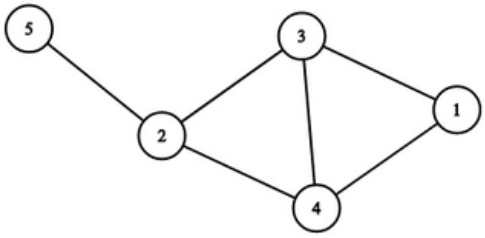
F. The Maximum Subtree

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Assume that you have k one-dimensional segments $s_1, s_2, \ldots s_k$ (each segment is denoted by two integers — its endpoints). Then you can build the following graph on these segments. The graph consists of k vertexes, and there is an edge between the i-th and the j-th vertexes ($i \neq j$) if and only if the segments s_i and s_j intersect (there exists at least one point that belongs to both of them).

For example, if $s_1 = [1, 6], s_2 = [8, 20], s_3 = [4, 10], s_4 = [2, 13], s_5 = [17, 18]$, then the resulting graph is the following:



A tree of size m is good if it is possible to choose m one-dimensional segments so that the graph built on these segments coincides with this tree.

You are given a tree, you have to find its good subtree with maximum possible size. Recall that a subtree is a connected subgraph of a tree.

Note that you have to answer q independent queries.

Input

The first line contains one integer q ($1 \leq q \leq 15 \cdot 10^4$) — the number of the queries.

The first line of each query contains one integer n ($2 \leq n \leq 3 \cdot 10^5$) — the number of vertices in the tree.

Each of the next $n - 1$ lines contains two integers x and y ($1 \leq x, y \leq n$) denoting an edge between vertices x and y. It is guaranteed that the given graph is a tree.

It is guaranteed that the sum of all n does not exceed $3 \cdot 10^5$.

Output

For each query print one integer — the maximum size of a good subtree of the given tree.

Example

input

```
1
10
1 2
1 3
1 4
2 5
2 6
3 7
3 8
4 9
4 10
```

output

```
8
```

Note

In the first query there is a good subtree of size 8. The vertices belonging to this subtree are $9, 4, 10, 2, 5, 1, 6, 3$.
