Programming Assignment 2: Strongly Connected Components

Write a Java program that implements the algorithm for finding the strongly connected components of a directed graph. Your program should consist of a single Java class named `Components.java`, and should be compilable with the simple command "`javac Components.java`". Your program should take two command-line arguments: an input file and an output file. The first line of the input file will be an integer N, which represents the number of problem instances contained in the file. It will then be followed by the N instance specifications. Each instance specification will consist of a directed graph represented as a set of adjacency lists. The first line of the specification of each instance will be an integer M, that represents the number of vertices in that instance. The vertices are numbered 1, 2, 3, …, M. This is followed by M lines, where the i-th line consists of the adjacency list of vertex i. The line for vertex i begins with an integer R that represents the number of outgoing edges that leave vertex i, followed by R integers representing the vertex numbers of the vertices that receive edges from i.

The output file created by your program should contain N lines, where the j-th line consists of a single number representing the number of strongly connected components in the graph represented by the j-th instance in the input file.

For example, the following is an example of an input file (that consists of two instances):

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

and its corresponding output file:

```
4
3
```