Project Euler #96: Su Doku

Problem Statement

This problem is a programming version of Problem 96 from projecteuler.net

Su Doku (Japanese meaning *number place*) is the name given to a popular puzzle concept. Its origin is unclear, but credit must be attributed to Leonhard Euler who invented a similar, and much more difficult, puzzle idea called Latin Squares. The objective of Su Doku puzzles, however, is to replace the blanks (or zeros) in a 9 by 9 grid in such that each row, column, and 3 by 3 box contains each of the digits 1 to 9. Below is an example of a typical starting puzzle grid and its solution grid.

0	0	3	0	2	0	6	0	0
9	0	0	3	0	5	0	0	1
0	0	1	8	0	6	4	0	0
0	0	8	1	0	2	9	0	0
7	0	0	0	0	0	0	0	8
0	0	6	7	0	8	2	0	0
0	0	2	6	0	9	5	0	0
8	0	0	2	0	3	0	0	9
0	0	5	0	1	0	3	0	0

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

A well constructed Su Doku puzzle has a unique solution and can be solved by logic, although it may be necessary to employ "guess and test" methods in order to eliminate options (there is much contested opinion over this). The complexity of the search determines the difficulty of the puzzle; the example above is considered *easy* because it can be solved by straight forward direct deduction.

You are given a number of Su Doku. All of them could be solved without guessing and even backtracking. Surely, you may write every solution that passes tests and fits into contraints.

Input Format

9 lines each contaning 9 characters '0'-'9'. '0' means that the place is empty otherwise the place contains corresponding digit.

Output Format

Output the result in the same format as input with no zeroes left.

Sample Input

```
123456780
456780123
780123456
234567801
567801234
801234567
345678012
678012345
012345678
```

Sample Output

```
123456789
456789123
789123456
234567891
567891234
891234567
345678912
678912345
912345678
```

Explanation

We can see that 9 is the only digit yet to be placed. All other digits are already on their places.