H. Incessant Rain

time limit per test: 3 seconds
memory limit per test: 192 megabytes

Note the unusual memory limit.

Silver Wolf gives you an array a of length n and q queries. In each query, she replaces an element in a. After each query, she asks you to output the maximum integer k such that there exists an integer x such that it is the k-majority of a subarray* of a.

An integer y is the k-majority of array b if y appears at least $\lfloor \frac{|b|+1}{2} \rfloor + k$ times in b, where $|b|$ represents the length of b. Note that b may not necessarily have a k-majority.

*An array b is a subarray of an array a if b can be obtained from a by the deletion of several (possibly, zero or all) elements from the beginning and several (possibly, zero or all) elements from the end.

Input

The first line contains an integer t ($1 \le t \le 10^4$) — the number of test cases.

The first line of each test case contains two integers n and q ($1 \le n, q \le 3 \cdot 10^5$) — the length of a and the number of queries.

The following line contains n space-separated integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le n$).

The following q lines contain two integers i and x, denoting the query that replaces a_i with x ($1 \le i, x \le n$).

It is guaranteed that the sum of n and the sum of q over all test cases does not exceed $3 \cdot 10^5$.

Output

For each test case, output the answer to all queries on a single new line, separated by a space.

Example

input Copy

```
2
5 5
1 2 3 4 5
3 4
1 4
2 4
4 3
2 3
7 8
3 2 3 3 2 2 3
2 3
5 3
6 3
3 4
4 4
7 4
6 4
2 4
```

output Copy

```
1 1 2 1 0
2 2 3 2 1 1 1 2
```

Codeforces Round 1029 (Div. 3)
Finished
Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
323843613	Jun/11/2025 06:50	Accepted

→ Problem tags

data structures divide and conquer sortings

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)