C - Black Intervals

Editorial (/contests/abc411/tasks/abc411_c/editorial)

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Time Limit: 3 sec / Memory Limit: 1024 MiB

Score : 350 points

Problem Statement

There are N squares arranged in a row from left to right. Initially, all squares are painted white.

Process Q queries in order. The i-th query gives an integer A_i between 1 and N, inclusive, and performs the following operation:

> Flip the color of the A_i-th square from the left. Specifically, if the A_i-th square from the left is painted white, paint it black; if it is painted black, paint it white.
> Then, find the number of intervals of consecutively painted black squares.
>
> Here, an interval of consecutively painted black squares is a pair of integers (l, r) $(1 \leq l \leq r \leq N)$ that satisfy all of the following:
>
> - The l-th, $(l+1)$-th, $\ldots$, r-th squares from the left are all painted black.
> - Either $l = 1$, or the $(l-1)$-th square from the left is painted white.
> - Either $r = N$, or the $(r+1)$-th square from the left is painted white.

Constraints

- $1 \leq N, Q \leq 5 \times 10^5$
- $1 \leq A_i \leq N$

- All input values are integers.

Input

The input is given from Standard Input in the following format:

$$N \quad Q$$
$$A_1 \quad A_2 \quad \dots \quad A_Q$$

Output

Output Q lines. On the i-th line $(1 \leq i \leq Q)$, output the answer to the i-th query.

Sample Input 1 Copy

Copy

```
5 7
2 3 3 5 1 5 2
```

Sample Output 1 Copy

Copy

```
1
1
1
2
2
1
1
```

Below, the i-th square from the left is referred to as square i.

After each query, the state is as follows:

- After the 1st query, only square 2 is painted black. There is 1 interval of consecutively painted black squares: $(l, r) = (2, 2)$.
- After the 2nd query, squares $2, 3$ are painted black. There is 1 interval of consecutively painted black squares: $(l, r) = (2, 3)$.
- After the 3rd query, only square 2 is painted black. There is 1 interval of consecutively painted black squares: $(l, r) = (2, 2)$.
- After the 4th query, squares $2, 5$ are painted black. There are 2 intervals of consecutively painted black squares: $(l, r) = (2, 2), (5, 5)$.
- After the 5th query, squares $1, 2, 5$ are painted black. There are 2 intervals of consecutively painted black squares: $(l, r) = (1, 2), (5, 5)$.

- After the 6th query, only squares $1, 2$ are painted black. There is 1 interval of consecutively painted black squares: $(l, r) = (1, 2)$.
- After the 7th query, only square 1 is painted black. There is 1 interval of consecutively painted black squares: $(l, r) = (1, 1)$.

Thus, output $1, 1, 1, 2, 2, 1, 1$ separated by newlines.

Sample Input 2 Copy

```
1 2
1 1
```

Sample Output 2 Copy

```
1
0
```

After the 2nd query, all squares are painted white, so output 0 on the 2nd line.

Sample Input 3 Copy

```
3 3
1 3 2
```

Sample Output 3 Copy

```
1
2
1
```

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