

Lights [II]

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output
points: 100 · problem code: lights2 · author: glipR

The blurb for this problem is the same as Lights [I], save for the statement of the problem.

You stand before an infinitely long corridor containing lights and their respective switches. You'd like to turn a subset of the lights on using little robots that will flick certain switches infinitely along the corridor.

In this second problem, you'll be sending an infinite number of robots. The i^{th} robot will flick switches according the the following rule:

Robot i flicks light switch j if 2^{i-1} divides j . In other words, the i^{th} robot flicks every 2^{i-1} th switch.

A light switch stays on if after all robots are done, it has been flicked an odd number of times. For example, Light Switch #4 is on because it was flicked by Robots 1, 2 and 3. While Light Switch #2 is off because it was flicked by Robots 1 and 2.

Input

Input will contain a single integer n , representing how many lights we'll be considering

Output

Output will contain a single integer, representing the total number of lights at position at or before the n^{th} light that are on at the end of execution

Constraints

- $1 \leq n \leq 10^{18}$

Examples

Input

3

Output

2

Explanation

2 is the only light switch that is turned off.

Input

4

Output

3

Explanation

2 is the only light switch that is turned off.

Input

10

Output

6

Explanation

2, 6, 8, 10 are the only light switches that are turned off.