583 Prime Factors

Webster defines *prime* as:

prime (prim) *n.*[**ME**, fr. **MF**, fem. of *prin* first, **L** *primus*; akin to **L** *prior*] **1** :first in time: **original** **2 a** : having no factor except itself and one $\langle$3 is a number $\rangle$ **b** : having no common factor except one $\langle$ 12 and 25 are relatively $\rangle$ **3 a** : first in rank, authority or significance : **principal b** : having the highest quality or value $\langle$ television time $\rangle$ [from *Webster's New Collegiate Dictionary*]

The most relevant definition for this problem is 2a: An integer $g > 1$ is said to be *prime* if and only if its only positive divisors are itself and one (otherwise it is said to be *composite*). For example, the number 21 is composite; the number 23 is prime. Note that the decompositon of a positive number g into its prime factors, i.e.,

$$g = f_1 \times f_2 \times \ldots \times f_n$$

is unique if we assert that $f_i > 1$ for all i and $f_i \leq f_j$ for $i < j$.

One interesting class of prime numbers are the so-called *Mersenne* primes which are of the form $2^p - 1$. Euler proved that $2^3 1 - 1$ is prime in 1772 — all without the aid of a computer.

Input

The input will consist of a sequence of numbers. Each line of input will contain one number g in the range $-2^3 1 < g < 2^3 1$. The end of input will be indicated by an input line having a value of zero.

Output

For each line of input, your program should print a line of output consisting of the input number and its prime factors. For an input number $0 < g = f_1 \times f_2 \times \ldots \times f_n$, where each f_i is a prime number greater than unity (with $f_i \leq f_j$ for $i < j$), the format of the output line should be

$$\langle g\rangle \texttt{ = } \langle f_1\rangle \texttt{ x } \langle f_2\rangle \texttt{ x } \ldots \texttt{ x } \langle f_n\rangle$$

If $0 > g = f_1 \times f_2 \times \ldots \times f_n$, the format of the output line should be

$$\langle g\rangle \texttt{ = -1 x } \langle f_1\rangle \texttt{ x } \langle f_2\rangle \texttt{ x } \ldots \texttt{ x } \langle f_n\rangle$$

Sample Input

```
-190
-191
-192
-193
-194
195
196
197
198
199
200
0
```

Sample Output

```
-190 = -1 x 2 x 5 x 19
-191 = -1 x 191
-192 = -1 x 2 x 2 x 2 x 2 x 2 x 2 x 3
-193 = -1 x 193
-194 = -1 x 2 x 97
195 = 3 x 5 x 13
196 = 2 x 2 x 7 x 7
197 = 197
198 = 2 x 3 x 3 x 11
199 = 199
200 = 2 x 2 x 2 x 5 x 5
```