

# Medians

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            4 seconds  
Memory limit:         256 megabytes

Ranran has a permutation  $p$ .

He wants to calculate the median of every prefix of  $p$ .

The median of  $n$  numbers is the  $\lceil n/2 \rceil$ -th smallest element.

For example, the median of  $\{1, 2, 3, 4, 5, 6\} = 3$ , and the median of  $\{1, 2, 4, 8, 16\} = 4$ .

Since the input can be large, the permutation is generated by the following code:

$$a_i = (a_{i-1} * 998244353 + 10^9 + 7) \bmod (10^9 + 9), p_i = i$$

then for  $i$  from 1 to  $n$ , swap( $p_i, p_{(a_i \bmod i)+1}$ )

Now we have permutation  $p$ .

## Input

First line contains two integers  $n$  ( $1 \leq n \leq 10^7$ ), and  $a_0$  ( $0 \leq a_0 < 10^9 + 9$ ).

## Output

Let  $ans_i$  be the answer of prefix  $p_{1\dots i}$ , print  $\sum (ans_i * 19^i) \bmod 998244353$ .

## Examples

standard input	standard output
5 0	7703113
5 1	7840977