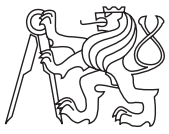


Czech ACM Student Chapter
CTU in Prague, Dept. of Computer Science and Engineering
Charles University in Prague, MFF
VŠB TU Ostrava, FEI, Dept. of Computer Science
SUT Bratislava, FEI, Dept. of Computer Science and Engineering



CTU Open Contest 2004

C Looooops

`c.p`, `c.c`, `c.C`

A Compiler Mystery: We are given a C-language style `for` loop of type

```
for (variable = A; variable != B; variable += C)
  statement;
```

I.e., a loop which starts by setting *variable* to value A and while *variable* is not equal to B, repeats *statement* followed by increasing the *variable* by C. We want to know how many times does the *statement* get executed for particular values of A, B and C, assuming that all arithmetics is calculated in a k-bit unsigned integer type (with values $0 \leq x < 2^k$) modulo 2^k.

Input Specification

The input consists of several instances. Each instance is described by a single line with four integers A, B, C, k separated by a single space. The integer k ($1 \leq k \leq 32$) is the number of bits of the control variable of the loop and A, B, C ($0 \leq A, B, C < 2^k$) are the parameters of the loop.

The input is finished by a line containing four zeros.

Output Specification

The output consists of several lines corresponding to the instances on the input. The i-th line contains either the number of executions of the *statement* in the i-th instance (a single integer number) or the word `FOREVER` if the loop does not terminate.

Sample Input

```
3 3 2 16
3 7 2 16
7 3 2 16
3 4 2 16
0 0 0 0
```

Output for Sample Input

```
0
2
32766
FOREVER
```