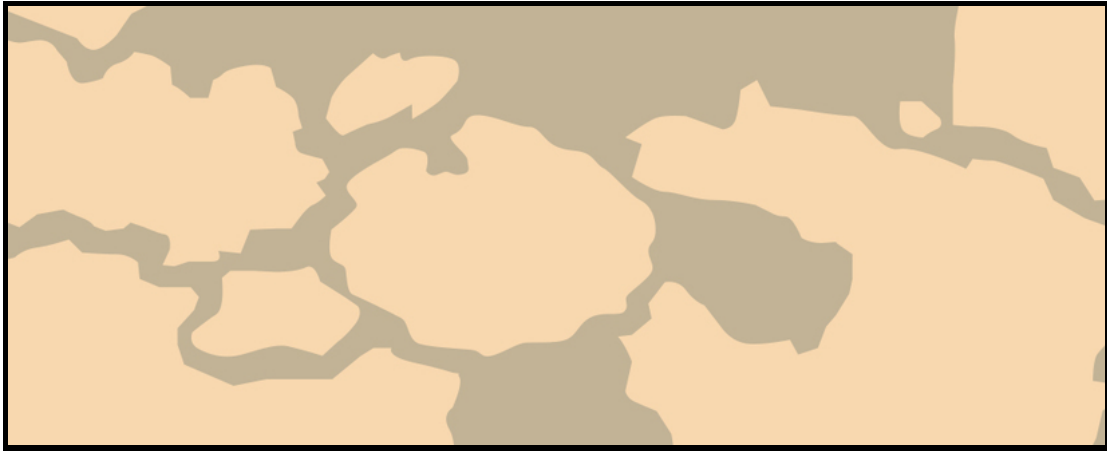


Cartogram



This is a problem about constructing cartograms.

Here's what a cartogram looks like:

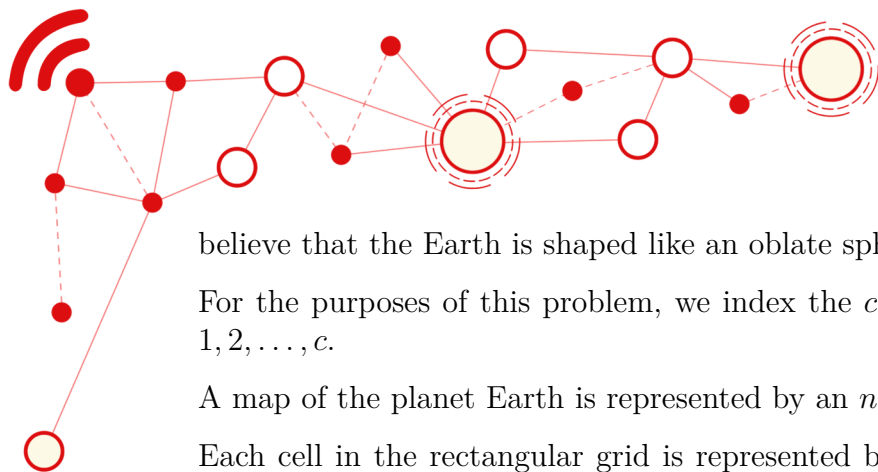


population cartogram

(Taken from worldmapper.org)

Briefly, a **cartogram** is a map in which some thematic mapping variable—such as travel time, population, or GNP—is substituted for land area or distance. Observe how in the above cartogram, places with more population are represented with larger area. The problem will be formalized as follows.

In this problem, we wish to visualize how many people in each country *wrongly*



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believe that the Earth is shaped like an oblate spheroid.

For the purposes of this problem, we index the c countries on Earth by integers $1, 2, \dots, c$.

A map of the planet Earth is represented by an $n \times m$ rectangular grid.

Each cell in the rectangular grid is represented by a non-negative integer whose value is at most c . A cell represented by a 0 means that it is water, and is not owned by any country. A cell represented by a positive integer c means that it is owned by country c . This means that each cell can be owned by at most one country.

Two cells in the grid are adjacent if they share an edge. Since the planet Earth is definitely not a sphere, the leftmost cells of the map are NOT adjacent to the rightmost cells of the map. Same goes for the topmost and bottommost cells.

A set S of cells is said to be contiguous if for any two cells $s, t \in S$, there exists a sequence x_0, \dots, x_r of cells on Earth such that

- $x_0 = s$
- $x_r = t$
- $x_i \in S$ for each non-negative integer $i \leq r$.
- x_{i-1} is adjacent to x_i for each positive integer $i \leq r$.

A map A is said to be **valid** if and only if it satisfies the following two properties:

- Map A represents each country as a map of **contiguous** set of cells.
- Each country owns at least one cell in map A .

Given a map A , two countries are **neighbors** in the map A if they own cells which are adjacent to each other.

Two valid maps A and B are said to be **similar** if and only if it preserves the property of “being neighbors”. More precisely, two maps A and B are similar if and only if the following condition is true:

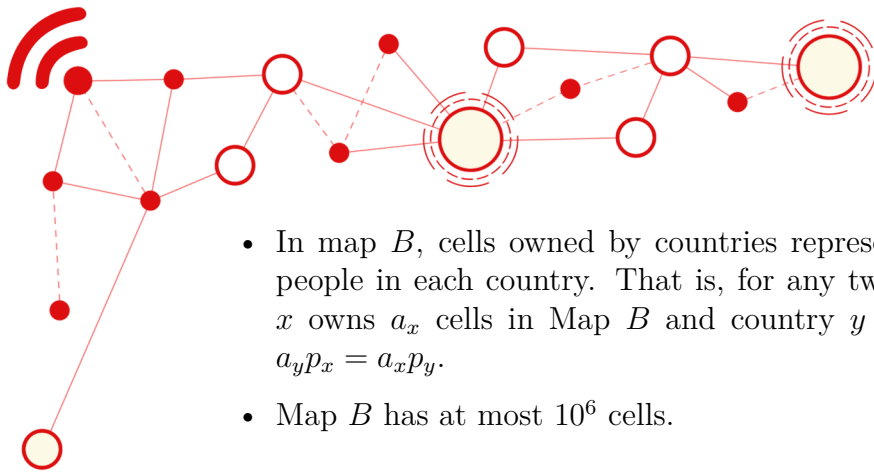
For any pair of different countries x and y , x and y are neighbors in the map A if and only if they are neighbors in the map B .

Our research shows that country i has exactly p_i million misinformed people who think that Earth is spherical.

You are given a valid map A of the planet Earth. The cells owned by each country in map A represent its geographical territory.

Your task is to find a valid map B such that:

- Map A is similar to Map B .



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- In map B , cells owned by countries represent the amount of misinformed people in each country. That is, for any two countries x and y , if country x owns a_x cells in Map B and country y owns a_y cells in Map B , then $a_y p_x = a_x p_y$.
- Map B has at most 10^6 cells.

Input Format

The first line of input contains t , the number of test cases.

The first line of test case contains three space-separated integers n , m and c .

The second line contains c space-separated integers p_1, p_2, \dots, p_c .

The next n lines describe the grid. In particular, the i th line contains m space-separated integers representing a row of map A .

Output Format

For each test case, first output a line containing two space-separated integers n' and m' denoting that $n' \times m'$ are the dimensions of the new map, map B .

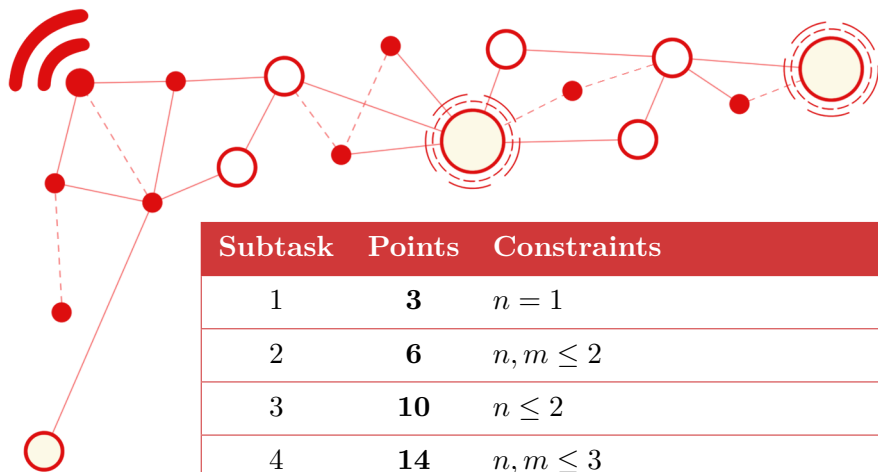
The following n' lines must describe the map B in the same format as the input map A , that is, the i th following line must contain m' space-separated integers denoting the i th row of map B .

If there are multiple solutions, you may output any. It is guaranteed that at least one solution exists.

Constraints and Subtasks

For all subtasks

- $1 \leq t \leq 12$
- $1 \leq n, m, nm \leq 36$
- $2 < p_i < 15$
- $1 \leq c \leq nm$
- $0 \leq \text{each value in the map} \leq c$



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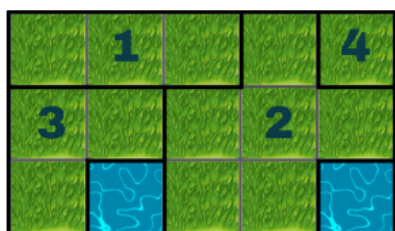
Subtask	Points	Constraints
1	3	$n = 1$
2	6	$n, m \leq 2$
3	10	$n \leq 2$
4	14	$n, m \leq 3$
5	38	$n, m \leq 4$
6	18	$nm \leq 25$
7	11	No additional constraints.

Sample I/O

Input	Output
1 3 5 4 6 8 6 4 1 1 1 2 4 3 3 2 2 2 3 0 2 2 0	4 3 1 2 4 1 2 4 1 2 2 3 3 3

Explanation

Here is an illustration of the sample input and output:



Map A



Map B

Although the output map B doesn't look anything like the input map A , you can show that they are similar. Furthermore, you can verify that the number of cells in each country in map B represents its number of misinformed individuals. Hence, this output is valid.