Problem F. Algebra is Awesome

Input file:	*standard input*
Output file:	*standard output*
Memory limit:	512 mebibytes

Every permutation σ can be composed with itself, which means $\sigma^2 = \sigma \circ \sigma$. More generally, for positive k, $\sigma^k = \sigma \circ \sigma^{k-1}$ and σ^0 is an identity permutation. For a permutation σ, the set of all its compositions is called $D(\sigma)$, which means $D(\sigma) = \{\sigma^k : k \in \mathbf{N}\}$.

You are given an m-element sequence of n-element permutations $\sigma_1, \sigma_2, \ldots, \sigma_m$. For each i, find the number of $j < i$ such that $D(\sigma_i) = D(\sigma_j)$.

Input

The first line of input contains a single integer z, the number of test cases. The descriptions of the test cases follow.

The first line of each test case consists of two integers n and m ($1 \le n \le 10^2$, $1 \le m \le 10^4$).

In each of the next m lines, you are given a pemutation as a sequence of n positive distinct integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le n$).

Output

For each test case, print m numbers each on a separate line: how many different j's satisfy the given condition.

Example

standard input	standard output
1 3 3 2 3 1 3 1 2 1 2 3	0 1 0