## 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. $(1 \leq N \leq 50000,1 \leq \mathrm{Q} \leq 200000)$
The second line contains $N$ integers $A_{1}, A_{2}, A_{3}, \ldots, A_{N}$ - the elements of sequence $A$. $\left(1 \leq A_{i} \leq 50000\right)$.
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 $\mathrm{K}_{\mathrm{i}}\left(1 \leq \mathrm{K}_{\mathrm{i}} \leq \mathrm{M}_{\mathrm{i}} \leq \mathrm{N}\right)$.

## OUTPUT

For each question, print one line containing the answer.

| 泉 Sample Input |  |
| :--- | :--- |
| 116 | 4 |
| 963151284222 | 6 |
| 51 | 5 |
| 72 | 8 |
| 91 | 7 |
| 92 | 11 |
| 111 |  |
| 1111 |  |

## EXPLAINATION

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

