The 2019 Ethiopian Collegiate Programming Contest

Problem B
Balanced String
Time Limit: 0.5 Seconds

The difference between the number of $0's$ and the number of $1's$ of a binary string 0101101 is less than or equal to 1. Furthermore, all substrings of 0101101 including the first character, i.e. 0, 01, 010, 0101, 01011, 010110, and 0101101 have the difference less than or equal to 1.

A binary string S is considered a **balanced string** if the difference of the number of 0 and the number of 1 is less than or equal to 1 for all substrings of S that include the first character. Note that S itself is a substring of S.

Given a positive integer n, write a program to find the number of balanced strings for the strings of the length n.

For example, if $n = 3$, four strings, 010, 011, 100, 101, are balanced strings.

Input
Your program is to read from standard input. The first line of input contains one integer n ($1 \leq n \leq 100{,}000$).

Output
Your program is to write to standard output. Print exactly one line. The line should contain B modulo 16769023 where B is the number of balanced strings of length n.

The following shows sample input and output for three test cases.

Sample Input 1	Output for the Sample Input 1
3	4

Sample Input 2	Output for the Sample Input 2
22	2048

Sample Input 3	Output for the Sample Input 3
101	393256