

Problem H. Honaam

Payam Pardaz team is working on a combinatorial problem for their new secure online voting app called Honaam. They have made quite a long deduction and got this resulting formula:

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

This does not surprise this brilliant team, as factorials are often found in this kind of formulas, because $n!$ represents the number of transpositions of n elements — one of the basic combinatorial objects.

However, they might have made a mistake in their deductions. they know that the result should be an integer and it must be checked first. For an integer result, this formula must be simplified for them to get a better sense of its real combinatorial significance. They would like 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, They are 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. The actual value of t does not matter. They want to know what is the factorial-product part of their result.

Input

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 ($1 \leq p_i \leq 10\,000$) separated by spaces. The third line of the input file contains m integer numbers q_i ($1 \leq q_i \leq 10\,000$) separated by spaces.

Output

On the first line of the output write a single integer number k . Write $k = -1$ if the ratio of the given factorial products is not an integer. Write $k = 0$ if the ratio is an integer but it cannot be represented in the desired form. Write $k > 0$ 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.



Examples

test	answer
1 2 6 4 4	-1
1 2 6 3 4	0
4 2 9 2 2 2 3 4	2 7 1 2 2

Note

In the first test case the given factorial is not an integer so the output is -1 .

In the second test case the given factorial is equal to $\frac{6!}{3!4!} = 5$ and thus it cannot be represented in the desired form so the output is 0.