

Problem L. Ascending Tree

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

You are given a rooted tree. Each vertex of the tree is labeled with an integer. If you pay one dollar, you can change (increment or decrement) the label of a vertex by one.

You want to change the labels such that, for each vertex, its label is **strictly greater** than any of the labels assigned to its children. Compute the minimum cost required to satisfy this condition.

Input

The first line contains two integers: N , the number of vertices in the tree, and C_1 , the label assigned to the root. The vertices are numbered 1 through N , and the root is vertex 1 ($1 \leq N \leq 10^5$).

The next $N - 1$ line describe non-root vertices. The i -th line contains two integers: P_i , the number of the parent of the vertex i , and C_i , the label assigned to the vertex i ($1 \leq P_i < i$, $-10^9 \leq c_i \leq 10^9$).

Output

Print the minimum cost on a single line.

Example

standard input	standard output
8 6 1 1 2 1 2 3 1 9 5 6 6 6 6 2	8
4 5 1 5 2 5 3 5	4

Note

The figure on the left is the input configuration for the first sample. The figure on the right is a possible final configuration: the label of each parent is strictly greater than that of its child.

