Maximum Rating

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

A rating system, usually used in sports, games, and competitive programming platforms, is a method to rank the skill level of their players or users in relatively impartial ways. The *rating* of an individual is the numerical evaluation of competitive performance, which is directly comparable even at different times.

Sulfox is an ICPC contestant who has participated in n AtForces rounds, where the rating change for the i-th round is a_i. The initial rating and maximum rating are both 0. After each round, the rating is increased by the rating change for that round. If the rating at that point is **strictly greater** than the current maximum rating, the maximum rating will be updated to the current rating.

Now Sulfox has hacked into AtForces' back-end database, which enables him to arrange these n rounds in any order. He wonders how many values of k exist satisfying that there is at least an arrangement of the n rounds that updates the maximum rating exactly k times. Additionally, he wants to know the result each time after some updates that modify the rating change for one of the n rounds.

Input

The first line contains two integers n and q ($1 \leq n, q \leq 2 \times 10^5$), denoting the number of AtForces rounds and the number of updates respectively.
The second line contains n integers $a_1, a_2, \ldots, a_n$ ($-10^9 \leq a_i \leq 10^9$), denoting the rating changes for each round.
Then q lines follow, each containing two integers x ($1 \leq x \leq n$) and v ($-10^9 \leq v \leq 10^9$), denoting an update that modifies the rating change for the x-th round to v.

Output

After each update, output a line containing an integer, representing the number of k satisfying that there exists at least an arrangement of the n rounds where the maximum rating is updated exactly k times.

Example

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

Note

In the sample case:

- After the first update, the rating changes for each round are $[1, 2, 4]$, and the maximum rating can only be updated 3 times.
- After the second update, the rating changes for each round are $[1, -2, 4]$, and the maximum rating can be updated 1 or 2 times.
- After the third update, the rating changes for each round are $[-3, -2, 4]$, and the maximum rating can be updated 0 or 1 times.
- After the fourth update, the rating changes for each round are $[-3, -2, 1]$, and the maximum rating can be updated 0 or 1 times.

- After the fifth update, the rating changes for each round are $[-3, 1, 1]$, and the maximum rating can be updated 0, 1, or 2 times.