# 390. Elimination Game

## Description

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` $^9$