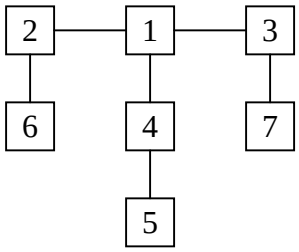
Balancing Act

TASK

Consider a tree T with N ($1 \leq N \leq 20{,}000$) nodes numbered 1…N. Deleting any node from the tree yields a **forest**: a collection of one or more trees. Define the **balance** of a node to be the size of the largest tree in the forest T created by deleting that node from T.

For example, consider the tree:



Deleting node 4 yields two trees whose member nodes are {5} and {1,2,3,6,7}. The larger of these two trees has five nodes, thus the balance of node 4 is five. Deleting node 1 yields a forest of three trees of equal size: {2,6}, {3,7}, and {4,5}. Each of these trees has two nodes, so the balance of node 1 is two.

For each input tree, calculate the node that has the minimum balance. If multiple nodes have equal balance, output the one with the lowest number.

The input trees are given one per file. Input cases are numbered 1 through 10 and are available via the contest website.

Input:

- The first line of input contains a single integer K, specifying the input case number.
- The second line contains a single integer N.
- Each of the next N-1 lines contains two space-separated node numbers that are the endpoints of an edge in the tree. No edge will be listed twice, and all edges will be listed.

Example input:

```
0
7
2 6
1 2
1 4
4 5
3 7
3 1
```

Output:

- The first line of output should contain the string "FILE balance K", where K is the input case number.
- The second line should contain a single integer, the number of the node with minimum balance.
- The third line should contain a single integer, the balance of that node.

Example output:

```
FILE balance 0
1
2
```

CONSTRAINTS:

Running time	1 second of CPU
Memory	64 MB

SCORING

You will receive full points on each test case for which your program produces a correct output file. No partial credit will be given on any test case.