
6. Factor Faster

Program Name: factor.java

Input File: factor.in

Write a program to factor integers or indicate they are prime.

Input

The first line of the input file will contain a single integer, n , indicating the number of integers to factor.

The next n lines will each contain a single positive integer less than 100000 (one hundred thousand).

Output

Factor each integer, m . If it is prime, output the message “ m is prime”. Otherwise, output the prime factorization of m with factors listed in descending order and with repeating factors noted using exponents. For example, the number $72 = 3 \times 3 \times 2 \times 2 \times 2 = 3^2 \times 2^3$ (see the third example).

Example Input File

```
3
13
99
72
```

Example Output To Screen

```
13 is prime
99 = 11 x 3^2
72 = 3^2 x 2^3
```