

F. Cowslip Collections

time limit per test: 8 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

In an attempt to make peace with the Mischievous Mess Makers, Bessie and Farmer John are planning to plant some flower gardens to complement the lush, grassy fields of Bovinia. As any good horticulturist knows, each garden they plant must have the exact same arrangement of flowers. Initially, Farmer John has n different species of flowers he can plant, with a_i flowers of the i -th species.

On each of the next q days, Farmer John will receive a batch of flowers of a new species. On day j , he will receive c_j flowers of the same species, but of a different species from those Farmer John already has.

Farmer John, knowing the right balance between extravagance and minimalism, wants exactly k species of flowers to be used. Furthermore, to reduce waste, each flower of the k species Farmer John chooses must be planted in some garden. And each of the gardens must be identical; that is to say that each of the k chosen species should have an equal number of flowers in each garden. As Farmer John is a proponent of national equality, he would like to create the greatest number of gardens possible.

After receiving flowers on each of these q days, Farmer John would like to know the sum, over all possible choices of k species, of the maximum number of gardens he could create. Since this could be a large number, you should output your result modulo $10^9 + 7$.

Input

The first line of the input contains three integers n , k and q ($1 \leq k \leq n \leq 100\,000$, $1 \leq q \leq 100\,000$).

The i -th ($1 \leq i \leq n$) of the next n lines of the input contains an integer a_i ($1 \leq a_i \leq 1\,000\,000$), the number of flowers of species i Farmer John has initially.

The j -th ($1 \leq j \leq q$) of the next q lines of the input contains an integer c_j ($1 \leq c_j \leq 1\,000\,000$), the number of flowers of a new species Farmer John receives on day j .

Output

After each of the q days, output the sum of the maximum possible number of gardens, where the sum is taken over all possible choices of k species, modulo $10^9 + 7$.

Examples

| input |
|--------------------------------|
| 3 3 2 4 6 9 8 6 |
| output |
| 5 16 |

| input |
|---------------------------|
| 4 1 2 6 5 4 3 |

| |
|----------|
| 2 1 |
| output |
| 20 21 |

Note

In the first sample case, after the first day Farmer John has $(4, 6, 9, 8)$ of each type of flower, and $k = 3$.

Choosing $(4, 6, 8)$ lets him make 2 gardens, each with $(2, 3, 4)$ of each flower, respectively. Choosing $(4, 6, 9)$, $(4, 9, 8)$ and $(6, 9, 8)$ each only let him make one garden, since there is no number of gardens that each species can be evenly split into. So the sum over all choices of $k = 3$ flowers is $2 + 1 + 1 + 1 = 5$.

After the second day, Farmer John has $(4, 6, 9, 8, 6)$ of each flower. The sum over all choices is $1 + 2 + 2 + 1 + 1 + 2 + 2 + 3 + 1 + 1 = 16$.

In the second sample case, $k = 1$. With x flowers Farmer John can make x gardens. So the answers to the queries are $6 + 5 + 4 + 3 + 2 = 20$ and $6 + 5 + 4 + 3 + 2 + 1 = 21$.