

**Course Assignments**  
**for**  
**Graph Drawing**  
**4DV802 – Autumn 2016**  
**Assignment 2**

Deadline for this assignment is Dec 18, 2016 at 23:55.

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All students should develop a simple tool in Java that is able to read an input file with a graph specification and to draw this graph (including the nodes' id) within a scrollable 2D drawing area. Each student will implement a different drawing algorithm or variations of one algorithm. A simple GUI is needed to allow the user to load input files (based on GraphML) easily and to modify options if possible. The latter issue depends on the implemented algorithm, e.g., the width  $W$  of the Coffman-Graham-Layering should be modifiable via the GUI. You should use the following graph specifications for testing (also available in Moodle):

<http://cs.lnu.se/isovis/courses/fall16/4dv802/assignments/dags-GraphML.zip> (DAGs)

<http://cs.lnu.se/isovis/courses/fall16/4dv802/assignments/digraphs-GraphML.zip> (digraphs)

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**Task 1** *GraphML (all students)*

Implement a parser for GraphML input files (a specification of GraphML can be found on the following url: <http://graphml.graphdrawing.org/>). This graph format is based on XML. Your tool should be able to parse simple graph specifications (i.e., nodes and edges), such as given in the ZIP-files with graph examples.

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**Task 2** *Hierarchical Layout of DAGs – Variant 1 (Student: Rob Bruinsma)*

Implement the hierarchical approach for creating polyline drawings of acyclic digraphs. Implement the algorithm and embed it into a tool as described above.

- Layer Assignment: Longest Path Layering
- Crossing Reduction: Hybrid Approach discussed in the course
- Coordinate Assignment: Simple dummy node removal

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**Task 3** *Hierarchical Layout of DAGs – Variant 2 (Student: Camille Fôret)*

Implement the hierarchical approach for creating polyline drawings of acyclic digraphs. Implement the algorithm and embed it into a tool as described above.

- Layer Assignment: Coffman/Graham Layering
- Crossing Reduction: Adjacent-Exchange AND Split (user can choose)
- Coordinate Assignment: Simple dummy node removal

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**Task 4** *Hierarchical Layout of DAGs – Variant 3 (Student: Andreas Zsigmond)*

Implement the hierarchical approach for creating polyline drawings of acyclic digraphs. Implement the algorithm and embed it into a tool as described above.

- Layer Assignment: Coffman/Graham Layering
- Crossing Reduction: Barycenter Method AND Median Method (user can choose)
- Coordinate Assignment: Simple dummy node removal

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Please prepare a demo of your tool as well as a short presentation (about 5–10 minutes) (PowerPoint, PDF, ...) on the most important aspects of your implementation like data structures, etc. You will present both on Dec 19, 10:15-12:00 via Adobe Connect or locally (room D1167V). Please, use your own computer for the demo and the presentation if possible. Submit all files in a ZIP archive via Moodle by the given deadline and also include a short readme file about your software with instructions on how to compile and run it.

Please note: any kind of plagiarism is not acceptable!