Popular Edges

You are given an undirected tree of n vertices rooted at 1. The popularity of an edge is defined as the number of simple paths in which this edge is included. You need to find the popularity of all edges in the order they are given. (Note: A tree path in simple if no edges are repeated in it.)

Input

First line contains T, number of testcases. Each testcase starts with n, number of vertices, followed by n-1 lines each containing u and v, indicating that there is an undirected edge between u and v.

Output

Output T lines, each containing n-1 integers seperated by a space.(Note that there is a space after the last value too).

Constraints

1<=n<=200000
1<=u,v<=n

Sample Input

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

Sample Output

2 2
4 4 4 4