Kick Start 2013 - Round B

Sudoku Checker

Problem

Sudoku is a popular single player game. The objective is to fill a 9x9 matrix with digits so that each column, each row, and all 9 non-overlapping 3x3 sub-matrices contain all of the digits from 1 through 9. Each 9x9 matrix is partially completed at the start of game play and typically has a unique solution.

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

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

Given a completed $\mathbf{N^2}$x$\mathbf{N^2}$ Sudoku matrix, your task is to determine whether it is a *valid* solution. A *valid* solution must satisfy the following criteria:

- Each row contains each number from **1** to $\mathbf{N^2}$, once each.
- Each column contains each number from **1** to $\mathbf{N^2}$, once each.
- Divide the $\mathbf{N^2}$x$\mathbf{N^2}$ matrix into $\mathbf{N^2}$ non-overlapping **N**x**N** sub-matrices. Each sub-matrix contains each number from **1** to $\mathbf{N^2}$, once each.

You don't need to worry about the uniqueness of the problem. Just check if the given matrix is a valid solution.

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. Each test case starts with an integer **N**. The next $\mathbf{N^2}$ lines describe a completed Sudoku solution, with each line contains exactly $\mathbf{N^2}$ integers. All input integers are positive and less than 1000.

Output

For each test case, output one line containing "Case #x: y", where x is the case number (starting from 1) and y is "Yes" (quotes for clarity only) if it is a valid solution, or "No" (quotes for clarity only) if it is invalid. Note that the judge is case-sensitive, so answers of "yes" and "no" will not be accepted.

Limits

Time limit: 30 seconds per test set.
Memory limit: 1GB.

$1 \leq \mathbf{T} \leq 100$.

Test set 1 - Visible

N = 3.

Test set 2 - Hidden

$3 \leq \mathbf{N} \leq 6$.

Sample

Sample Input

```
3
3
5 3 4 6 7 8 9 1 2
6 7 2 1 9 5 3 4 8
1 9 8 3 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
3
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
1 2 3 4 5 6 7 8 9
3
5 3 4 6 7 8 9 1 2
6 7 2 1 9 5 3 4 8
```

Sample Output

```
Case #1: Yes
Case #2: No
Case #3: No
```

```
1 9 8 3 4 2 5 6 7
8 5 9 7 6 1 4 2 3
4 2 6 8 999 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
```