Ad-hoc Newbie

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

Yuki gives you a sequence of n positive integers $f_1, \ldots, f_n$, **where for each i, $1 \le f_i \le i$ holds**. She wants you to construct an n-ordered square matrix A such that:

- For each $1 \le i, j \le n$, $0 \le A_{i,j} \le n$;
- For each $1 \le i \le n$, $\text{mex}(A_{i,1}, A_{i,2}, \ldots, A_{i,n}) = \text{mex}(A_{1,i}, A_{2,i}, \ldots, A_{n,i}) = f_i$*.

It can be proven that for any valid $f_1, \ldots, f_n$, a solution always exists.

Input

Each test contains multiple test cases. The first line of input contains a single integer t ($1 \le t \le 2 \cdot 10^4$) — the number of test cases. The description of the test cases follows.

The first line contains a single integer n ($1 \le n \le 1\,414$), denoting the length of the sequence.

The second line contains n integers $f_1, \ldots, f_n$ ($1 \le f_i \le i$), describing the given sequence.

It is guaranteed that the sum of n^2 over all test cases does not exceed $2 \cdot 10^6$.

Output

For each test case, output n lines, in which the i-th line contains n non-negative integers $A_{i,1}, A_{i,2}, \ldots, A_{i,n}$ in the range $[0, n]$.

Example

standard input	standard output
3 3 1 1 2 5 1 1 3 2 5 4 1 2 1 3	0 2 0 0 0 0 0 0 1 3 2 0 0 4 0 0 2 0 3 2 4 1 0 2 0 0 1 1 0 2 0 4 3 1 2 0 2 2 0 1 0 1 2 3 0 0 0 0 2 1

Note

In the first test case, $f = [1, 1, 2]$, and a possible square matrix is as follows:

$$A = \begin{bmatrix} 0 & 2 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}.$$

In the first row, $\text{mex}([0, 2, 0]) = f_1 = 1$, because 0 appears in $[0, 2, 0]$, but 1 does not, so 1 is the smallest non-negative integer not present; in the first column, similarly, $\text{mex}([0, 0, 0]) = f_1 = 1$. It is easy to verify that this matrix also satisfies all other constraints.

*The mex of a sequence $b_1, \ldots, b_m$ is the smallest non-negative integer x such that x does not appear in b.