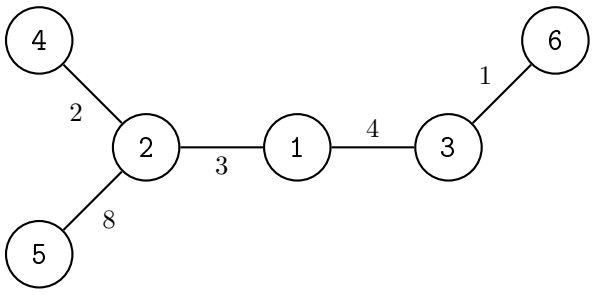
Problem E
Walking Around

You are given a weighted tree with N vertices, numbered from 1 to N. The edges are numbered from 1 to $N-1$, where edge i connects two vertices U_i and V_i with a weight of a non-negative integer W_i.

A path in the tree is defined as a sequence of unique vertices $(u_0, u_1, \ldots, u_m)$ for some $m \geq 1$ such that each pair of adjacent vertices, (u_j, u_{j+1}) for all $0 \leq j < m$, is connected by an edge in the tree. Define the *score* of a path $(u_0, u_1, \ldots u_m)$ as the bitwise XOR of the weight of all edges in the path, i.e. $\mathrm{XOR}(w_0, w_1, \ldots, w_{m-1})$ where w_j is the weight of the edge that connects u_j and u_{j+1} (for all $0 \leq j < m$).

Your task is to find the minimum and the maximum score of any path that can be obtained from the given tree.

For example, the minimum and the maximum score of any path in the following tree are path $(4, 2, 1)$ with a score of $\mathrm{XOR}(2, 3) = 1$, and path $(5, 2, 1, 3)$ with a score of $\mathrm{XOR}(8, 3, 4) = 15$, respectively.



Input

Input begins with an integer N ($2 \leq N \leq 100\,000$) representing the number of vertices in the given tree. Each of the next $N-1$ lines contains three integers U_i V_i W_i ($1 \leq U_i < V_i \leq N$; $0 \leq W_i \leq 10^9$) representing edge i.

Output

Output two space-separared integers in a single line, representing the minimum and the maximum score of any path that can be obtained from the given tree in that order.

Sample Input #1

```
6
1 2 3
1 3 4
2 4 2
2 5 8
3 6 1
```

Sample Output #1

```
1 15
```

Explanation for the sample input/output #1

The illustration in the description section represents this example.

Sample Input #2

```
6
1 2 4
1 3 3
1 4 1
4 5 7
1 6 2
```

Sample Output #2

```
1 7
```

Sample Input #3

```
10
1 2 5
1 3 3
2 4 8
3 5 7
2 6 6
5 7 9
4 8 8
1 9 6
6 10 11
```

Sample Output #3

```
0 14
```