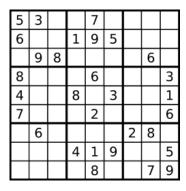
Sudoku

Sudoku is a very popular puzzle that involves numbers. It is very good for your brain and an excellent game to play while you are waiting for something (e.g. in a hospital waiting for your turn or waiting for the bus). Just make sure you don't miss the bus, though. The specifications of a Sudoku puzzle are as follows:



5	3	4	6	7	8	9	1	2
6	7	2	1	9	5	თ	4	8
1	9	8	ന	4	2	5	6	7
8	5	9	7	6	1	4	2	3
4	2	6	8	5	3	7	9	1
7	1	3	9	2	4	8	5	6
9	6	1	5	3	7	2	8	4
2	8	7	4	1	9	6	3	5
3	4	5	2	8	6	1	7	9

- 1. You have a grid of size $N^2 \times N^2$ and you have to fill it using the numbers 1 ... N^2 .
- 2. Each row must contain all numbers between 1 to N^2 (both inclusive) with each number appearing exactly once.
- 3. Each column must contain all numbers between 1 to N^2 (both inclusive) with each number appearing exactly once.
- 4. There are N^2 non-overlapping N x N submatrices (defined by the bolded black lines in the diagram). Each of them must contain all numbers between 1 to N^2 (both inclusive) with each number appearing exactly once.
- 5. The left diagram represents an empty Sudoku puzzle, while a valid solution to the given puzzle is given on the right diagram, given N = 3.

You are to write an automated checker to check whether the given input is a valid solution to the Sudoku puzzle. Good luck!

Input

The input consists of a single number \mathbf{N} (2 <= N <= 14). \mathbf{N}^2 rows follow. Each row represents the ith row of the Sudoku puzzle. In each row, there are \mathbf{N}^2 distinct numbers from 1 to \mathbf{N}^2 (inclusive), each occupying a cell in the Sudoku puzzle. There is a single space separating each number.

Output

If the given input is a valid solution to the Sudoku puzzle, print "VALID". Otherwise, print "INVALID".

Sample Input 1	Sample Output 1
3	VALID
534678912	
672195348	
198342567	
859761423	
426853791	
713924856	
961537284	
287419635	
345286179	

Sample Input 2	Sample Output 2
3	INVALID
792135468	
546879213	
381624957	
135468792	
879213546	
624957381	
468792135	
213546879	
957381625	

Explanation

Sample input 1 is illustrated in the Sudoku puzzle example. It is clear that sample input 1 provides a valid solution as illustrated in the example, whereas sample input 2 is not a valid solution. If you look at the last column of sample input 2, there are two 5s in that column (row 7 and 9). It already violates one of the requirements of a valid Sudoku solution. Therefore, it is not a valid solution.

Note

This is a special practice as an extension to CS1020 Soap Opera episode 8 entitled "Sudoku Verifier". Treat it as a good practice for you in addition to the take-home labs. This is not part of the take-home labs and all discussions on this problem are welcome on the Soap Opera forum under Episode 8: Sudoku Verifier. If you are up for a little bit of challenge, do attempt this challenging exercise. The test-cases have been mounted on CodeCrunch and you can upload your code to CodeCrunch to check whether it passes all test-cases. Have fun!