Jutge.org

The Virtual Learning Environment for Computer Programming

Strongly connected components P90865_en

Quart Concurs de Programació de la UPC - Semifinal (2006-09-20)

A directed graph $G = (V, A)$ consists of a set of vertices V and a set of arcs A. An arc is an ordered pair (u, v), where $u, v \in V$. A path from a vertex v_{i_1} to a vertex v_{i_k} is a sequence of arcs $(v_{i_1}, v_{1_2}), (v_{i_2}, v_{i_3}), \ldots, (v_{i_{k-1}}, v_{i_k})$. By definition, there is always a path from every vertex to itself.

Consider the following equivalence relation: two vertices u and v of G are related if, and only if, there is a path from u to v and a path from v to u. Every equivalence class resulting from this definition is called a strongly connected component of G.

Given a directed graph, calculate how many strongly connected components it has.

Input

Input begins with the number of cases. Each case consists of the number of vertices n and the number of arcs m, followed by m pairs (u, v). Vertices are numbered starting at 0. There are not repeated arcs, nor self-arcs (v, v). Assume $1 \leq n \leq 10^4$.

Output

For every graph, print its number of strongly connected components.

Sample input

```
3

3 3
0 1  1 2  2 0

7 7
0 1  1 2  2 0  3 4  4 6  6 3  0 6

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

Sample output

```
Graph #1 has 1 strongly connected component(s).
Graph #2 has 3 strongly connected component(s).
Graph #3 has 4 strongly connected component(s).
```

Problem information

Author : Xavier Martínez
Generation : 2018-10-29 15:25:58