Cycle Representation

HackerRank

Let n be a fixed integer.

A **permutation** is a bijection from the set $\{1, 2, \ldots, n\}$ to itself.

A **cycle of length** k ($k \geq 2$) is a permutation f where different integers exist $i_1, \ldots, i_k$ such that $f(i_1) = i_2, f(i_2) = i_3, \ldots, f(i_k) = i_1$ and, for all x not in $\{i_1, \ldots, i_k\}$, $f(x) = x$.

The **composition of** m **permutations** $f_1, \ldots, f_m$, written $f_1 \circ f_2 \circ \ldots \circ f_m$, is their composition as functions.

Steve has some cycles $f_1, f_2, \ldots, f_m$. He knows the length of cycle f_i is l_i, but he does not know exactly what the cycles are. He finds that the composition $f_1 \circ f_2 \circ \ldots \circ f_m$ of the cycles is a cycle of length n. He wants to know how many possibilities of $f_1, \ldots, f_m$ exist.

Input Format

The first line contains T, the number of test cases.
Each test case contains the following information:
The first line of each test case contains two space separated integers, n and m.
The second line of each test case contains m integers, $l_1, \ldots, l_m$.

Constraints
$n \geqslant 2$
Sum of $n \leqslant 1000$
$2 \leqslant l_i \leqslant n$
Sum of $m \leq 10^6$

Output Format

Output T lines. Each line contains a single integer, the answer to the corresponding test case.

Since the answers may be very large, output them modulo $(10^9 + 7)$.

Sample Input

```
1
3 2
2 2
```

Sample Output

```
6
```

Explanation

There are three cycles of length 2. The composition of two cycles of length 2 is a cycle of length 3 if, and only if, the two cycles are different. So, there are $3 \cdot 2 = 6$ possibilities.