7X7

Problem Description

CODU is solving a 7x7 sudoku. Help him in solving the unique Sudoku.

Rules are as follows

1. There are 7 regions coloured differently. Each region must have a single occurrence of numbers between range [1, 7].

2. Regions don't have a fix shape and it can change from input to input.

3. Each row must have a single occurrence of numbers between range [1, 7] across all input.

4. Each column must have a single occurrence of numbers between range [1, 7] across all input.

Some numbers in some rows, columns and regions will be given. These will be between [1, 7].

Zero (0) denotes that the number is covered. Uncovering it will give a number between [1, 7].

Your task is to fill the numbers [1,7] where there is a 0 such that the 7x7 Sudoku is solved.

7x7 Sudoku is said to be solved when every region, every column, every row has exactly one occurrence of numbers [1,7].

Constraints

7 < Known/Given numbers in Entire Sudoku < 14

Input

Input consists of 14 lines.

First 7 lines denote the positions of numbers [1,7] in respective row and column.

Next 7 lines denote the shape of the regions inside the Sudoku. These will be denoted by 7 unique characters between alphabets [a-z].

Output

Print the solved Sudoku.

7 lines, each line containing 7 space separated integers honoring all the conditions.

Time Limit

1

Examples

Example 1

Input

0 0 0 0 0 6 0

0 0 0 0 0 0 0

2 6 5 1 7 4 3

0 0 0 3 0 0 0

0 0 0 0 0 0 0

0 0 0 0 0 0 0

0 0 0 0 0 0 0

a a a b b b b

a a a a b b c

d d d e e b c

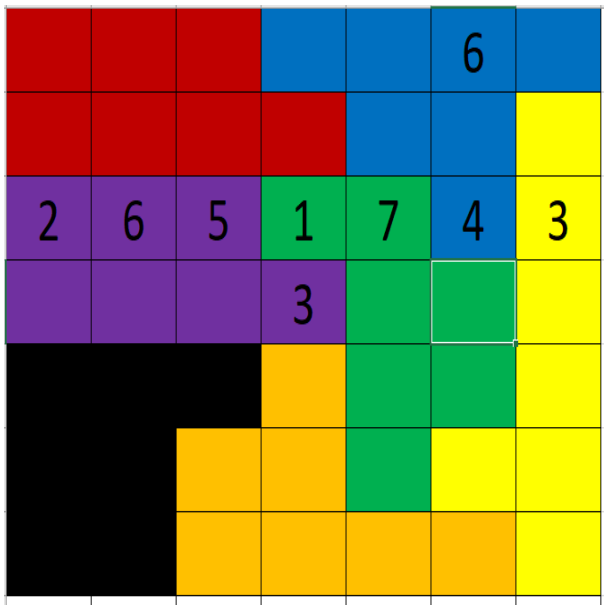
d d d d e e c

f f f h e e c

f f h h e c c

f f h h h h c

The above input can be visualized as follows-



Output

1 2 4 5 3 6 7

3 5 6 7 1 2 4

2 6 5 1 7 4 3

4 7 1 3 2 5 6

7 1 2 6 4 3 5

5 4 3 2 6 7 1

6 3 7 4 5 1 2

Explanation

There could be many different solutions. Producing any solution as output is acceptable.

Example 2

Input

0 0 0 0 0 0 0

0 0 0 0 4 0 0

3 0 0 6 0 0 0

0 0 0 0 6 0 1

5 0 0 0 0 0 3

0 0 1 0 0 0 2

2 0 0 0 0 0 5

r r r b b b b

g r r r r b o

g g g g b b o

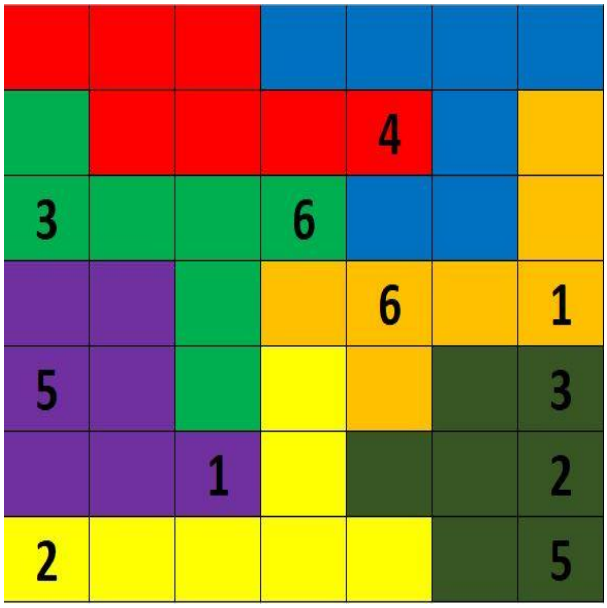
p p g o o o o

p p g d o l l

p p p d l l l

d d d d d l l

The above input can be visualized as follows-



Note that the shape of the regions in both the inputs are different.

Output

7 1 3 4 5 2 6

1 6 5 2 4 3 7

3 5 2 6 1 7 4

4 2 7 3 6 5 1

5 7 4 1 2 6 3

6 3 1 5 7 4 2

2 4 6 7 3 1 5

Explanation

There could be many different solutions. Producing any solution as output is acceptable.