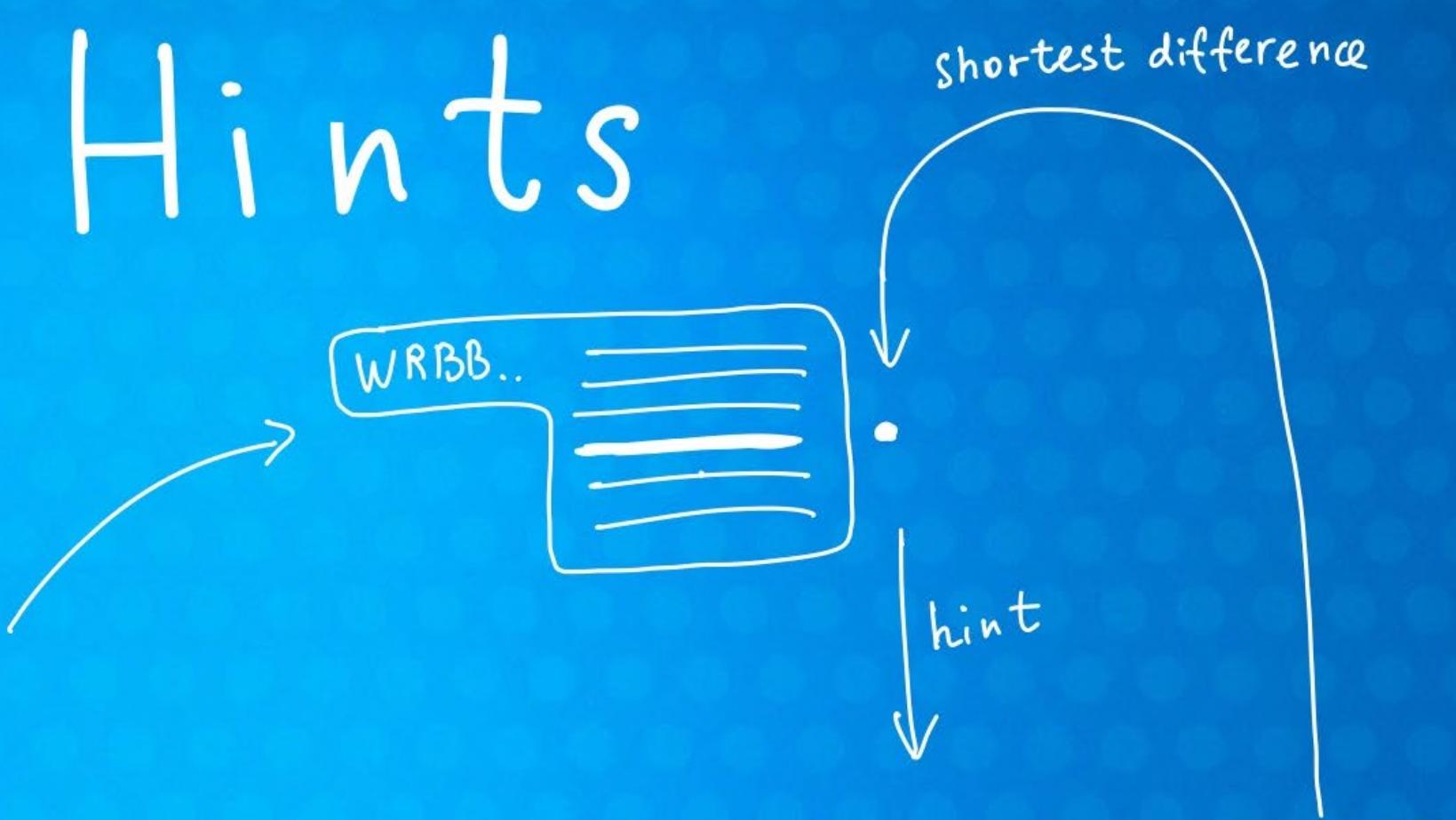
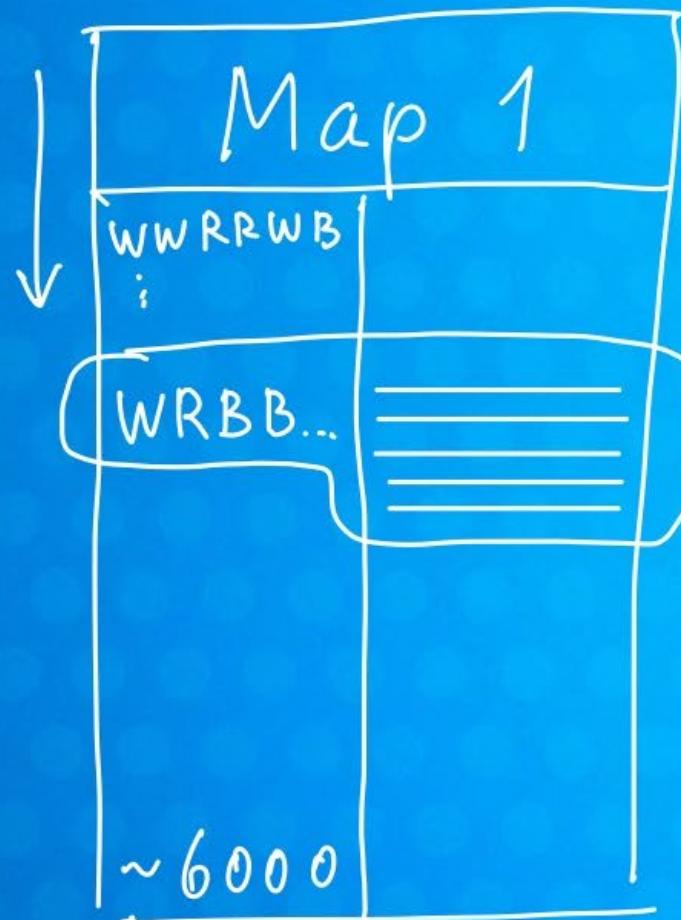
Agree



W I N

Play More

Hints



Interesting Problems

- how many solvable challenges?
- what is their distribution?
- maximum number of solutions?

4006

Histogram



256417 challenges have 0 solutions

4006 challenges have 1 solutions

1180 challenges have 2 solutions

250 challenges have 3 solutions

145 challenges have 4 solutions

65 challenges have 5 solutions

40 challenges have 6 solutions

10 challenges have 7 solutions

17 challenges have 8 solutions

3 challenges have 9 solutions

5 challenges have 10 solutions

1 challenges have 11 solutions

3 challenges have 12 solutions

0 challenges have 13 solutions

1 challenges have 14 solutions

0 challenges have 15 solutions

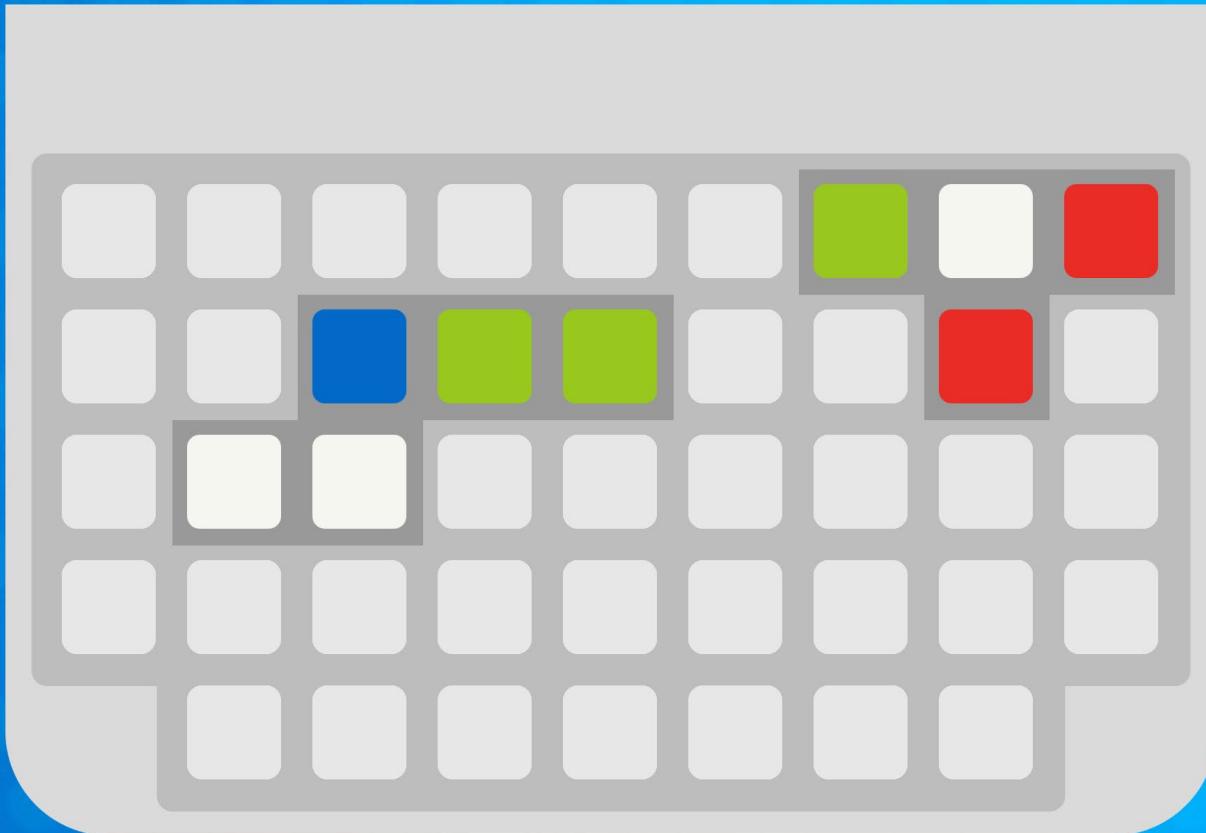
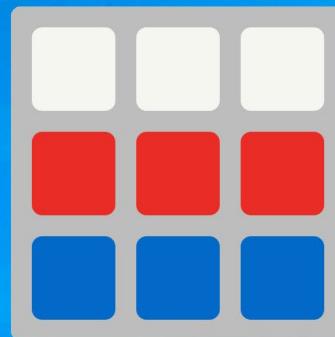
0 challenges have 16 solutions

0 challenges have 17 solutions

0 challenges have 18 solutions

1 challenges have 19 solutions

??

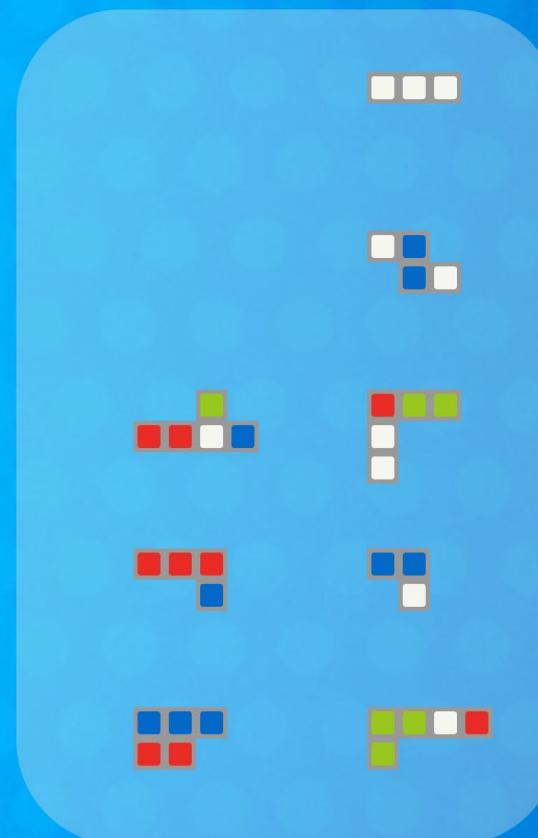


Select Difficulty Level

Medium ▾

Start New Game

Hint



Close Lid

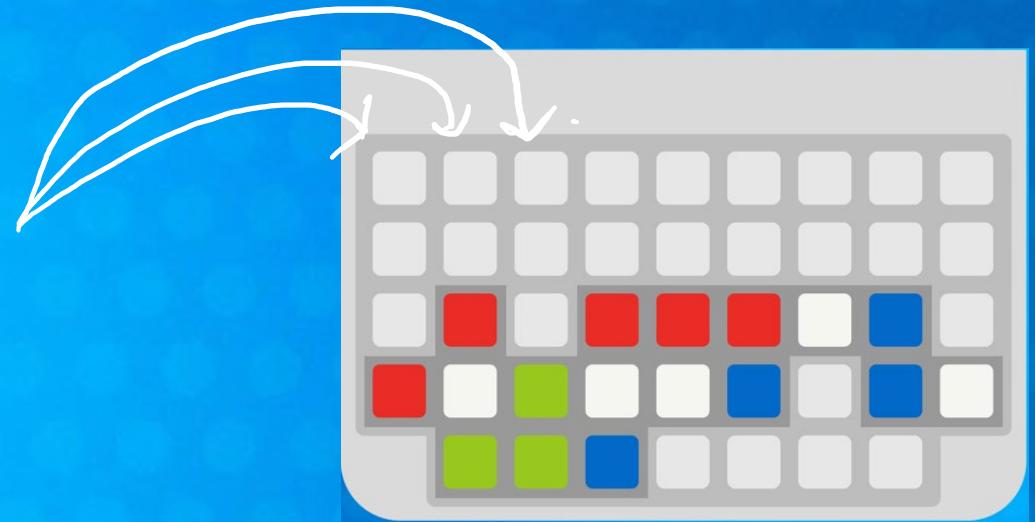
Finish Game

Rotate

Optimization

Before optimization:

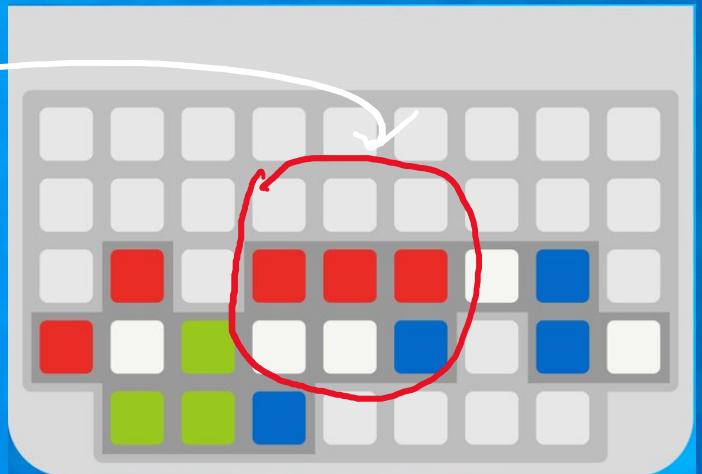
Find solutions one-by-one



After optimization:

From challenge to find.

Save at least half time



To find all. Solutions

Combinations of challenge : $4^9 = 262,144 !!!$



Use three computers to run them



Save at least. $\geq \frac{1}{3}$ time.

Questions ?

Thank you

谢谢 谢谢



