

Connected Points

[English](#)

[Vietnamese](#)

Consider a regular grid of $3 \times N$ points. Every point in the grid has up to eight neighboring points (see figure 1).

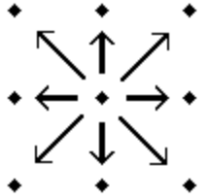


Figure 1: Neighboring points (marked by arrows).

We are interested in counting the number of different ways to connect the points of the grid to form a polygon that fulfils the following conditions: 1. The set of vertices of the polygon consists of all $3 \times N$ points. 2. Adjacent vertices of the polygon are neighboring points in the grid. 3. Each polygon is simple, i.e. there must not be any self-intersections. Two possible polygons for $N = 6$ are given in the figure 2.



Figure 2: Two possible connections of points for $N = 6$.

Write a program that calculates for a given N the number of possible ways to connect the points as described modulo 1,000,000,000.

Input

The first and only line contains one positive integer N ($N \leq 1,000,000,000$).

Output

The only line to be written contains the remainder of the number of ways to connect the points modulo 1,000,000,000.

Example

Input:

3

Output:

8

Input:

4

Output:

