

# Grid Coloring

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            1 second  
Memory limit:         512 megabytes

There is a grid with 2 rows and  $n$  columns, where the rows are numbered from 1 to 2 from top to bottom, and the columns are numbered from 1 to  $n$  from left to right. There are  $2n$  colors numbered from 1 to  $2n$ . Some cells in the grid have already been colored, and you need to color the remaining cells (cells that have already been colored cannot be recolored) in such a way that the number of four-connected components of the same color is minimized. Please construct a coloring scheme.

Four-connected means that if two cells of the same color share a common edge, then these two cells are considered connected.

## Input

The first line contains an integer  $n$  ( $1 \leq n \leq 10^5$ ).

The second line contains  $n$  integers  $a_{1,1}, a_{1,2}, \dots, a_{1,n}$  ( $0 \leq a_{1,i} \leq 2n$ ), representing the coloring of the first row of the grid.

The third line contains  $n$  integers  $a_{2,1}, a_{2,2}, \dots, a_{2,n}$  ( $0 \leq a_{2,i} \leq 2n$ ), representing the coloring of the second row of the grid.

If  $a_{i,j} = 0$ , it means that the cell in the  $i$ -th row and  $j$ -th column is not colored, otherwise it represents the color of the cell in the  $i$ -th row and  $j$ -th column as  $a_{i,j}$ . It is guaranteed that at least one cell is initially colored ( $a_{i,j} \neq 0$ ).

## Output

Output two lines, each containing  $n$  positive integers  $b_{i,j}$  ( $1 \leq b_{i,j} \leq 2n$ ), representing a coloring scheme. The output should ensure that cells that have already been colored cannot be recolored, i.e., for cells where  $a_{i,j} \neq 0$ , the output should ensure that  $b_{i,j} = a_{i,j}$ .

If there are multiple valid coloring schemes, output any one of them.

## Examples

| standard input                  | standard output            |
|---------------------------------|----------------------------|
| 5<br>1 0 1 0 2<br>3 3 2 0 4     | 1 1 1 2 2<br>3 3 2 2 4     |
| 6<br>1 0 4 0 2 3<br>4 0 1 2 0 3 | 1 4 4 2 2 3<br>4 4 1 2 3 3 |
| 6<br>1 0 2 0 0 0<br>3 0 0 0 4 1 | 1 1 2 1 1 1<br>3 1 1 1 4 1 |