Jenny's Subtrees

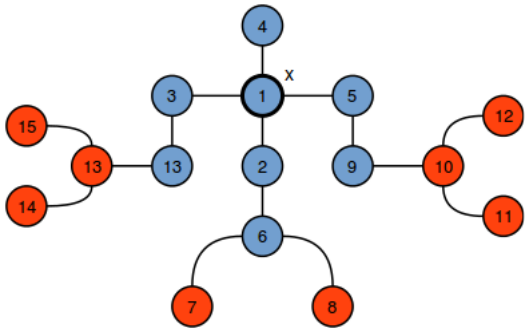
by nikasvanidze

Problem | Submissions | Leaderboard | Discussions | Editorial

Jenny loves experimenting with trees. Her favorite tree has n nodes connected by $n-1$ edges, and each edge is 1 unit in length. She wants to cut a *subtree* (i.e., a connected part of the original tree) of radius r from this tree by performing the following two steps:

1. Choose a node, x, from the tree.
2. Cut a subtree consisting of *all* nodes which are *not further* than r units from node x.

For example, the blue nodes in the diagram below depict a subtree centered at $x = 1$ that has radius $r = 2$:



Given n, r, and the definition of Jenny's tree, find and print the number of *different* subtrees she can cut out. Two subtrees are considered to be different if they are not isomorphic.

Input Format

The first line contains two space-separated integers denoting the respective values of n and r.
Each of the next $n-1$ subsequent lines contains two space-separated integers, x and y, describing a bidirectional edge in Jenny's tree having length 1.

Constraints

- $1 \leq n \leq 3000$
- $0 \leq r \leq 3000$
- $1 \leq x, y \leq n$

Subtasks

For 50% of the max score:

- $1 \leq n \leq 500$
- $0 \leq r \leq 500$

Output Format

Print the total number of different possible subtrees.

Sample Input 0

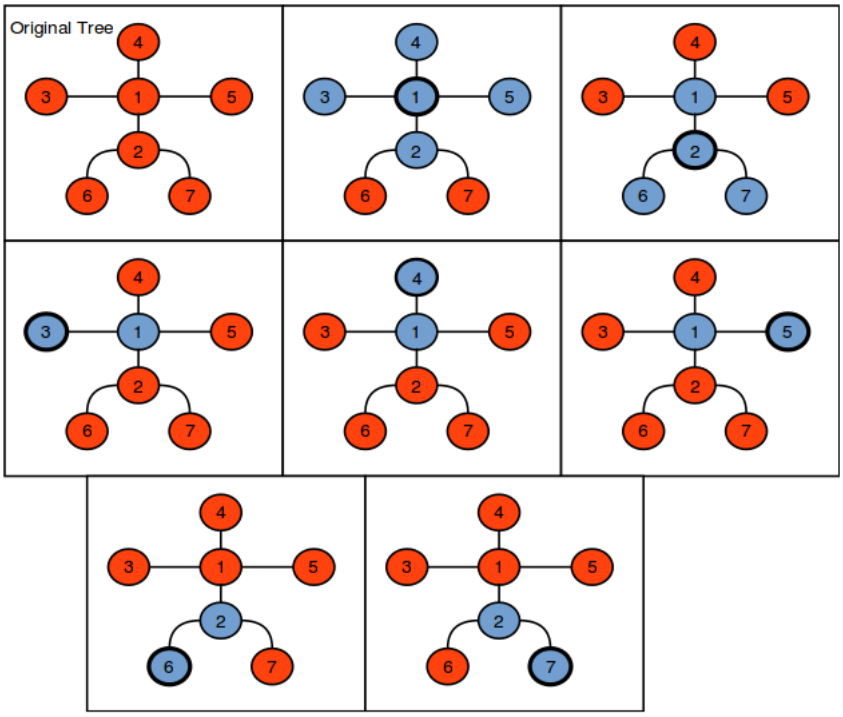
```
7 1
1 2
1 3
1 4
1 5
2 6
2 7
```

Sample Output 0

```
3
```

Explanation 0

In the diagram below, blue nodes denote the possible subtrees:



The last 5 subtrees are considered to be the same (i.e., they all consist of two nodes connected by one edge), so we print 3 as our answer.

Sample Input 1

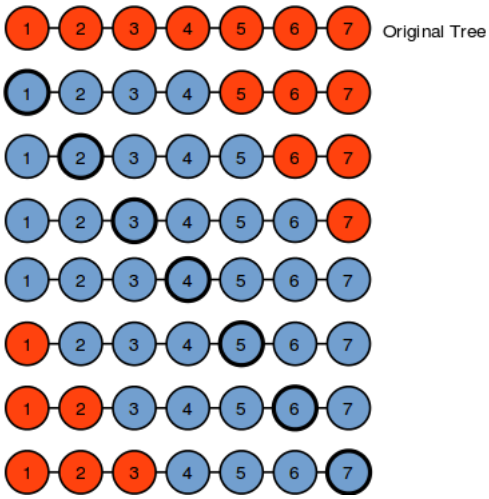
```
7 3
1 2
2 3
3 4
4 5
5 6
6 7
```

Sample Output 1

```
4
```

Explanation 1

In the diagram below, blue nodes denote the possible subtrees:



Here, we have four possible different subtrees.

Submissions:115

Max Score:70

Difficulty: Hard

Rate This Challenge:

More

Current Buffer (saved locally, editable)

C++

```
#include <map>
#include <set>
#include <list>
#include <cmath>
#include <ctime>
#include <deque>
#include <queue>
#include <stack>
#include <string>
#include <bitset>
#include <cstdio>
#include <limits>
#include <vector>
#include <climits>
#include <cstring>
#include <cstdlib>
#include <fstream>
#include <numeric>
#include <sstream>
#include <iostream>
#include <algorithm>
#include <unordered_map>

using namespace std;


int main(){
    int n;
    int r;
    cin >> n >> r;
    for(int a0 = 0; a0 < n-1; a0++){
        int x;
        int y;
        cin >> x >> y;
        // your code goes here
    }
```

```
    return 0;
}

```

Line: 1 Col: 1

Upload Code as File | Test against custom input | Run Code | Submit Code