Problem E
Exponial
Problem ID: exponial
Time limit: 1 second

Everybody loves big numbers (if you do not, you might want to stop reading at this point). There are many ways of constructing really big numbers known to humankind, for instance:

Illustration of $\mathtt{exponial}(3)$ (not to scale), Picture by C.M. de Talleyrand-Périgord via Wikimedia Commons

- Exponentiation: $42^{2016} = \underbrace{42 \cdot 42 \cdot \ldots \cdot 42}_{\text{2016 times}}$.
- Factorials: $2016! = 2016 \cdot 2015 \cdot \ldots \cdot 2 \cdot 1$.

In this problem we look at their lesser-known love-child the *exponial*, which is an operation defined for all positive integers n as

$$\mathrm{exponial}(n) = n^{(n-1)^{(n-2)^{\cdots^{2^{1}}}}}.$$

For example, $\mathrm{exponial}(1) = 1$ and $\mathrm{exponial}(5) = 5^{4^{3^{2^{1}}}} \approx 6.206 \cdot 10^{183230}$ which is already pretty big. Note that exponentiation is right-associative: $a^{b^c} = a^{(b^c)}$.

Since the exponials are really big, they can be a bit unwieldy to work with. Therefore we would like you to write a program which computes $\mathrm{exponial}(n) \bmod m$ (the remainder of $\mathrm{exponial}(n)$ when dividing by m).

Input

The input consists of two integers n ($1 \le n \le 10^9$) and m ($1 \le m \le 10^9$).

Output

Output a single integer, the value of $\mathrm{exponial}(n) \bmod m$.

Sample Input 1	Sample Output 1
`2 42`	`2`

Sample Input 2	Sample Output 2
`5 123456789`	`16317634`

Sample Input 3	Sample Output 3
`94 265`	`39`