In mathematics, and more specifically in graph theory, a tree is an undirected graph in which any two nodes are connected by exactly one path. In other words, any connected graph without simple cycles is a tree.

You find a partial tree on the way home. This tree has n nodes but lacks of $n-1$ edges. You want to complete this tree by adding $n-1$ edges. There must be exactly one path between any two nodes after adding. As you know, there are n^{n-2} ways to complete this tree, and you want to make the completed tree as cool as possible. The coolness of a tree is the sum of coolness of its nodes. The coolness of a node is $f(d)$, where f is a predefined function and d is the degree of this node. What's the maximum coolness of the completed tree?

Input

The first line contains an integer T indicating the total number of test cases. Each test case starts with an integer n in one line, then one line with $n-1$ integers $f(1), f(2), \ldots, f(n-1)$.

- $1 \leq T \leq 2015$
- $2 \leq n \leq 2015$
- $0 \leq f(i) \leq 10000$
- There are at most 10 test cases with $n > 100$.

Output

For each test case, please output the maximum coolness of the completed tree in one line.

Sample Input

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

Sample Output

```
5
19
```