

F. Cyclic Cipher

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given n sequences. Each sequence consists of positive integers, not exceeding m . All integers in one sequence are distinct, but the same integer may appear in multiple sequences. The length of the i -th sequence is k_i .

Each second integers in each of the sequences are shifted by one to the left, i.e. integers at positions $i > 1$ go to positions $i - 1$, while the first integers becomes the last.

Each second we take the first integer of each sequence and write it down to a new array. Then, for each value x from 1 to m we compute the longest **segment** of the array consisting of element x only.

The above operation is performed for 10^{100} seconds. For each integer from 1 to m find out the longest segment found at this time.

Input

The first line of the input contains two integers n and m ($1 \leq n, m \leq 100\,000$) — the number of sequences and the maximum integer that can appear in the sequences.

Then follow n lines providing the sequences. Each of them starts with an integer k_i ($1 \leq k_i \leq 40$) — the number of integers in the sequence, proceeded by k_i positive integers — elements of the sequence. It's guaranteed that all integers in each sequence are pairwise distinct and do not exceed m .

The total length of all sequences doesn't exceed 200 000.

Output

Print m integers, the i -th of them should be equal to the length of the longest segment of the array with all its values equal to i during the first 10^{100} seconds.

Examples

input
3 4 3 3 4 1 4 1 3 4 2 3 3 1 4
output
2 1 3 2

input
5 5 2 3 1 4 5 1 3 2 4 2 1 3 5 1 3 2 5 3
output
3 1 4

0
1

input

4 6
3 4 5 3
2 6 3
2 3 6
3 3 6 5

output

0
0
2
1
1
2