# NOI '22 Multi-Provincial Team Selection P2 - Tree

**Time limit:** 2.0s **Memory limit:** 512M

Tommy has an unrooted tree of $n$ nodes numbered $1, 2, \ldots, n$. He wishes to assign weights to **all nodes on some nonempty path on this tree** such that the weight $w_i$ of a node $i$ **on this path** satisfies $l_i \leq w_i \leq r_i$ for given $[l_1, r_1], [l_2, r_2], \ldots, [l_n, r_n]$. Tommy has a positive integer $K$ and further requests that the maximum absolute difference of the weight of any two nodes **on this path** is less than or equal to $K$.

1. How many such assignments satisfy these constraints?
2. What is the sum of the sum of the weights over all such assignments?

Output the answer modulo $10^9 + 7$.

## Constraints

$1 \leq n \leq 200$

$1 \leq l_i \leq r_i \leq 10^9$

$1 \leq K \leq 10^9$

$70\%$ of points are awarded for the first question and $30\%$ of points are awarded for the second question.

| Test | $n \leq$ | $r_i, K \leq$ | Properties |
|---|---|---|---|
| 1 | $5$ | $10$ | None |
| 2-3 | $30$ | $10^9$ | None |
| 4 | $30$ | $500$ | None |
| 5-6 | $200$ | $2 \times 10^5$ | None |
| 7-8 | $200$ | $10^9$ | For $1 \leq i < n$, there is an edge between $i$ and $i + 1$. |
| 9-10 | $200$ | $10^9$ | None |

## Input Specification

The first line contains two integers $n, K$.

The $i$-th of the following $n$ lines contains two integers $l_i, r_i$.

The following $n - 1$ lines describe the edges of the tree.

## Output Specification

On the first line, output the answer for the first question.

On the second line, output the answer for the second question.

**Please output exactly two integers, as otherwise your submission could be graded as Presentation Error.**

## Sample Input

```
3 1
2 3
3 5
4 6
1 2
1 3
```

## Sample Output

```
14
78
```

## Attachments