Problem F
Fundamental Neighbors

Problem ID: fundamentalneighbors
CPU Time limit: 1 second
Memory limit: 1024 MB

Author: Greg Hamerly
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The fundamental theorem of arithmetic says that any natural number greater than one can be written uniquely as the product of prime numbers. For example: $3 = 3^1$, $4 = 2^2$, $6 = 2^1 \times 3^1$, $72 = 2^3 \times 3^2$, and in general,

$$n = p_1^{e_1} \times p_2^{e_2} \times \cdots \times p_k^{e_k}$$

for prime numbers p_1 through p_k and exponents e_1 through e_k.

For this problem, given an integer $n \geq 2$, determine what we will call the 'neighbor' of n. The neighbor is the integer you get by swapping the p_i and e_i values in the prime factorization of n. That is, if n is written in prime factorization as above, the neighbor of n is

$$e_1^{p_1} \times e_2^{p_2} \times \cdots \times e_k^{p_k}.$$

For example, if $n = 2\,000 = 2^4 \times 5^3$ then its neighbor is $4^2 \times 3^5 = 3\,888$.

Input

Input is a sequence of up to $20\,000$ integers, one per line. Each integer is in the range $2 \leq n < 2^{31}$. Input ends at the end of file.

Output

For each n, print n followed by its neighbor. Each neighbor is in the range $[1, 2^{31})$.

Sample Input 1

```
2
3
4
5
6
7
8
9
10
72
200
```

Sample Output 1

```
2 1
3 1
4 4
5 1
6 1
7 1
8 9
9 8
10 1
72 72
200 288
```