Saathvik has a Range of Queries

Filename: `arange`
Time Limit: `2 seconds`

After taking some photos of Providence from the top of the pyramid, Tanmay was making his way down the back side when he noticed a new set of **N** papers, one at each level below. Tanmay collected each of the papers and arranged them in order after reaching the ground safely. This time, the **i**[th] paper (which contains an integer c_i such that $|c_i| \leq 10^8$) represents the beauty of the **i**[th] level of the pyramid.

As Tanmay catches his breath from running down the steps, Saathvik shows up and starts asking a whole bunch of questions. Each question is of one of the following 4 forms:

> **1 a b** - *What is the maximum beauty among levels a ... b?*
> **2 a b** - *What is the minimum beauty among levels a ... b?*
> **3 a b** - *What is the sum of the beauties of all levels a ... b?*
> **4 a b c** - *What if we decorated steps a ... b in such a way that all their beauties change by c?*

Not fully understanding what it's like to climb up $N \leq 10^5$ steps, Saathvik declares that he will indeed go decorate the pyramid after all queries of the fourth type, changing the beauty of the pyramid. Tanmay is tired and doesn't have time to bother answering all $Q \leq 2 \times 10^5$ of Saathvik's questions. Please help by writing a program to do it for him.

Input

The first line contains three positive integers **N** and **Q**, the number of levels of the pyramid and the number of questions Saathvik has. The second line contains **N** integers c_1 **...** c_N, where c_i represents the initial beauty of the **i**[th] level of the pyramid.

Each of the following lines contains a query of one of the four types described above. For all query types, **1 ≤ a ≤ b ≤ N**, and for queries of the fourth type, $|c| \leq 10^8$.

Output

For query types **1**, **2**, and **3**, output a single line containing the answer to the query.

Samples

Input	Output
4 8 1 3 2 99 1 1 3 2 2 4 3 1 4 4 2 3 13 1 1 3 2 1 4 4 1 3 23 3 1 3	3 2 105 16 1 101