

4988 Factorial Simplification

Peter is working on a combinatorial problem. He has carried out quite lengthy derivations and got a resulting formula that is a ratio of two products of factorials like this:

$$\frac{p_1!p_2!\dots p_n!}{q_1!q_2!\dots q_m!}$$

This does not surprise Peter, since factorials appear quite often in various combinatorial formulae, because $n!$ represents the number of transpositions of n elements — one of the basic combinatorial objects.

However, Peter might have made a mistake in his derivations. He knows that the result should be an integer number and he needs to check this first. For an integer result Peter wants to simplify this formula to get a better feeling of its actual combinatorial significance. He wants to represent the same number as a product of factorials like this.

$$r_1!^{s_1}r_2!^{s_2}\dots r_k!^{s_k}t$$

where all r_i are distinct integer numbers greater than one in the descending order ($r_i > r_{i+1} > 1$), s_i and t are positive integers. Among all the possible representations in this form, Peter is interested in one where r_1 is the largest possible number, among those in the one where s_1 is the largest possible number; among those in the one where r_2 is the largest possible number; among those in the one where s_2 is the largest possible number; etc, until the remaining t cannot be further represented in this form. Peter does not care about the actual value of t . He wants to know what is the factorial-product part of his result.

Input

The input file contains several test cases, each of them as described below.

The first line of the input file contains two integer numbers n and m ($1 \leq n, m \leq 1000$). The second line of the input file contains n integer numbers p_i ($1 \leq p_i \leq 10000$) separated by spaces. The third line of the input file contains m integer numbers q_i ($1 \leq q_i \leq 10000$) separated by spaces.

Output

For each test case, the output must follow the description below.

On the first line of the output write a single integer number k . Write ‘-1’ if the ratio of the given factorial products is not an integer. Write ‘0’ if the ratio is an integer but it cannot be represented in the desired form. Write k , ($k > 0$) followed by k lines if the ratio can be represented by a factorial product as described in the problem statement. On each of the following k lines write two integers r_i and s_i (for $i = 1 \dots k$) separated by a space.

Sample Input

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1 2
6
4 4
1 2
6
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3 4
4 2
9 2 2 2
3 4

Sample Output

-1
0
2
7 1
2 2