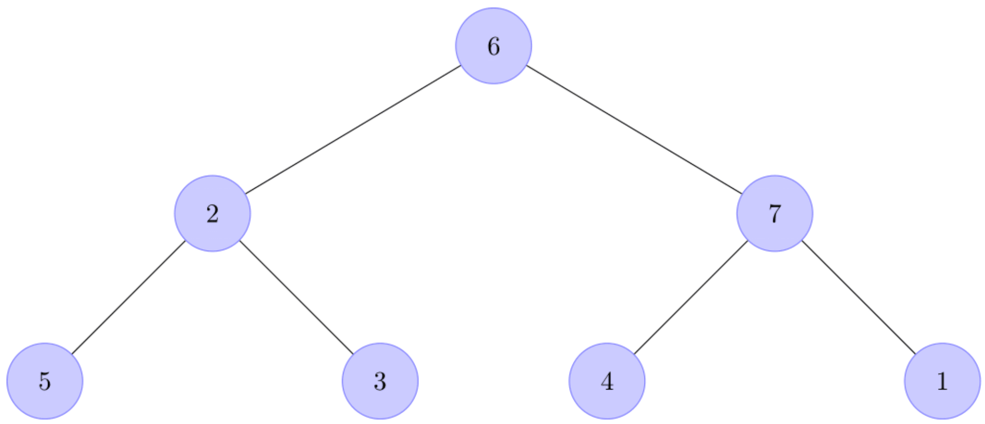
Path Sums

Input file:	`standard input`
Output file:	`standard output`
Time limit:	0.5 seconds
Memory limit:	256 megabytes

You are given a rooted binary tree with n nodes (that is, each node has at most 2 children). Each node has a value attached to it. Given a query k, you are asked to count the number of simple paths whose values sum to exactly k.

For simplicity, we will consider a path to be valid in this context if it starts at some node and only moves down the tree. A path is not required to start at the root nor end at a leaf. For example, consider the following binary tree.



6-2-3 would be considered a valid path, as would **6-7**, **2-5**, and even **4**. However, **4-7-1** is not a valid path because it goes up and then down. Nor would any paths which double back on themselves like **6-7-1-7**. We are also not considering the empty path to be valid.

Input

The first line contains a single integer n, the number of nodes in the tree. Let's call the nodes $v_0, v_1, \ldots, v_{n-1}$. v_0 is guaranteed to be the root of the tree.

The next n lines $L_0, L_1, \ldots, L_{n-1}$ each contain three values c_i, l_i, and r_i. c_i is the value of v_i. l_i and r_i are the indices of the children of v_i. That is, v_i's left child is v_{l_i}, and its right child is v_{r_i}. If l_i or r_i is -1, then that means v_i has no left or right child, respectively.

The final line contains a single integer k, the sum you are querying for.

Output

A single integer representing the number of paths whose values sum to k.

Example

standard input	standard output

`7`
`6 1 2`
`2 3 4`
`7 5 6`
`5 -1 -1`
`3 -1 -1`
`4 -1 -1`
`1 -1 -1`
`11`
	`2`

Note

$1 \le n \le 1,000$

$1 \le k \le 100,000$

$\forall i \in [0, n), -100 \le c_i \le 100$

The values c_i are not guaranteed to be unique.

For test cases 1–80, you may assume the tree is balanced.

For test cases 1–40, you may further assume that $n \le 100$.

For test cases 81–100, you may make neither of these assumptions.

You should aim for a runtime of $O(n^2)$ or better.