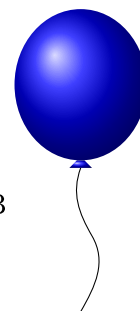


J Are you weak or strong?

TIME LIMIT: 2.0s
MEMORY LIMIT: 256MB



Given an array a of size n and q queries, in each query one of three operations can be applied:

- Given 1 $l\ r$ where $(1 \leq l \leq r \leq n)$, for each i such that $(l \leq i \leq r)$, set $a_i := \lfloor \sqrt{a_i} \rfloor$.
- Given 2 $l\ r\ k$ where $(1 \leq l \leq r \leq n)$ and k is a positive integer, for each i such that $(l \leq i \leq r)$, undo the last k operations of type 1 that were applied on element a_i . It is guaranteed for each element i , there are at least k operations of type 1 applied.
- Given 3 $l\ r$ where $(1 \leq l \leq r \leq n)$, calculate the sum of all a_i such that $(l \leq i \leq r)$.

For each operation of type 3, output the sum.

INPUT

First line of input contains an integer n — $(1 \leq n \leq 2 \cdot 10^5)$.

Second line of input contains a_1, a_2, \dots, a_n , the array a — $(1 \leq a_i \leq 10^9)$.

Third line contains a single integer q — $(1 \leq q \leq 10^5)$.

Followed by q lines where each line gives the description of one of the operations explained. For operation 2, It is guaranteed that at least k operations were applied on each i $(l \leq i \leq r)$.

It is guaranteed that there exist at least one query of type 3.

OUTPUT

For each operation of type 3, output the sum resulted by the operation in a separate line.

SAMPLES

Sample input 1	Sample output 1
3 5 6 7 6 1 1 3 3 1 3 2 1 3 1 3 1 3 1 2 2 3 1 2	6 18 7

Sample input 2	Sample output 2
5 16 10 1 25 4 7 3 1 5 1 1 5 3 1 5 1 2 4 3 1 5 2 2 4 1 3 1 5	56 15 10 15

Sample input 3	Sample output 3
1 4 7 1 1 1 1 1 1 1 1 1 1 1 1 3 1 1 2 1 1 2 3 1 1	1 1