6 Last Digit of the Sum of Fibonacci Numbers

Problem Introduction

The goal in this problem is to find the last digit of a sum of the first n Fibonacci numbers.

Problem Description

Task. Given an integer n, find the last digit of the sum $F_0 + F_1 + \cdots + F_n$.

Input Format. The input consists of a single integer n.

Constraints. $0 \leq n \leq 10^{14}$.

Output Format. Output the last digit of $F_0 + F_1 + \cdots + F_n$.

Sample 1.

Input:

```
3
```

Output:

```
4
```

$F_0 + F_1 + F_2 + F_3 = 0 + 1 + 1 + 2 = 4$.

Sample 2.

Input:

```
100
```

Output:

```
5
```

The sum is equal to 927 372 692 193 078 999 175, the last digit is 5.

What To Do

Instead of computing this sum in a loop, try to come up with a formula for $F_0 + F_1 + F_2 + \cdots + F_n$. For this, play with small values of n. Then, use a solution for the previous problem.

Need Help?

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