



E. Expected Value Again

time limit per test: 4 seconds
 memory limit per test: 256 megabytes
 input: standard input
 output: standard output

You are given integers n, k . Let's consider the alphabet consisting of k different elements.

Let **beauty** $f(s)$ of the string s be the number of indexes $i, 1 \leq i < |s|$, for which prefix of s of length i equals to suffix of s of length i . For example, beauty of the string *abacaba* equals 2, as for $i = 1, 3$ prefix and suffix of length i are equal.

Consider all words of length n in the given alphabet. Find the expected value of $f(s)^2$ of a uniformly chosen at random word. We can show that it can be expressed as $\frac{P}{Q}$, where P and Q are coprime and Q isn't divided by $10^9 + 7$. Output $P \cdot Q^{-1} \bmod 10^9 + 7$.

Input

The first and the only line contains two integers n, k ($1 \leq n \leq 10^5, 1 \leq k \leq 10^9$) — the length of a string and the size of alphabet respectively.

Output

Output a single integer — $P \times Q^{-1} \bmod 10^9 + 7$.

Examples

input	Copy
2 3	
output	Copy
333333336	
input	Copy
1 5	
output	Copy
0	
input	Copy
100 1	
output	Copy
9801	
input	Copy
10 10	
output	Copy
412377396	

Note

In the first example, there are 9 words of length 2 in alphabet of size 3 — *aa, ab, ac, ba, bb, bc, ca, cb, cc*. 3 of them have beauty 1 and 6 of them have beauty 0, so the average value is $\frac{1}{3}$.

In the third example, there is only one such word, and it has beauty 99, so the average value is 99^2 .

Codeforces Round #580 (Div. 1)

Finished

Practice



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You can clone this contest to a mashup.

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→ 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.



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→ Problem tags

[combinatorics](#) [strings](#) [*3100](#)

No tag edit access

→ Contest materials

- Announcement #1 (en) 
- Announcement #2 (ru) 



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