8143 Permutation

A permutation P of size N is defined as an array $[P_1, P_2, \cdots, P_N]$ where $1 \leq Pi \leq N$ and $P_i \neq P_j$ for $i \neq j$.

We also define an order of a permutation. If A and B are permutations of size N, then A is less than B if and only if there exists an index i $(1 \leq i \leq N)$ where:

- $A_i < B_i$, and
- $A_j = B_j$ for all $1 \leq j < i$

We also define the multiplication of two permutations. If A and B are permutations of size N, then $A \times B$ is a permutation of size N, where the i-th element is A_{B_i}.

We also define the exponentiation of a permutation and a positive integer. If P is permutation and z is a positive integer, then P^z is defined as follow:

- $P^z = P$, for $z = 1$
- $P^z = P^{z-1} \times P$, for $z > 1$

You are given a permutation P of size N. Let M be the smallest integer greater than 1 such that $P = P^M$. We define A (index starts from 1) as an array consisting of P^i for all $1 \leq i < M$ sorted in the increasing order (of permutation). In other words, $A_i < A_j$ for all $1 \leq i < j < M$.

For example, suppose $P = [2, 3, 1, 5, 4]$. Therefore:

- $P^1 = [2, 3, 1, 5, 4]$,
- $P^2 = [3, 1, 2, 4, 5]$,
- $P^3 = [1, 2, 3, 5, 4]$,
- $P^4 = [2, 3, 1, 4, 5]$,
- $P^5 = [3, 1, 2, 5, 4]$,
- $P^6 = [1, 2, 3, 4, 5]$,
- $P^7 = [2, 3, 1, 5, 4]$,

Thus, the value of M in this case is 7, and $A = [P^6, P^3, P^4, P^1, P^2, P^5]$.

You are also given Q queries. The i-th query contains an integer K_i. The answer for the i-th query is an integer T_i such that $1 \leq T_i < M$ and $P^{T_i} = A_{K_i}$. Can you answer all of the queries?

Input

The input file contains several test cases, each of them as described below.

The first line contains two integers: N Q $(1 \leq N \leq 100;\ 1 \leq Q \leq 300,000)$ in a line denoting the size of the permutation and the number of queries. The second line contains N integers: $P_1 P_2 \cdots P_N$ $(1 \leq P_i \leq N)$ in a line denoting the permutation. It is guaranteed that $P_i \neq P_j$ for all $i \neq j$.

The next Q lines, each contains an integer; the integer on the i-th line is K_i $(1 \leq K_i < M$, where M is the smallest integer greater than 1 such that $P = P^M$ as explained above. Note that M is not explicitly given in this problem) denoting the query.

Output

For each test case, the output must follow the description below.

Q lines, each contains an integer: T_i in a line denoting the answer of the i-th query.

Note: Explanation for the 1st sample case

The permutation given in the first sample is the same as the permutation given in the problem description.

Sample Input

```
5 6
2 3 1 5 4
1
2
3
4
5
6
```

Sample Output

```
6
3
4
1
2
5
```