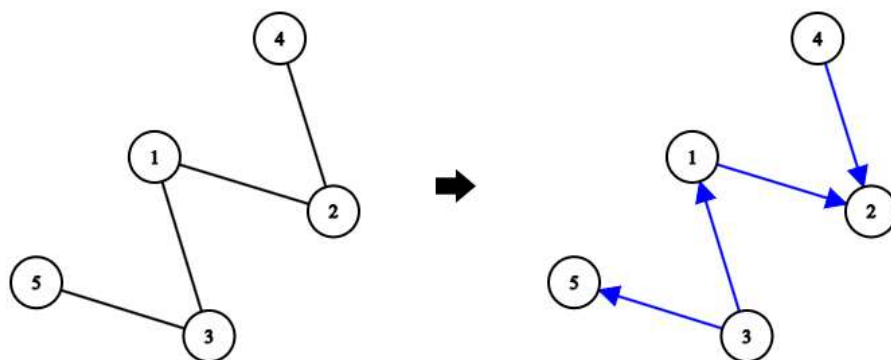


## D. Reachability and Tree

time limit per test: 2 seconds  
memory limit per test: 256 megabytes

Let  $u$  and  $v$  be two distinct vertices in a directed graph. Let's call the ordered pair  $(u, v)$  *good* if there exists a path from vertex  $u$  to vertex  $v$  along the edges of the graph.

You are given an undirected tree with  $n$  vertices and  $n - 1$  edges. Determine whether it is possible to assign a direction to each edge of this tree so that the number of good pairs in it is **exactly**  $n$ . If it is possible, print any way to direct the edges resulting in exactly  $n$  good pairs.



One possible directed version of the tree for the first test case.

### Input

The first line contains one integer  $t$  ( $1 \leq t \leq 10^4$ ) — the number of test cases.

The first line of each test case contains one integer  $n$  ( $2 \leq n \leq 2 \cdot 10^5$ ) — the number of vertices in the tree.

The next  $n - 1$  lines describe the edges. The  $i$ -th line contains two integers  $u_i$  and  $v_i$  ( $1 \leq u_i, v_i \leq n$ ;  $u_i \neq v_i$ ) — the vertices connected by the  $i$ -th edge.

It is guaranteed that the edges in each test case form an undirected tree and that the sum of  $n$  over all test cases does not exceed  $2 \cdot 10^5$ .

### Output

For each test case, print "NO" (case-insensitive) if it is impossible to direct all edges of the tree and obtain exactly  $n$  good pairs of vertices.

Otherwise, print "YES" (case-insensitive) and then print  $n - 1$  pairs of integers  $u_i$  and  $v_i$  separated by spaces — the edges directed from  $u_i$  to  $v_i$ .

The edges can be printed in any order. If there are multiple answers, output any.

### Example

input

Copy

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

### Educational Codeforces Round 180 (Rated for Div. 2)

Finished

Practice



### → Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

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:  No file chosen

Submit

### → Last submissions

Submission	Time	Verdict
<a href="#">325959779</a>	Jun/25/2025 08:27	Accepted
<a href="#">325959617</a>	Jun/25/2025 08:25	Wrong answer on test 2
<a href="#">325959277</a>	Jun/25/2025 08:21	Wrong answer on test 2
<a href="#">325731550</a>	Jun/23/2025 17:55	Wrong answer on test 1

### → Problem tags

constructive algorithms dfs and similar  
dp trees

No tag edit access

### → Contest materials

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

output

Copy

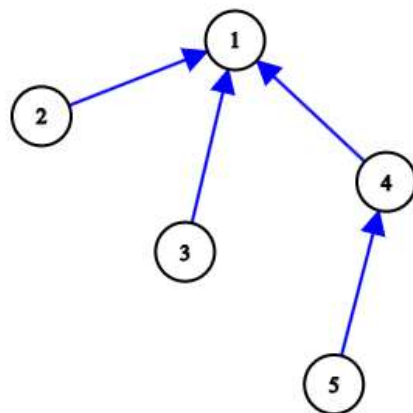
```
YES
1 2
3 1
3 5
4 2
YES
2 1
3 1
4 1
5 4
NO
YES
1 3
2 1
2 4
```

### Note

The tree from the first test case and its possible directed version are shown in the legend above.

In this version, there are exactly 5 good pairs of vertices:  $(3, 5)$ ,  $(3, 1)$ ,  $(3, 2)$ ,  $(1, 2)$ , and  $(4, 2)$ .

One possible directed version of the tree from the second test case is shown below:



In the presented answer, there are exactly 5 good pairs of vertices:  $(2, 1)$ ,  $(3, 1)$ ,  $(4, 1)$ ,  $(5, 4)$ , and  $(5, 1)$ .

In the third test case, there are only two directed pairs of vertices, but for any direction of the edge, only one pair will be good.

