

# University of Utah

## School of Computing

CS 1060

Homework #6

Spring 2016

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**Due April 26, 2016 at the start of class.**

This homework is designed for you to get familiar with a popular graph analysis and visualization tool: *Gephi*.

Before proceed, please install Gephi (<https://gephi.org/>) on your computer. It runs on Windows, Max OS X and Linux. If you are using CADE lab, please contact the TA with installation questions regarding the CADE lab.

Please go through the brief tutorial at: <https://gephi.org/users/quick-start/>

For detailed description of the GEXF format, see: <https://gephi.org/gexf/format/index.html>

Three GEXF examples can be found (also downloadable from course webpage):

- dh11.gexf (to be downloaded from <https://dhs.stanford.edu/gephi-workshop/sample-graph-data/> under “DH11 Network”)
- Les Miserables.gexf (coming by default with Gephi installation).
- facebook.gexf (to be downloaded from course webpage).

Other sample datasets can be found at: <https://github.com/gephi/gephi/wiki/Datasets>.

Question 1 (3 points). Start Gephi, open the sample data file provided by default “Les Miserables.gexf”, obtain a screenshot of the graph as your solution (1 point). Under filters, apply Topology: Degree Range filters, to display the above network with node degree at least 8. Obtain a screenshot of the filtered graph as your solution (2 points).

Question 2 (3 points). Open the data file “dh11.gexf”, apply Statistics: Graph density. Obtain a screenshot of the “Graph Density Report” as your solution (1 point). On the left panel, apply layout:contraction 3 times (by clicking “run” three times), obtain a screenshot to be your solution (2 points).

Question 3 (3 points). Open the data file ”facebook.gexf”. Obtain a screenshot of the graph under layout:Noverlap as your solution (1 point). Apply Topology:Degree Range to filter the network to contain nodes with degree at least 10. Obtain a screenshot as your solution (2 points).

Question 4 (3 points). Do research online and describe what is the meaning of a  $k$ -core for a graph (1 point). Using Gephi, apply Topology: Kcore filter to the “facebook.gexf” graph under parameter setting “6” to produce a graph that is different from the original data (2 points).

Bonus Question (2 points). Open “facebook.gexf”, apply Statistics: Network Diameter and report the number that is returned; and obtain a screenshot of the “Graph Distance Report” as your solution.