Tree Flow

HackerRank

Recall that a tree is an undirected, connected acyclic graph. We have a weighted tree, T, with n vertices; let $dist_{u,v}$ be the total sum of edge weights on the path between nodes u and v.

Let's consider all the matrices, $A_{u,v}$, such that:

- $A_{u,v} = -A_{v,u}$
- $0 \leq |A_{u,v}| \leq dist_{u,v}$
- $\sum_{i=1}^{n} A_{u,i} = 0$ for each $u \neq 1$ and $u \neq n$

We consider the *total value* of matrix A to be:

$$\sum_{i=1}^{n} A_{1,i}$$

Calculate and print the maximum total value of A for a given tree, T.

Input Format

The first line contains a single positive integer, n, denoting the number of vertices in tree T.
Each line i of the $n-1$ subsequent lines contains three space-separated positive integers denoting the respective a_i, b_i, and c_i values defining an edge connecting nodes a_i and b_i (where $1 \leq a_i, b_i \leq n$) with edge weight c_i.

Constraints

- $2 \leq n \leq 500000$
- $1 \leq c_i \leq 10^4$
- Test cases with $n \leq 10$ have 30% of total score
- Test cases with $n \leq 500$ have 60% of total score

Output Format

Print a single integer denoting the maximum total value of matrix A satisfying the properties specified in the *Problem Statement* above.

Sample Input

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

Sample Output

```
3
```

Explanation

In the sample case, matrix A is:

$$A = \begin{pmatrix} 0 & 2 & 1 \\ -2 & 0 & 2 \\ -1 & -2 & 0 \end{pmatrix}$$

The sum of the elements of the first row is equal to 3.