Problem D
Factors
Time Limit: 2 seconds

The fundamental theorem of arithmetic states that every integer greater than 1 can be uniquely represented as a product of one or more primes. While unique, several arrangements of the prime factors may be possible. For example:

$$\begin{aligned} 10 &= 2 \cdot 5 \\ &= 5 \cdot 2 \end{aligned} \qquad \begin{aligned} 20 &= 2 \cdot 2 \cdot 5 \\ &= 2 \cdot 5 \cdot 2 \\ &= 5 \cdot 2 \cdot 2 \end{aligned}$$

Let $f(k)$ be the number of different arrangements of the prime factors of k. So $f(10) = 2$ and $f(20) = 3$.

Given a positive number n, there always exists at least one number k such that $f(k) = n$. We want to know the smallest such k.

Input

The input consists of at most 1 000 test cases, each on a separate line. Each test case is a positive integer $n < 2^{63}$.

Output

For each test case, display its number n and the smallest number $k > 1$ such that $f(k) = n$. The numbers in the input are chosen such that $k < 2^{63}$.

Sample Input 1	Sample Output 1
1 2 3 105	1 2 2 6 3 12 105 720