



Paths in a Tree

locked

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Problem

Submissions

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Definition: a tree is an undirected graph in which any two vertices are connected by exactly one path.

You are given a tree of N vertices. Each edge within this tree has some associated weight assigned to it. You are tasked to find the sum of: the cost for all paths within the tree. In other words, for every ordered pair of vertices within the tree, say vertex u and v , sum the cost of the path from u to v .

The cost of a path is denoted by the sum of the weights along each edge within the path. As mentioned above, the path from vertex 1 to 2 is the equivalent to 2 to 1 and thus is not considered again.

Input Format

The first line contains N , the number of vertices in the tree.

$N - 1$ lines follow of the form: $u \ v \ w$, each line denotes that there is an undirected edge from vertex u to vertex v with weight w .

Constraints

$$1 \leq N \leq 10^5$$

$$1 \leq u, v \leq N$$

$$-1000 \leq w \leq 1000$$

The input is guaranteed to be a tree.

Output Format

Print a single integer describing the answer.

Sample Input 0

```
3
1 2 2
2 3 2
```

Sample Output 0

```
8
```

Explanation 0

The third example looks like: $1 - 2 - 3$. The valid paths are $1 \rightarrow 2$ with a cost of 2, $2 \rightarrow 3$ with a cost of 2 and $1 \rightarrow 3(1 \rightarrow 2 \rightarrow 3)$ with a cost of 4. Add them all up and you get 8.

Sample Input 1

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

Sample Output 1

45

Sample Input 2

```
2
1 2 100
```

Sample Output 2

100

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Max Score: 20



Difficulty: Medium

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