

D: Farthest City

Time Limit: 3 seconds

There are n cities in the State of Confusion, numbered from 1 to n . There are n bidirectional roads that connect the cities. The i^{th} road connects cities a_i and b_i , and is d_i miles long.

All n cities are connected. In other words, regardless of which city you start from, it is always possible to reach any other city using the given roads. In addition, no road connects a city to itself, and there is at most one road between any pair of cities.

You are interested in holding a statewide event in one of the cities. One of the important factors to consider is how far away the rest of the cities are from where the event will be held. The distance between two cities is the length of the shortest path that connects them.

Given the information about all roads, find the distance to the farthest city from every city in the state.

Input

The first line of the input contains a single integer n ($3 \leq n \leq 3 \cdot 10^5$), representing the number of cities in the state. Each of the next n lines contains three integers a_i , b_i , d_i ($1 \leq d_i \leq 10^7$), describing one of the roads.

Output

Output n integers on a single line, where the i^{th} number denotes the distance of the city that is the farthest from city i .

Sample Input 1

```
4
1 2 1
2 3 2
3 4 3
4 1 4
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Sample Output 1

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4 5 3 5
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