Problem D
LEGO Brick

Time limit: 1 second
Memory limit: 2048 megabytes

Problem Description

Your little brother Daniel loves playing with LEGO bricks. He has n bricks, each measuring 1×3 in size. However, Daniel never tidies them up after playing, and you always end up stepping on the scattered LEGO bricks, causing you considerable pain. Reluctantly, you then help him tidy up.

The storage box for the LEGO bricks is a $3 \times n$ flat surface. Each LEGO brick can be placed vertically or horizontally into the box, but they cannot be bent or damaged, as Daniel would cry. As you tidy up the LEGO bricks, you suddenly become curious. How many different ways are there to neatly store these LEGO bricks?

Input Format

The first line contains an integer n, indicating the total number of LEGO bricks.

Output Format

Output the number of ways to neatly store the LEGO bricks. Since the answer could be large, please output it modulo $10^9 + 7$.

Technical Specification

- $1 \leq n \leq 10^{18}$

Sample Input 1

```
4
```

Sample Output 1

```
3
```

Sample Input 2

```
5
```

Sample Output 2

```
4
```

Sample Input 3

```
1000000000000000000
```

Sample Output 3

```
615472476
```

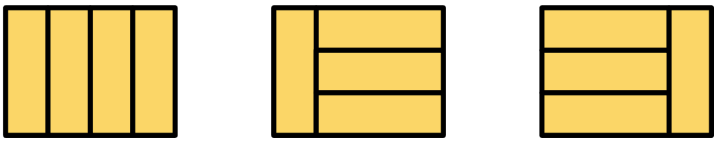
Hint

Here are some properties of modulo operations:

1. $(a+b) \mod m = ((a \mod m) + (b \mod m)) \mod m$
2. $(a \times b) \mod m = (a \mod m) \times (b \mod m) \mod m$

Note

When there are 4 LEGO bricks, there are 3 ways to neatly store them.



When there are 5 LEGO bricks, there are 4 ways to neatly store them.