4503 - Integer Game

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You are playing a single player game where you can convert one integer from another through a sequence of moves. The integer Y is reachable from X in a single move if the following is satisfied.

$Y = \frac{X \times P_2^k}{P_1^k}$, where k is a positive integer, P_1 and P_2 are prime numbers and X is divisible by P_1^k.

For example 18 is reachable from 8 in one move, because you can divide 8 by 4 and then multiply by 9. But 6 is not reachable from 8. Given two integers A and B calculate the minimum number of moves necessary to transform A into B. Both A and B can be very large. So each of them is needed to be expressed as a multiplication of a sequence of small integers: $A = \prod_{i=1}^{n} a_i$ and $B = \prod_{i=1}^{m} b_i$. Both of the sequences a_i and b_i will be given as inputs.

Input

First line of the input contains T ($1 \le T \le 40$) the number of test cases. Then T blocks of test cases follows. First line of the test case contains N ($1 \le N \le 300$) followed by N integers. N is the length of the sequence a_i and the following N integers form the sequence a_i. The second line starts with an integer M ($1 \le M \le 300$). M is the length of the sequence b_i and the following M integers form the sequence b_i. Each of integers in these two sequences will be between 2 and 200 (inclusive).

Output

For each case of input, print the serial of output followed by an integer: the minimum number of moves required to transform A to B. If it is impossible to transform A to B with any number of moves output -1 instead. If the minimum number of moves is greater than or equal to 20 print a -1 as well.

Sample Input	Output for Sample Input
4	Case 1: 1

1 4

1 9

2 2 2

2 3 3

1 8

1 6

2 32 11

3 27 25 13

Case 2: 1

Case 3: -1

Case 4: 3

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