## I. LIS

Leon is a hardworking student who spends his free time pondering over sequences of integers. Today, he is particularly interested in increasing sequences.

A subsequence is formed by removing zero or more elements from a sequence while retaining the order of the remaining elements. The longest increasing subsequence of a sequence is defined as the longest subsequence whose elements are strictly increasing. This subsequence may not necessarily be unique. For example, the longest increasing subsequence of the sequence (1, 2, 4, 3) can either be (1, 2, 3) or (1, 2, 4), and both subsequences have a length of 3.

Leon gives you the following problem:

Given a sequence X, let Y be a subsequence of X. What is the longest possible length of Y such that the length of the longest increasing subsequence of Y does not exceed K?

This problem was too easy for you, so Leon decides to ask you more questions. He starts by providing you with a starting sequence A which contains N integers. Then, he gives you Q questions. You are still going to solve the problem above, but sequence X and the integer K will vary between questions. He gives you the integer K directly, and he also gives you an integer M and says that sequence X is formed by taking the first M elements of sequence A.

For each question, provide the answer to the problem above for the given sequence X and the integer K.

## INPUT

The first line contains two integers N and Q, where N is the number of elements in sequence A, and Q is the number of questions you must answer.  $(1 \le N \le 50000, 1 \le Q \le 200000)$ 

The second line contains N integers  $A_1, A_2, A_3, ..., A_N$  - the elements of sequence A.  $(1 \le A_i \le 50000)$ .

The next Q lines contain two integers  $M_i$  and  $K_i$ , meaning you must solve the problem above for the first  $M_i$  elements of A and the integer  $K_i$   $(1 \le K_i \le M_i \le N)$ .

## OUTPUT

For each question, print one line containing the answer.

Sample Input	Sample Output
11 6	4
963151284222	6
51	5
72	8
91	7
92	11
11 1	
11 11	

## **EXPLAINATION**

- Question 1: For the sequence X = (9, 6, 3, 1, 5), one can choose the subsequence Y = (9, 6, 3, 1). The length of the longest increasing subsequence of Y is 1.
- Question 2: For the sequence X = (9, 6, 3, 1, 5, 12, 8), one can choose the subsequence Y = (9, 6, 3, 1, 12, 8). The length of the longest increasing subsequence of Y is 2.
- Question 3: For the sequence X = (9, 6, 3, 1, 5, 12, 8, 4, 2), one can choose the subsequence Y = (9, 6, 5, 4, 2). The length of the longest increasing subsequence of Y is 1.

- Question 4: For the sequence X = (9, 6, 3, 1, 5, 12, 8, 4, 2), one can choose the subsequence Y = (9, 6, 3, 1, 12, 8, 4, 2). The length of the longest increasing subsequence of Y is 2.
- Question 5: For the sequence X = (9, 6, 3, 1, 5, 12, 8, 4, 2, 2, 2), one can choose the subsequence Y = (9, 6, 5, 4, 2, 2, 2). The length of the longest increasing subsequence of Y is 1.
- Question 6: For the sequence X = (9, 6, 3, 1, 5, 12, 8, 4, 2, 2, 2), one can choose the subsequence Y = (9, 6, 3, 1, 5, 12, 8, 4, 2, 2, 2). The length of the longest increasing subsequence of Y is 3.