Problem L

Irreducible Basic Fractions

Input: standard input
Output: standard output
Time Limit: 4 seconds

A *fraction m / n* is *basic* if 0 <= *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

$$\frac{1}{12},\frac{5}{12},\frac{7}{12},\frac{11}{12}$$

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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“I shot an arrow into the air,
It fell to earth, I knew not where;
For, so swiftly it flew, the sight
Could not follow it in its flight.

I breathed a song into the air,
It fell to earth, I knew not where;
For who has sight so keen and strong,
That it can follow the flight of song?

Long, Long afterward, in an oak
I found the arrow, still unbroke;
And the song from beginning to end,
I found again in the heart of a friend.”