

6702 Minimum-upset tournaments

A tournament is a directed graph (digraph for short) obtained by assigning a direction for each edge in an undirected complete graph. Let x and y be the vertices (or players) in a tournament. If there is a directed edge from x to y , then we say that x wins the game against y . The score of x is the total number of games that x wins. Assume that v_1, \dots, v_n are the vertices (or players) in a tournament. Let s_i be the score of v_i . After renumbering the vertices, assume that $s_1 \leq s_2 \leq \dots \leq s_n$. The sequence $S = (s_1, s_2, \dots, s_n)$ is called the *score sequence* of a tournament. Note that a sequence $S = (s_1, s_2, \dots, s_n)$ with $0 \leq s_1 \leq s_2 \leq \dots \leq s_n$ is a score sequence if and only if $\sum_{i=1}^k s_i \geq \binom{k}{2}$ for $1 \leq k \leq n$ and equality holds when $k = n$. We say that a tournament realizes a score sequence S if S is exactly the score sequence of the tournament. Given a score sequence S , there are a lot of different tournaments which realize S . For example, assume that $n = 5$ and $S = (1, 2, 2, 2, 3)$. There are fourteen different tournaments realizing S (see Figure 6).

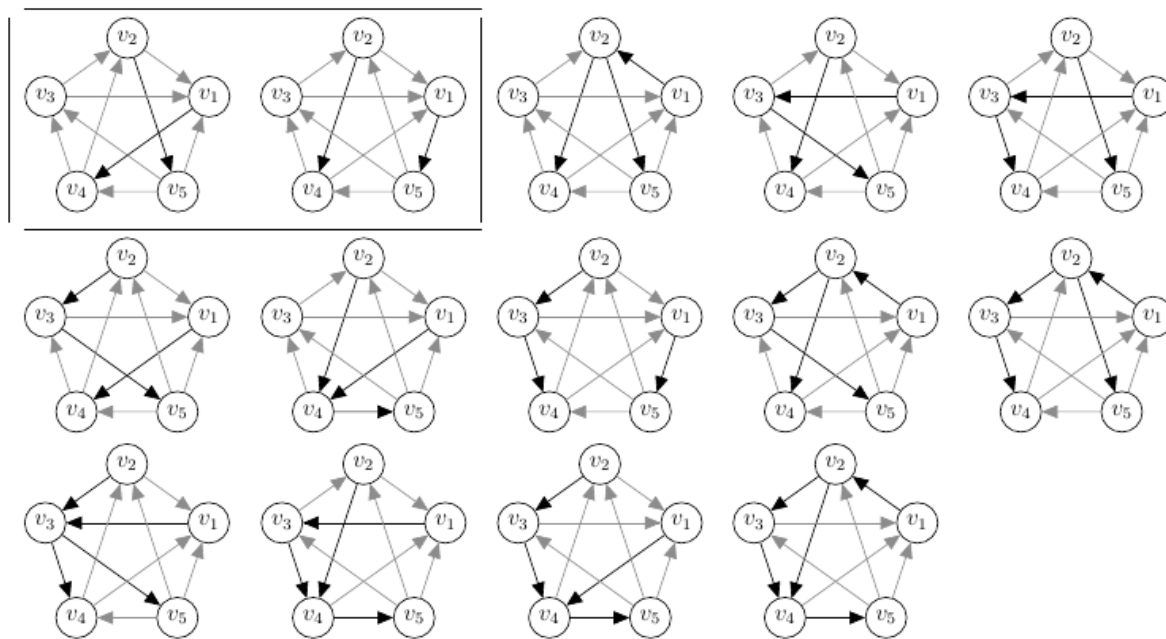


Figure 6: All tournaments with the score sequence $S = (1, 2, 2, 2, 3)$.

We say that an *upset* occurs in a tournament if there are two players v_i and v_j with $i < j$ such that v_i defeats v_j , i.e., a lower-rank player beats a higher-rank player in the game between them. Given a score sequence S , a tournament is a *minimum-upset tournament* if it is with the minimum number of upsets with respect to S . For example, in Figure 6, the first two tournaments in the rectangle are minimum-upset tournaments. You are asked to find the number of minimum-upset tournaments for a given score sequence.

Technical Specification

- The number of test cases is at most 10 and, in each test case, $3 \leq n \leq 16$.

Input

The first line of the input contains an integer, denoting the number of test cases. For each test case, the first line contains an integer indicating n players in the tournament and the second line contains n integers, separated by a space, indicating the score sequence S .

Output

For each test case, output the number of minimum-upset tournaments in one line.

Sample Input

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

Sample Output

```
2
3
1
1
```