Problem B. Palindrome and Permutation

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

Suppose you have an array B of length M. Your goal is to make B a palindrome.

An array B of length M is said to be a palindrome if $B_i = B_{M+1-i}$ for every $1 \le i \le M$.

To achieve this, you will choose a permutation P of $\{1, 2, \ldots, M\}$ and perform the following process using it:

In the i-th step ($1 \le i \le M$), you must choose exactly one index j ($1 \le j \le M$) and set $B_j = P_i$.

It is allowed to choose the same index j in different steps.

The process ends either after all M indices of P have been processed, or immediately after B becomes a palindrome for the first time.

Define $f(B, P)$ to be the minimum number of steps after which B can become a palindrome, if you choose the indices to operate on optimally.

In particular:

- If B is already a palindrome initially, then $f(B, P) = 0$.
- If it is impossible to make B a palindrome even after processing every element of P, we define $f(B, P) = M + 1$.

You are given an array A of length N.

Calculate the sum of $f(A, P)$ over all possible permutations P of $\{1, 2, \ldots, N\}$.

Since the answer might be large, output it modulo 998 244 353.

Input

The input is given in the following format:

```
T
N
A_1 A_2 ··· A_N
⋮
```

- All input values are integers.
- $1 \le T \le 10^5$
- $1 \le N \le 5000$
- $1 \le A_i \le N$
- It is guaranteed that the sum of N^2 over all test cases does not exceed 5000^2.

Output

For each test case, output a single integer — the value of

$$\sum_P f(A, P)$$

over all permutations P of $\{1, 2, \ldots, N\}$, modulo 998 244 353.

Examples

standard input	standard output
4 3 1 2 3 4 2 3 3 2 6 4 6 4 6 4 6 10 1 5 2 10 2 6 3 1 10 2	8 0 5040 31363200

Note

Test case 1: For $P = [1, 2, 3]$ and $A = [1, 2, 3]$, the minimum number of moves needed is 1, since A can be turned into a palindrome in the first move.

Test case 2: As A is already a palindrome initially, $f(A, P) = 0$ for every permutation P.