CN Assignment 1

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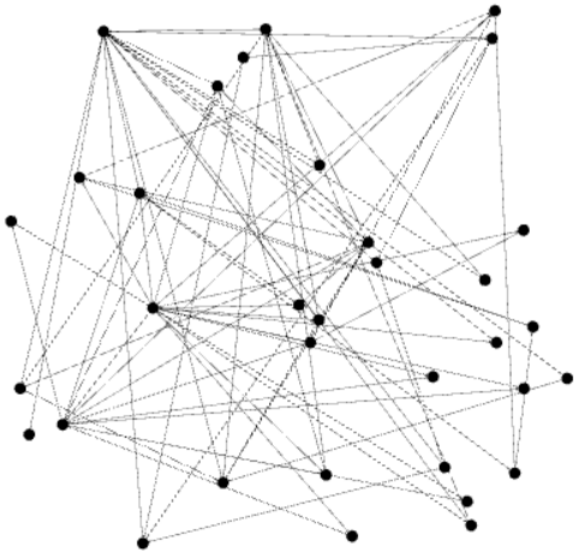
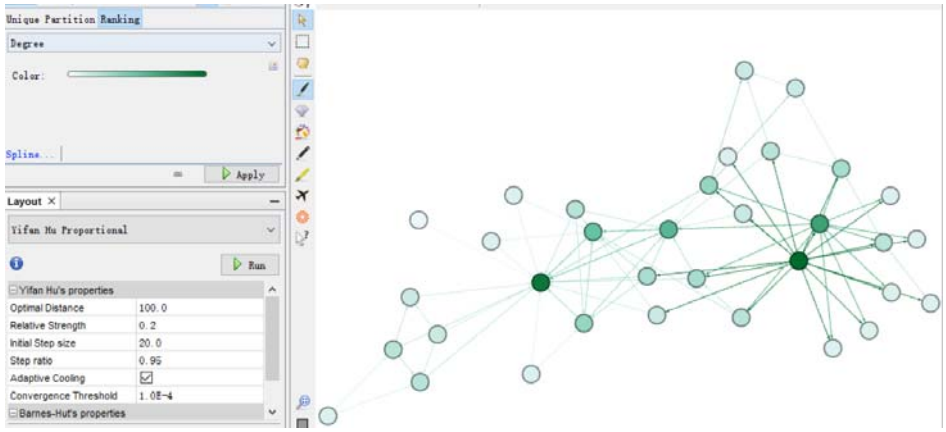
1. Visualize the network of Zachary's karate club.

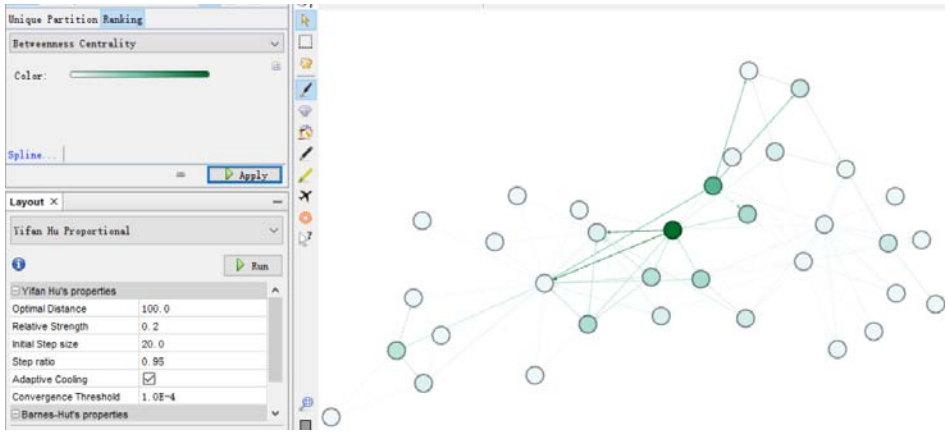


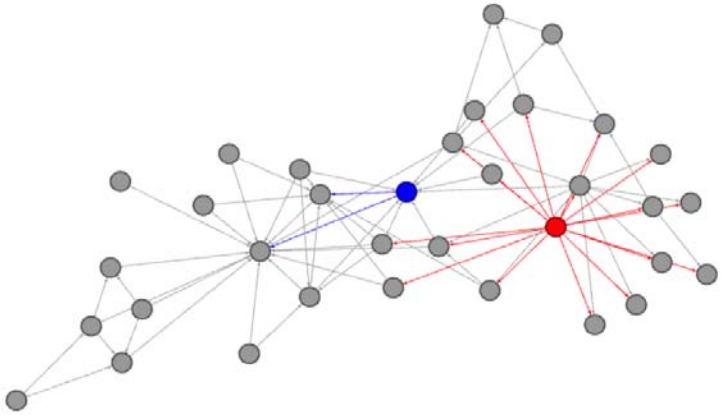
2. Select two central vertices. Why do you think they are central?

Degree ranking:



Betweenness ranking:





Red One: Degree centrality, because its degree is 17, which is among the highest in the graph.
Blue One: Betweenness centrality, its betweenness is among the highest (8.3333).

3. Show the diameter, density, average path length, and clustering coefficient of the (undirected) network.

Graph Distance Report

Parameters:

Network Interpretation: undirected

Results:

Diameter: 5
Radius: 3
Average Path length: 2.408199643493761

Graph Density Report

Parameters:

Network Interpretation: undirected

Results:

Density: 0.139

Clustering Coefficient Metric Report

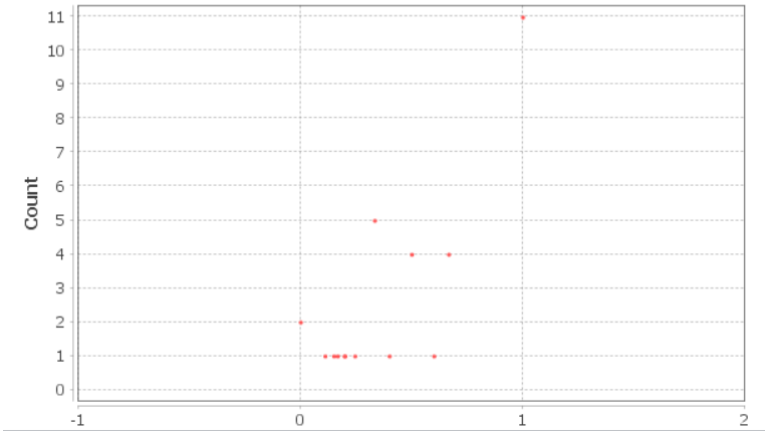
Parameters:

Network Interpretation: undirected

Results:

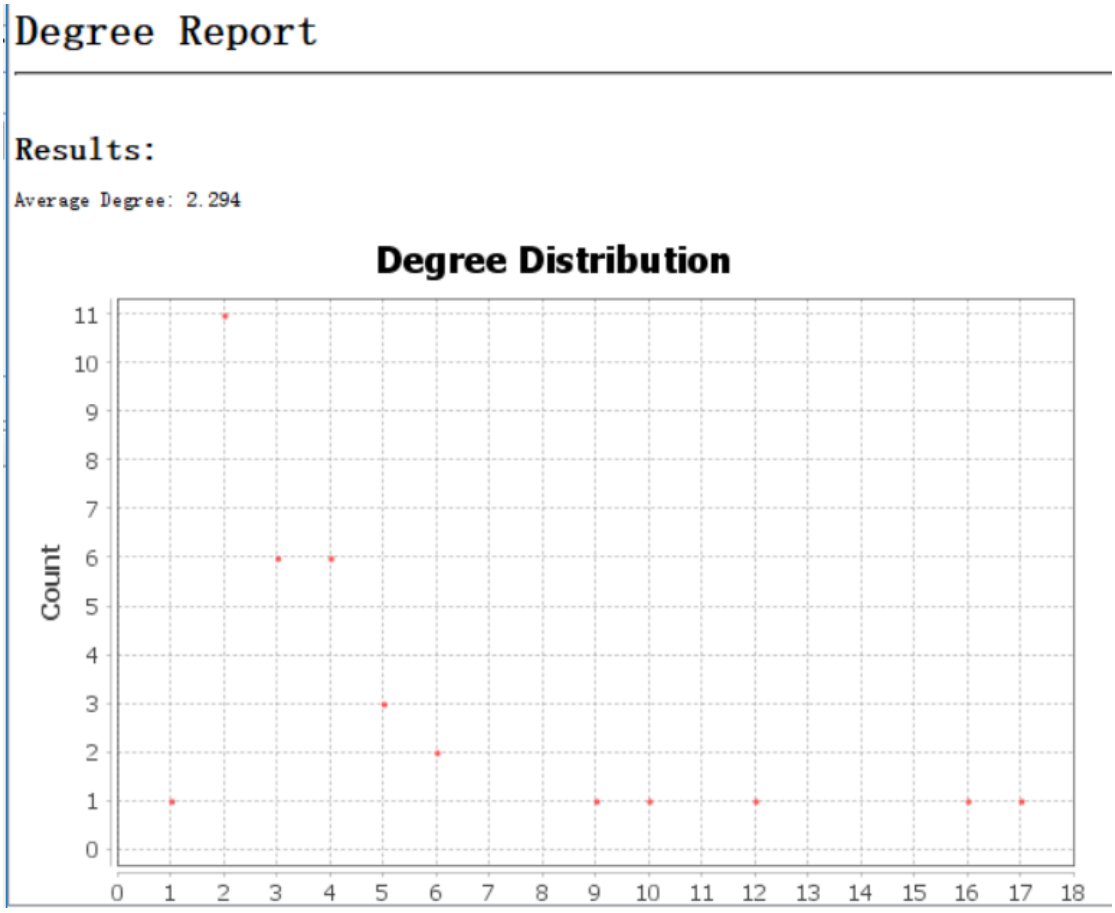
Average Clustering Coefficient: 0.588
Total triangles: 45
The Average Clustering Coefficient is the mean value of individual coefficients.

Clustering Coefficient Distribution

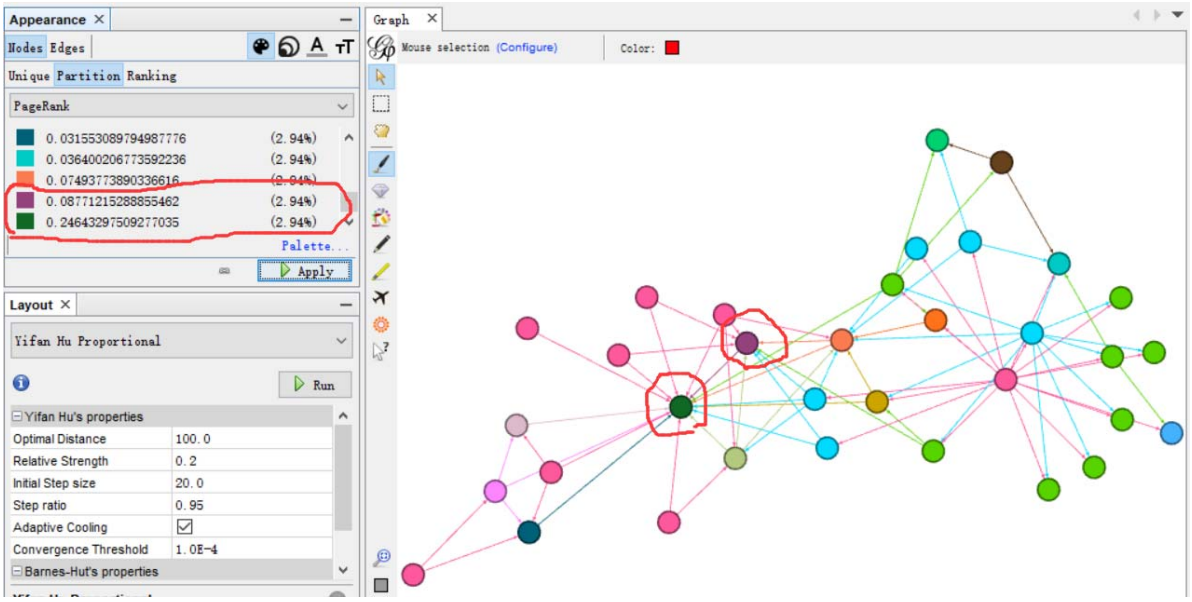


According to the data of Gephi for undirected network. The Network diameter is 5, density is 0.139, average path length is 2.408, average clustering coefficient is 0.588.

4. Draw a degree distribution (a histogram of the degrees of vertices) of the network.



5. Select two vertices whose PageRank values are the highest.



According to the PageRank, the dark green and the purple vertices (shown above) are the two with highest PageRank value (directed).

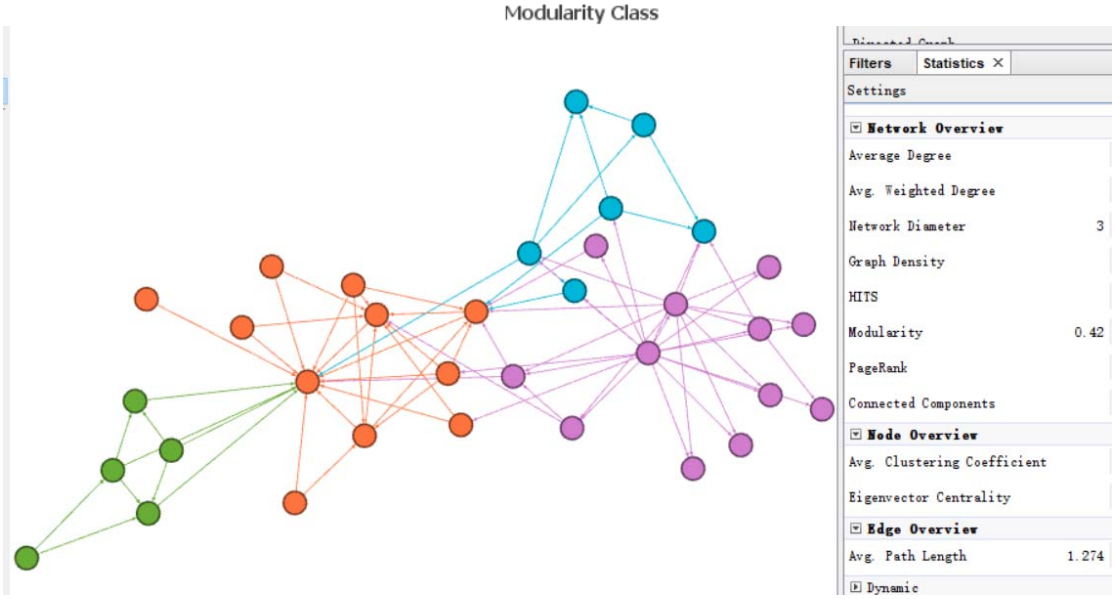
6. Divide the network into small groups and answer its modularity.

Parameters:

Randomize: On
Use edge weights: On
Resolution: 1.0

Results:

Modularity: 0.420
Modularity with resolution: 0.420
Number of Communities: 4



Hereby I divided the network into 4 groups of which the Modularity is 0.42