

Good Partitions

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 1024 megabytes

Lawliet has a sequence of numbers of length n , denoted as a_1, a_2, \dots, 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 $a_{(i-1) \times k + 1}, a_{(i-1) \times k + 2}, \dots, a_{i \times k}$.
- For the $\lceil \frac{n}{k} \rceil$ -th part, the elements are $a_{(\lceil \frac{n}{k} \rceil - 1) \times k + 1}, \dots, a_n$. 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, \dots, 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	1
5 2	2
4 3 2 6 1	3
2 5	
3 5	

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 $k = 4$.