Problem I. Good Partitions

Time limit: 1 second
Memory limit: 1024 megabytes

Lawliet has a sequence of numbers of length n, denoted as $a_1, a_2, \ldots, a_n$, and he wants to determine how many good partitions exist.

A partition size k is considered a good partition size if it satisfies $1 \leq k \leq n$ and, after dividing the sequence a into parts by partition size, each resulting sub-sequence is non-decreasing. The partitioning method is as follows:

- The sequence a is divided into $\lceil \frac{n}{k} \rceil$ parts.
- For the i-th part ($1 \leq i \leq \lceil \frac{n}{k} \rceil - 1$), the elements are $a_{(i-1)\times k+1}, a_{(i-1)\times k+2}, \ldots, a_{i\times k}$.
- For the $\lceil \frac{n}{k} \rceil$-th part, the elements are $a_{(\lceil \frac{n}{k} \rceil - 1)\times k+1}, \ldots, a_n$. Note that the length of the last part may be less than k.

Lawliet finds this problem too simple, so he will make q modifications. Each modification provides two positive integers p and v, indicating that the value of a_p will be changed to v.

Your task is to help Lawliet calculate the number of good partition sizes before any modifications and after each modification.

Input

The first line contains an integer T ($1 \leq T \leq 10$), representing the number of test cases.

For each test case, the first line contains two integers n ($1 \leq n \leq 2 \cdot 10^5$) and q ($1 \leq q \leq 2 \cdot 10^5$), representing the length of the sequence and the number of modifications.

The second line contains n integers, representing the sequence $a_1, a_2, \ldots, a_n$ ($1 \leq a_i \leq 2 \cdot 10^9$).

The following q lines each contain two integers p ($1 \leq p \leq n$) and v ($1 \leq v \leq 2 \cdot 10^9$), indicating that the element at the p-th position in the sequence will be modified to v.

It is guaranteed that the sum of n and the sum of q over all test cases do not exceed $2 \cdot 10^5$, respectively.

Output

For each test case, output $q + 1$ lines, representing the number of good partition sizes before any modifications and after each modification.

Example

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

Note

Initially, the only good partition size is $k = 1$.

After the first modification, the sequence becomes $[4, 5, 2, 6, 1]$. Both $k = 1$ and $k = 2$ are good partition sizes.

After the second modification, the sequence becomes $[4, 5, 5, 6, 1]$. The good partition sizes are $k = 1$, $k = 2$, and $k = 4$.