


PSEGTREE - Make Versions in Segment Tree

no tags

You have an array of N integers, named **Version-0** array.
You need to do **Q** queries. There are 2 type of queries.

- idx pos v**: Take **Version-idx** array and copy it into another array. Name the new array **Version-K** array where **K** = (number of queries of 1st type before this query + 1). Then add **v** the element at index **pos** in **Version-K** array.
- idx l r**: In **Version-idx** array, sum the elements from index **l** to **r**. Print the sum of the range

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Input

First line there will be an integer **N** ($1 \leq N \leq 100000$), the length of the array. The following line wil contain **N** integers, the elements of **Version-0** array. Each element is non-negative and at most **100**.

The next line will contain an integer **Q** ($1 \leq Q \leq 100000$), the number of queries. Next **Q** lines will contain the queries. All queries in form

a b c d

If **a = 1**, then you have first kind of query and **idx = b, pos = c, v = d**.

If **a = 2**, then you have second kind of query and **idx = b, l = c, r = d**.

For all queries, it is guaranteed that **Version-idx** array exists. And

$1 \leq pos \leq N$
 $1 \leq l \leq r \leq N$
 $1 \leq v \leq 100$

Output

If you incounter an query of second type, you need to print the required sum in a seperate line. These should be printed in the order they appears in the input.


Example


Input:

10
1 2 3 4 5 6 7 8 9 10
5
2 0 1 6
1 0 10 30
1 1 2 10
1 2 3 10
2 3 2 3

Output:

21
25

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Concept difficulty

easy normal hard extreme

Implementation difficulty

easy normal hard extreme

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