



Romanian Master of Informatics

3rd Edition, Bucharest, 15th -18th of October 2015

Euclid

After eating at Deadpool's restaurant and escaping from the Matrix, you are now asked to return to the ancient world. To the invention of the **greatest common divisor**, to be more precise.

In the beautiful city of Alexandria there is a vicious king. His kingdom consists of N cities displayed on a straight line, numbered from 1 to N . Each city has to pay some taxes (city i has to pay $1 \leq V_i$ coins initially, $1 \leq i \leq N$).

From time to time, the king would increase some taxes or ask Euclid for the greatest number which divides all the taxes of cities in a given interval.

Task

You are given the initial array V , where V_i is the amount of coins city i has to pay. You have to perform Q operations on this array. There are two types of operations:

- `query(a, b)` - you are to help Euclid compute $\text{gcd}(V_a, V_{a+1}, \dots, V_b)$
- `update(a, b, k)` - the king increases the taxes such that
 - $V_a += k$
 - $V_{a+1} += 2 \times k$
 - ...
 - $V_b += (b - a + 1) \times k$

Input data

The file **euclid.in** contains on the first line two integer numbers N and Q , representing the number of cities and the number of operations performed by the king. The second line of the file contains N integer numbers, the contents of the V array. The following Q lines contain one operation each as follows:

- if the operation is `query(a, b)` then the line will contain three integers: 0 a b
- if the operation is `update(a, b, k)` then the line will contain four integers: 1 a b k

Output data

The file **euclid.out** must contain the answers to all the `query` operations, in the order in which the queries were given, each answer on a separate line.



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Limits and constraints

- $1 \leq N \leq 100,000$
- $1 \leq Q \leq 100,000$
- $1 \leq a \leq b \leq N$ for all updates and queries
- $1 \leq k \leq 200,000,000$ for all updates
- $1 \leq V_i \leq 200,000,000$ for $1 \leq i \leq N$
- Time limit: 1.0 seconds
- Memory limit: 128 MB

Subtasks

Test cases will be scored **individually**.

| Subtask | Percentage of test cases | Additional input constraints |
|---------|--------------------------|------------------------------|
| 1 | 20 | $N, Q \leq 1,000$ |
| 2 | 40 | $1,000 < N, Q \leq 70,000$ |
| 3 | 40 | none |

Example

| euclid.in | euclid.out | Explanation |
|--|------------|---|
| 8 3 2 8 12 24 66 33 21 7 0 2 4 1 1 4 2 0 2 4 | 4 2 | First operation: compute $\text{gcd}(8,12,24)=4$ Second operation: the array updates to: 4 12 18 32 66 33 21 7 Third operation: compute $\text{gcd}(12,18,32)=2$ |