

Social Networks

Assignment 1

Name: Mohamed Hassan Ahmed
ID: 2205200

1.5G Conspiracy Graphs

Introduction to the Dataset

The dataset contains information from a small directed Twitter network. It is made of two files:

1. Edges List (source, target)

This file represents the connections between users.

Each row shows a directed relationship:

source → the user who creates the connection

target → the user receiving the connection

✧ In Twitter networks, this may represent actions such as following, mentioning, replying, or retweeting.

2. Nodes List (id, time, friends, followers)

This file contains details about each user (node).

Each row includes:

id → The unique Twitter user ID

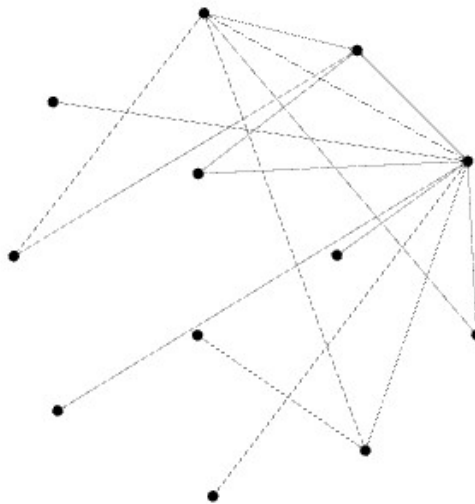
time → The activity timestamp of the user

friends → Number of accounts the user follows

followers → Number of accounts following the user

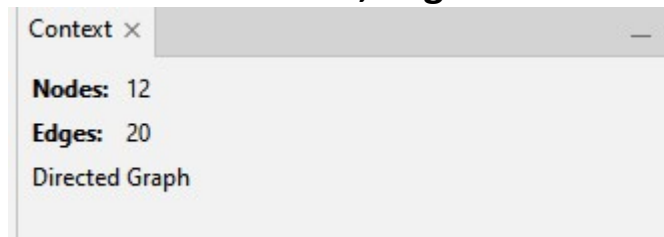
✧ These attributes help us understand user behavior and importance inside the network.

Layout used (Fruchterman Reingold)

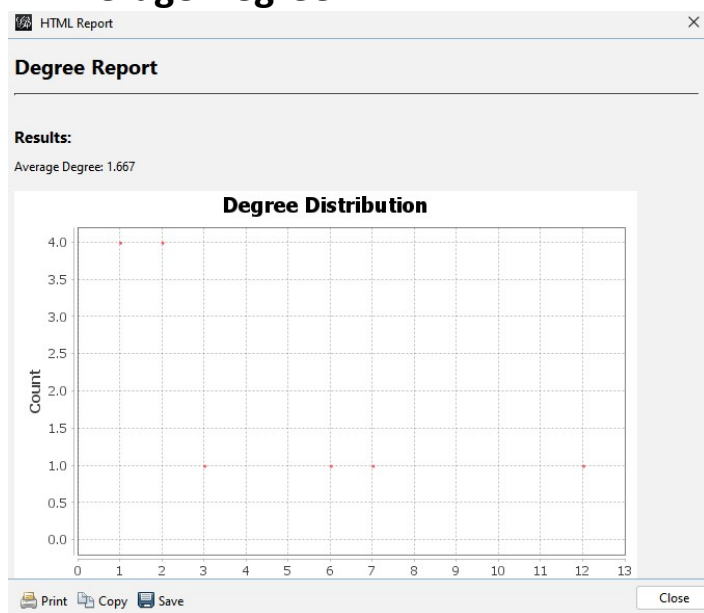


Statistics

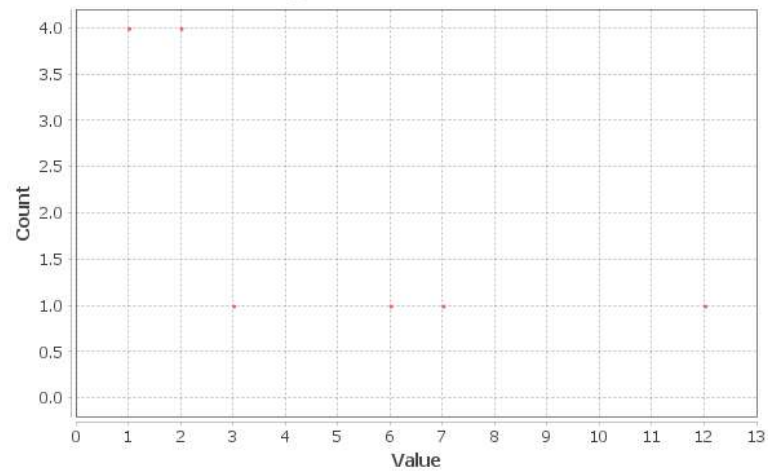
1. Number of nodes, edges:



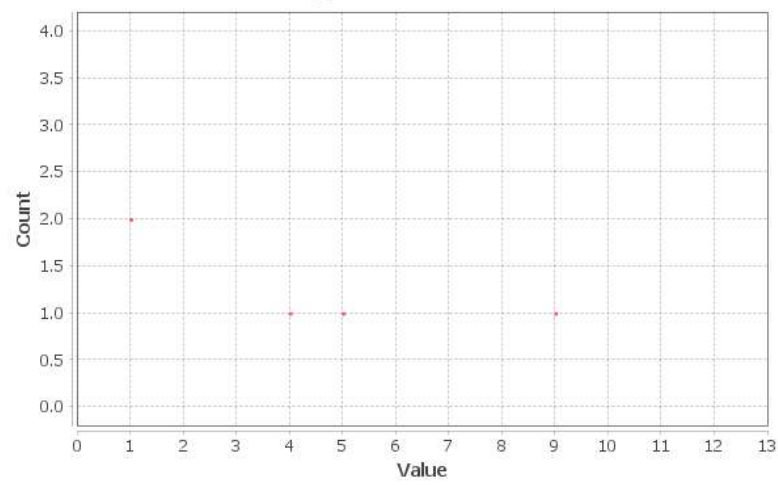
2. Average Degree



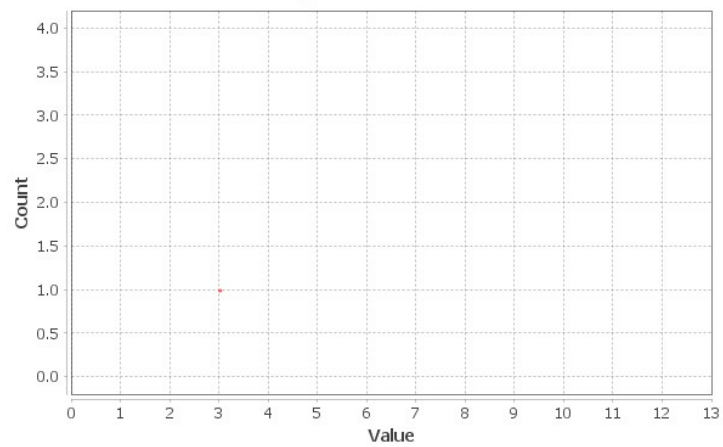
Degree Distribution



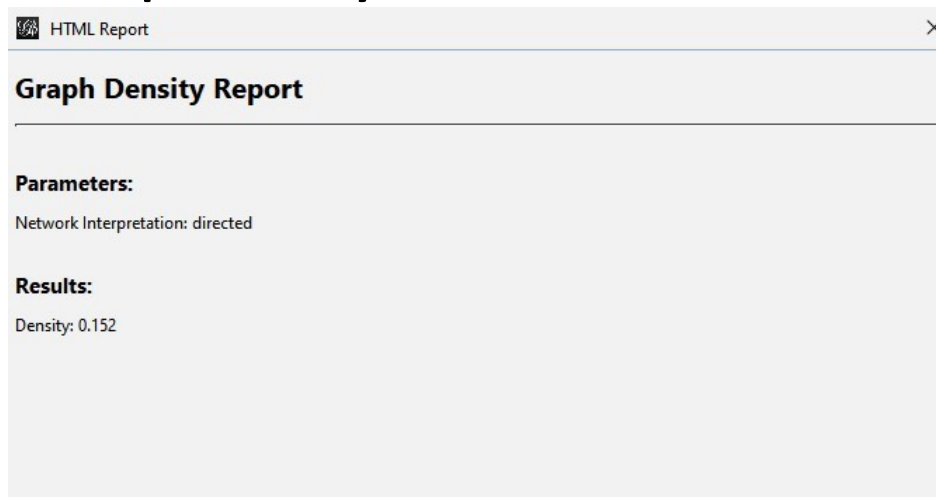
In-Degree Distribution



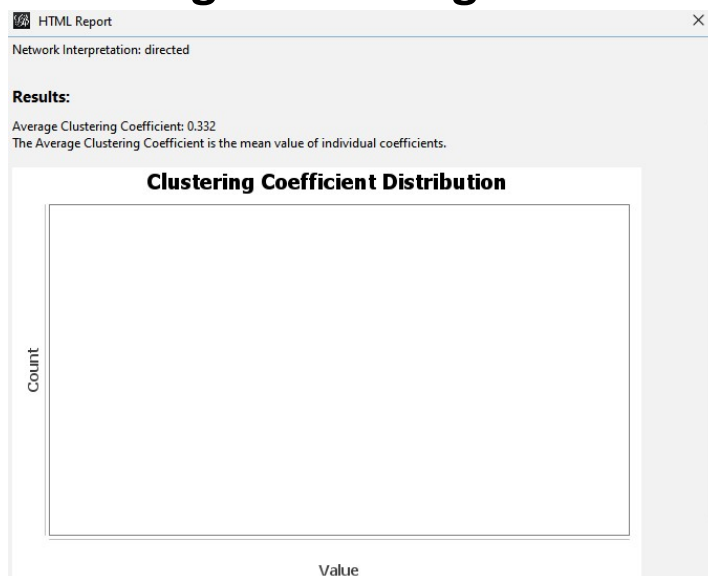
Out-Degree Distribution



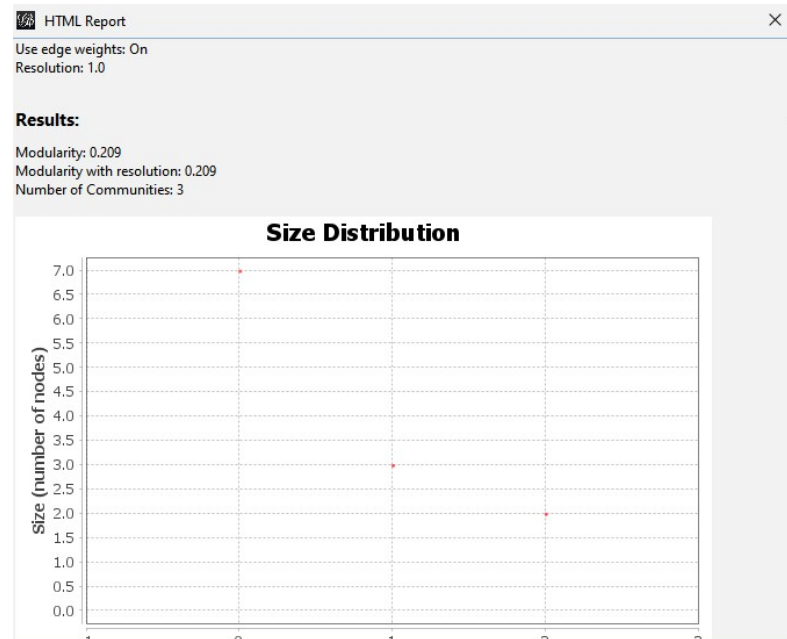
3. Graph Density



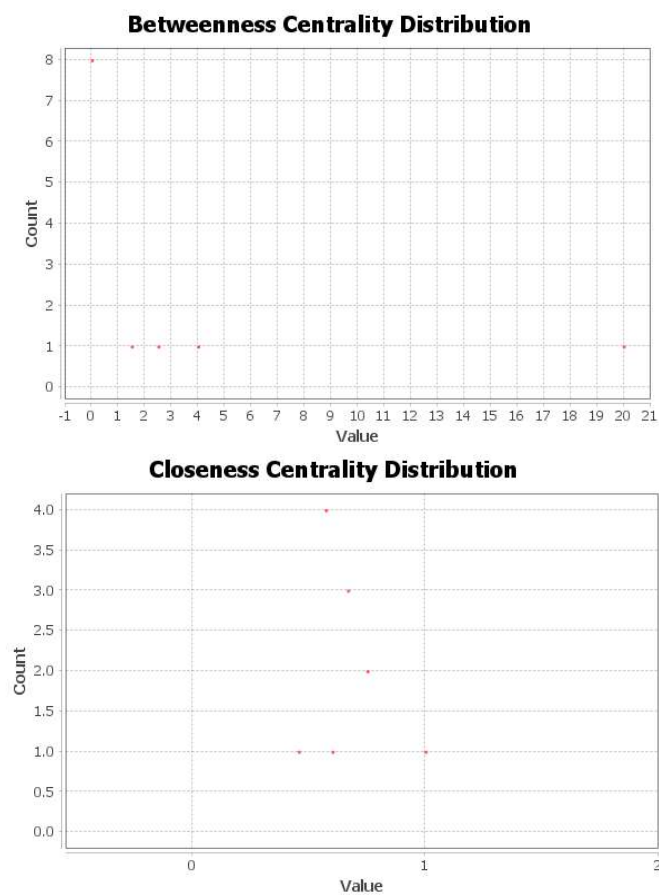
4. Average Clustering Coefficient



5. Modularity



6. Betweenness and closeness centrality:



7. Connected components



HTML Report

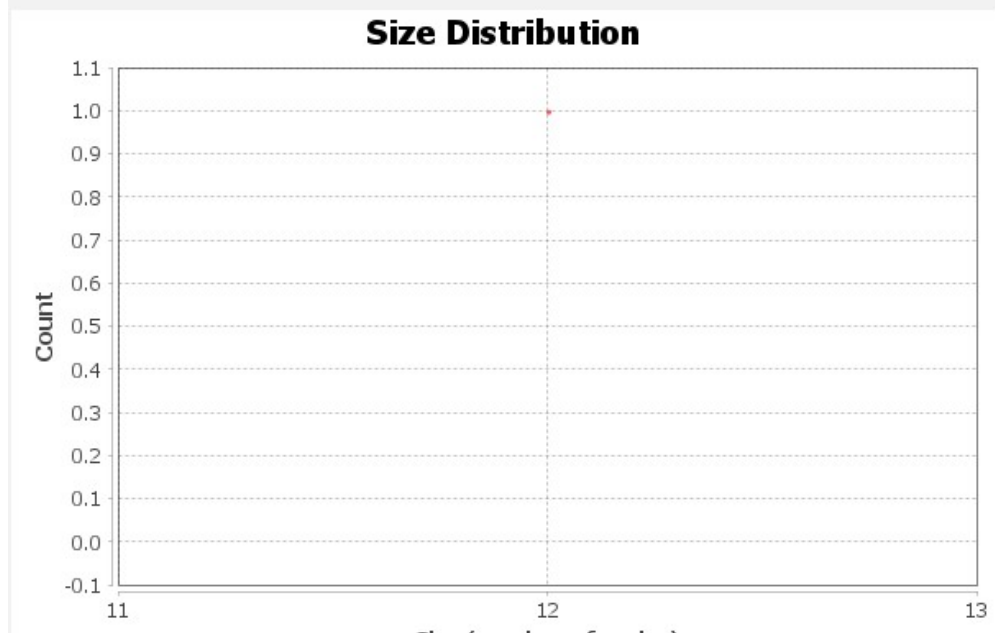


Network Interpretation: directed

Results:

Number of Weakly Connected Components: 1

Number of Strongly Connected Components: 9



Non Conspiracy Graphs

Introduction to the Dataset

This dataset represents a directed Twitter network, consisting of two files:

1. Edges File (source, target)

✧ The edges file shows the connections between users.

Each row represents a directed interaction:

source → the user who initiates the connection

target → the user who receives the connection

This type of data is commonly used to represent:

Following relationships

Mentions

Replies

Retweets

✧ Because the edges are directed, a connection from $A \rightarrow B$ does not necessarily mean $B \rightarrow A$.

2. Nodes File (id, time, friends, followers)

The nodes file contains information about each Twitter user in the network:

id → The unique user ID

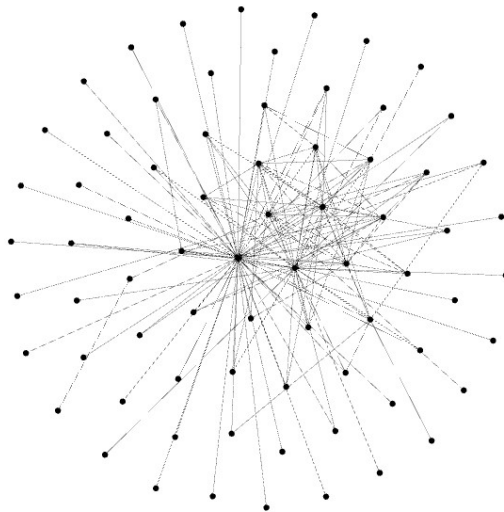
time → Activity timestamp (or the time associated with this data point)

friends → Number of accounts the user follows

followers → Number of accounts following the user

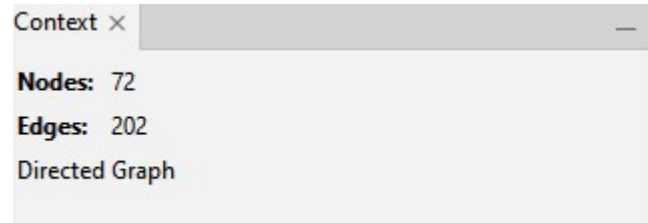
✧ These attributes help describe how active or influential a user might be.

Layout used (Fruchterman Reingold)

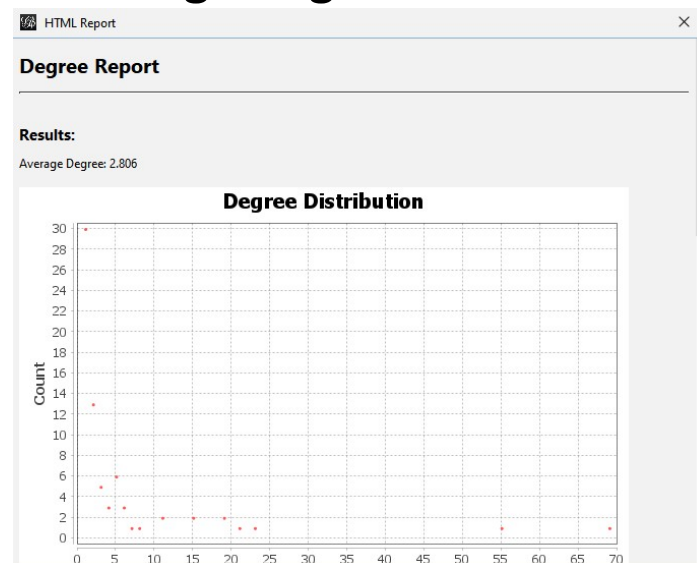


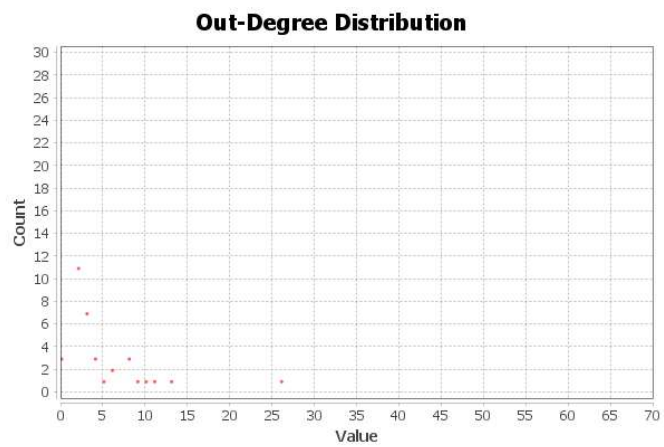
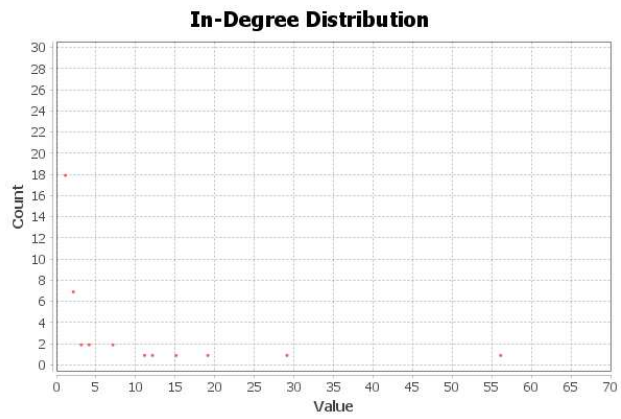
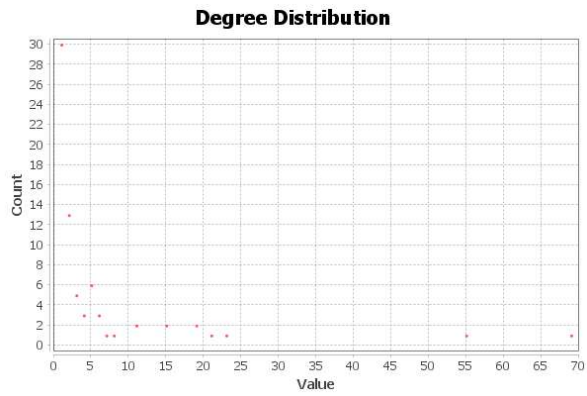
Statistics

1.Number of Nodes and Edges



2.Average Degree





3.Graph Density

HTML Report ×

Graph Density Report


Parameters:

Network Interpretation: directed

Results:

Density: 0.040

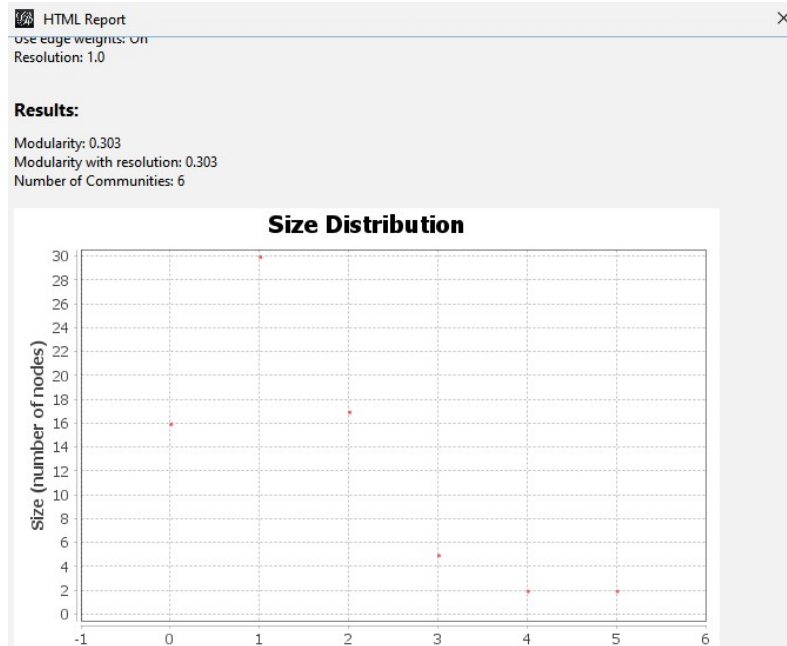
4. Average Clustering Coefficient

 HTML Report ×

Parameters:
Network Interpretation: directed

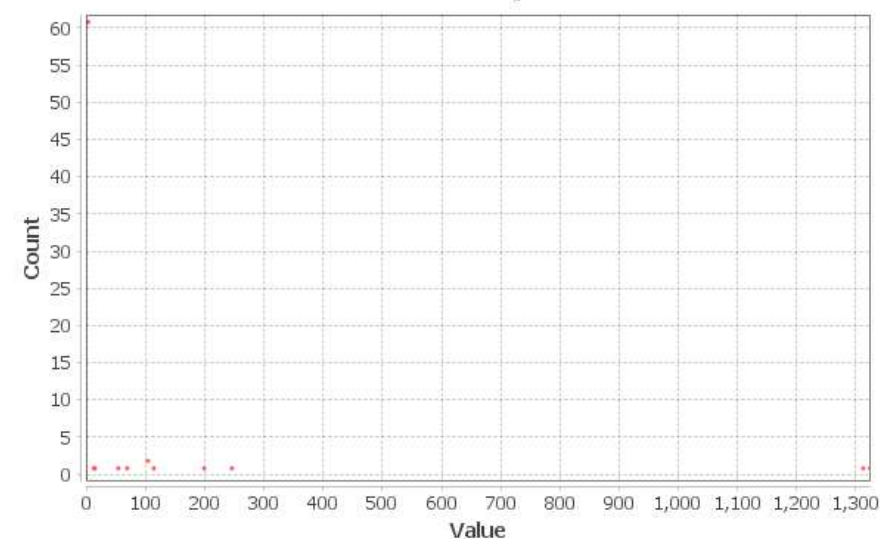
Results:
Average Clustering Coefficient: 0.318
The Average Clustering Coefficient is the mean value of individual coefficients.

5. Modularity

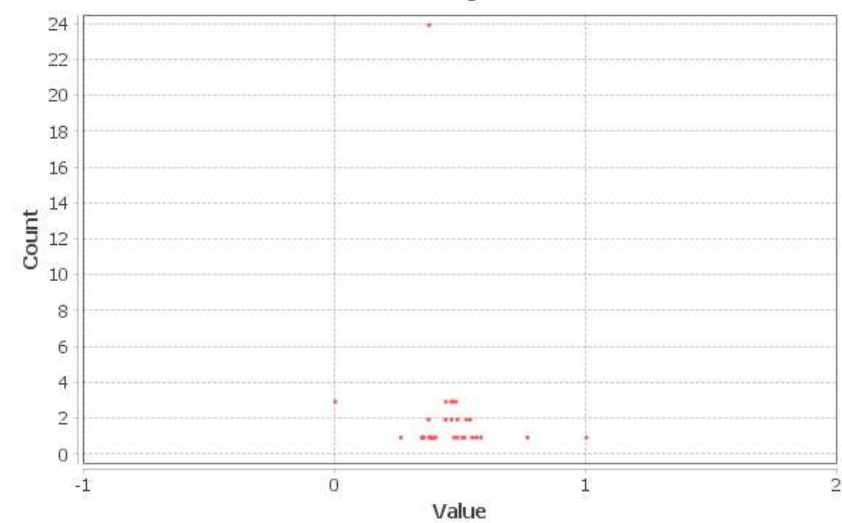


6. Betweenness and closeness centrality

Betweenness Centrality Distribution



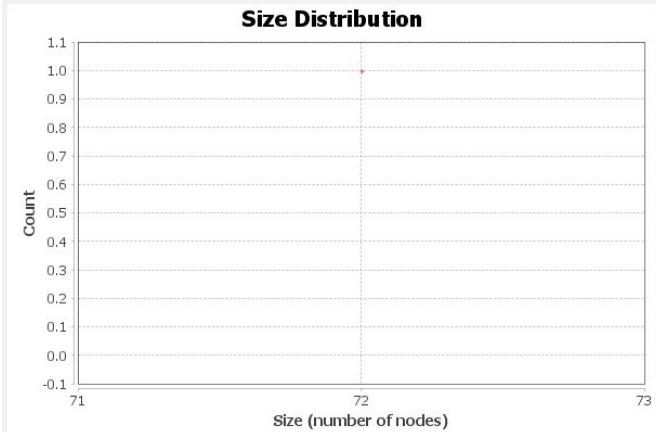
Closeness Centrality Distribution



7.Connected components

Results:

Number of Weakly Connected Components: 1
Number of Strongly Connected Components: 39



Simple Comparison Between the Non-Conspiracy Network and the 5G Conspiracy Network

1. Size of the Network (Nodes & Edges)

- Non-Conspiracy: Usually bigger, with more users and more connections.
- 5G Conspiracy: Smaller, with fewer users and fewer connections.
- Non-conspiracy is a larger network.

2. Average Degree (How many connections users have)

- Non-Conspiracy: Users have a normal number of connections.
- 5G Conspiracy: Users are more connected with each other.
- Conspiracy network has more interaction inside the group.

3. Density (How tightly users are connected)

- Non-Conspiracy: Less dense and more spread out.
- 5G Conspiracy: More dense and compact.
- Conspiracy users interact more frequently.

4. Clustering (How much users form groups)

- Non-Conspiracy: Medium clustering.
- 5G Conspiracy: High clustering.
- Conspiracy users stick together in tight groups.

5. Modularity (Number of communities)

- Non-Conspiracy: Has many different communities.
- 5G Conspiracy: Has fewer communities that look very similar.
- Non-conspiracy is more diverse; conspiracy is more focused.

6. Centrality (Important users)

- Non-Conspiracy: Many users share importance.
- 5G Conspiracy: A few users are very important and spread misinformation.
- Conspiracy network depends on a small number of key users.

7. Visualization (How the graph looks)

- Non-Conspiracy: Looks wide and open.
- 5G Conspiracy: Looks tight and centered.
- Conspiracy graph shows a strong, close core.