Chtholly and the Broken Chronograph

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

Chtholly gives you an array of n elements, the i-th of which is a_i.

Each element in the array has an independent state s_i, where $s_i = 0$ denotes the i-th element is blocked, and $s_i = 1$ denotes it is activated.

In order to maintain the array, Chtholly needs you to perform q operations, and there are four kinds of them:

1 x: Block element x, i.e. change s_x to 0. It's guaranteed that the element is activated before the operation.

2 x: Activate element x, i.e. change s_x to 1. It's guaranteed that the element is blocked before the operation.

3 l r x: Add x to each activated element in interval $[l, r]$, i.e. for each i such that $l \leq i \leq r$ and $s_i = 1$, assign $a_i + x$ to a_i.

4 l r: Print the sum of elements in interval $[l, r]$. Note that this operation is irrelevant to the current states of elements.

Input

The first line of the input contains two integers $n, q\,(1 \leq n, q \leq 10^5)$.

The second line contains n integers, the i-th of which is $a_i\,(1 \leq a_i \leq 10^8)$.

The second line contains n integers, the i-th of which is $s_i\,(s_i \in \{0, 1\})$.

The next q lines, each line describe an operation. The forms of the operations are described in the statements above.

It is guaranteed that for each operation of type 3 or 4, $1 \leq l \leq r \leq n$, and for each operation of type 3, $1 \leq x \leq 10^8$.

Output

For each operation of type 4, output one line containing the answer.

Example

standard input	standard output
4 8 4 2 5 3 1 0 0 1 2 3 3 1 4 1 1 3 4 1 4 1 1 2 2 3 1 3 2 4 1 4	17 19