

Problem C: Commutativity

- Time Limit: 2 sec

Problem Statement

You are given a function $F : \{1, 2, \dots, N\} \rightarrow \{1, 2, \dots, N\}$. In other words, F is a function that takes an integer x between 1 and N inclusive and returns an integer $F(x)$ between 1 and N inclusive. Your task is to count the number of functions $G : \{1, 2, \dots, N\} \rightarrow \{1, 2, \dots, N\}$ such that F and G commute under composition: that is, $F(G(x)) = G(F(x))$ holds for any $x \in \{1, 2, \dots, N\}$.
As this number could be large, print the answer modulo 998,244,353.

Input

The input consists of a single test case of the following format.

N
 $F_1 \ F_2 \ \dots \ F_N$

The first line consists of an integer N between 1 and 5,000, inclusive. The second line consists of N positive integers F_1, F_2, \dots, F_N . For each i ($1 \leq i \leq N$), F_i represents the value of $F(i)$. It is guaranteed that $1 \leq F_i \leq N$.

Output

Print the number of possible functions $G : \{1, 2, \dots, N\} \rightarrow \{1, 2, \dots, N\}$ modulo 998,244,353.

Sample Input 1	Sample Output 1
5 4 5 3 2 1	5
Sample Input 2	Sample Output 2
8 2 3 1 3 6 7 5 5	64
Sample Input 3	Sample Output 3
10 3 1 4 1 5 9 2 6 5 3	64
Sample Input 4	Sample Output 4
15 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	567381138