# Problem F. Figure Skating

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|---|---|
| Input file: | figure.in |
| Output file: | figure.out |
| Time limit: | 2 seconds |
| Memory limit: | 512 megabytes |

Martian Federation of Figure Skating has adapted the new rules for Mars Figure Skating Championship that will take part in Matrozavodsk on August 31.

The *program* of each competitor consists of a series of *jumps*. There are four jumps that Martians can perform: Axel, Flip, Lutz and Salchow. The program is considered *beautiful* by the judges if it satisfies the following conditions. In all descriptions *arbitrary number of jumps* means 0 or more jumps.

- A *beautiful program* is a *good sequence* of jumps.
- A *good sequence* of jumps starts with an arbitrary number of Axel jumps. After that the sequence can be over, or it can continue with a Flip followed by either *romantic sequence* or *energetic sequence*.
- A *romantic sequence* of jumps starts with arbitrary number of Flip or Lutz jumps (not necessarily all the same) followed by
  - a Lutz jump or a Salhow jump and then an *energetic sequence* or
  - an Axel jump and then a *good sequence*.
- An *energetic sequence* of jumps starts with arbitrary number of Flip jumps followed by a Salhow jump and then a *tragic sequence*.
- A *tragic sequence* of jumps starts with arbitrary number of Flip jumps followed by
  - an Axel jump and then a *romantic sequence*.
  - an Axel jump or a Salhow jump and then an *energetic sequence*.

The rules are so complicated that the judges wonder how many ways are there to create different beautiful programs of exactly $n$ jumps. Help them find that out. The number can be quite large, so output it modulo 998 244 353.

## Input

The input file contains multiple test cases.

Each test case consists of a single line that contains $n$ ($1 \le n \le 10^9$).

The last test case is followed by a line containing a single zero.

There are at most 1000 test cases.

## Output

For each test case output one integer — the number of jump sequences that make a beautiful program. Output the answer modulo 998 244 353.

## Examples

| figure.in | figure.out |
|---|---|
| 1<br>2<br>3<br>4<br>5<br>0 | 1<br>2<br>5<br>14<br>42 |

There are 5 sequences of 3 jumps that make a beautiful program: ⟨Axel, Axel, Axel⟩; ⟨Axel, Flip, Axel⟩; ⟨Flip, Axel, Axel⟩; ⟨Flip, Flip, Axel⟩; ⟨Flip, Lutz, Axel⟩.