A. Almost Increasing Subsequence

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

A sequence is *almost-increasing* if it does not contain three **consecutive** elements x, y, z such that $x \geq y \geq z$.

You are given an array $a_1, a_2, \ldots, a_n$ and q queries.

Each query consists of two integers $1 \leq l \leq r \leq n$. For each query, find the length of the longest *almost-increasing* subsequence of the subarray $a_l, a_{l+1}, \ldots, a_r$.

A subsequence is a sequence that can be derived from the given sequence by deleting zero or more elements without changing the order of the remaining elements.

Input

The first line of input contains two integers, n and q $(1 \leq n, q \leq 200\,000)$ — the length of the array a and the number of queries.

The second line contains n integers $a_1, a_2, \ldots, a_n$ $(1 \leq a_i \leq 10^9)$ — the values of the array a.

Each of the next q lines contains the description of a query. Each line contains two integers l and r $(1 \leq l \leq r \leq n)$ — the query is about the subarray $a_l, a_{l+1}, \ldots, a_r$.

Output

For each of the q queries, print a line containing the length of the longest almost-increasing subsequence of the subarray $a_l, a_{l+1}, \ldots, a_r$.

Example

input Copy

```
9 8
1 2 4 3 3 5 6 2 1
1 3
1 4
2 5
6 6
3 7
7 8
1 8
8 8
```

output Copy

```
3
4
3
1
4
2
7
1
```

Note

In the first query, the subarray is $a_1, a_2, a_3 = [1, 2, 4]$. The whole subarray is almost-increasing, so the answer is 3.

In the second query, the subarray is $a_1, a_2, a_3, a_4 = [1, 2, 4, 3]$. The whole subarray is a almost-increasing, because there are no three consecutive elements such that $x \geq y \geq z$. So the answer is 4.

In the third query, the subarray is $a_2, a_3, a_4, a_5 = [2, 4, 3, 3]$. The whole subarray is not almost-increasing, because the last three elements satisfy $4 \geq 3 \geq 3$. An almost-increasing

→ Problem tags

binary search | data structures | greedy | *1500

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→ Contest materials

- Codeforces Round #869 (en)
- Tutorial (en)

subsequence of length 3 can be found (for example taking $a_2, a_3, a_5 = [2, 4, 3]$). So the answer is 3.
