Tara's Beautiful Permutations

by ma5termind

Tara has an array, A, consisting of n integers where each integer occurs *at most* 2 times in the array.

Let's define P to be a permutation of A where p_i is the i^{th} element of permutation P. Tara thinks a permutation is *beautiful* if there is no index i such that $p_i - p_{i+1} = 0$ where $i \in [0, n-1)$.

You are given q queries where each query consists of some array A. For each A, help Tara count the number of possible beautiful permutations of the n integers in A and print the count, modulo $10^9 + 7$, on a new line.

Note: Two permutations, P and Q, are considered to be *different* if and only if there exists an index i such that $p_i \neq q_i$ and $i \in [0, n)$.

Input Format

The first line contains a single integer, q, denoting the number of queries. The $2 \cdot q$ subsequent lines describe each query in the following form:

1. The first line contains an integer, n, denoting the number of elements in array A.
2. The second line contains n space-separated integers describing the respective values of $a_0, a_1, \ldots, a_{n-1}$ in array A.

Constraints

- $1 \leq a_i \leq 10^9$
- Each integer in A can occur at most 2 times.

For 40% of the maximum score:

- $1 \leq q \leq 100$
- $1 \leq n \leq 1000$
- The sum of n over all queries does not exceed 10^4.

For 100% of the maximum score:

- $1 \leq q \leq 100$
- $1 \leq n \leq 2000$

Output Format

For each query, print the the number of possible beautiful permutations, modulo $10^9 + 7$, on a new line.

Sample Input 0

```
3
3
1 1 2
2
1 2
4
1 2 2 1
```

Sample Output 0

```
1
2
2
```

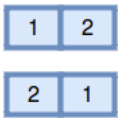
Explanation 0

We perform the following $q = 3$ queries:

1. Array $A = [1, 2, 1]$ and there is only one good permutation:

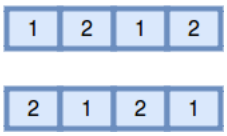
Thus, we print the result of $1 \bmod (10^9 + 7) = 1$ on a new line.

2. Array $A = [1, 2]$ and there are two good permutations:

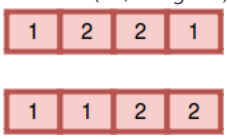


Thus, we print the result of $2 \bmod (10^9 + 7) = 2$ on a new line.

3. Array $A = [1, 2, 2, 1]$ and there are two good permutations:



For demonstration purposes, the following two permutations are invalid (i.e., not good):



Because we only want the number of good permutations, we print the result of $2 \bmod (10^9 + 7) = 2$ on a new line.

Submissions:133

Max Score:70

Difficulty: Hard

Rate This Challenge:

More

Current Buffer (saved locally, editable) Java 7

```
import java.io.*;
import java.util.*;
import java.text.*;
import java.math.*;
import java.util.regex.*;

public class Solution {
    public static void main(String args[] ) throws Exception {
        /* Enter your code here. Read input from STDIN. Print output to STDOUT */
    }
}
```

Line: 1 Col: 1

Upload Code as File | Test against custom input | Run Code | Submit Code