Problem A. Growing Trees

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	1024 megabytes

You are given a tree T with N nodes and $N-1$ edges. The tree have a cost in its edges, which changes every day : In day 0, the edge have cost C_i, and the cost of edges are changed by A_i each day. Thus, i-th edge will have cost $C_i + X \times A_i$ in day X. Note that the weight of edges might be negative.

Distance between two nodes $v, w \in V(T)$ is defined as a sum of cost of edges in path $v - w$. Note that there exists exactly one path between every two nodes in tree. A "Diameter"of tree is defined as a maximum distance between two nodes. Formally, let $dist(v, w)$ be a distance of node v and w in T, then diameter of T is defined as $\max_{i,j \in V(T)}(dist(i, j))$. Node i and j doesn't have to be different.

You will observe the tree for $D+1$ days, starting from day 0 until day D. You want to find a date which minimizes the diameter of two nodes - formally, you need to find an integer $x \in [0, D]$ such that no other integer in $[0, D]$ yields a smaller diameter. If there is more than one such integer, **you should find a smallest such integer**.

Input

The first line contains a number of nodes N, and number of observing day D ($1 \leq N \leq 250000$, $0 \leq D \leq 10^6$)

In next $N-1$ lines, four integer S_i, E_i, C_i, A_i is given, which indicates edge i connects two vertices S_i and E_i, and it have cost C_i in day 0, and it changes by A_i everyday. ($1 \leq S_i, E_i \leq N$, $|C_i| \leq 10^8$, $|A_i| \leq 10^3$)

Output

In first line, print the integer $x \in [0, D]$ that minimizes the diameter in interval $[0, D]$. If there is more than one such integer, **you should find a smallest such integer**.

In next line, print the diameter of tree in day x, when x is the day you found in first line.

Examples

standard input	standard output
3 4 1 2 10 -2 2 3 20 2	0 30
3 10 1 2 20 -3 2 3 30 -4	8 0
5 5 1 2 20 -3 2 3 10 -3 3 4 22 -2 3 5 26 -3	5 23
4 0 1 2 -1 0 2 3 20 0 3 4 -1 0	0 20