Problem J. Jiry Matchings

Input file:	`standard input`
Output file:	`standard output`
Time limit:	6 seconds
Memory limit:	512 mebibytes

Ruyi Ji has a tree where the vertices are numbered by integers from 1 to n and each edge has a weight.

For each $k \le (n-1)$, he asked you to find the largest total weight of a matching with k edges if it exists.

Input

The first line of input contains one integer n: the number of vertices in the tree ($2 \le n \le 200\,000$).

Each of the next $n-1$ lines contains three integers u_i, v_i, w_i, describing an edge from u_i to v_i with weight w_i in the tree ($1 \le u_i, v_i \le n$, $u_i \ne v_i$, $-10^9 \le w_i \le 10^9$).

It is guaranteed that the given graph is a tree.

Output

Output $n-1$ integers: the largest weights of the matchings with $1, 2, \ldots, n-1$ edges. If there is no such matching for the current k, print "?" instead.

Examples

standard input	standard output
5 1 2 3 2 3 5 2 4 4 3 5 2	5 6 ? ?
10 2 8 -5 5 10 5 3 4 -5 1 6 5 3 9 5 1 7 -3 4 8 -5 10 8 -5 1 8 -3	5 10 15 10 ? ? ? ? ?
2 1 2 35	35

Note

In the first sample, with $k = 1$ you should take edge $(2, 3)$ with weight 5. And with $k = 2$ you should take two edges, $(2, 4)$ and $(3, 5)$, with total weight 6. There are no matchings with a greater number of edges.