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## Baba and AVL Trees

Input file:            **standard input**  
Output file:          **standard output**  
Time limit:           **2 seconds**  
Memory limit:        **256 megabytes**

Baba has had a very sad experience with AVL trees. Since his first year, he could never ever code it without any mistakes. Now he needs to teach AVL trees in his lab and he is super scared. He was practicing problems on AVL trees recently when he came across the following problem.

Given an array  $A$  of length  $N$  and containing only positive integers, design a data structure to support the following operations :

- **1 i x** : Update the value at the  $i$ 'th index of the array and set it equal to  $x$  i.e. perform the operations  $A_i = x$ .
- **2 l r v** : Report the smallest index  $i$  such that  $i \geq l$  and  $(A_l + A_{l+1} + \dots + A_i) \geq v$ . If  $(A_l + A_{l+1} + \dots + A_r) < v$ , report -1.

As usual, he couldn't solve the problem and asks you for help. Can you help him?

### Input

First line contains two integers  $N$  and  $Q$  ( $1 \leq N, Q \leq 2 * 10^5$ ) denoting the number of elements in the array  $A$  and the number of queries to answer  $Q$ .

Next line contains  $N$  space separated integers where the  $i$ 'th integer denotes the value  $A_i$  ( $1 \leq A_i \leq 10^9$ ).

Next  $Q$  lines describe the query in the format mentioned above. The first integer  $t$  denotes the type of query ( $1 \leq t \leq 2$ ).

If  $t == 1$ , then follows 3 space separated integers ( $1 \leq l \leq r \leq N, 1 \leq v \leq 2 * 10^{14}$ ).

If  $t == 2$ , then follows 2 space separated integers  $i$  and  $x$  ( $1 \leq i \leq N, 1 \leq x \leq 10^9$ ).

### Output

For every query of type 2, print the answer in a new line.

### Example

standard input	standard output
5 5	4
6 4 3 5 1	-1
2 2 4 8	3
1 5 9	
2 1 1 10	
1 3 9	
2 3 5 7	