A mad researcher was trying to get fund for his research project but it is a pity that after a year he was able to collect 500$ only. So all his research work has gone to ashtray. The mad researcher now wants his revenge, so he wants you to solve his unfinished research problem within a very limited time. You will be happy to know that his research is related to Eulers phi function.

Euler's phi (or totient) function of a positive integer n is the number of integers in $\{1, 2, 3, \ldots, n\}$ which are relatively prime to n. This is usually denoted as $\phi(n)$. The table below shows the value of phi function for first few numbers.

integer n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
$\phi(n)$	1	1	2	2	4	2	6	4	6	4	10	4	12	6	8	8

Given the value of n, it is very easy to find the value of $\phi(n)$ using the formula below:

$$\phi(n) = n \prod_{p|n}(1 - \frac{1}{p}) \qquad // \text{ Here } p \text{ is prime}$$

According to this formula $\phi(12) = \phi(2^2 * 3) = 12(1 - \frac{1}{2})(1 - \frac{1}{3}) = 12 * \frac{1}{2} * \frac{2}{3} = 4$.

But your task is not quite straightforward, given the value of $\phi(n)$ you will have to find the minimum possible value of n.

Input

The input file contains at most 100 lines of input. Each line contains a positive integer phi_n ($1 \leq phi_n \leq 100000000$). Input is terminated by a line where $phi_n = 0$. This line should not be processed.

Output

For each line of input produce one line of output. This line contains the serial of output followed by two integers phi_n and n. The first integer is the integer taken as input and the second integer is the minimum possible value of n, for which $\phi(n) = phi_n$. All the input numbers will be such that for all given input there will be a possible value of n less than 200000000.

Sample Input

```
12
24
2280960
5000000
0
```

Sample Output

```
Case 1: 12 13
Case 2: 24 35
Case 3: 2280960 2283989
Case 4: 5000000 6265625
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