```
3
1 1
2 1 2

5
1 1
1 1
2 2 3
1 1
```

Output for Sample Input

```
The bridge is safe.
4
```

Comment: The joint number 4 is connected to joints 2 and 3, which are not connected together directly.





Numbers Factorization

`no files available yet`

Factoring numbers into a product of primes is one of the most famous problems in mathematics. Your task is to solve this problem once for all. Remember that a *prime* is a number that has exactly two natural divisors.

Input Specification

The input consists of several lines, each of them containing one positive integer number, no bigger than 1000000. The last line contains the number zero, which signals the end of the input.

Output Specification

For each of the positive numbers, print the number, one space, an equal sign ("="), one more space, and the factorization into prime numbers (factors) on either one or two lines. The factors should be listed in ascending order, separated with one space, small letter "`x`", and one more space. If some factor should appear more than once, use exponents instead, printed on an additional line above the main one. See the Sample Output for an example.

The position of exponents must be exact, each of them beginning one character after the corresponding prime number. The main line (the one with primes) must be filled with extra spaces wherever an exponent appears. Do not display exponents that are equal to 1. If there are no exponents at all, you *must not* print the additional line.

If the input number is a prime, print it, one space, and the phrase "`is a prime number`". If the input number is 1, output the phrase "`1 is just a one`".

Print one empty line after each factorization or phrase. There may be additional spaces at the end of any line.