E - Count Sequences 2

Editorial (/contests/abc425/tasks/abc425_e/editorial)

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 450 points

Problem Statement

You are given a positive integer N and a sequence of positive integers $C = (C_1, C_2, \ldots, C_N)$ of length N.

Find, modulo a given positive integer M, the number of sequences of positive integers that satisfy all of the following conditions.

- All elements of the sequence are between 1 and N, inclusive.
- For each $i = 1, 2, \ldots, N$, the value i appears exactly C_i times in the sequence.

T test cases are given, so find the answer for each. M is common to all T test cases.

Constraints

- $1 \leq T \leq 10^5$
- $2 \leq M \leq 10^9$
- $1 \leq N$
- $1 \leq C_i$
- $\sum_{i=1}^{N} C_i \leq 5000$
- The sum of N over all test cases is at most 3×10^5.
- All input values are integers.

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Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&T \quad M \\
&\mathrm{case}_1 \\
&\mathrm{case}_2 \\
&\vdots \\
&\mathrm{case}_T
\end{aligned}
$$

The i-th test case, case_i, is given in the following format:

$$
\begin{aligned}
&N \\
&C_1 \quad C_2 \quad \ldots \quad C_N
\end{aligned}
$$

Output

Output T lines. The i-th line should contain the answer for the i-th test case.

Sample Input 1 Copy

Copy

```
3 1000000000
2
2 2
5
1 1 1 1 1
6
1 2 3 4 5 6
```

Sample Output 1 Copy

Copy

```
6
120
230379200
```

For the first test case, the sequences that satisfy the conditions are $(1, 1, 2, 2)$, $(1, 2, 1, 2)$, $(1, 2, 2, 1)$, $(2, 1, 1, 2)$, $(2, 1, 2, 1)$, $(2, 2, 1, 1)$, which is six sequences.

Sample Input 2 Copy

Copy

```
3 998244353
1
1
3
4 2 5
10
500 500 500 500 500 500 500 500 500 500
```

Sample Output 2 Copy

```
1
6930
261233246
```

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