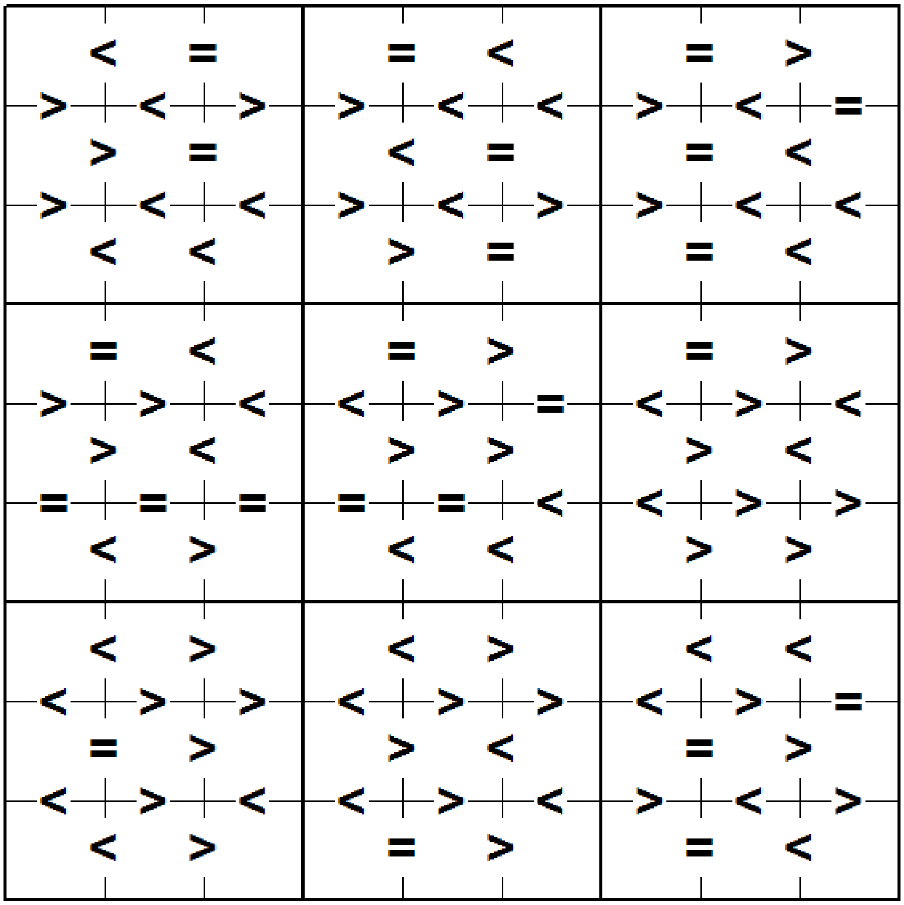
I • Sumdoku

Sumdoku is a variant of the game *Sudoku*. As in *Sudoku*, the aim is to fill in a 9-by-9 grid with the digits 1 through 9 so that each digit 1 through 9 occurs exactly once in each row, exactly once in each column and exactly once in each of the 9 3-by-3 sub-squares subject to constraints on the choices. In Sudoku, the constraints are that certain squares must contain fixed values. In *Sumdoku*, the constraints are on the sum of adjacent squares within each 3-by-3 sub-square. In the illustration below, the symbols **<. =** and **>** indicate that the sum of the values on either side (or above and below) the symbol must have sum less than **10**, equal to **10** or greater than **10**, respectively.



Write a program to solve *Sumdoku* problems.

Input

The first line of input contains a single decimal integer ***P*, (1 ≤ *P* ≤ 10000**), which is the number of data sets that follow. Each data set should be processed identically and independently.

Each data set consists of a 16 lines of input. The first line contains the data set number, ***K***. The following 15 lines consist of the characters **<**, **=** or **>**. Rows 1, 3, 5, 6, 8, 10, 11, 13 and 15 contain 6 characters corresponding to constraints on the sum of values to the left and right of the symbol. Rows 2, 4, 7, 9, 12 and 14 contain 9 characters corresponding to constraints on the sum of values above and below the symbol. **Note:** Solutions of some problems may not be unique. The judging program will just check whether your solution satisfies the constraints of the problem (row, column, 3-by-3 box and inequality constraints.

Output

For each data set there are 10 lines of output. The first output line consists of the data set number, ***K***. The following 9 lines of output consist of 9 decimal digits separated by a single space. The value in the j^{th} position in the i^{th} line of the 9 output lines is the solution value in column j of row i.

Sample Input

```
1
1
<==<=>
><>><<><=
>=<==<
><<><>><<
<<>==<
=<=>=>
>><<>=<><
><>>><
=====<<>>
<><<>>
<><><<
<>><>><>=
=>><=>
<><<><><>
<>=>=<
```

Sample Output

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