

Course Assignments
for
Graph Drawing
4DV802 – Autumn 2018

Assignment 1

Deadline for this assignment is Nov 20, 2018 at 23:55.

Task 1 *Graph example*

Draw the following graph given by the adjacency matrix

$$\begin{pmatrix} 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 0 \end{pmatrix}$$

by using your creativity and hands (*it is allowed to either attach a quality photo/scan of a drawing or use general-purpose software such as PowerPoint or Inkscape for this task, but not specialized editors such as Gephi or GDE*). Answer the following questions:

1. Is the graph directed or undirected?
2. Does it have cycles? If yes, where?
3. Is this graph simple?
4. What is the maximal degree of a node in the graph? In case the graph is directed, distinguish between indegree and outdegree.
5. What is a transitive edge? Does this graph have transitive edges? If yes, where?

Task 2 *Graph editors and specification languages*

Download and install the graph editor yEd. You can find it here: <http://www.yworks.com/products/yed>. Produce a nice drawing of the graph from Task 1 with the help of yEd. To do that you must convert this adjacency matrix to a GML file, load it into yEd, and choose a suitable layout algorithm. The specification of the GML format can be found here: <http://www.fim.uni-passau.de/fileadmin/files/lehrstuhl/brandenburg/projekte/gml/gml-technical-report.pdf>

Task 3 *Layout of selected graphs*

Download the ZIP-file with five different graphs from Moodle in *Assignments/Graph files for Assignment 1* and draw them with yEd as good and nice as possible! Test all algorithms and available options of this tool to get the best result. Why do you think that your result is nice and the best? Please, justify your thoughts!

Please **prepare a short presentation** (PowerPoint, PDF, ...) on/with your results and upload it to Moodle by the given deadline! If you have questions you can contact Kostiantyn Kucher via email (kostiantyn.kucher@lnu.se). You will have to present your work on Nov 21, 14:00–15:30, room B3032V or remotely via Zoom.

Please note: any kind of plagiarism is not acceptable!