

Problem H. Array and Operations

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 512 mebibytes

You have an array a with n integers. There are three types of operations:

- “1 l r x ”: for each i in $[l, r]$, change a_i to $a_i + x$;
- “2 l r ”: for each i in $[l, r]$, change a_i to $\lfloor \sqrt{a_i} \rfloor$;
- “3 l r ”: sum up a_i for all i in $[l, r]$ and print the answer.

Your goal is to process the operations and print the answers of all type 3 operations.

Input

The first line of the input contains two integers n and q ($1 \leq n, q \leq 10^5$). The second line contains n integers a_1, \dots, a_n . Then q lines follow, each line describes an operation.

It is guaranteed that $1 \leq a_i, x \leq 10^5$, $1 \leq l \leq r \leq n$.

Output

For each operation of type 3, print a single line containing the required sum.

Example

standard input	standard output
5 5	5
1 2 3 4 5	6
1 3 5 2	
2 1 4	
3 2 4	
2 3 5	
3 1 5	