

Programming Assignment #1

Puzzle with a Missing Piece

Due: 10/23 23:59

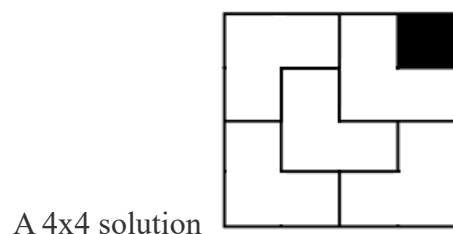
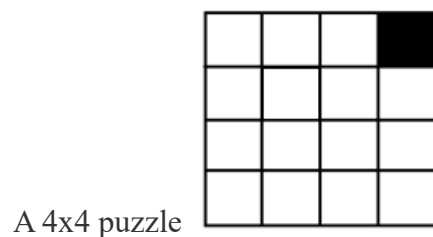
Problem Description

Your mom finds a strange puzzle in your bedroom. The puzzle is a $W \times W$ square.

The player should fill the space with L-shape pieces, except for a cell at specified position.

A friend of you says that he can solve the puzzle as long as W is a power of 2.

As an Asian parent, your mom has always wanted you to be the smartest kid in the world. Prove yourself able to solve the puzzle as your friend can or you will have no dinner tonight.



I/O Format

Use standard I/O. (stdin, stdout)

Input

The first line contains one integer T ($1 \leq T \leq 10$), representing the number of test cases T . Then T test cases follow.

For each test case there are 3 positive integers k, X, Y written in one line.

$W = 2^k$ is the width of the puzzle. (X, Y) gives the location of the empty cell.

$0 \leq X, Y < W$

$1 \leq k \leq 10$

Output

For each test case, output the solved puzzle.

The empty cell is -1.

Each L-shape piece should have a unique id i . i should start from 1, 2, 3... and go on.

Time Limit: 1000ms

An empty line is needed between the output of two test cases.

There may be more than one answer to each test case. All answers are acceptable as long as they live up to the requirements.

Examples

Input 1

1

1 0 0

Output 1

-1 1

1 1

Input 2

1

2 2 1

output 2

1 1 2 2

1 3 -1 2

4 3 3 5

4 4 5 5

Program Submission

1. Please use C/C++ and write your program in a **single source file**.
2. Your source file must be named as “<Student_ID>_hw1.cpp” and please make sure that all characters of the filename are in **lower case**. For example, if your student id is 106062000, the name of your program file should be 106062000_hw1.cpp.
3. Your program will be compiled in a GNU/Linux environment with:
`g++ -O2 -std=c++14 <Student_ID>_hw1.cpp`
4. The source file must be uploaded directly, without compressing the file.
5. **0 points will be given to Plagiarism. NEVER SHOW YOUR CODE** to others and you must write your code by yourself. If the codes are similar to other people and you cannot explain your code properly, you will be identified as plagiarism.

Report

1. Your report must contain the **flowchart or the pseudo code** of your program. You have to describe how your approach works.
2. You have to analyze the **time complexity** of your program and prove it.
3. The report filename must be “<Student_ID>_hw1.pdf”. Please make sure that all characters of the filename are in lower case.

Grading Policy

You must submit both your source code and report. Remember the submission rules mentioned above, or you will be punished on your grade.

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| ● Test cases | 80% |
| ● Report | 20% |