IOITC 2022 TST 2

Tree Coverage

You are given a tree of N nodes which are connected by $N-1$ edges. The ith edge connects the nodes u_i and v_i bidirectionally, and there is a path between any pair of nodes in the tree.

You are allowed to construct a watchtower in each node in the tree. A watchtower is said to cover all the edges which are adjacent to it (i.e., if a watchtower is constructed in node x, then all edges which connect x to another node are covered). Your goal is to cover at least K edges across all the watchtowers that you construct. What is the minimum number of watchtowers that you need to construct to do so?

Input

- The first line contains two integers: N, the number of cities, and K, the minimum number edges that must be covered.
- i-th of the next $N-1$ lines contains two space separated integers, u_i and v_i, denoting that there is an edge between nodes u_i and v_i.

Output

- Print a single integer: the minimum number of watchtowers that you need to construct.

Test Data

In all inputs,

- $1 \leq N \leq 5000$
- $1 \leq K \leq N-1$

Subtask 1 (5 Points): The tree is a star.

Subtask 2 (17 Points): $N \leq 18$

Subtask 3 (23 Points): $K = N-1$

Subtask 4 (25 Points): $N \leq 300$

Subtask 5 (30 Points): No additional constraints.

Sample Input 1

```
9 6
1 2
1 3
1 4
2 5
2 6
3 7
4 8
4 9
```

Sample Output 1

```
2
```

Sample Input 2

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

Sample Output 2

```
1
```

Sample Input 3

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

Sample Output 3

```
3
```

Limits

Time: 1 second

Memory: 1024 MB