Galactic Adventure Agency

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	256 megabytes

In a galaxy far, far away, there are N planets. The i-th planet is located at coordinates (x_i, y_i, z_i). The planets are connected by a galactic railway system consisting of $N-1$ **bi-directional** railways, forming a tree structure.

As an agent of the *Galactic Adventure Agency*, you are planning a promotional campaign. For this campaign, you must choose **two planets** to highlight. Wanderers can journey between these two planets in two different ways:

- By **galactic train**: Traveling along the unique simple path that connects the two planets in the railway system. Each railway has an associated **satisfaction score** (*it can be negative*), and the total satisfaction is the sum of the scores along the path.
- By **private rocket**: Traveling directly between the two planets along the x, y, and z axes. The satisfaction score for this option is equal to the **Manhattan distance** between the two planets, i.e. $|x_i - x_j| + |y_i - y_j| + |z_i - z_j|$.

To please both types of tourists, you want to select a pair of planets (u, v) that maximizes the combined satisfaction value, defined as the **sum** of the train satisfaction and the rocket satisfaction between them.

Your task is to find this maximum combined satisfaction value.

Input

The first line of input contains one integer N ($2 \le N \le 2 \cdot 10^5$) — the number of planets.

Each of the next $N-1$ lines contains three integers, u, v, and w, — a railway between planet u and planet v with a satisfaction score of w ($1 \le u, v \le N, u \ne v, |w| \le 10^9$). It is guaranteed that these edges form a tree.

Each of the next N lines contains three integers, x, y, and z — the coordinates of the planet u ($1 \le x, y, z \le 10^{14}$).

Output

A line contains one integer — the maximum combined satisfaction value.

If the maximum combined satisfaction value is less than zero, output zero.

Example

standard input	standard output
5 1 2 -2 2 4 5 3 4 1 4 5 -5 8 3 2 7 6 1 8 6 2 3 6 3 1 1 1	12

Note

For the example, if you choose planet 1 and planet 4, the train satisfaction is equal to $-2 + 5 = 3$ and the rocket satisfaction is $|8 - 3| + |3 - 6| + |2 - 3| = 9$, the combined satisfaction is equal to $9 + 3 = 12$, which can be shown to be the maximum.