



Problem J. Binary String

Huyen is learning about the string and she is very interested in binary string problems. She decided to build an infinite string using the following rule:

- Start from $str = "0"$
- $str = str + \text{not}(str)$, where $\text{not}(str)$ is a binary sequence that's generated by swapping 0 to 1 and vice versa.

Given an integer n , your task is to write a program to find the substring of str with a length of 3 that starts at position n .

For example: $n = 3$, the output should be "010".

Step 1: $str = "0" + "1" = "01"$

Step 2: $str = "01" + "10" = "0110"$

Step 3: $str = "0110" + "1001" = "01101001"$

You can continue to build the infinite string but the substring of length 3 starting from position 3 is always "010".

Input

The input contains a positive integer n ($0 \leq n \leq 2 \times 10^{15}$).

Output

The substring of str that has a length of 3 and starts at position n .

Examples

Standard Input	Standard Output
3	010