



Problem G: Pascal's Pyramid

Time limit: 1s; Memory limit: 256 MB

A construction consists of n floors and uses n types of cubes, numbered from 1 to n .

A type- k cube has side length k , so the volume of each type- k cube is k^3 .

The number of cubes required to build each floor follows Pascal's Triangle from top to bottom:

- The first floor consists of 1 type-1 cube.
- The second floor consists of 2 cubes: 1 type-1 cube and 1 type-2 cube.
- The third floor consists of 4 cubes: 1 type-1 cube, 2 type-2 cubes, and 1 type-3 cube.
- The fourth floor consists of 8 cubes: 1 type-1 cube, 3 type-2 cubes, 3 type-3 cubes, and 1 type-4 cube.
- The construction continues following the same rule.

The numbers of cubes on the first four floors are arranged as follows:

```
1
1 1
1 2 1
1 3 3 1
```

Here, the k -th position on the n -th floor corresponds to type- k cubes.

Determine the total volume of all cubes required to build the n -th floor.

Input

A single line containing a positive integer n ($1 \leq n \leq 10^{18}$).

Output

Print the total volume of all cubes on the n -th floor, modulo $10^9 + 7$.

Sample

Sample 1

Sample Input	Sample Output
3	44

Sample 2

Sample Input	Sample Output
4	170

Note / Explanation

In the first sample, the third floor consists of: 1 type-1 cube, 2 type-2 cubes, and 1 type-3 cube.

Therefore, the total volume is:

$$1^3 + 2 \times 2^3 + 3^3 = 1 + 16 + 27 = 44.$$

In the second sample, the fourth floor consists of: 1 type-1 cube, 3 type-2 cubes, 3 type-3 cubes, and 1 type-4 cube.

Therefore, the total volume is:

$$1^3 + 3 \times 2^3 + 3 \times 3^3 + 4^3 = 1 + 24 + 81 + 64 = 170.$$



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