



## C. Primes and Multiplication

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

Let's introduce some definitions that will be needed later.

Let  $prime(x)$  be the set of prime divisors of  $x$ . For example,  $prime(140) = \{2, 5, 7\}$ ,  $prime(169) = \{13\}$ .

Let  $g(x, p)$  be the maximum possible integer  $p^k$  where  $k$  is an integer such that  $x$  is divisible by  $p^k$ . For example:

- $g(45, 3) = 9$  (45 is divisible by  $3^2 = 9$  but not divisible by  $3^3 = 27$ ),
- $g(63, 7) = 7$  (63 is divisible by  $7^1 = 7$  but not divisible by  $7^2 = 49$ ).

Let  $f(x, y)$  be the product of  $g(y, p)$  for all  $p$  in  $prime(x)$ . For example:

- $f(30, 70) = g(70, 2) \cdot g(70, 3) \cdot g(70, 5) = 2^1 \cdot 3^0 \cdot 5^1 = 10$ ,
- $f(525, 63) = g(63, 3) \cdot g(63, 5) \cdot g(63, 7) = 3^2 \cdot 5^0 \cdot 7^1 = 63$ .

You have integers  $x$  and  $n$ . Calculate  $f(x, 1) \cdot f(x, 2) \cdot \dots \cdot f(x, n) \bmod (10^9 + 7)$ .

### Input

The only line contains integers  $x$  and  $n$  ( $2 \leq x \leq 10^9$ ,  $1 \leq n \leq 10^{18}$ ) — the numbers used in formula.

### Output

Print the answer.

### Examples

<b>input</b>	<a href="#">Copy</a>
10 2	
<b>output</b>	<a href="#">Copy</a>
2	
<b>input</b>	<a href="#">Copy</a>
20190929 1605	
<b>output</b>	<a href="#">Copy</a>
363165664	
<b>input</b>	<a href="#">Copy</a>
947 987654321987654321	
<b>output</b>	<a href="#">Copy</a>
593574252	

### Note

In the first example,  $f(10, 1) = g(1, 2) \cdot g(1, 5) = 1$ ,  
 $f(10, 2) = g(2, 2) \cdot g(2, 5) = 2$ .

In the second example, actual value of formula is approximately  $1.597 \cdot 10^{171}$ . Make sure you print the answer modulo  $(10^9 + 7)$ .

In the third example, be careful about overflow issue.

### Codeforces Round #589 (Div. 2)

[Finished](#)
[Practice](#)


### → Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest](#)

### → Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

### → Clone Contest to Mashup

You can clone this contest to a mashup.

[Clone Contest](#)

### → Submit?

Language: GNU G++11 5.1.0

Choose file: [选择文件](#) 未选择任何文件



Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

[Submit](#)

### → Problem tags

[math](#) [number theory](#)
[No tag edit access](#)

### → Contest materials

- [Announcement \(en\)](#) 
- [Tutorial \(en\)](#) 



---

[Codeforces](#) (c) Copyright 2010-2019 Mike Mirzayanov  
The only programming contests Web 2.0 platform  
Server time: Sep/30/2019 08:08:31<sup>UTC+8</sup> (h2).  
Desktop version, switch to [mobile version](#).  
[Privacy Policy](#)

Supported by



ITMO UNIVERSITY