Hotpot

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Sichuan hotpot is one of the most famous dishes around the world. People love its spicy taste.

There are n tourists, numbered from 0 to $(n-1)$, sitting around a hotpot. There are k types of ingredients for the hotpot in total and the i-th tourist favors ingredient a_i most. Initially, every tourist has a happiness value of 0 and the pot is empty.

The tourists will perform m moves one after another, where the i-th (numbered from 0 to $(m-1)$) move is performed by tourist $(i \mod n)$. When tourist t moves:

- If ingredient a_t exists in the pot, he will eat them all and gain 1 happiness value.
- Otherwise, he will put one unit of ingredient a_t into the pot. His happiness value remains unchanged.

Your task is to calculate the happiness value for each tourist after m moves.

Input

There are multiple test cases. The first line of the input contains an integer T $(1 \le T \le 10^3)$ indicating the number of test cases. For each test case:

The first line contains three integers n, k and m $(1 \le n \le 10^5, 1 \le k \le 10^5, 1 \le m \le 10^9)$ indicating the number of tourists, the number of types of ingredients and the number of moves.

The second line contains n integers $a_0, a_1, \cdots, a_{n-1}$ $(1 \le a_i \le k)$ where a_i indicates the favorite ingredient of tourist i.

It's guaranteed that neither the sum of n nor the sum of k of all the test cases will exceed 2×10^5.

Output

For each test case output n integers $h_0, h_1, \cdots, h_{n-1}$ in one line separated by a space, where h_i indicates the happiness value of tourist i after m moves.

Please, DO NOT output extra spaces at the end of each line, or your answer might be considered incorrect!

Example

standard input	standard output
4 3 2 6 1 1 2 1 1 5 1 2 2 10 1 2 2 2 10 1 1	0 2 1 2 2 2 0 5

Note

The first sample test case is explained as follows:

Move	Tourist	Action	Pot after move
0	0	Puts ingredient 1 into the pot	$\{1\}$
1	1	Eats ingredient 1 in the pot	$\{\}$
2	2	Puts ingredient 2 into the pot	$\{2\}$
3	0	Puts ingredient 1 into the pot	$\{1, 2\}$
4	1	Eats ingredient 1 in the pot	$\{2\}$
5	2	Eats ingredient 2 in the pot	$\{\}$