

COMPLEX NETWORKS - SPRING 2024
HOMEWORK 4

INSTRUCTOR: JIA LIU
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- DUE on 04/20/2025 11:59pm C.T.
- This is a group project. Each group only needs to submit one file.
- All files should be typed.
- Please name your file as follows: *LastnameInitials–MAP6306quiz1.pdf*. If your name is David Roberts, file name is *RobertsAD–MAP6306quiz1.pdf*.
- Try to keep the file size less than 4MB.
- You can resubmit the quiz if you want. Please specify which one is the one to be graded. Otherwise I will grade the most recent version.
- DO NOT EMAIL me the quiz. All quizzes are submitted via Canvas.

- (1) Consider following data sets (you can download the data here <https://websites.umich.edu/~mejn/netdata/>)
 - (a) Zachary's karate club
 - (b) American College football
 - (c) Power grid

Report the questions below for each network:

- (a) Use Gephi to plot the network. Make sure to use centrality and communities so that you can show the properties of the network.
- (b) Use Gephi to find how many communities this network has.
- (c) What is the modularity for the community detection?

Answers:

- (1) Use Gephi to plot the network.
 - (a) Plot **Zachary's karate club** network with Gephi.
 - (b) Plot **American College football** network with Gephi.
 - (c) Plot **Power grid** network with Gephi.
- (2) Use Gephi to find how many communities this network has.
 - (a) Use Gephi to find how many communities there are in the **Zachary's karate club** network.
 - (b) Use Gephi to find how many communities there are in the **American College football** network.
 - (c) Use Gephi to find how many communities there are in the **Power grid** network.
- (3) What is the modularity for the community detection?
 - (a) What is the modularity for the community detection in the **Zachary's karate club** network?
 - (b) What is the modularity for the community detection in the **American College football** network?
 - (c) What is the modularity for the community detection in the **Power grid** network?