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C - Black Intervals

[Editorial \(/contests/abc411/tasks/abc411_c/editorial\)](/contests/abc411/tasks/abc411_c/editorial)



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, \dots , 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.

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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 Q
A1 A2 ... AQ
```

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](#)

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

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Sample Output 1

[Copy](#)

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

[Copy](#)

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: $(l, r) = (2, 2), (5, 5)$.

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- 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

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```
1 2
1 1
```

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Sample Output 2

[Copy](#)

```
1
0
```

[Copy](#)

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
```

[Copy](#)

Sample Output 3

[Copy](#)

```
1
2
1
```

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Language

Python (CPython 3.11.4)

Source Code

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* at most 512 KiB

* Your source code will be saved as `Main.extension`.



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