Problem Modulosum

C++ header `modulosum.h`

The following problem was passed down through the generations in the Info(1)cup Kingdom — can you solve it?

You are given a sequence $A_0, \ldots, A_{N-1}$ of N non-negative integers, and Q queries of the form (L_i, R_i, M_i) for $i = 0, \ldots, Q-1$. For each query, compute

$$(A_{L_i} \bmod M_i) + \cdots + (A_{R_i} \bmod M_i).$$

For example, if $L = 2, R = 3, M = 5, A_2 = 3, A_3 = 4$, then the answer is $(3 \bmod 5) + (4 \bmod 5) = 7$.

Implementation details

You should implement the following function.

```
std::vector <long long> solve(
    int N, int Q,
    std::vector<int> A,
    std::vector<int> L,
    std::vector<int> R,
    std::vector<int> M
);
```

This function should return the answer for the given Q questions. It will only be called *once* per execution by the committee's grader. Note that the array A is indexed from 0 to $N-1$, and the arrays L, R, M are indexed from 0 to $Q-1$.

Remember to include the header `modulosum.h`! Also, remember that you *should not* implement the `main` function, only `solve`.

Sample grader behaviour

The sample grader will read N, Q, the array A, and then Q triplets (L_i, R_i, M_i). It will then call `solve`(N, Q, A, L, R, M), and output the returned values to standard output, one on a line. The input/output files below work for this grader.

Restrictions

- $1 \leq N \leq 100\,000$
- $1 \leq Q \leq 100\,000$
- $0 \leq L_i \leq R_i < N$
- $1 \leq M_i \leq 1\,000\,000\,000$
- $1 \leq A_i \leq 300\,000$.

#	Points	Restrictions
1	8	$1 \leq N, Q \leq 1\,000$
2	5	$M_i = M_j, 1 \leq i, j \leq Q$
3	9	$1 \leq N \cdot M_i \leq 2\,000\,000$
4	11	$1 \leq N \cdot M_i \leq 200\,000\,000$
5	25	$10\,000 \leq M_i$
6	42	No further restrictions.

Examples

Input file	Output file
5 4 5 1 4 2 3 0 2 4 1 4 3 2 3 3 0 4 10	2 4 3 15

Explanations

In the first question, $(5 \bmod 4) + (1 \bmod 4) + (4 \bmod 4) = 1 + 1 + 0 = 2$.

In the second question, $(1 \bmod 3) + (4 \bmod 3) + (2 \bmod 3) + (3 \bmod 3) = 1 + 1 + 2 + 0 = 4$.

In the third question, $(4 \bmod 3) + (2 \bmod 3) = 1 + 2 = 3$.

In the fourth question,

$$(5 \bmod 10) + (1 \bmod 10) + (4 \bmod 10) + (2 \bmod 10) + (3 \bmod 10) = 5 + 1 + 4 + 2 + 3 = 15.$$