SWE2004: Principles in Programming(Spring 2015)

Programming Lab #5
Due-date: April 9 , 14:45PM
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Problem 1.

Description

A binary search tree is a binary tree with root k such that any node v reachable from its left has $label(v) < label(k)$ and any node w reachable from its right has $label(w) > label(k)$. It is a search structure which can find a node with label x in $O(nlogn)$ average time, where n is the size of the tree(number of vertices).
Given a number n, can you tell how many different binary search trees may be constructed with a set of numbers of size n such that each element of the set will be associated to the label of exactly one node in a binary search tree?

Input

The input will contain a number $1 \leq i \leq 1000$ per line representing the number of elements of the set.

Output

You have to print a line in the output for each entry with the answer to the previous question.

Sample Input

1
2
3

Sample Output

1
2
5

Problem 2.

Description

You are given **n** rods of length 1, 2…, n. You have to pick any 3 of them & build a triangle. How many distinct triangles can you make? Note that, two triangles will be considered different if they have at least 1 pair of arms with different length.

Input

The input for each case will have only a single positive integer **n** (3<=n<=1000000). The end of input will be indicated by a case with **n**<3. This case should not be processed

Output

For each test case, print the number of distinct triangles you can make.

Sample Input

5
8
0

Sample Output

3
22