UVa Online Judge

10179 Irreducible Basic Fractions

A *fraction* $\frac{m}{n}$ is *basic* if $0 \leq m < n$ and it is *irreducible* if $\gcd(m, n) = 1$. Given a positive integer n, in this problem you are required to find out the number of *irreducible basic fractions* with denominator n.

For example, the set of all *basic fractions* with denominator 12, before reduction to lowest terms, is

$$\frac{0}{12}, \frac{1}{12}, \frac{2}{12}, \frac{3}{12}, \frac{4}{12}, \frac{5}{12}, \frac{6}{12}, \frac{7}{12}, \frac{8}{12}, \frac{9}{12}, \frac{10}{12}, \frac{11}{12}$$

Reduction yields

$$\frac{0}{12}, \frac{1}{12}, \frac{1}{6}, \frac{1}{4}, \frac{1}{3}, \frac{5}{12}, \frac{1}{2}, \frac{7}{12}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}, \frac{11}{12}$$

Hence there are only the following 4 *irreducible basic fractions* with denominator 12

$$\frac{0}{12}, \frac{5}{12}, \frac{7}{12}, \frac{11}{12}$$

Input

Each line of the input contains a positive integer n (< 1000000000) and the input terminates with a value 0 for n (do not process this terminating value).

Output

For each n in the input print a line containing the number of *irreducible basic fractions* with denominator n.

Sample Input

```
12
123456
7654321
0
```

Sample Output

```
4
41088
7251444
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