

Alice purchased an array of n wooden boxes that she indexed from 0 to $n - 1$. On each box i , she writes an integer that we'll refer to as box_i .

Alice wants you to perform q operations on the array of boxes. Each operation is in one of the following forms:

(Note: For each type of operations, $l \leq i \leq r$)

- 1 l r c : Add c to each box_i . Note that c can be negative.
- 2 l r d : Replace each box_i with $\left\lfloor \frac{box_i}{d} \right\rfloor$.
- 3 l r : Print the minimum value of any box_i .
- 4 l r : Print the sum of all box_i .

Recall that $\lfloor x \rfloor$ is the maximum integer y such that $y \leq x$ (e.g., $\lfloor -2.5 \rfloor = -3$ and $\lfloor -7 \rfloor = -7$).

Given n , the value of each box_i , and q operations, can you perform all the operations efficiently?

Input Format

The first line contains two space-separated integers denoting the respective values of n (the number of boxes) and q (the number of operations).

The second line contains n space-separated integers describing the respective values of $box_0, box_1, \dots, box_{n-1}$ (i.e., the integers written on each box).

Each of the q subsequent lines describes an operation in one of the four formats defined above.

Constraints

- $1 \leq n, q \leq 10^5$
- $-10^9 \leq box_i \leq 10^9$
- $0 \leq l \leq r \leq n - 1$
- $-10^4 \leq c \leq 10^4$
- $2 \leq d \leq 10^9$

Output Format

For each operation of type **3** or type **4**, print the answer on a new line.

Sample Input 0

```
10 10
-5 -4 -3 -2 -1 0 1 2 3 4
1 0 4 1
1 5 9 1
2 0 9 3
3 0 9
4 0 9
3 0 1
4 2 3
3 4 5
4 6 7
3 8 9
```

Sample Output 0

```
-2
-2
-2
-2
0
1
1
```

Explanation 0

Initially, the array of boxes looks like this:

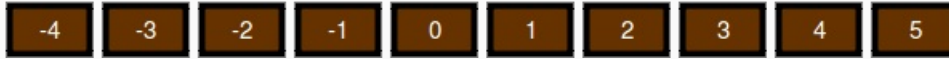


We perform the following sequence of operations on the array of boxes:

1. The first operation is 1 0 4 1, so we add **1** to each box_i where $0 \leq i \leq 4$:



2. The second operation is 1 5 9 1, so we add $c = 1$ to each box_i where $5 \leq i \leq 9$:



3. The third operation is 2 0 9 3, so we divide each box_i where $0 \leq i \leq 9$ by $d = 3$ and take the floor:



4. The fourth operation is 3 0 9, so we print the minimum value of box_i for $0 \leq i \leq 9$, which is the result of $\min(-2, -1, -1, -1, 0, 0, 0, 1, 1, 1) = -2$.

5. The fifth operation is 4 0 9, so we print the sum of box_i for $0 \leq i \leq 9$, which is the result of $-2 + -1 + -1 + -1 + 0 + 0 + 0 + 1 + 1 + 1 = -2$.

... and so on.