

## Factors and Factorial (UVA 160)

The factorial of a number  $N$  (written  $N!$ ) is defined as the product of all the integers from 1 to  $N$ . It is often defined recursively as follows:

$$1! = 1$$

$$N! = N * (N-1)!$$

Factorials grow very rapidly-- $5! = 120$ ,  $10! = 3,628,800$ . One way of specifying such large numbers is by specifying the number of times each prime number occurs in it, thus 825 could be specified as (0 1 2 0 1) meaning no twos, 1 three, 2 fives, no sevens and 1 eleven.

Write a program that will read in a number  $N$  ( $2 \leq N \leq 100$ ) and write out its factorial in terms of the numbers of the primes it contains.

### Input

Input will consist of a series of lines, each line containing a single integer  $N$ . The file will be terminated by a line consisting of a single 0.

### Output

Output will consist of a series of blocks of lines, one block for each line of the input. Each block will start with the number  $N$ , right justified in a field of width 3, and the characters `!', space, and `='. This will be followed by a list of the number of times each prime number occurs in  $N!$ .

These should be right justified in fields of width 3 and each line (except the last of a block, which may be shorter) should contain fifteen numbers. Any lines after the first should be indented. Follow the layout of the example shown below exactly.

### Sample input

```
5
53
0
```

### Sample output

```
5! = 3 1 1
53! = 49 23 12 8 4 4 3 2 2 1 1 1 1 1 1
```