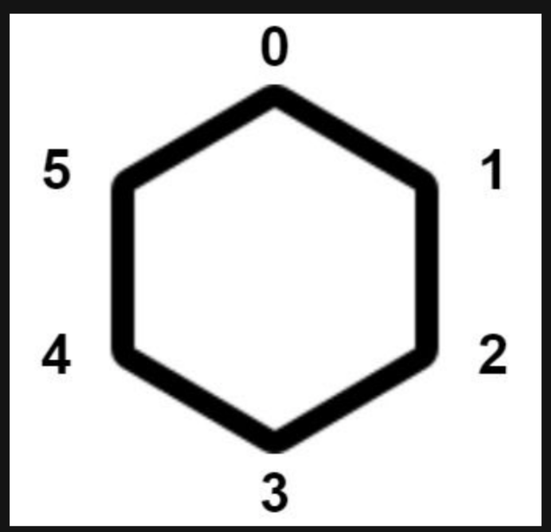
2550. Count Collisions of Monkeys on a Polygon

Description

There is a regular convex polygon with `n` vertices. The vertices are labeled from `0` to `n - 1` in a clockwise direction, and each vertex has **exactly one monkey**. The following figure shows a convex polygon of `6` vertices.



Each monkey moves simultaneously to a neighboring vertex. A neighboring vertex for a vertex `i` can be:

- the vertex `(i + 1) % n` in the clockwise direction, or
- the vertex `(i - 1 + n) % n` in the counter-clockwise direction.

A **collision** happens if at least two monkeys reside on the same vertex after the movement or intersect on an edge.

Return *the number of ways the monkeys can move so that at least* ***one collision*** *happens*. Since the answer may be very large, return it modulo `10^9 + 7`.

Note that each monkey can only move once.

Example 1:

```
Input: n = 3
Output: 6
Explanation: There are 8 total possible movements.
Two ways such that they collide at some point are:
- Monkey 1 moves in a clockwise direction; monkey 2 moves in an anticlockwise direction; monkey 3 moves in a clockwise direction. Monkeys 1 and 2 collide.
- Monkey 1 moves in an anticlockwise direction; monkey 2 moves in an anticlockwise direction; monkey 3 moves in a clockwise direction. Monkeys 1 and 3 collide.
It can be shown 6 total movements result in a collision.
```

Example 2:

```
Input: n = 4
Output: 14
Explanation: It can be shown that there are 14 ways for the monkeys to collide.
```

Constraints:

- `3 <= n <= 10^9`