

Homework 5, Due February 26

CAPP 30255 Advanced Machine Learning for Public Policy
University of Chicago

1. (25 points) Exercises 2 and 4, Easley/Kleinberg, §4.6, page 116.
2. (25) Implement the Girvan-Newman algorithm. Your function should take as input a **Networkx** graph object and the number of components to partition the graph into, and return a list of components. Each component should be a list of nodes in the graph. Please see the attached helper file for a test case. Also see this [implementation of a version of Girvan-Newman](#) for an illustration; this version only partitions a connected graph into two components.
3. (25) Use your implementation of Girvan-Newman to draw the ego networks from Facebook, [available here](#), such that each network is partitioned into 10 components and each component is colored differently. See the attached example for ego network “0”. Submit similar pdf images for “3980”, “348”, and “3437”. You will have to determine which files to read, what an ego network is, drawing graphs in **Networkx**, etc.
4. (25) Extend your implementation to analyse the above Facebook networks (and possibly others in the same dataset) and discover interesting properties of the networks. This is an open-ended problem and you are encouraged to collaborate with other students on Piazza to share insights. Submit your code and a write-up on your results.