Problem H. Hidden card trick

Source file name:	`H.c, H.cpp, H.java`
Input:	`Standard`
Output:	`Standard`
Author(s):	`Gilberto Vargas - CUCEI Guadalajara`

There is a guy that comes to CUCEI and do some magick tricks, this is his way to make money and keep studying. A lot of people have seen his magic tricks but nobody know exactly if he really studies or not. His favorite tricks are always with a deck of cards and nobody have ever found how does he do all these sorceries.

One of the tricks that I can remember is that one day he asked a friend to choose a card without letting him see it, then he shuffles the deck and tries to guess what card my friend picked, He guessed incorrectly three times with different cards and when we thought he had failed he asked us to move one step back to give him some space, when we moved back the card was under my friend's foot. Amazing!

Another trick that he does is that he asks you to take one card and to remove it from the deck, then he takes the card and places it in some random position in the deck. After the card is placed he will take the first card and put it at the bottom of the deck, and discard the next card, he continues alternating until only one card is left. As you may guess the last card is the one that was chosen at the beginning of the trick.

Can you guess how did he do this magic trick?

Given a number N representing the size of the deck determine in which position you should place the card so it will be the last card after when doing the trick.

Input

The input consists of several test cases, one case per line. Each test case is described by a single line with a single number N.

- $1 \leq N \leq 10^{15}$

Output

One line for each test case telling the position in which the card should be placed. The input finishes with a line containing a zer, this should not be processed.

Example

Input	Output
1 7 14 8 0	1 7 13 1

Explanation

For the case for 7 cards:

- 1 goes to bottom
- 2 is discarded
- 3 goes to bottom
- 4 is discarded

- 5 goes to bottom
- 6 is discarded
- 7 goes to bootm
- 1 is discarded
- 3 goes to bottom
- 5 is discarded
- 7 goes to bottom
- 1 is discarded
- 7 is the last card, so 7 should be the position to place the card.