

The Jeweller's Game (gemgame)

John is playing the new hit mobile game: “The Jeweller’s Game”.

In this game, there is an $N \times N$ board full of different kinds of gems. Let’s denote by (r, c) the cell located at the r -th row and c -th column of the board. Each cell of the board contains a gem. The type of the gem in cell (r, c) is represented by a positive integer $G_{r,c}$.

We group the cells according to the following rule. Cells a and b are in the same group if and only if there exists a sequence of cells p_0, \dots, p_k such that:

- $p_0 = a$ and $p_k = b$, and
- cells p_{i-1} and p_i are edge-adjacent and are of the same type for each $i = 1, \dots, k$.

Note that every cell belongs to exactly one group.

The player can improve their score by swapping edge-adjacent cells of the board. Depending on whether the two swapped cells are in the same row or in the same column, we call a swap either horizontal or vertical, respectively. If the two swapped gems are of the same type, then the score of the swap is 0. Otherwise, consider the board **after** performing the swap: the score is the product of the *values* of the two swapped cells. The *value* of a cell is the number of cells in its group (including itself).



Figure 1: There were many similar games in the past.

Find the score of all horizontal and vertical swaps on the board!

👉 Among the attachments of this task you may find a template file `gemgame.*` with a sample incomplete implementation.

Input

The input file consists of:

- a line containing integer N .
- N lines, the j -th of which consisting of the N integers $G_{j,1}, \dots, G_{j,N}$.

Output

The first N lines of the output should contain $N - 1$ integers each. On the i -th line the j -th number ($1 \leq i \leq N, 1 \leq j < N$) should be the score of the swap of cells (i, j) and $(i, j + 1)$.





The next $N - 1$ lines of the output should contain N integers each. The j -th number on i -th line ($1 \leq i < N, 1 \leq j \leq N$) should be the score of the swap of cells (i, j) and $(i + 1, j)$.

Constraints

- $2 \leq N \leq 1000$.
- $1 \leq G_{r,c} \leq 1\,000\,000$ for each $r = 1 \dots N$ and $c = 1 \dots N$.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

- **Subtask 1** (0 points) Examples.
 
- **Subtask 2** (15 points) $N = 2$.
 
- **Subtask 3** (45 points) $N \leq 75$.
 
- **Subtask 4** (40 points) No additional limitations.
 

Examples

input	output
3 1 2 1 1 3 2 2 2 2	2 15 1 5 0 0 0 5 2 1 4 0
4 2 1 9 1 1 2 1 1 2 1 2 7 2 9 2 1	4 4 4 24 12 0 8 16 1 3 3 1 8 12 4 0 6 30 4 2 0 1 0 4

Explanation

In the **first sample case**, consider the result of the (horizontal) swap of cells $(1, 2)$ and $(1, 3)$:

1	1	2
1	3	2
2	2	2

The groups of the two swapped cells are marked with red and blue. So the score of the swap is $3 \cdot 5 = 15$.