Bubble Sort Machine

JOI-kun, an algorithm researcher, has developed a machine called the Bubble Sort Machine.

The Bubble Sort Machine operates on an integer sequence $a = (a_1, a_2, \ldots, a_N)$ of length N. To activate the Bubble Sort Machine, the initial values A_i are provided as input for each a_i ($1 \leq i \leq N$). Each time **Button 1** on the Bubble Sort Machine is pressed, the machine modifies the sequence a in the following way:

> For each $i = 1, 2, \ldots, N-1$ in order, if $a_i > a_{i+1}$, then the values of a_i and a_{i+1} are swapped.

To make the Bubble Sort Machine even more appealing, JOI-kun decided to add the following feature:

> When **Button 2** is pressed and integers l and r satisfying $1 \leq l \leq r \leq N$ are given as input, the machine outputs the value of $a_l + a_{l+1} + \cdots + a_r$.

Given the initial values of the integer sequence and the sequence of operations on the Bubble Sort Machine, write a program that computes the outputs produced by Button 2.

Input

Read the following data from the standard input.

> N
> $A_1\ A_2\ \cdots\ A_N$
> Q
> (Query 1)
> (Query 2)
> $\vdots$
> (Query Q)

Here, Q is the number of operations performed on the Bubble Sort Machine. Each (Query j) ($1 \leq j \leq Q$) consists space separated integers. Let T_j denote the first integer of (Query j). The content of this line is one of the following.

- If $T_j = 1$, this line contains no additional integers. This means that the j-th operation on the Bubble Sort Machine is pressing Button 1.
- If $T_j = 2$, this line contains two more integers, L_j and R_j, in that order. This means that the j-th operation on the Bubble Sort Machine is pressing Button 2 with the integers L_j and R_j as input.

Output

For each operation where Button 2 is pressed, that is, for each j ($1 \leq j \leq Q$) such that $T_j = 2$, output the integer produced by the Bubble Sort Machine on a separate line in the order of the queries.

Constraints

- $2 \leq N \leq 500\,000$.
- $1 \leq A_i \leq 10^9$ ($1 \leq i \leq N$).
- $1 \leq Q \leq 500\,000$.
- T_j is either 1 or 2 ($1 \leq j \leq Q$).
- If $T_j = 2$, $1 \leq L_j \leq R_j \leq N$ ($1 \leq j \leq Q$).
- Given values are all integers.

Subtasks

1. (5 points) The number of j ($1 \leq j \leq Q$) such that $T_j = 1$ is at most 10.
2. (11 points) $N \leq 150\,000$, $Q \leq 150\,000$, $L_j = R_j = 1$ if $T_j = 2$ ($1 \leq j \leq Q$).
3. (15 points) $N \leq 150\,000$, $Q \leq 150\,000$, $1 \leq A_i \leq 2$ ($1 \leq i \leq N$).
4. (23 points) $N \leq 150\,000$, $Q \leq 150\,000$, $L_j = R_j$ if $T_j = 2$ ($1 \leq j \leq Q$).
5. (29 points) $N \leq 150\,000$, $Q \leq 150\,000$.
6. (17 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
4 5 3 5 2 6 2 1 3 1 2 1 1 2 2 4 1 2 1 2	13 3 12 5

First, the initial values $a_1 = 5$, $a_2 = 3$, $a_3 = 5$, and $a_4 = 2$ are given, initializing $a = (5, 3, 5, 2)$. The operations of the Bubble Sort Machine proceed as follows:

1. Button 2 is pressed with $l = 1$, $r = 3$ as input. The Bubble Sort Machine outputs $a_1 + a_2 + a_3 = 13$.
2. Button 1 is pressed. For $i = 1, 2, 3$, the following operations are performed in order:
   - For $i = 1$: Since $a_1 > a_2$ holds, their values are swapped, resulting in $a = (3, 5, 5, 2)$.
   - For $i = 2$: Since $a_2 > a_3$ does not hold, no change is made to a.
   - For $i = 3$: Since $a_3 > a_4$ holds, their values are swapped, resulting in $a = (3, 5, 2, 5)$.
3. Button 2 is pressed with $l = 1$, $r = 1$ as input. The Bubble Sort Machine outputs $a_1 = 3$.
4. Button 2 is pressed with $l = 2$, $r = 4$ as input. The Bubble Sort Machine outputs $a_2 + a_3 + a_4 = 12$.
5. Button 1 is pressed. For $i = 1, 2, 3$, the following operations are performed in order:
   - For $i = 1$: Since $a_1 > a_2$ does not hold, no change is made to a.
   - For $i = 2$: Since $a_2 > a_3$ holds, their values are swapped, resulting in $a = (3, 2, 5, 5)$.
   - For $i = 3$: Since $a_3 > a_4$ does not hold, no change is made to a.
6. Button 2 is pressed with $l = 1$, $r = 2$ as input. The Bubble Sort Machine outputs $a_1 + a_2 = 5$.

This sample input satisfies the constraints of subtasks 1, 5, and 6.

Sample Input 2	Sample Output 2
5 1 1 2 1 2 5 2 2 3 1 2 2 4 1 2 2 4	3 4 4

This sample input satisfies the constraints of subtasks 1, 3, 5, and 6.