Height Decreasing Surgery

Description

As a human, we want to increase our height in most case. However, for a tree being, it is embarrassing to be a tall guy.

You are a tree plastic surgeon. A few rooted trees reach out to you for their height issues.

There are only one kind of operation you can do on your tree customers: pick a non-root vertex v, cut off the subtree rooted at vertex v, choose another vertex u which is not in the v's subtree, and connect the subtree of vertex v to be the child of vertex u.

Let w be the parent of vertex v before the operation, then the cost of this operation is equal to the distance between vertex w and vertex u, which is the distance between vertex v's old parent and new parent. The distance is measure as if all the edges are with length 1.

You can do as many operations on a tree as you want. The cost of a surgery is the summation of the cost of every operations you applied.

You pity the tall trees. So you want to find the minimum cost for them.

For each tree, your are given its number of nodes N, a target height H and the $N-1$ edges. The nodes are numbered with integer 0 to $N-1$ where node 0 is the root node. The height of a tree is defined as the maximum distance between its root node and any other nodes. Please find the minimum cost to adjust the tree so that its height becomes less than or equal to H.

Input

The first line contains an integer T indicating the total number of test cases.

For each test case, the first line contains two integers N, H, indicating the number of nodes and the target height. Following $N-1$ lines, each contains two integer x, y, indicating that there's an edge connecting node x and node y.

- $1 \leq T \leq 90$
- $2 \leq N \leq 100$
- $1 \leq H < N$
- The input is a valid tree

Output

For each test case, output one integer indicating the minimum surgery cost for this tree.

Sample Input

```
3
6 2
0 1
0 2
1 3
3 4
3 5
3 2
0 1
1 2
3 1
0 1
1 2
```

Sample Output

```
1
0
1
```

Hint

In the first sample test case, you can pick node 3 as v and node 0 as u, the height of this tree becomes 2 after this 1-cost operation.