NOIP '07 P4 - Core of a Tree Net

Time limit: 1.0s **Memory limit:** 256M

Let $T = (V, E, W)$ be an acyclic and connected undirected graph (also known as an unrooted tree), each edge has a positive integer weight, we call T a tree network, where V, E Respectively represent the collection of nodes and edges, W represents the collection of the length of each side, and let T have n nodes.

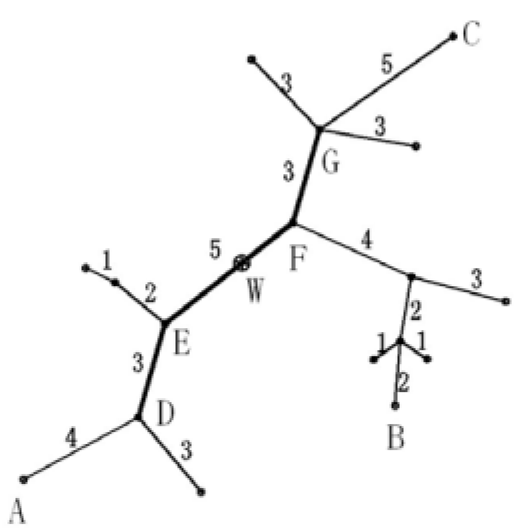
Definitions

- Path: There is a unique simple path between any two nodes a and b in the tree network. Let $d(a, b)$ represent the length of the path with a and b as the endpoints, which is the sum of the lengths of the sides on the path. We call $d(a, b)$ the distance between two nodes a, b. The distance from a point v to a path P is the distance from that point to the nearest node on P: $d(v, P) = \min\{d(v, u), \text{u is the node on the path P}\}$
- Diameter of the tree network: The longest path in the tree network is called the diameter of the tree network. For a given treenet T, the diameter is not necessarily unique, But it can be proved that the midpoint of each diameter (not necessarily exactly a certain node, it may be inside a certain side) is unique, and we call this point the center of the tree network.
- Eccentric distance $ECC(F)$: the distance from the node farthest from the path F in the tree network T to the path F, that is $ECC(F) = \max\{d(v, F), v \in V\}$

Task

For a given tree network $T = (V, E, W)$ and a non-negative integer s, find a path F, which is a path on a certain diameter (both ends of the path are nodes in the tree network) , whose length does not exceed s (can be equal to s), so that the eccentricity $ECC(F)$ is the smallest. We call this path the core of the tree network $T = (V, E, W)$. When necessary, F can degenerate to a node. Generally speaking, under the above definition, there is not necessarily only one core, but the minimum eccentricity is unique.

The figure below shows an example of a tree network. In the figure, $A - B$ and $A - C$ are two diameters with a length of 20. Point W is the center of the treenet, and the length of the EF edge is 5. If $s = 11$ is specified, the core of the tree network is path $DEFG$ (or path DEF), and the eccentricity is 8. If $s = 0$ (or $s = 1$ or $s = 2$), the core of the tree network is node F with an eccentricity of 12.



Input Specification

- Line 1, two positive integers n and s, separated by a space. n is the number of nodes in the tree network, and s is the upper bound of the length of the core of the tree network. Let the node numbers be $1, 2, \dots n$.
- Lines 2 to n each contains 3 positive integers separated by spaces, indicating the two endpoint numbers and length of each edge in turn. For example, `2 4 7` means that the length of the edge connecting nodes 2 and 4 is 7.

It's guaranteed that the input forms a valid tree.

Output Specification

One non-negative numbers, the minimum eccentricity under this condition.

Sample Input 1

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

Sample Output 1

```
5
```

Sample Input 2

```
8 6
1 3 2
2 3 2
3 4 6
4 5 3
4 6 4
4 7 2
7 8 3
```

Sample Output 2

```
5
```

Constraints

- 32% of the test cases satisfy $5 \le n \le 15$.
- 56% of the test cases satisfy $5 \le n \le 80$.
- 80% of the test cases satisfy $5 \le n \le 300$, $0 \le s \le 1\,000$.
- 90% of the test cases satisfy $5 \le n \le 5 \times 10^5$, $0 \le s < 2^{31}$, and all lengths are positive integers not exceeding $1\,000$.
- 100% of the test cases satisfy $5 \le n \le 2 \times 10^6$, $0 \le s < 2^{31}$, and all lengths are positive integers not exceeding $1\,000$.