ELL880 Assignment 1

Anish Majumder
2020EE30580

Dataset: https://networkrepository.com/soc-dolphins.php

Metadata

Short	Dolphins online social network
Description	A social network of bottlenose dolphins. The dataset contains a list of all of links, where a link represents frequent associations between dolphins.

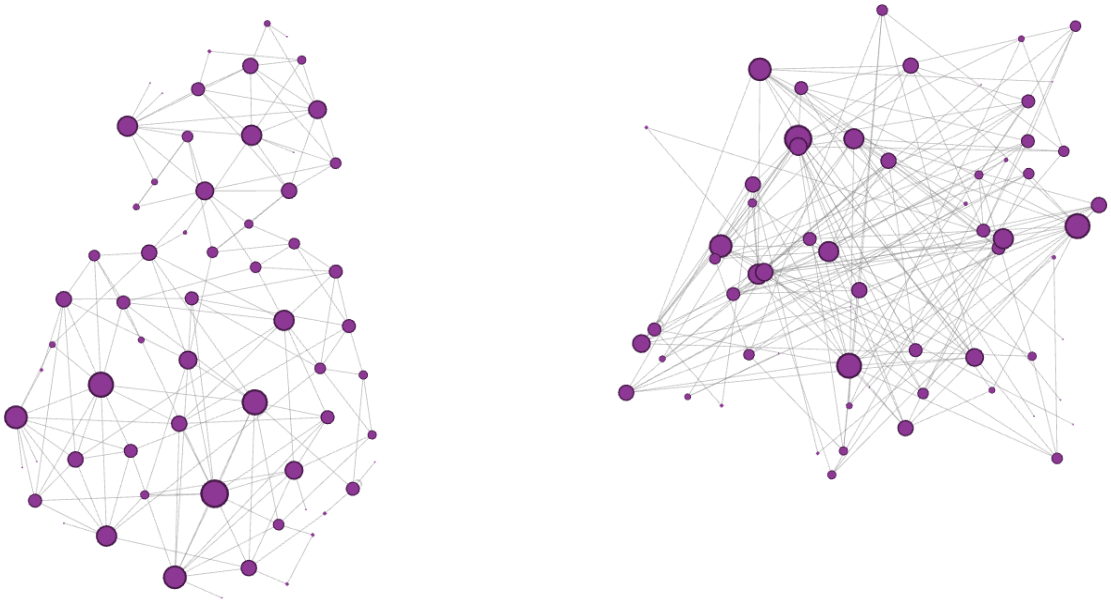
Network Data Statistics

Nodes	62
Edges	159
Density	0.0840825
Maximum degree	12
Minimum degree	1
Average degree	5
Assortativity	-0.043594
Number of triangles	285
Average number of triangles	4
Maximum number of triangles	17
Average clustering coefficient	0.258958
Fraction of closed triangles	0.308776
Maximum k-core	5
Lower bound of Maximum Clique	5

Tools and Libraries Used: Gephi, NetworkX, MatplotLib, Numpy

Part A -> Tools

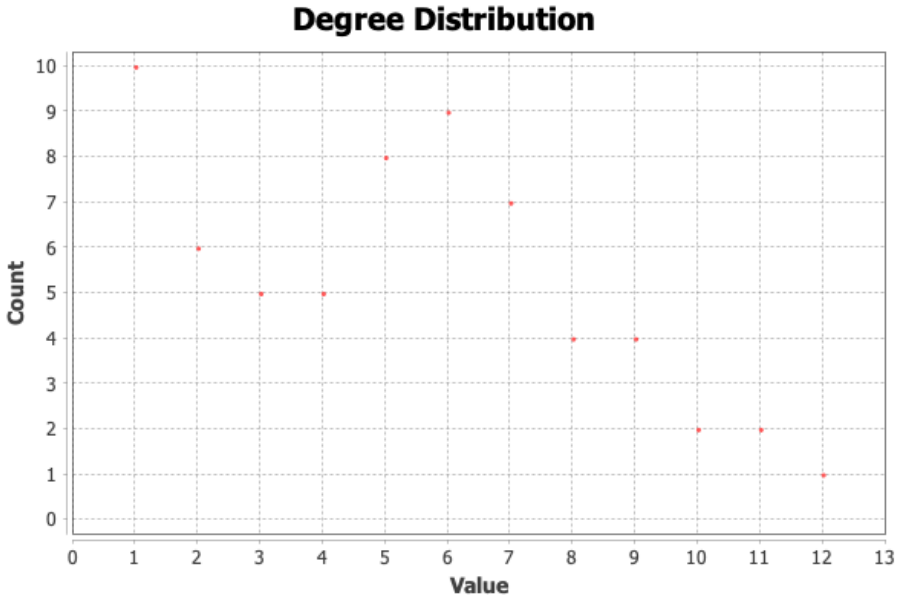
2. Visualize the graph using 2 different layouts



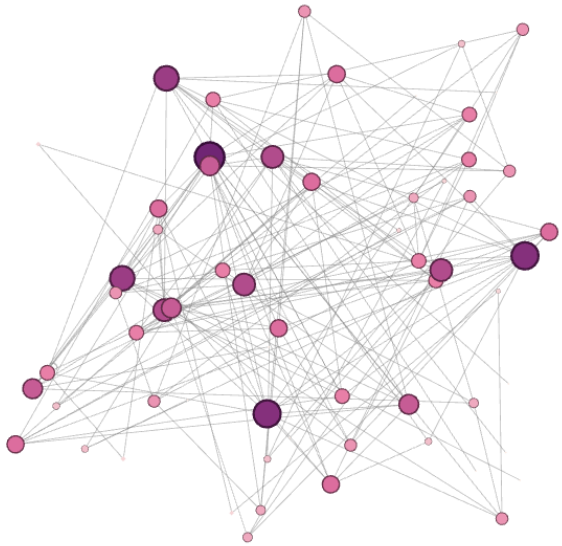
Two of few layouts available in gephi -> Yifan Hu (left) , Random Layout (right)
More Layouts in Jupyter Notebook

3. Calculate the Degree Distribution

Average Degree: 5.111



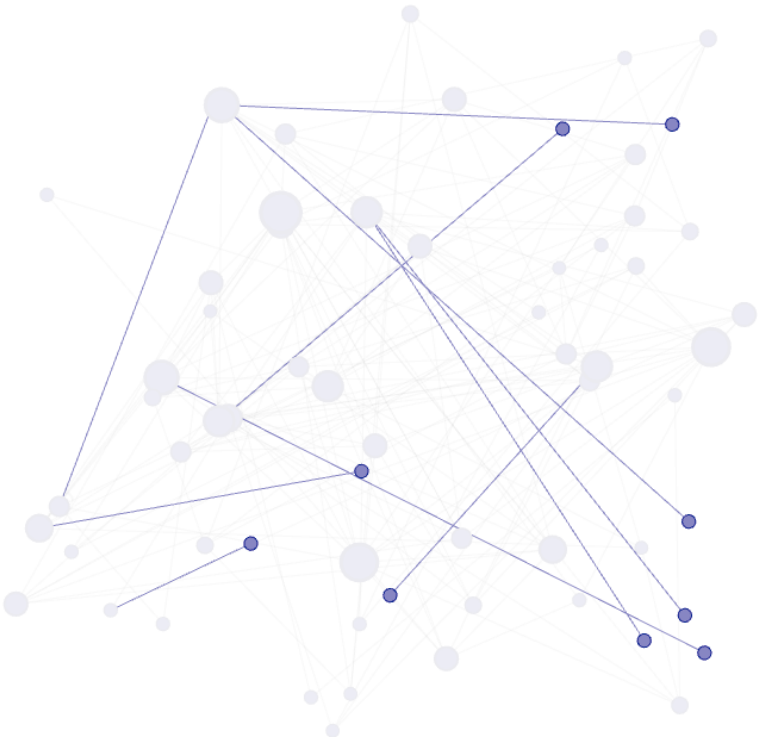
3.i Assign sizes to vertices based on their total degree.



Intensity of color of node and size of node is proportional to degree of node here

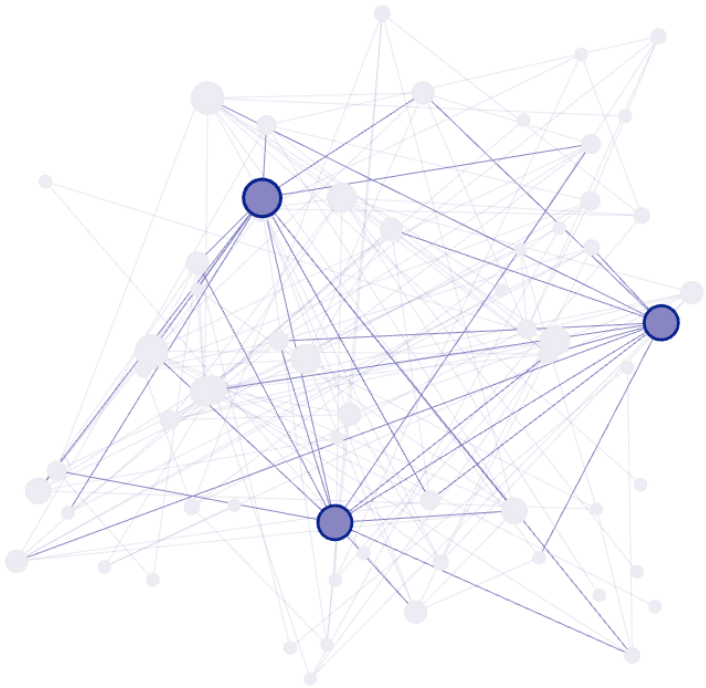
4. Filter the network by degree such that only the:

4.i Bottom 10% of nodes and the connection among them are visible.



As we can see the bottom 10% nodes have degree = 1, and they have only one edge

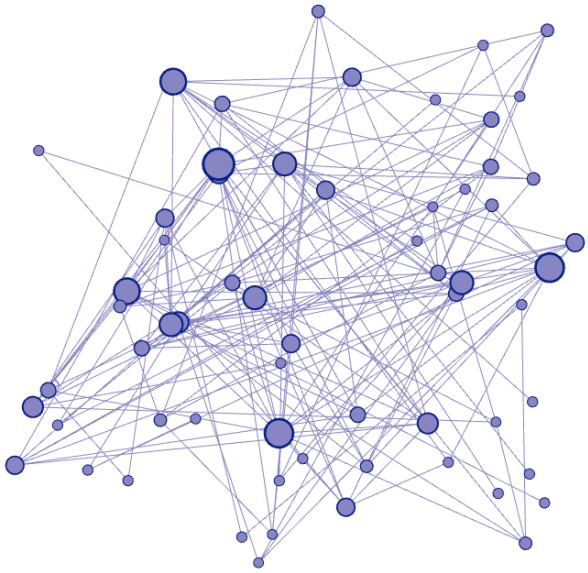
4.ii Top 5% of nodes and the connections among them are visible.



We can see the top 5% nodes have a lot of connections

5. Find

5.i All the connected components of the network



Only one large connected component in the graph

5.ii The size of the giant component of the network -> 63