

D. Apple Tree Traversing

time limit per test: 5 seconds

memory limit per test: 512 megabytes

There is an apple tree with n nodes, initially with one apple at each node. You have a paper with you, initially with nothing written on it.

You are traversing on the apple tree, by doing the following action as long as there is at least one apple left:

- Choose an **apple path** (u, v) . A path (u, v) is called an **apple path** if and only if for every node on the path (u, v) , there's an apple on it.
- Let d be the number of apples on the path, write down three numbers (d, u, v) , in this order, on the paper.
- Then remove all the apples on the path (u, v) .

Here, the path (u, v) refers to the sequence of vertices on the unique shortest walk from u to v .

Let the number sequence on the paper be a . Your task is to find the lexicographically largest possible sequence a .

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10^4$). The description of the test cases follows.

The first line of each test case contains a number n ($1 \leq n \leq 1.5 \cdot 10^5$).

The following $n - 1$ lines of each test case contain two numbers u, v ($1 \leq u, v \leq n$). It's guaranteed that the input forms a tree.

It is guaranteed that the sum of n over all test cases does not exceed $1.5 \cdot 10^5$.

Output

For each test case, output the lexicographically largest sequence possible $a_1, a_2, \dots, a_{|a|}$. It can be shown that $|a| \leq 3 \cdot n$.

Example

input	Copy
<pre> 6 4 1 2 1 3 1 4 4 2 1 2 4 2 3 5 1 2 2 3 3 4 4 5 1 8 6 3 3 5 5 4 4 2 5 1 1 8 3 7 6 3 2 2 6 2 5 5 4 4 1 </pre>	

Codeforces Round 1023 (Div. 2)

Finished

Practice



→ Virtual participation

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Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms)

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
321868650	May/29/2025 08:46	Accepted
318491847	May/05/2025 18:22	Wrong answer on pretest 1

→ Problem tags

brute force dfs and similar greedy implementation trees *2100

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)

output

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```
3 4 3 1 2 2
3 4 3 1 1 1
5 5 1
1 1 1
5 8 7 2 4 2 1 6 6
5 6 1 1 3 3
```

Note

In the first test case, we do the following steps:

- Choose the apple path (4, 3). This path consists of the nodes 4, 1, 3, and each of them have an apple (so it is a valid apple path). $d = 3$ as there are 3 apples on this path. Append 3, 4, 3 in that order to our sequence a . Now, remove the apples from these 3 vertices.
- Only node 2 has an apple left. Choose the apple path (2, 2). This path only consists of the single node 2. $d = 1$ as there is 1 apple on this path. Append 1, 2, 2 in that order to our sequence a and remove the apple from 2.

The final sequence is thus [3, 4, 3, 1, 2, 2]. It can be shown this is the lexicographically largest sequence possible.

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