

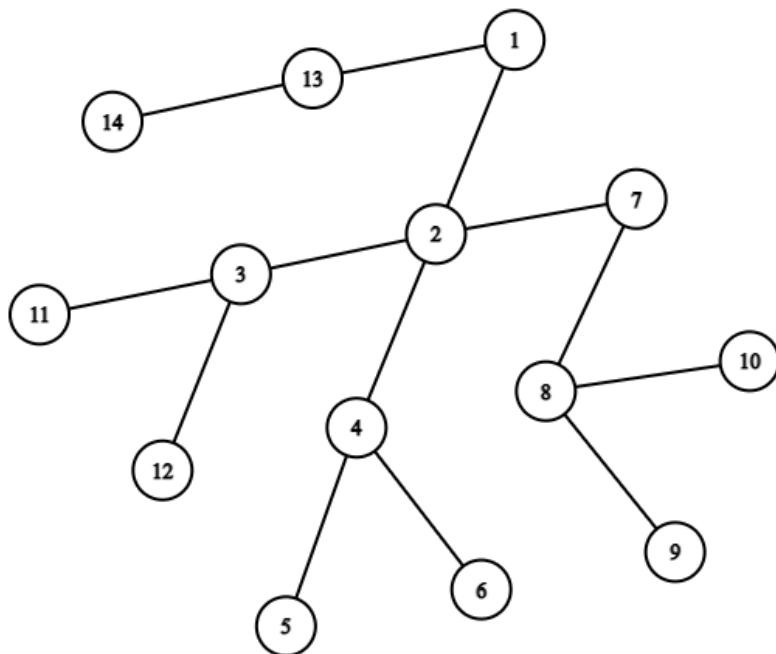
E. Gardener and Tree

time limit per test: 4 seconds

memory limit per test: 256 megabytes

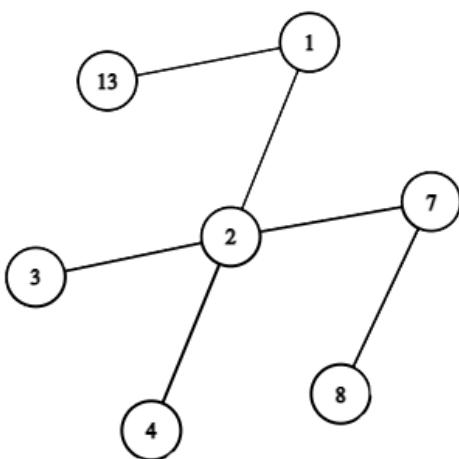
A tree is an undirected connected graph in which there are no cycles. This problem is about non-rooted trees. A leaf of a tree is a vertex that is connected to **at most one** vertex.

The gardener Vitaly grew a tree from n vertices. He decided to trim the tree. To do this, he performs a number of operations. In one operation, he removes **all** leaves of the tree.



Example of a tree.

For example, consider the tree shown in the figure above. The figure below shows the result of applying exactly one operation to the tree.



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The result of applying the operation "remove all leaves" to the tree.

Note the special cases of the operation:

- applying an operation to an empty tree (of 0 vertices) does not change it;
- applying an operation to a tree of one vertex removes this vertex (this vertex is treated as a leaf);
- applying an operation to a tree of two vertices removes both vertices (both vertices are treated as leaves).

Vitaly applied k operations sequentially to the tree. How many vertices remain?

Input

The first line contains one integer t ($1 \leq t \leq 10^4$) — the number of test cases. Then t test cases follow.

Each test case is preceded by an empty line.

Each test case consists of several lines. The first line of the test case contains two integers n and k ($1 \leq n \leq 4 \cdot 10^5$, $1 \leq k \leq 2 \cdot 10^5$) — the number of vertices in the tree and the number of operations, respectively. Then $n - 1$ lines follow, each of them contains two integers u and v ($1 \leq u, v \leq n$, $u \neq v$) which describe a pair of vertices connected by an edge. It is guaranteed that the given graph is a tree and has no loops or multiple edges.

It is guaranteed that the sum of n from all test cases does not exceed $4 \cdot 10^5$.

Output

For each test case output on a separate line a single integer — the number of vertices that remain in the tree after applying k operations.

Example

input

```
6

14 1
1 2
2 3
2 4
4 5
4 6
2 7
7 8
8 9
8 10
3 11
3 12
1 13
13 14
```

```
2 200000
1 2
```

```
3 2
1 2
2 3
```

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

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

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

```
1 7  
2 1
```

output

```
7  
0  
0  
3  
1  
2
```

Note

The first test case is considered in the statement.

The second test case contains a tree of two vertices. 200000 operations are applied to it. The first one removes all two vertices, the other operations do not change the tree.

In the third test case, a tree of three vertices is given. As a result of the first operation, only 1 vertex remains in it (with the index 2), the second operation makes the tree empty.

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