Technische Universität München
Fakultät für Informatik
Lehrstuhl für Effiziente Algorithmen
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Aufgabenblatt 4
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Praktikum Algorithmen-Entwurf

Due date: Monday, 12th November 2012, 14:00

Aufgabe 1 (Blocks/Biconnectivity)

Let $G = (V, E)$ be an undirected graph. Implement and animate an algorithm that finds all articulation vertices and blocks in time $O(|V| + |E|)$ using a single depth-first search (DFS). At the end, the articulation vertices should be colored red. Edges that are part of the same block should have the same color. If two edges a and b are in different blocks but share an articulation vertex, then a and b should have different colors.

Test your program with the graphs `bicon1.gw` to `bicon4.gw`.

Aufgabe 2 (Strong connectivity)

Let $G = (V, E)$ be a directed graph. A strongly connected component of G is a maximal subset Z of nodes such that for all nodes $v, w \in V$, $v \neq w$, there is a directed path from v to w in G. Implement and animate an algorithm that finds all strongly connected components of G in time $O(|V| + |E|)$ using a single depth-first search (DFS).

Test your program with the graphs `scc1.gw` to `scc4.gw`.