Problem L. Shiori

Input file: `standard input`
Output file: `standard output`

What does it mean to be "normal" or "ordinary"?
This ruler in my hand doesn't measure very well at all.

Tomorin, a penguin, has a huge stone collection! To appreciate the stones, she puts some of them on the ground, and there are n piles of stones. Initially, the i-th pile has a_i stones, where a_i is a non-negative number. Tomorin is going to move her stones, and your task is to help her move the stones according to her instructions.

- `1 l r v` : Tomorin rebuilds each stone pile from l to r, with each having v stones. More formally, for every i that $l \leq i \leq r$, $a_i \leftarrow v$.
- `2 l r` : Tomorin watches the piles from l to r. As a careful penguin with a taste for natural numbers, she does not like numbers to be left behind. To solve the problem fairly, let w be the minimum natural number that no piles in $a[l \dots r]$ have exactly w stones; then Tomorin puts an extra w stone from her collections to each of the piles. More formally, let $w = \operatorname{mex}(a_l, a_{l+1}, \cdots, a_r)$; for all $l \leq i \leq r$, $a_i \leftarrow a_i + w$. Here, $\operatorname{mex}(S) = \min(\{0, 1, 2, 3, \dots\} \setminus S)$.
- `3 l r` : Rikki, the enthusiastic breeder, asks for the sum of the number of stones from pile l to r to check if you are ignoring Tomorin. More formally, calculate $\sum_{i=l}^{r} a_i$.

Input

The first line contains two integers n and m ($1 \leq n \leq 5 \times 10^5$, $1 \leq m \leq 5 \times 10^5$), indicating the length of the sequence and the number of operations.

The second line contains n integers $a_1, a_2, \cdots, a_n$ ($0 \leq a_i \leq 5 \times 10^5$), which denote the sequence a.

For the following m lines, the i-th line first contains an integer op_i ($op_i \in \{1, 2, 3\}$) specifying the type of the i-th operation.

- If $op_i = 1$, then three integers l, r, and v follow in the same line ($1 \leq l \leq r \leq n$, $0 \leq v \leq 5 \times 10^5$);
- Otherwise, two integers l and r follow in the same line ($1 \leq l \leq r \leq n$).

Output

For each operation of the third kind, output one line containing the answer.

Example

standard input	standard output
5 8 0 7 2 1 0 1 2 4 0 2 1 3 2 3 4 3 1 3 1 2 3 4 3 1 4 2 1 5 3 2 5	5 11 22