HCI '16 - Totient

Time limit: 0.2s   **Memory limit:** 16M

Functions $f(x)$ and $g(y)$ are defined below.

$$f(x) = \begin{cases} 1, & \text{if } x = a^b \\ 0, & \text{if } x \neq a^b \end{cases}$$

where a and b are integers such that $a \geq 1$ and $b > 1$.

$$g(y) = \sum_{i=0}^{y} f(\phi(i)) \cdot \phi(i)$$

where $\phi(z)$ is Euler's totient function.

Given an integer N, output $g(N) \pmod{10^9 + 7}$.

Input

A positive integer $N \leq 1\,000\,000$.

Output

The value of $g(N) \pmod{10^9 + 7}$.

Constraints

Average scoring is used for this problem.

The first test case is the sample test below.

Afterwards, there will be 50 test cases worth 2 points each.

In all test cases, $1 \leq N \leq 1\,000\,000$.

Sample Input

```
5
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Sample Output

6

Explanation

$g(5) = 0 \cdot 0 + 1 \cdot 1 + 1 \cdot 1 + 0 \cdot 2 + 0 \cdot 2 + 1 \cdot 4 = 6$