
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 $(v_{i_1}, v_{i_2}), (v_{i_2}, v_{i_3}), \dots, (v_{i_{k-1}}, v_{i_k})$. 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

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