Make Versions in Segment Tree

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

1. **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.
2. **idx l r**: In **Version-idx** array, sum the elements from index **l** to **r**. Print the sum of the range

Input

First line there will be an integer **N (1 <= N <= 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 <= Q <= 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 <= pos <= N
1 <= l <= r <= N
1 <= v <= 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