

Competitive Programming SS24

Submit until end of contest



Problem: cake (1.5 second timelimit)

Wendy baked n pairwise different cakes for her students. She put all of them on a long table arranged in a straight line numbered 1 to n . Every cake is divided into a_i pieces.

Since there are so many, Ilia has to deliver them for her. Ilia despises easy tasks so he will not simply carry them. Instead he will stack the cakes on top of each other. This requires very advanced skills as to not crush the cakes on the bottom. After stacking some cakes, he will not be able to see in front of him. He can always find the next cake by judging the distance. Because of this he will only take cakes in an interval $[l, r]$. The remaining cakes serve as a “delivery fee” for him to eat. Therefore Wendy has to give him instructions to pick up all consecutive cakes in one given interval $[l, r]$.

She plans to distribute the cakes evenly among some people, everyone should get the same positive number of pieces from the same cakes (every person gets the same number d_i pieces of the i -th cake). Of course no piece should be left over. She wants to give as many people cake as possible.

To help her decide which cakes to take, she wants to know the maximum number of people she can give them to if she takes cakes from some intervals $[l_i, r_i]$. Help her find these numbers. Be careful, some hungry tutor might eat some pieces during this process. You can be sure that no tutor is evil enough to finish a cake (there will always be at least one piece of each cake remaining).

Input The first line contains n ($2 \leq n \leq 2 \cdot 10^5$) and q ($1 \leq q \leq 2 \cdot 10^5$) the number of cakes and the number of queries.

The second line contains n integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq 10^{18}$), the number of pieces the i -th cake is divided into.

The next q lines contain the queries. Each query has one of two forms:

- **! name i x** : The tutor *name* ($1 \leq |name| \leq 10$) eats x ($1 \leq x \leq 10^{18}$) pieces of cake i ($1 \leq i \leq n$). Names only consist of upper and lowercase english letters.
- **? l r** : determine the maximum number of people that can get some if the cakes from $[l, r]$ are taken ($1 \leq l \leq r \leq n$).

Output Print the answer for every query of the second type on a separate line.

Sample input

```
4 5
25 15 9 22
? 1 2
? 1 3
? 2 4
! Ilia 4 1
? 2 4
```

Sample output

```
5
1
1
3
```

```
3 9
100 50 75
? 1 3
! Michael 1 75
? 1 3
! Michael 1 24
! Michael 2 49
? 3 3
? 2 3
! Michael 3 74
? 1 3
```

```
25
25
75
1
1
```