

F. Fafa and Array

time limit per test: 3 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Fafa has an array A of n positive integers, the function $f(A)$ is defined as . He wants to do q queries of two types:

- 1 $l\ r\ x$ — find the maximum possible value of $f(A)$, if x is to be added to one element in the range $[l, r]$. You can choose to which element to add x .
- 2 $l\ r\ x$ — increase all the elements in the range $[l, r]$ by value x .

Note that queries of type 1 don't affect the array elements.

Input

The first line contains one integer n ($3 \leq n \leq 10^5$) — the length of the array.

The second line contains n positive integers a_1, a_2, \dots, a_n ($0 < a_i \leq 10^9$) — the array elements.

The third line contains an integer q ($1 \leq q \leq 10^5$) — the number of queries.

Then q lines follow, line i describes the i -th query and contains four integers $t_i\ l_i\ r_i\ x_i$.

It is guaranteed that at least one of the queries is of type 1.

Output

For each query of type 1, print the answer to the query.

Examples

input
5 1 1 1 1 1 5 1 2 4 1 2 2 3 1 2 4 4 2 2 3 4 1 1 3 3 2
output
2 8

input
5 1 2 3 4 5 4 1 2 4 2 2 2 4 1 2 3 4 1 1 2 4 2
output
6 10