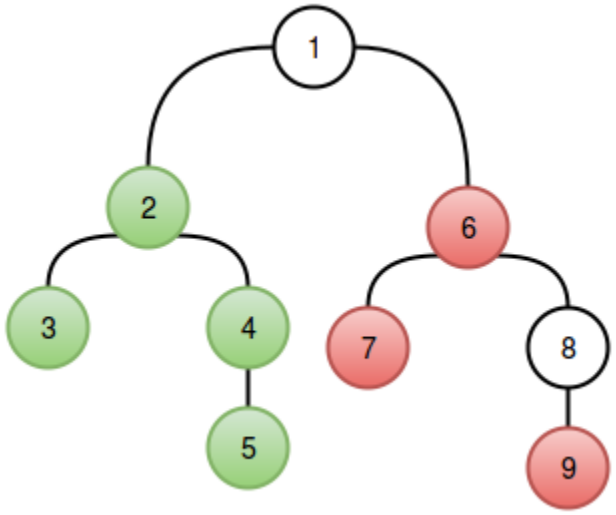
SCS1201 – Data Structures and Algorithm I

Optional Take home Assignment -2019

Treeland is a country with cities and roads. There is exactly *one* path between any two cities.

The ruler of Treeland wants to implement a self-driving bus system and asks tree-loving Alex to plan the bus routes. Alex decides that each route must contain a subset of *connected* cities; a subset of cities is *connected* if the following two conditions are true:

1. There is a path between every pair of cities which belongs to the subset.
2. Every city in the path must belong to the subset.



In the figure above, {2,3,4,5} is a *connected* subset, but {6,7,9} is not (for the second condition to be true, would need to be part of the subset).

Each self-driving bus will operate within a *connected segment* of Treeland. A connected segment [L,R] where $1 \leq L \leq R \leq n$ is defined by the connected subset of cities

S={x|x∈ $Z\ and\ L\ \leq x\ \leq R$}

In the figure above,[2,5] is a connected segment that represents the subset {2,3,4,5}. Note that a single city can be a segment too.

Help Alex to find number of connected segments in Treeland.

Input Format

The first line contains a single positive integer, n . The n-1 subsequent lines each contain two positive space-separated integers, a_i and b_i, describe an edge connecting two nodes in tree T .

Output Format

Print a single integer: the number of segments [L,R], which are connected in tree T .

Sample Input

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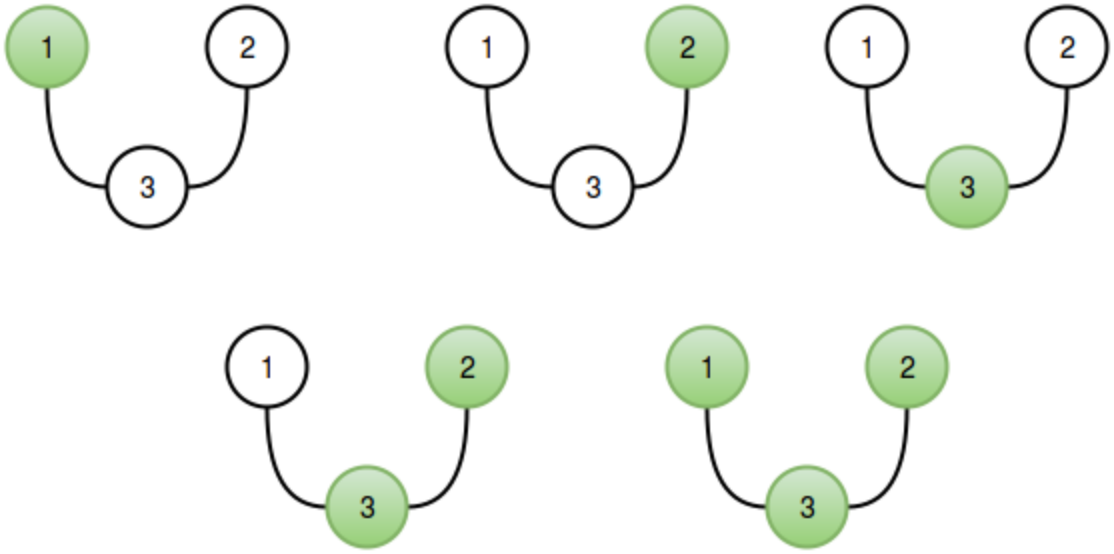
3
1 3
3 2
```

Sample Output

```
5
```

Explanation

The connected *segments* for our test case are: [1,1],[2,2],[3,3],[2,3] and[1,3] . These *segments* can be represented by the respective subsets:{1}{2}{3}{2,3}and{1,2,3} .



Note:[1,2] is not a connected segment. It represents the subset {1,2} and the path between 1 and 2 goes through 3 which is not a member of the subset.