Thesis/Dissertation: Miroslav Demek: A library for drawing directed graphs

Bachelor's thesis

Awards: Dean's Award for an Outstanding Final Thesis

A library for drawing directed graphs

A library for drawing directed graphs

Miroslav Demek

Abstract

Cílem této bakalářské práce je implementovat knihovnu v jazyce C++ pro vizualizaci orientovaných grafů. Tato knihovna umožňuje uživateli popsat graf přidáváním vrcholů a hran a poté vytvořit jeho hierarchické rozložení v rovině. Toto rozložení je popsáno pomocí pozic vrcholů a kontrolních bodů hran. Práce začíná úvodem do vykreslování grafů. Poté jsou detailně popsány všechny implementované algoritmy …more

Abstract

The goal of this thesis is to implement a C++ library for creating visualizations of directed graphs. The library allows the user to create a graph by adding vertices and edges and create a hierarchical layout of this graph in space which is described by the positions of vertices and control points of edges. The thesis first gives an introduction to graph drawing, then the implemented algorithms are …more

Keywords

graph graph drawing layered drawings hierarchical drawings Sugiyama framework C++ library

Thesis description

The goal of this thesis is to study the algorithms employed in the toolkit GraphViz (especially the algorithms used by the tool 'dot') and implement the 'dot' algorithm (or a variant thereof) as a C++ API. The outcome of the thesis should be a reusable library which allows the user to incrementally describe a (directed) graph by adding vertices and edges using API calls. The library should then return an abstract, programmatically accessible description of the layout of the graph in a plane. This description should be independent of the employed display device (screen, graphics file, etc.) and should therefore only use a coordinate system, not a specific graphics library. Interpreting the coordinates of vertices and control points of edges is up to the client of the library. The thesis should contain at least one 'reference' implementation of a client for the library, which would output a graphics file or display the rendered graph on the screen, using a graphics library chosen by the student. Evaluation should include a comparison of the output from the library with the output of the tool 'dot' from the GraphViz package. The student should select suitable small and medium-sized evaluation graphs (on the order of tens to hundreds of vertices).
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28/7/2020 05:07, RNDr. Petr Ročkai, Ph.D., UČO 139761

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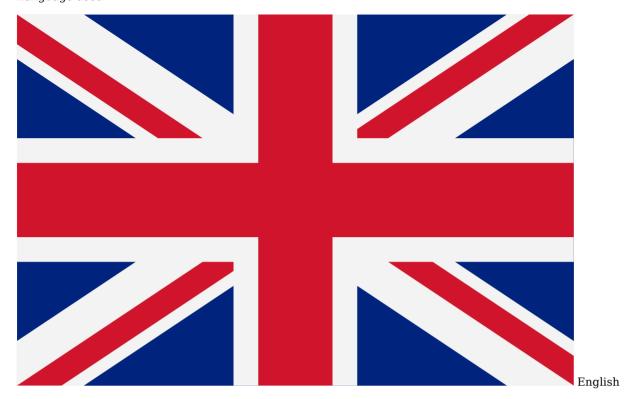- Thesis/dissertation received 20/7/2020 12:01, Helena Kryštofová, UČO 306

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Supervisor

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Supervisor's report

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