Ayano and sequences

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	512 megabytes

Ayano have three arrays of integers $a_1, \ldots, a_n$, $b_1, \ldots, b_n$ and $c_1, \ldots, c_n$. Initially, the value of every b_i, c_i is zero.

Now she wants you to do q operations. There are two types of operations:

- `1 l r w` ($1 \le l \le r \le n$, $1 \le w \le n$): for each i that $l \le i \le r$, set a_i to w.
- `2 l r w` ($1 \le l \le r \le n$, $1 \le w \le 10^9$): for each i that $l \le i \le r$, increase c_i by w.

At the end of each operation, for each i ($1 \le i \le n$), Ayano will increase b_{a_i} by c_i.

Please tell her the array $b_1, \ldots, b_n$ after all of the operations. Because the answer is very large, you only have to output each number modulo 2^{64}.

Input

The first line contains two integers n and q ($1 \le n, q \le 5 \cdot 10^5$), representing the length of the arrays and the number of operations.

The next line contains n integers $a_1, \ldots, a_n$ ($1 \le a_i \le n$).

Each line of the following q lines contains four integers t_i, l_i, r_i, w_i ($1 \le t_i \le 2$) — the operations.

Output

Output one line containing n integers. the i-th integer represents b_i modulo 2^{64}.

Example

standard input	standard output
5 6 1 2 3 4 5 2 2 4 1 1 2 3 3 2 3 4 3 1 3 5 4 2 1 5 2 1 1 3 2	2 12 12 36 0