

4225 Prime Bases

Given any integer base $b \geq 2$, it is well known that every positive integer n can be uniquely represented in base b . That is, we can write

$$n = a_0 + a_1 * b + a_2 * b * b + a_3 * b * b * b + \dots$$

where the coefficients $a_0, a_1, a_2, a_3, \dots$ are between 0 and $b - 1$ (inclusive).

What is less well known is that if p_0, p_1, p_2, \dots are the first primes (starting from 2, 3, 5, ...), every positive integer n can be represented uniquely in the “mixed” bases as:

$$n = a_0 + a_1 * p_0 + a_2 * p_0 * p_1 + a_3 * p_0 * p_1 * p_2 + \dots$$

where each coefficient a_i is between 0 and $p_i - 1$ (inclusive). Notice that, for example, a_3 is between 0 and $p_3 - 1$, even though p_3 may not be needed explicitly to represent the integer n .

Given a positive integer n , you are asked to write n in the representation above. Do not use more primes than it is needed to represent n , and omit all terms in which the coefficient is 0.

Input

Each line of input consists of a single positive 32-bit signed integer. The end of input is indicated by a line containing the integer '0'.

Output

For each integer, print the integer, followed by a space, an equal sign, and a space, followed by the mixed base representation of the integer in the format shown below. The terms should be separated by a space, a plus sign, and a space. The output for each integer should appear on its own line.

Sample Input

```
123
456
123456
0
```

Sample Output

```
123 = 1 + 1*2 + 4*2*3*5
456 = 1*2*3 + 1*2*3*5 + 2*2*3*5*7
123456 = 1*2*3 + 6*2*3*5 + 4*2*3*5*7 + 1*2*3*5*7*11 + 4*2*3*5*7*11*13
```