Problem M. You be The Judge, Again

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	1024 mebibytes

You are a judge, again! The contest you're judging includes the following problem:

> "You have one L-shaped triomino of each of $\frac{4^n-1}{3}$ different colors. Tile a 2^n by 2^n grid using each of these triominos such that there is exactly one blank square and all other squares are covered by exactly one square of such a triomino. All triominos must be used."

Your team is to write a checker for this problem. Validation of the input values and format has already taken place. You will be given a purported tiling of a 2^n by 2^n grid, where each square in the grid is either 0 or a positive integer from 1 to $\frac{4^n-1}{3}$ representing one of the colors. Determine if it is, indeed, a covering of the grid with $\frac{4^n-1}{3}$ unique triominos and a single empty space.

L-shaped triominos look like this:



Input

The first line of input contains a single integer n ($1 \le n \le 10$), which is the n of the description.

Each of the next 2^n lines contains 2^n integers x ($0 \le x \le \frac{4^n-1}{3}$), where 0 represents an empty space, and any positive number is a unique identifier of a triomino.

Output

Output a single integer, which is 1 if the given grid is covered with $\frac{4^n-1}{3}$ unique triominos and a single empty space. Otherwise, output 0.

Examples

standard input	standard output
2 1 1 2 2 1 3 3 2 4 4 3 5 4 0 5 5	1
1 1 1 1 1	0