

Buntopia

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

Spring is coming and in order to please the Buntopian kids, you decided to buy for them many balls of different types, namely n types of balls.

For the first game, you asked them to arrange all the balls in such a way that among all the possible arrangements of balls, the sum of subarray beauties is as small as possible.

For a given arrangement, the sum of subarray beauties is computed in the following way:

We compute all the maximal subarrays consisting of balls having the same color and then for each of them, we add up to the answer 2^x , where x is the length of the subarray.

For example, if we have the array $[2, 2, 4, 1, 1, 3, 3, 3]$, the sum of beauties will be $4 + 2 + 4 + 8 = 18$.

Since Buntopian kids are some of the best kids at math from the entire universe, in order to challenge them, now you ask them to compute some of these values during the next q days, while considering potential changes in the number of balls from the gift as well. However, since the values are too big, they are only asking for the remainder of the answer when dividing by $10^9 + 7$.

Can you repeat Buntopian kids' achievement?

Input

The first line of the input contains n and q , the number of types of balls and the number of queries ($1 \leq n, q \leq 2 * 10^5$).

The next line of the input contains the n numbers, representing the initial quantities of each type of ball ($1 \leq v_i \leq 10^9$).

The next q lines contain the queries, which are of two types:

1 a b : The number of balls of type a becomes b ($1 \leq b \leq 10^9$).

2 x y : Buntopian kids now want to know the answer for the problem, if we only consider types of balls in range $[x, y]$.

For tests worth 20 points, ($1 \leq n, q \leq 1000$).

Output

The output will contain one line for each query of type 2, representing the answer asked by Buntopian kids modulo $10^9 + 7$.

Example

standard input	standard output
7 6	54
4 2 18 5 7 9 3	120
2 2 4	102
1 5 19	328
2 1 7	
2 3 6	
1 2 106	
2 1 7	

Note

For the first query from the sample, we can re-arrange the balls as following:

3 3 2 3 3 4 3 3 2 3 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3

The sum of beauties will be $4 + 2 + 4 + 2 + 4 + 2 + 8 + 2 + 4 + 2 + 4 + 2 + 4 + 2 + 8$, which is 54