XXVI Olimpiada Informática Española
Final día 1
`inspectores`

Inspectores de hacienda

The city of Lineopolis consists of a street with n houses numbered from 1 to n. Each of the families living in Lineopolis has an open account in the city bank.

The city's finance office is interested in investigating its users for certain periods of time to understand how they spend their money. To do so, they will carry out different investigations on several accounts simultaneously, they want to know the minimum balance that each account has had during the period of the investigation.

In the meantime, the balance of Lineopolis' families will change as they receive bills or payrolls. As with any other bank, the balance of an account may occasionally be in the red.

More specifically, this is the sequence of events: at the beginning of the year, the account of the i-th house has a_i euros. During the following days q events occur, which can be of various types:

- In an event of type **postman**, a postman will visit the houses between l and r, both included, leaving a bill or a payroll. At that precise moment, the balance of the accounts of the houses between l and r will be modified by an amount x, which can be less or greater than zero depending on whether it is a bill or a payroll.
- In an event of type **start**, the bank will begin to investigate the i-th house's account.
- In an event of type **end**, the bank will end the investigation of the i-th house. Then it will have to calculate and write the minimum value that has been in the i-th house's account since the beginning of the investigation.

¿Can you help Lineopolis' administration to carry out the investigations?

It is ensured that all investigations that begin will be completed, that no investigation ends before it begins, and that a second investigation will not be initiated in a house that is already being investigated. In other words, the events of **startend** that refer to the i-th house form a succession of **start-end** pairs.

Input

The first line of the input contains the numbers n and q — the number of houses and the number of events that will happen.

The next line contains n integers $a_1, \ldots, a_n$ — the list of initial money for each house.

Next follow q lines indicating the events that happen in chronological order, in the following format:

- The character `C`, followed by three integers l, r, x, for an event of type **postman**.
- The character `I`, followed by an integer i, for an event of type **start**.
- The car'acter `F`, followed by an integer i, for an event of type **end**.

Output

You must write, for each investigation performed and in order of completion, a line containing the minimum balance in the investigated account during that period.

Example

Input:

```
5 19
0 35 7 13 100
I 4
I 1
F 1
I 1
C 1 2 -5
I 5
C 2 5 -8
F 1
I 3
I 2
C 2 4 12
C 5 5 10
F 3
C 4 5 -11
C 5 5 20
F 5
C 2 3 -16
F 4
F 2
```

Output:

```
0
-5
-1
91
5
18
```

Constraints

$1 \leq n, q \leq 200000$, $0 \leq a_i \leq 5000$.

In each event of type **postman**, $1 \leq l \leq r \leq n$ and $-5000 \leq x \leq 5000$, $x \neq 0$.

In each event of type **start** or **end**, $1 \leq i \leq n$.

Subtasks

1. (13 points) $1 \leq n, q \leq 2000$.
2. (17 points) All cards are bills, so $x < 0$ always.
3. (11 points) The postman always delivers to only one house in the street.
4. (19 points) The postman always delivers to every house in the street.
5. (40 points) No additional restrictions.