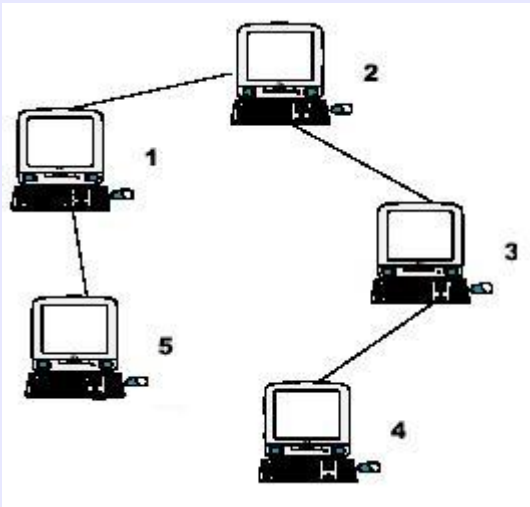


Computer

<https://vjudge.net/problem/hdu-2196>

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