

Problem L

Irreducible Basic Fractions

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

A fraction 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

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

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
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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.”