
More Sudokus

P79494_en

Write a program to find all the possible solutions of a Sudoku.

Input

Input begins with a number n , followed by n Sudokus. Every Sudoku consists of 81 numbers between zero and nine, plus the characters shown in the examples. A zero indicates an unknown value. Except for zeros, there are no repeated numbers in any row, nor in any column, nor in any of the nine 3×3 squares.

Output

For every Sudoku, print all the possible solutions in lexicographical order, each one followed by an empty line. Print "no solution" if there is no solution. Print a line with 30 asterisks after the output for every Sudoku.

Observation

The data tests are chosen so that a backtracking program that simply fills the rows from top to bottom and from left to right will be fast enough.

Sample input

```
3

0 8 0 | 0 5 9 | 0 0 0
7 0 3 | 0 0 0 | 0 0 0
6 4 9 | 7 0 0 | 0 0 0
-----+-----+-----
0 6 4 | 0 0 3 | 0 0 5
0 0 7 | 0 0 0 | 6 0 0
8 0 0 | 6 0 0 | 0 4 0
-----+-----+-----
0 0 0 | 0 0 7 | 3 2 8
0 0 0 | 0 0 0 | 1 0 7
0 0 0 | 8 9 0 | 0 0 0

1 2 3 | 4 5 6 | 7 8 9
4 5 6 | 0 0 0 | 0 0 0
7 8 9 | 0 0 0 | 0 6 0
-----+-----+-----
2 0 0 | 1 0 0 | 0 0 0
5 0 0 | 0 2 0 | 8 0 0
8 0 1 | 5 0 3 | 9 0 0
-----+-----+-----
3 0 0 | 0 6 0 | 1 9 8
6 0 0 | 0 0 0 | 0 2 7
9 7 5 | 8 0 0 | 0 0 3

1 2 3 | 4 5 6 | 7 8 9
9 8 7 | 3 2 1 | 6 5 4
4 5 6 | 7 8 9 | 1 2 3
-----+-----+-----
3 9 2 | 8 4 5 | 0 0 0
0 0 0 | 0 0 0 | 0 0 0
0 0 0 | 0 0 0 | 0 0 0
-----+-----+-----
0 0 0 | 0 0 0 | 0 0 0
0 0 0 | 0 0 0 | 0 0 0
0 0 0 | 0 0 0 | 0 0 0
```

Sample output

```
1 8 2 | 3 5 9 | 4 7 6
7 5 3 | 2 6 4 | 9 8 1
6 4 9 | 7 1 8 | 2 5 3
-----+-----+-----
2 6 4 | 9 7 3 | 8 1 5
9 1 7 | 4 8 5 | 6 3 2
8 3 5 | 6 2 1 | 7 4 9
-----+-----+-----
5 9 6 | 1 4 7 | 3 2 8
4 2 8 | 5 3 6 | 1 9 7
3 7 1 | 8 9 2 | 5 6 4

*****
1 2 3 | 4 5 6 | 7 8 9
4 5 6 | 9 7 8 | 2 3 1
7 8 9 | 2 3 1 | 4 6 5
-----+-----+-----
2 9 4 | 1 8 7 | 3 5 6
5 3 7 | 6 2 9 | 8 1 4
8 6 1 | 5 4 3 | 9 7 2
-----+-----+-----
3 4 2 | 7 6 5 | 1 9 8
6 1 8 | 3 9 4 | 5 2 7
9 7 5 | 8 1 2 | 6 4 3

1 2 3 | 4 5 6 | 7 8 9
4 5 6 | 9 8 7 | 2 3 1
7 8 9 | 2 3 1 | 4 6 5
-----+-----+-----
2 9 4 | 1 7 8 | 3 5 6
5 3 7 | 6 2 9 | 8 1 4
8 6 1 | 5 4 3 | 9 7 2
-----+-----+-----
3 4 2 | 7 6 5 | 1 9 8
6 1 8 | 3 9 4 | 5 2 7
9 7 5 | 8 1 2 | 6 4 3

*****
no solution
*****
```

Problem information

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