

Art Gallery

Statement

Fluffy the Hamster has recently opened a new art gallery.

There are N paintings in a row on display. The i th painting is valued at $\$P_i$. Fluffy will perform a sequence of Q actions, of the following 3 types:

- **ADD x p** : Fluffy purchases a brand new painting of price $\$p$, and places it after the x th painting from the left. If $x = 0$ then the new painting becomes the first painting from the left. After performing this action, the total number of paintings is increased by 1.
- **REPLACE x p** : Fluffy purchases a brand new painting of price $\$p$, and replaces the x th painting from the left with the new painting. After performing this action, the total number of paintings is unchanged.
- **ASK x y** : Fluffy wants to know, among the paintings from the x th painting from the left to the y th painting from the left (inclusive), what is the price of the most expensive painting.

Help Fluffy perform his actions!

Constraints

- $1 \leq N \leq 10^5$
- $1 \leq Q \leq 5 \cdot 10^4$
- $1 \leq P_i, p \leq 10^9$

Input

The first line of the input contains two integers N and Q .

The second line of input will contain N integers, P_1, P_2, \dots, P_N .

The next Q lines of input will contain one action each, in the format described above.

Output

For each **ASK** operation, output a single integer, the price of the most expensive painting among the paintings considered.

Examples

Sample Input	Expected Output
5 5 1 2 3 4 5 ASK 2 4 REPLACE 2 6 ASK 1 3 ADD 4 7 ASK 3 6	4 6 7

Notes

1. A skeleton file has been given to help you. You should not create a new file or rename the file provided. You should develop your program using this skeleton file.
2. You are free to define your own helper methods and classes (or remove existing ones) if it is suitable but you must put all the new classes, if any, in the same skeleton file provided.

Skeleton File

You are given the skeleton file `Gallery.java`. You should see the following contents when you open the file:

```
/**
 * Name      :
 * Matric. No :
 */

import java.util.*;

public class Gallery {
    private void run() {
        // implement your "main" method here
    }

    public static void main(String args[]) {
        Gallery runner = new Gallery();
        runner.run();
    }
}
```