

# Problem E

## Cards Counting-out

**Time limit: 1 second**

**Memory Limit: 131072 bytes**

A deck of  $n$  cards is placed on the table. The cards are numbered from 1 (top) to  $n$  (bottom). The top card is moved to the bottom of the deck, then the next top card is discarded, i.e. thrown away, then the next next top card is moved to the bottom of the deck, then the next next next top card is discarded, and the process continues until only one card remains on the table. Your task is to compute what number of the last remaining card is. For instance, when  $n = 5$  then the last card remains on the table is card number 3.

**Input:**

Number of cards in the deck,  $n$  ( $0 < n \leq 10^{19}$ )

**Output:**

Number of the last card on the table.

<b>Sample Input 1:</b> 4	<b>Sample Output 1:</b> 1
<b>Sample Input 2:</b> 5	<b>Sample Output 2:</b> 3
<b>Sample Input 3:</b> 8700000078	<b>Sample Output 3:</b> 220130973
<b>Sample Input 4:</b> 1234567890123456789	<b>Sample Output 4:</b> 163292771033219627