13^{th} South African Regional ACM Collegiate Programming Contest

Sponsored by IBM

15 October 2011

Problem D - Green Balloon
Prime factors

Problem Description

The Fundamental Theorem of Arithmetic roughly states that *every positive integer greater than one can be decomposed as a product of prime numbers; furthermore, this decomposition is unique apart from rearrangement of the factors.* Not one to believe mathematicians easily, you intend to check this out for yourself.

Your task is to write a program that will decompose an integer into its prime factors — you are of course hoping to find one that cannot be decomposed, but that, as they say, is your business.

Input

Your input consists of an arbitrary number of integers (but no more than 5000 of them), each on its own line. These integers are in the range $[2, 2^{21})$.

The end of input is indicated by a line containing only the value -1.

Output

For each input value x, print out the line

x=$f_1 * f_2 * \ldots * f_j$

where x is the input value, and $f_1, \ldots, f_j$, with $f_i \geq f_{i+1}\ \forall i \in 1..j$, denotes the prime factors of x.

Sample Input

```
991
2097151
-1
```

Sample Output

```
991=991
2097151=337*127*7*7
```

Time Limit

60 seconds