Derangements HARD

A derangement of *n* numbers is a permutation of those numbers in which none of the numbers appears in its original place. For example, the numbers $\{1, 2, 3\}$ can be deranged into $\{2, 3, 1\}$ and $\{3, 1, 2\}$. We can modify this slightly for *n* numbers that are not necessarily distinct by saying that no number in the derangement can be in the place that a number of the same value was in in the original ordering. So the numbers $\{1, 1, 2, 2, 3\}$ could be deranged into $\{2, 2, 1, 3, 1\}$, $\{2, 2, 3, 1, 1\}$, $\{2, 3, 1, 1, 2\}$, and $\{3, 2, 1, 1, 2\}$.

Input

First line contains T (1 <= T <= 100) the number of test cases. Each test case contains two lines. First line contains an integer N (1 <= N <= 15) denoting total number of elements in the array. Second line contains a space separated list of N integers Ai such that $0 \le Ai \le N$.

Output

For each test case output an integer, the total number of derangements of the array.

Example

Output:

4 1