Modelling and Analysis of Complex Networks

Exercise 1

Due: DUE DATE

The maximum score of this assignment is: **16 points**. Please submit the assignment in any readable data format (.txt, .doc, .pdf, .md ...) and submit the assignment before the deadline. If you have additional information concerning your answers, please also upload the document to the Moodle, or include the link to the document in your answers (e.g., link to your Github repository). If you have a teammate, please write down the name of your teammate.

The datasets can be downloaded from https://github.com/wang422003/Complex-Networks_exercise/tree/main/Datasets according to the number of your team.

Let's turn to the networks we just distributed (Facebook-Ego and Twitter-Ego). Each of the network consists of more than one hundred nodes and numerous edges, thus it is quite impractical to check the features and the characteristics of the networks manually. Instead, we can use powerful tools to explore the networks. SNAP is a powerful package to deal with large networks. Please check the documentation of Snap.py, which is the python implementation of SNAP (https://snap.stanford.edu/snappy/). After that, please utilize its python package to answer the following questions on both of the networks you have. Please also submit your ready-to-run code. **($2 \times (2 + 2 + 4) = 16$ points)**

(a) How many nodes and edges are there in the networks?

(b) What are the maximum degree and the average degree of the networks?

(c) Extract 5 - 8 nodes from the network and state them as a partial network. What is the adjacency matrix of the partial network? Why do we need adjacency matrix to describe the structure of the network?