390. Elimination Game

You have a list arr of all integers in the range [1, n] sorted in a strictly increasing order. *Apply the following algorithm on arr:*

- Starting from left to right, remove the first number and every other number afterward until you reach the end of the list.
- Repeat the previous step again, but this time from right to left, remove the rightmost number and every other number from the remaining numbers.
- Keep repeating the steps again, alternating left to right and right to left, until a single number remains.

Given the integer n, return the last number that remains in arr.

Example 1:

- **Input:** n = 9
- **Output:** 6
- **Explanation:**
  - arr = [1, 2, 3, 4, 5, 6, 7, 8, 9]
  - arr = [2, 4, 6, 8]
  - arr = [2, 6]
  - arr = [6]

Example 2:

- **Input:** n = 1
- **Output:** 1

Constraints:

- $1 <= n <= 10^9$