WALTZ

5s

As great dancers, Katharina and you are invited for the opening waltz at the annual ball event of Infamously Clumsy People's Community. After hours of training, both of you are confident in your skill. However, as the name suggests, other dancers might be clumsy and mistake someone else's partner as their own, especially on a chaotic dance floor.

This year, the opening waltz is performed as follow: first, all n dancers stand in a line. Each dancer is given an ID number so that spectators can follow.

Then, at some point, the dancers with indices from l to r perform a circular dance of k steps. This means if before the dance, the ID's of n dancers form an array of n integers $b_1, \ldots, b_n$, at the end of the dance, their ID's are now

$b_1, \ldots, b_{l-1}, b_{r-k+1}, b_{r-k+2}, \ldots, b_{r-1}, b_r, b_l, b_{l+1}, \ldots, b_{r-k}, b_{r+1}, \ldots, b_n$.

As everyone dances, you do not want to lose sight of your precious partner (or else, she will be very mad at you afterwards). But there are three problems:

• You are clumsy, so you cannot keep track of her whilst dancing;

• Other dancers are clumsy, so whilst to the spectators' eyes, the ID numbers might look consistent, somehow a dancer might not end up with someone else's ID number (hence the need for ID numbers in the first place). Thus, even Katharina's ID number might change.

• The organiser is also clumsy, so there might be multiple dancers with the same ID number;

Knowing this, from time to time, Katharina will ask you to identify her. She will gives you three numbers, l, r, and k, meaning that her ID number is the k-th smallest number amongst those of dancers with indices from l to r in the line.

In other words, if the ID's of n dancers form an array of n integers $b_1, \ldots, b_n$, then her ID is the k-th smallest number amongst $b_l, \ldots, b_r$.

INPUT

The input consists of:

• One line with two integers n and q ($1 \leq n, q \leq 10^5$), the size of array and the number of queries.

• One line with n integers $a_1, \ldots, a_n$ ($1 \leq a_i \leq 10^9$ for each i), where a_i denotes the i th of the initial array.

• q lines, the i th of which contains four integers t_i, l_i, r_i, k_i. Assume that before this dance, the heights of the dancers in their order are $b_1, b_2, \ldots, b_{n-1}, b_n$.

– If $t_i = 1$, it means the dancers with indices from l to r perform a circular dance of k steps. In other words, then at the end of the dance, the heights of dancers are now $b_1, \ldots, b_{l-1}, b_{r-k+1}, b_{r-k+2}, \ldots, b_{r-1}, b_r, b_l, b_{l+1}, \ldots, b_{r-k}, b_{r+1}, \ldots, b_n$.

– If $t_i = 2$, then Katharina wants you to identify her. Her ID number is the k-th smallest amongst all dancers with indices from l_i to r_i, meaning with ID's $b_l, \ldots, b_r$.

OUTPUT

For each query of type 2, output Katharina's ID number.

Sample Input	Sample Output
10 10	5
10 5 7 5 1 9 8 1 10 1	5
1 6 10 1	1
2 1 4 2	5
2 3 7 3	1
1 9 10 1	5

2 5 8 2	
2 2 4 1	
1 4 10 4	
2 6 8 1	
1 1 10 9	
2 1 3 1	