

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 $p_{1...i}$, print $\sum (ans_i * 19^i) \bmod 998244353$.

Examples

standard input	standard output
5 0	7703113
5 1	7840977