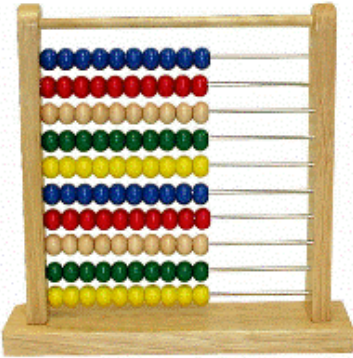


## 12090 Counting Zeroes

In our daily life we often meet some stupid persons. They tend to do things by hand which can only be done with computers. Our friend Hashmat is such a person and now he is counting with abacus, pencil and paper the summation of trailing zeroes of a particular number in all possible number systems (Of course, I am talking about the common number system like decimal, binary, hexadecimal or n-based number system).



We the average intelligent peoples know what a number system is. Our daily life number system is the decimal (10-based) number system, our corporate life number system is the binary (2-based) number system. A number may or may not have trailing zeroes in certain number system. For example in decimal number system  $1020_{10}$  (It means 1020 is a number whose base is 10) has 1 trailing zero but in hexadecimal number system  $1020_{10}$  has no trailing zeroes. Let us create a function  $fzero(n, b)$ , which actually denotes the number of trailing zeroes of  $n$  in  $b$ -based number system. So  $fzero(1020_{10}, 10) = 1$  and  $fzero(1020_{10}, 16) = 0$ . Although for a certain number and certain base the task is trivial but it is very time consuming to do it for all possible

number systems with the help of only pencil and paper. So your job is now to help Hashmat, so that he can complete this task and do something meaningful in life. In other words given the value of  $n$  your job is to find out the value of:

$$\sum_{b=2}^{\infty} fzero(n, b)$$

### Input

The input file contains at most 400 lines of inputs. Each line contains a decimal integer  $n$  ( $0 < n \leq 10^{13}$ ). Input is terminated by a line containing a single zero.

### Output

For each line of input produce one line of output. This line contains the input number followed by the value of  $\sum_{b=2}^{\infty} fzero(n, b)$ .

### Sample Input

```
10
20
0
```

### Sample Output

```
10 3
20 6
```