

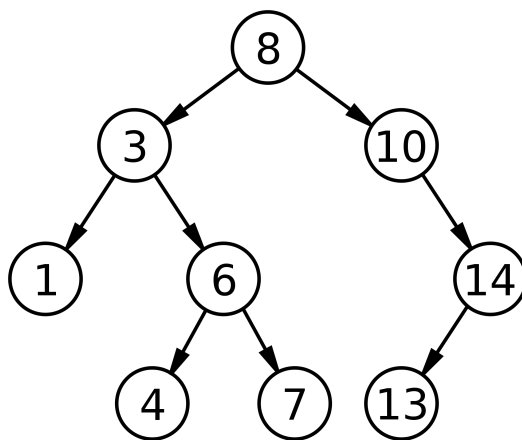
2015-2016 NOI Pre-Training Practice

Problem: BSTREES

Time Limit: 1 second

Memory Limit: 64 MB

Problem Description Jacob the mathematician has been researching on data structures recently, especially binary search trees. A binary search tree is a *rooted binary tree* with uniquely labeled nodes, and the left child of a every node has a label that is smaller than the node itself, and the right child of every node has a label that is greater than itself. Here is an example of a binary search tree.



For this problem, we are only considering *balanced* binary search trees that contain integers $1 \dots N$. A *balanced* binary search tree must satisfy the condition that, for each node, the difference in its left subtree size and its right subtree size must not exceed 1. Jacob wants to know how many such binary search trees there are.

Input Format The input will contain exactly one line with one integer, N .

Output Format The output should contain exactly one line with one integer, the number of valid binary search trees there are that contain integers $1 \dots N$, modulo $10^9 + 7$.

Limits These are the bounds on the input.

Subtask	Score	Additional Bounds
1	11	$1 \leq N \leq 100$
2	16	$1 \leq N \leq 3,000$
3	24	$1 \leq N \leq 500,000$
4	49	$1 \leq N \leq 10^{18}$

Sample Input

4

Sample Output

4