

# Tara's Beautiful Permutations



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  $i^{\text{th}}$  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  $a_0, a_1, \dots, a_{n-1}$  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:

1	2	1
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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:

1	2
---	---

2	1
---	---

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:

1	2	1	2
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2	1	2	1
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For demonstration purposes, the following two permutations are invalid (i.e., not good):

1	2	2	1
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1	1	2	2
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Because we only want the number of good permutations, we print the result of  $2 \bmod (10^9 + 7) = 2$  on a new line.