



杭州电子科技大学

HANGZHOU DIANZI UNIVERSITY Online Judge



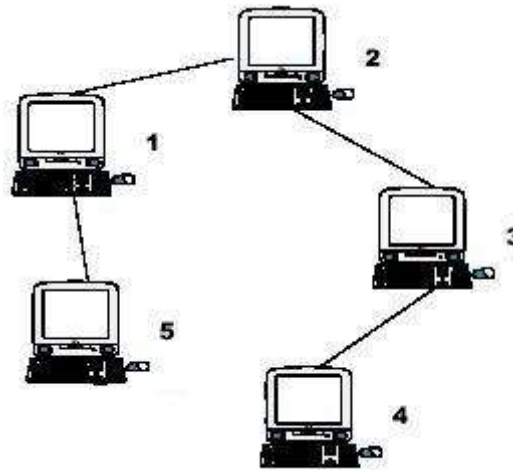
Online Judge F.A.Q Hand In Hand Online Acmers Forum Discuss Statistical Charts	Online Exercise Problem Archive Realtime Judge Status Authors Ranklist <div style="border: 1px dashed blue; padding: 2px; display: inline-block; margin-top: 5px;"> <input style="width: 60px;" type="text"/> <input style="width: 40px; margin-left: 5px;" type="button" value="Search"/> </div>	Online Teaching C/C++/Java Exams ACM Steps Go to Job Contest LiveCast ICPC@China	Online Contests Best Coder <small>beta</small> VIP STD Contests Virtual Contests DIY Web-DIY <small>beta</small> Recent Contests	Exercise Author <div style="border: 1px solid blue; padding: 2px; display: inline-block; margin-top: 5px;"> 用QQ帐号登录 </div> <div style="display: flex; justify-content: space-between;"> <div> Author ID Password <input style="width: 60px;" type="button" value="Sign In"/> </div> <div> <input style="width: 60px;" type="text" value="lydrainbowcat"/> <input style="width: 60px;" type="text" value="....."/> <input style="width: 60px;" type="button" value="Register new ID"/> </div> </div>
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Computer

Time Limit: 1000/1000 MS (Java/Others) Memory Limit: 32768/32768 K (Java/Others)
Total Submission(s): 31022 Accepted Submission(s): 3905

Problem Description

A school bought the first computer some time ago(so this computer's id is 1). During the recent years the school bought N-1 new computers. Each new computer was connected to one of settled earlier. Managers of school are anxious about slow functioning of the net and want to know the maximum distance S_i for which i-th computer needs to send signal (i.e. length of cable to the most distant computer). You need to provide this information.



Hint: the example input is corresponding to this graph. And from the graph, you can see that the computer 4 is farthest one from 1, so $S_1 = 3$. Computer 4 and 5 are the farthest ones from 2, so $S_2 = 2$. Computer 5 is the farthest one from 3, so $S_3 = 3$. we also get $S_4 = 4$, $S_5 = 4$.

Input

Input file contains multiple test cases. In each case there is natural number N ($N \leq 10000$) in the first line, followed by $(N-1)$ lines with descriptions of computers. i -th line contains two natural numbers - number of computer, to which i -th computer is connected and length of cable used for connection. Total length of cable does not exceed 10^9 . Numbers in lines of input are separated by a space.

Output

For each case output N lines. i -th line must contain number S_i for i -th computer ($1 \leq i \leq N$).

Sample Input

```

5
1 1
2 1
3 1
1 1

```

Sample Output

3
2
3
4
4

Author

scnu

Recommend

lcy

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