

Problem F

Turkish Delight

Time limit: 5 seconds

Ankara, Turkey

A Turkish delight vendor is organizing a display at a bazaar in Ankara. Turkish delights are beautiful candies which come in many flavors. Passers-by will add and remove candies from the display of candies as the day goes on. The vendor would like to know the number of different flavors remaining each time.

There is initially a horizontal line of candies on display. Passers-by can add a candy to either end of the line (either the left end or the right end). But they may also be greedy, and eat the first candy they can as they're passing by (either from the left end or the right end).



Some small Turkish delights.
By Appaloosa - Self-photographed, CC BY-SA 3.0, acquired from Wikimedia Commons.

After each passerby comes and goes, report the number of different flavors remaining.

Input

The first line contains two space-separated integers n and c , the initial number of candies and the number of flavors ($1 \leq n, c \leq 10^5$). Each flavor is an integer from 1 to c (inclusive).

The second line contains n space-separated integers a_1, \dots, a_n ($1 \leq a_1, \dots, a_n \leq c$), indicating the initial flavors on display.

The third line contains one integer q ($1 \leq q \leq 10^5$) denoting the number of passers-by.

Each of the next q lines denotes an action of a passerby, where d is either L or R, representing whether the action is on the left or right side, respectively.

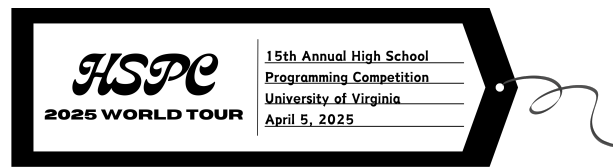
- E d
- A d k

E means a passerby eats the candy on that end, while A means they add a Turkish delight of type k ($1 \leq k \leq c$).

Output

Output q lines, where the i^{th} line represents the number of unique flavors present after the i^{th} person passes by.

Sample Input 1	Sample Output 1
5 3	3
1 3 2 2 3	2
4	2
E R	3
E L	
A L 3	
A L 1	



Sample Input 2

```
5 7
1 3 2 2 3
4
E R
E R
E R
E R
```

Sample Output 2

```
3
3
2
1
```