Total Distance in a Tree

(Time Limit: 2 seconds)

Problem Description

In this problem, you are asked to find the total distance in a tree network. Each edge is associated with a positive edge length, and the distance from a node to the other is the sum of lengths of the edges in the path. The total distance of a network is the total distance summed over all pairs of nodes. The total distance does not exceed 2^32.

Input Format

The first line has an integer which indicates the number of test cases. The first line of each test case is an integer n, $1 < n \leq 5000$, which is the number of nodes in this case. The tree is given by a rooted manner. The root is of label 1. The second line of each case consists of n-1 integers which are the parents of nodes 2,3,…, and n respectively. The third line also consists of n-1 integers which are the lengths of the edge between node i and its parent for i from 2 to n. The edge lengths are positive integers at most 100.

Output Format

For each case, output the total distance of the tree network in one line.

Example

Sample Input:	Sample Output:
2 4 1 2 3 10 20 30 5 1 1 1 2 20 20 30 30	400 880