

Introduction

The greatest common divisor (GCD) of two or more integers is the largest positive integer that divides the numbers without a remainder. The least common multiple (LCM) is the least common multiple of the denominators in a set of fractions.

You need to write a program that calculates the GCD and the LCM of a series of numbers using the factorization method.

This method allows calculating both at the same time and consists on:

1. Find the prime factorization of each number: the prime factorization of an integer is the list of prime factors, along with their multiplicities, that produce the integer. This is unique for each number.
2. Find the GCD by grabbing the terms that all the sequences have in common. In no term is found, GCD is 1.
3. Find the LCD by grabbing all the different terms with their maximum multiplicity

Input

The input of the program is a set of numbers ending with a zero

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12
36
48
84
0
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Output

The program must output the prime factorization of each of the numbers, the GCD and the LCM. In the example, the common terms on all the factorization are $2 \times 2 \times 3$ so GCD is 12. The different terms with their maximum multiplicity, that is, the set that contains all of them, is 4 repetitions of number 2 (the maximum is in the factorization of 48), 2 repetitions of 3 and 1 repetition of 7, so LCM is 1008 ($= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7$).

$$12 = 2 \times 2 \times 3$$

$$36 = 2 \times 2 \times 3 \times 3$$

$$48 = 2 \times 2 \times 2 \times 2 \times 3$$

$$84 = 2 \times 2 \times 3 \times 7$$

The greatest common divisor is $2 \times 2 \times 3 = 12$

The least common multiple is $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7 = 1008$