



Problem 2: Builder's Dilemma

Time limit: 5 seconds

Maverick Díaz is a well known real-estate developer in the city of X. His great skill at cutting costs and efficient use of resources to build projects has gathered him unreal amounts of wealth. Mr. Díaz owns multiple buildings scattered throughout the city. Each building has some height H and some cost C . Mr. Díaz recently got into an argument with his chief architect and ended up firing him. Now, Mr. Díaz thinks that he should be able to re-use architectural plans for the existing buildings to come up with new building plans.

A new building plan can be created by combining two existing building plans, given that the plans are compatible with each other. Each building plan has some height H and some cost C . Let's say we have two mutually compatible building plans P and Q , having heights H_P and H_Q respectively and having costs C_P and C_Q respectively. If we merge the building plans P and Q to create a new plan R , then the height H_R of the new building plan is the sum of the heights of the plans merged, and the cost C_R of the new plan, is the product of the cost of the plans merged. To put it simply: $H_R = H_P + H_Q$ and $C_R = C_P \times C_Q$

Mr. Díaz regularly constructs new buildings. Whenever he wants to construct a new building, he first decides the required height H for the new building. In his line of work, it is cheaper and much more efficient to construct multiple buildings of the same height together. So, he always constructs all the different buildings meeting the height requirement by combining existing building plans.

You are an analyst working for Mr. Díaz. You have access to two lists L_1 and L_2 of building plans. Each plan from L_1 is compatible with each plan from L_2 , but any plan from one list is not compatible with any other plan from the same list. Mr. Díaz wants you to answer his queries about the cost of new buildings. Answer those queries otherwise you might be next in line to get fired. Note that you can re-use plans between queries.

The problem statement sounds easy but solving it with a time-efficient algorithm for big values of N and M will be difficult and brute-force solutions will not be accepted.

Input

First line contains two integers N and M , denoting the length of lists L_1 and L_2 .

Second line contains N integers, where each integer C_i denotes the cost of the i^{th} plan of L_1 .

Third line contains N integers, where each integer H_i denotes the height of the i^{th} plan of L_1 . All height values are unique in the list.

Fourth line contains M integers, where each integer C_i denotes the cost of the i^{th} plan of L_2 .

Fifth line contains M integers, where each integer H_i denotes the height of the i^{th} plan of L_2 . All height values are unique in the list.

Sixth line contains a single integer Q , denoting the number of queries.

Seventh line contains Q integers, where each integer Q_i denotes a height query.

Limits

$$1 \leq N, M \leq 105$$

$$0 \leq H \leq 105$$

$$0 \leq C \leq 32$$

$$0 \leq Q, Q_i \leq 2 \times 105$$

All height values are unique within their respective lists

Output

For each query Q_i , print the total cost to construct all possible buildings having height Q_i . If such a building is impossible (i.e: no two plan heights add up to Q_i), then print 0.



Sample input	Sample Output
2 3	0
2 3	27
1 2	18
6 4 5	
2 0 1	
3	
0 3 4	

Sample Case Explanation

In Query 1, there's no way to construct a building having total height 0, hence the cost is 0.

In Query 2, we want to construct a building having height 3. We can construct two buildings having this height. The first way is to merge plans for building having height 1 in L_1 and the building having height 2 in L_2 . The cost for this way is $2 \times 6 = 12$. The second way is to merge the plan having height 2 in L_1 and the plan having height 1 in L_2 . The cost for this way is $3 \times 5 = 15$. The total cost is then: $15 + 12 = 27$.

In Query 3, we want to construct a building having height 4. There's only one way to construct such a building. We merge the plans for building having height 2 in L_1 and the building having height 2 in L_2 .