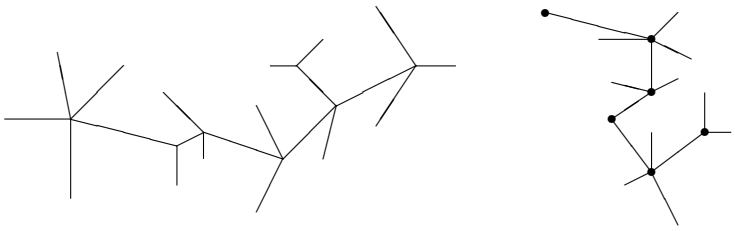
Problem A: Caterpillar

An undirected graph is called a *caterpillar* if it is connected, has no cycles, and there is a path in the graph where every node is either on this path or a neighbor of a node on the path. This path is called the *spine* of the caterpillar and the spine may not be unique. You are simply going to check graphs to see if they are caterpillars.

For example, the left graph below is not a caterpillar, but the right graph is. One possible spine is shown by dots.



Input

There will be multiple test cases. Each test case starts with a line containing n indicating the number of nodes, numbered 1 through n (a value of $n = 0$ indicates end-of-input). The next line will contain an integer e indicating the number of edges. Starting on the following line will be e pairs n_1 n_2 indicating an undirected edge between nodes n_1 and n_2. This information may span multiple lines. You may assume that $n \leq 100$ and $e \leq 300$. Do not assume that the graphs in the test cases are connected or acyclic.

Output

For each test case generate one line of output. This line should either be

Graph g is a caterpillar.

or

Graph g is not a caterpillar.

as appropriate, where g is the number of the graph, starting at 1.

Sample Input

```
22
21
1 2 2 3 2 4 2 5 2 6 6 7 6 10 10 8 9 10 10 12 11 12 12 13 12 17
18 17 15 17 15 14 16 15 17 20 20 21 20 22 20 19
16
15
1 2 2 3 5 2 4 2 2 6 6 7 6 8 6 9 9 10 10 12 10 11 10 14 10 13 13 16 13 15
0
```

Sample Output

```
Graph 1 is not a caterpillar.
Graph 2 is a caterpillar.
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