List of Products

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	512 megabytes

In number theory, the fundamental theorem of arithmetic, also called the unique factorization theorem or the unique-prime-factorization theorem, states that every integer greater than 1 either is a prime number itself or can be represented as a product of prime numbers and that this representation is unique. For example, $720 = 2^4 \times 3^2 \times 5^1$.

According to the unique factorization theorem, we can represent any integer x as

$$x = 2^{e(x,2)} \times 3^{e(x,3)} \times 5^{e(x,5)} \times \cdots \times p_i^{e(x,p_i)} \times \ldots$$

where p_i is the i-th smallest prime number. Now let's define a different way to compare two integers x and y ($x, y \geq 2$):

- When $x = y$, we consider x to be equal to y.
- When $x \neq y$, let's find the smallest positive integer i such that $e(x, p_j) = e(y, p_j)$ holds for $j = 1, 2, \ldots, i-1$ and $e(x, p_i) \neq e(y, p_i)$, then we consider x to be smaller than y if and only if $e(x, p_i) < e(y, p_i)$, otherwise we consider x to be greater than y.

You will be given n positive integers $a_1, a_2, \ldots, a_n$ and m positive integers $b_1, b_2, \ldots, b_m$. Let's consider all $n \times m$ possible pairwise products of those integers $a_i \times b_j$ ($1 \leq i \leq n$, $1 \leq j \leq m$) and print them in non-decreasing order according to the comparison rules described above. Your task is to find the k-th number in the printed list. Note that the elements in the list are numbered from 1 to $n \times m$.

Input

The input contains multiple cases. The first line of the input contains a single integer T ($1 \leq T \leq 2\,000$), the number of cases.

For each case, the first line of the input contains three integers n, m and k ($1 \leq n, m \leq 10^5$, $1 \leq k \leq n \times m$).

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \leq i \leq n,\ 2 \leq a_i \leq 10^6$).

The third line contains m integers $b_1, b_2, \ldots, b_m$ ($1 \leq i \leq m,\ 2 \leq b_i \leq 10^6$).

It is guaranteed that the sum of n over all cases does not exceed 10^5, and the sum of m over all cases does not exceed 10^5.

Output

For each case, print a single line containing a single integer, denoting the k-th number in the list.

Example

standard input	standard output
1 3 3 6 7 5 7 3 2 7	15

Note

The list of the sample test is `[49,49,35,21,21,15,14,14,10]`.