Problem C
Conform Conforme
Time Limit: 2 seconds

The *Illustrious College Promoting Conformity*, Manila Campus, has one central theme which its mission and vision both revolve around: to teach its students that life is better when you're exactly the same as everyone else.

Fun Fact: Clinical studies have shown that expressing your individuality causes other people to perceive you as abrasive, irritating, obnoxious, and just an all-around awful human being.

The college has n students, labeled 1 to n, each with a shirt that displays any positive integer of their choosing. Initially, before the first day of school, we know that a_i is the number on student i's shirt.

Fun Fact: If you're exactly like everyone else, then other people will perceive you as safe, secure, comforting, and familiar, which are all desirable traits for human interaction.

The school's culture swiftly instills in them a desire to form cliques of people that are exactly like them. At the end of each of day, each student **simultaneously** does the following: If the number on their shirt is v, then they replace it with $\text{freq}(v)$. Here, $\text{freq}(v)$ counts the number of people *that day* whose shirt displayed the value v (this includes themselves in the count).

Fun Fact: If you don't have any friends, maybe try completely changing everything about your personality in order to make yourself more likeable!

Trends are dynamic, and the students are always constantly reassessing what's popular, ready to change the number on their shirt (and their entire personality) at the end of every day. It's getting a bit hard to keep track of!

As a favor to the administration of the college, you must answer the following question: Given the initial values on their shirts and some integer k, what will be the value on each student's shirt at the end of the kth day?

Input Format

The first line of input contains the space-separated integers n and k.

The second line of input contains the n space-separated integers $a_1, a_2, a_3, \ldots, a_n$.

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq k \leq 10^9$
- $1 \leq a_i \leq 10^9$ for each i

Output Format

Output n space-separated integers, the values on the shirts of the students (in order) at the end of the kth day.

Sample Input 1	Sample Output 1
8 1 2 7 1 8 2 8 1 8	2 1 2 3 2 3 2 3

Sample Input 2	Sample Output 2
7 2 6 7 1 1 1 9 9	2 2 3 3 3 2 2

Explanation

In the first sample input, initially,

- There are $\text{freq}(1) = 2$ occurrences of the number 1.
- There are $\text{freq}(2) = 2$ occurrences of the number 2.
- There are $\text{freq}(7) = 1$ occurrences of the number 7.
- There are $\text{freq}(8) = 3$ occurrences of the number 8.

Thus, for example, all students with 8 on their shirt will change that number to 3 at the end of the first day.

In the second sample input, note that there is only one student wearing the shirt with the number 6, so they replace it with the number 1 at the end of the first day; similarly, the student wearing a 7 also changes their number to 1. In general, the values on the shirts are $\{1, 1, 3, 3, 3, 2, 2\}$

But then the next day, those two note that there are *two* students now wearing a 1 on their shirt, so at the end of the second day, both of them change their numbers to 2.