International Olympiad in Fishing

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

The 1st International Olympiad in Fishing ("IOF") is planned to be hosted in Atlantis this year. The best fish all over the world will compete for the title of the *World Fish Champion*.

Little Cyan Fish is going to participate in the championship. The chairman of the contest, called Little Gelly Fish, has told him the rules of this year's contest: a card game called "Balatro" will be used to determine the winner.

In the game, there are n cards, indexed with integers from 1 to n. Each card has two additional attributes: the rank and the suit. Both the rank and the suit are independently and uniformly selected random integers within the range $[1, n]$, and two different cards may have the same rank or suit.

The index of each card is written on the back of the card, while the rank and suit are on the front. Currently, all the cards are placed on the table in ascending order of their indices, with their backs facing up. Therefore, the player knows the indices of all the cards but cannot see the rank or suit of each card.

There are also two buttons labeled "Rank" and "Suit" on the table. Little Gelly Fish told Little Cyan Fish that he can operate these two buttons, with the following rules:

- If Little Cyan Fish presses the button labeled "Rank", all the cards will be sorted in ascending order based on their ranks.
- If Little Cyan Fish presses the button labeled "Suit", all the cards will be sorted in ascending order based on their suits.

Little Gelly Fish noted that the sorting process will be *stable*. This means, after pressing one of the buttons, for any two cards, if their corresponding attributes (either rank or suit, depending on the button) are different, the card with the smaller value will appear earlier in the sorted order. If their corresponding attributes are the same, their relative order will remain unchanged.

"You can press the button multiple times," Little Gelly Fish said, "and... you must tell me the exact rank and suit of each card."

Little Cyan Fish wants to know that, under the optimal strategy, what is the probability of guessing the ranks and suits correctly. Since Little Gelly Fish lives in the world of $\mathbb{F}_{998\,244\,353}$, you only need to give the answer modulo 998 244 353.

Input

The first line of the input contains one integer n ($1 \le n \le 5 \times 10^5$).

Output

Output a single line containing a single integer, indicating the answer, modulo 998 244 353.

Examples

standard input	standard output
2	686292993
5	301495273
52	126716306

Note

There are two cards in the first example, and under the constraints of this example, Little Cyan Fish can adopt the following strategy:

First, Little Cyan Fish will press the "Rank" button once to check if the two cards are swapped, and then press the "Suit" button once to check if the two cards are swapped.

Let's consider all possible outcomes:

- If both the "Rank" button and the "Suit" button cause the cards to swap, Little Cyan Fish will guess as follows:
  - The first card has a rank of 2 and a suit of 1.
  - The second card has a rank of 1 and a suit of 2.
- If the "Rank" button causes a swap but the "Suit" button does not, Little Cyan Fish will guess as follows:
  - The first card has a rank of 2 and a suit of 2.
  - The second card has a rank of 1 and a suit of 1.
- If neither the "Rank" button nor the "Suit" button causes a swap, Little Cyan Fish will guess as follows:
  - The first card has a rank of 1 and a suit of 1.
  - The second card has a rank of 2 and a suit of 2.
- If the "Rank" button does not cause a swap but the "Suit" button causes a swap, Little Cyan Fish will press the "Rank" button again:
  - If a swap occurs after pressing the "Rank" button for the second time, Little Cyan Fish will guess as follows:
    - The first card has a rank of 1 and a suit of 2.
    - The second card has a rank of 2 and a suit of 1.
  - If no swap occurs after pressing the "Rank" button for the second time, Little Cyan Fish will guess as follows:
    - The first card has a rank of 1 and a suit of 2.
    - The second card has a rank of 1 and a suit of 1.

It can be proven that with the strategy described above, Little Cyan Fish has a $\frac{5}{16} \equiv 686\,292\,993 \pmod{998\,244\,353}$ probability of guessing all ranks and suits correctly, and this is optimal among all strategies.