Discrete Logging

Time Limit: 5000MS **Memory Limit:** 65536K
Total Submissions: 12744 **Accepted:** 4818

Description

Given a prime P, 2 <= P < 2^{31}, an integer B, 2 <= B < P, and an integer N, 1 <= N < P, compute the discrete logarithm of N, base B, modulo P. That is, find an integer L such that

$$B^{L} == N \pmod{P}$$

Input

Read several lines of input, each containing P,B,N separated by a space.

Output

For each line print the logarithm on a separate line. If there are several, print the smallest; if there is none, print "no solution".

Sample Input

```
5 2 1
5 2 2
5 2 3
5 2 4
5 3 1
5 3 2
5 3 3
5 3 4
5 4 1
5 4 2
5 4 3
5 4 4
12345701 2 1111111
1111111121 65537 1111111111
```

Sample Output

```
0
1
3
2
0
3
1
2
0
no solution
no solution
1
9584351
462803587
```

Hint

The solution to this problem requires a well known result in number theory that is probably expected of you for Putnam but not ACM competitions. It is Fermat's theorem that states

$$B^{(P-1)} == 1 \pmod{P}$$

for any prime P and some other (fairly rare) numbers known as base-B pseudoprimes. A rarer subset of the base-B pseudoprimes, known as Carmichael numbers, are pseudoprimes for every base between 2 and P-1. A corollary to Fermat's theorem is that for any m

$$B^{(-m)} == B^{(P-1-m)} \pmod{P} .$$

Source

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