ePAL - Strongly Connected Components

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Outline

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Example 1

Is there a graph in which the sum of all output degrees different from the sum of all input degrees?

Example 2

Is there a graph condensation with a cycle?

How does it look like?

Example 3

What is the difference between the condensation of a acyclic and the graph itself?

Example 4

A graph condensation contains only one node.

What is the original graph?

Example 5

The graph condensation is isomorphic with the graph itself.

What is the original graph?

Example 6

Is there an acyclic graph without roots or leaves?

Example 7

Is there a graph with the same number of roots and leaves?

May a graph have more roots than leaves? Or vice versa?

Example 9

Is there a directed graph without roots and leaves?

Only with a root (roots) and leaves?

Only with leaves (leaf) and without roots?

Example 10

Each edge of any undirected circle is arbitrarily oriented.

What is the relationship between the number of roots and leaves of such a formed graph?

Example 11

Input and output degree of all vertices in a graph without loops is 1.

How does this graph look like?

Is it connected?

Example 12

Can a graph be isomorphic with the oppositely directed graph?

Example 13

Can a directed graph be isomorphic with its complement?

Example 14

Provide instructions for making a graph with n nodes, where all the input degrees are mutually different and all output degrees are mutually different.

Example 15

Each directed graph contains a variety of induced acyclic subgraphs (eg, in many ways, we can remove all edges except for one).

It is true that every directed acyclic graph contains a factor?

Example 16

Draw all mutually nonisomorphic directed graphs with 3 nodes.

Example 17

Draw all mutually nonisomorphic directed circles with 5 nodes. (Please note, not cycles, but circles!)

Example 18

Orient a circle with six vertices to form an acyclic graph. How many mutually nonisomorphic variants can it be done?

Example 19

Find a graph in which the input and output degree of each node is nonzero, while the graph contains a node which does not pass through any cycle.

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Example 1

An acyclic graph has been violated in a way that there were added accidentally two edges, each of which violates acyclicity by entering a cycle in the graph. We do not know which edges are those and we should detect those in time propotional to the number of edges of the graph.

Example 2

Show that if the output degree of each node is non-zero, then the graph contains a cycle. Is the same theorem is valid for input degree?

Example 3

A weakly connected acyclic graph has a single root and a single leaf. Add an edge leading from the leaf to the root. The result will be strongly connected. Prove.

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