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:

```
10 = 2 * 5            20 = 2 * 2 * 5
   = 5 * 2               = 2 * 5 * 2
                         = 5 * 2 * 2
```

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 1000 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
2
3
105
```

Sample Output

```
1 2
2 6
3 12
105 720
```