

## Fractal graphs (fractal)

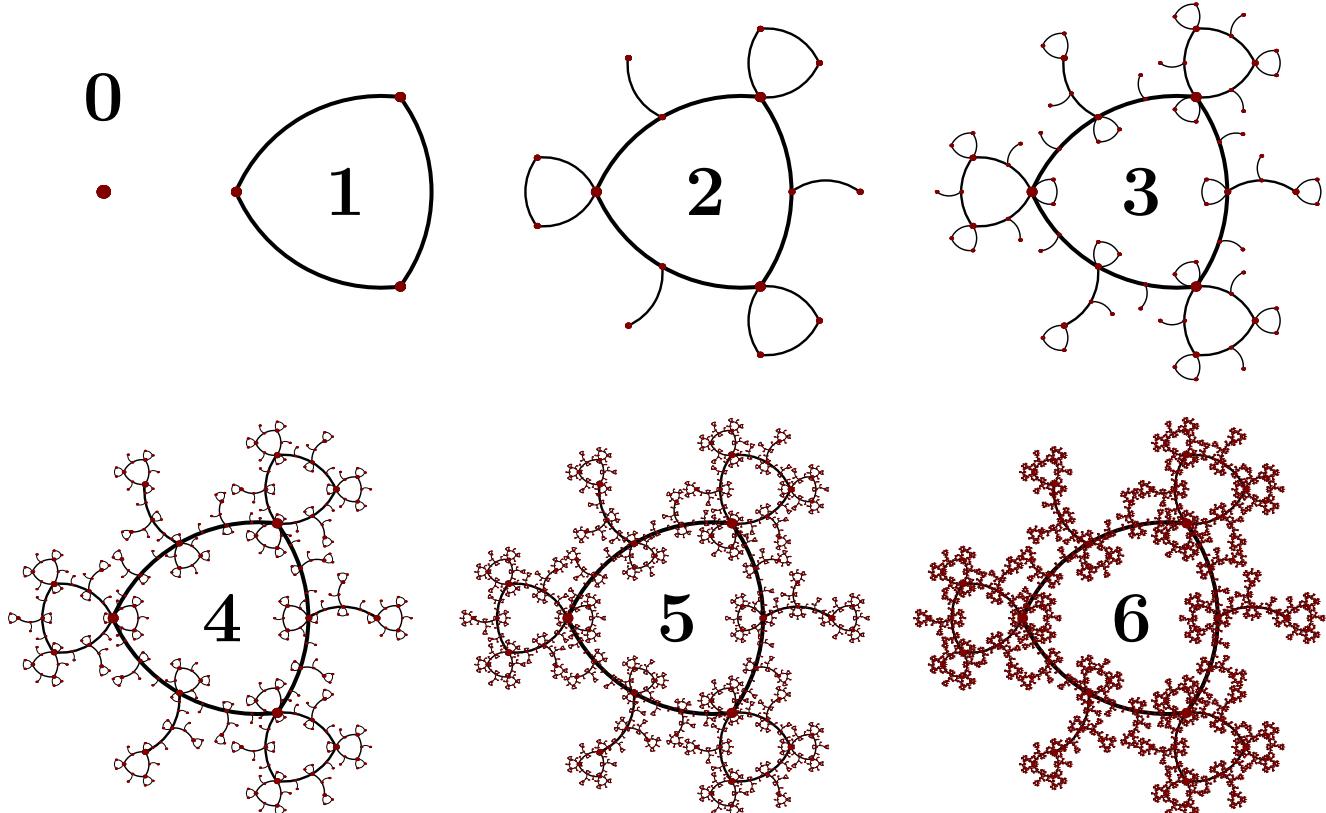
After Edoardo accidentally found Giorgio working on fractals (amazing mathematical shapes with recursive definitions), he decided to do something similar... but in a somewhat more *computer science* fashion.

After days of excruciating research, he finally discovered the *fractal graphs*  $\mathcal{G}_N$ ! The first member of this family of graphs,<sup>1</sup>  $\mathcal{G}_0$ , is very simple: a single node without any edges. After that, the graphs quickly grow in complexity as  $N$  increases.

More precisely, each fractal graph  $\mathcal{G}_N$  for  $N > 0$  is obtained from its predecessor  $\mathcal{G}_{N-1}$  by adding:

- A triangle  $T$  for every node  $v$  in  $\mathcal{G}_{N-1}$ , so that one of the nodes of  $T$  is  $v$  and the other nodes and edges are new;
- A segment  $S$  in the middle of every edge  $e$  in  $\mathcal{G}_{N-1}$ , that is,  $e$  is split in half into two edges  $e_1$  and  $e_2$  joined by node  $v$ , and  $S$  starts from  $v$  (thus adding a further node and edge).

The first seven fractal graphs  $\mathcal{G}_0, \dots, \mathcal{G}_6$  are the following:



Help Edoardo show his fractal supremacy, by counting the number of nodes and edges in  $\mathcal{G}_N$ !

<sup>1</sup>A *graph* is a mathematical object consisting of a set  $V$  of *nodes* (unlabelled points) and a set  $E$  of *edges* (undirected links between couple of points), so that  $E \subseteq V \times V$ .

 Among the attachments of this task you may find a template file `fractal.*` with a sample incomplete implementation.

## Input

The first and only line contains the only integer  $N$ .

## Output

You need to write a single line with two integers: the number of nodes and edges in  $\mathcal{G}_N$  **modulo 32 749**.

 The *modulo* operation ( $a \bmod m$ ) can be written in C/C++ as `(a % m)` and in Pascal as `(a mod m)`. To avoid the *integer overflow* error, remember to reduce all partial results through the modulus, and not just the final result!

*Notice that if  $x < 32\,749$ , then  $2x^2$  fits into a C/C++ `int` and Pascal `longint`.*

## Constraints

- $0 \leq N \leq 1\,000\,000\,000$ .

## Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

- **Subtask 1 [0 points]**: Examples.
- **Subtask 2 [10 points]**:  $N \leq 3$ .
- **Subtask 3 [20 points]**:  $N \leq 6$ .
- **Subtask 4 [20 points]**:  $N \leq 10$ .
- **Subtask 5 [20 points]**:  $N \leq 1000$ .
- **Subtask 6 [20 points]**:  $N \leq 50\,000\,000$ .
- **Subtask 7 [10 points]**: No additional limitations.

## Examples

input.txt	output.txt
0	1 0
1	3 3
2	15 18