

# Social Networks

## Assignment 1

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## 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

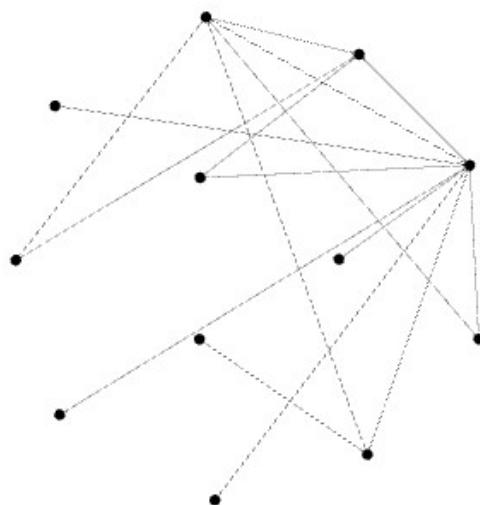
time → The activity timestamp of the user

friends → Number of accounts the user follows

followers → Number of accounts following the user

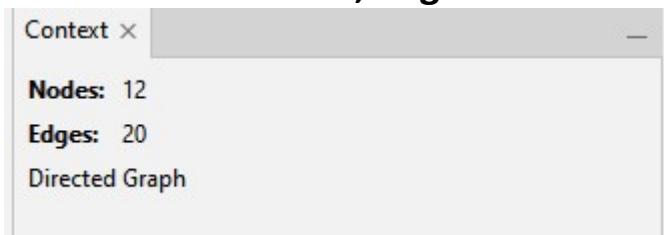
- ❖ These attributes help us understand user behavior and importance inside the network.

### Layout used (Fruchterman Reingold)

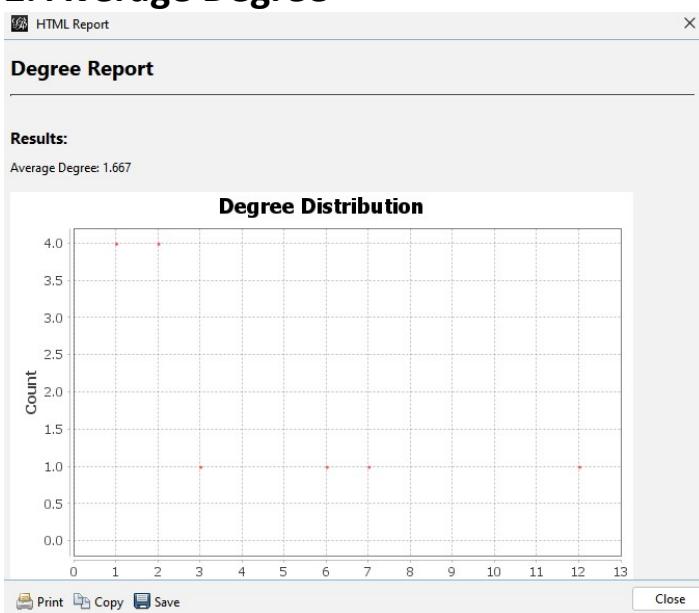


# Statastics

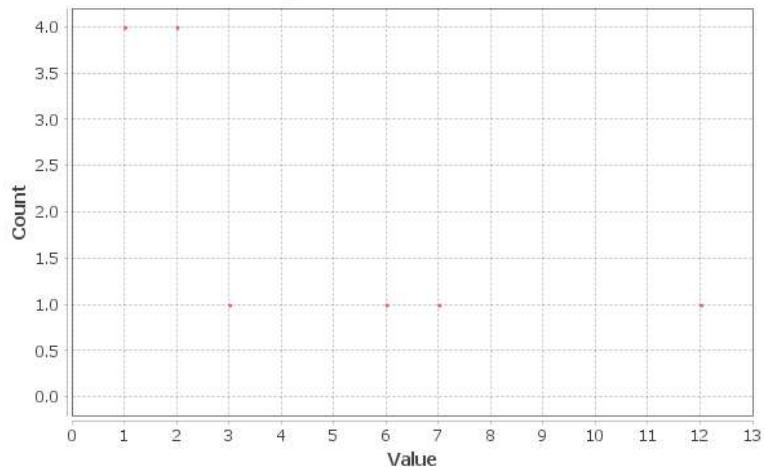
## 1. Number of nodes, edges:



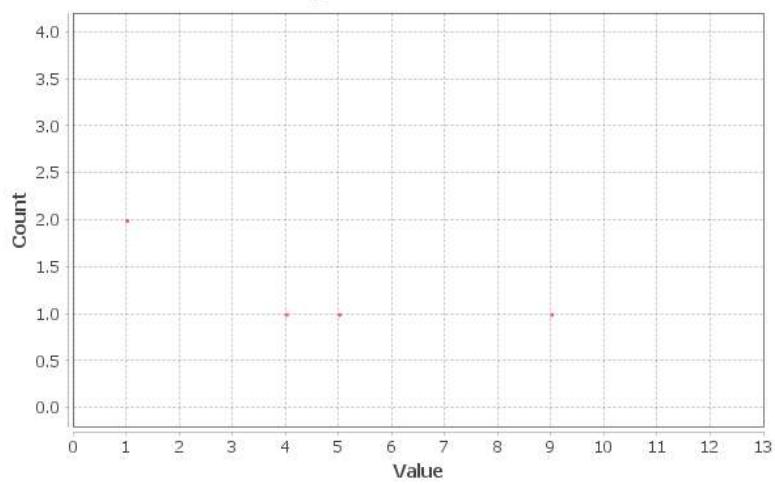
## 2. Average Degree



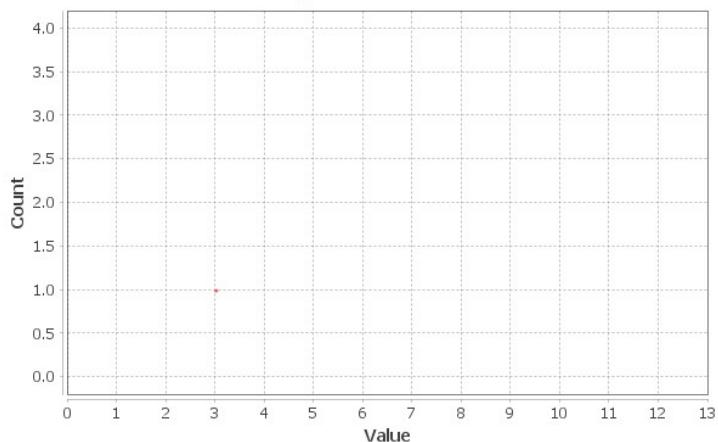
### Degree Distribution



### In-Degree Distribution



### Out-Degree Distribution



### 3. Graph Density

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#### Graph Density Report

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**Parameters:**  
Network Interpretation: directed

**Results:**  
Density: 0.152

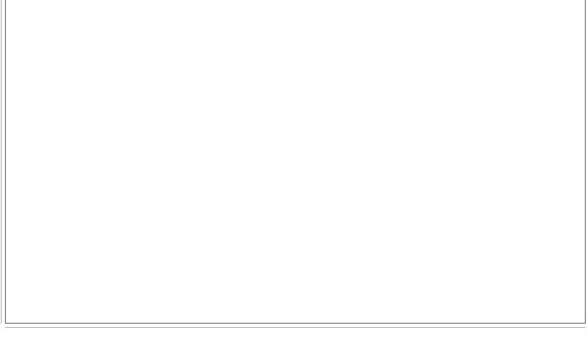
### 4. Average Clustering Coefficient

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Network Interpretation: directed

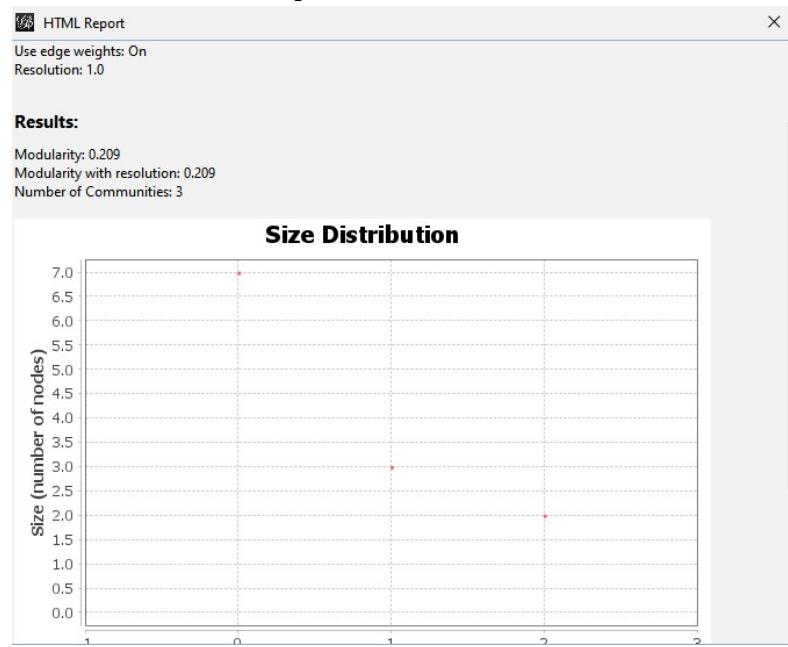
**Results:**  
Average Clustering Coefficient: 0.332  
The Average Clustering Coefficient is the mean value of individual coefficients.

**Clustering Coefficient Distribution**



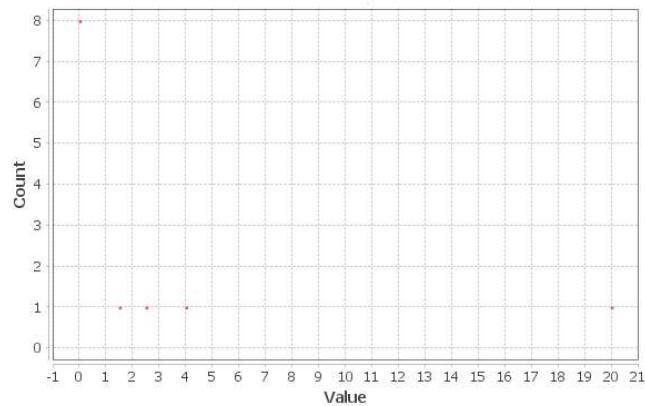
The histogram is currently blank, showing a large empty rectangular area with 'Count' labeled vertically on the left and 'Value' labeled horizontally at the bottom.

## 5. Modularity

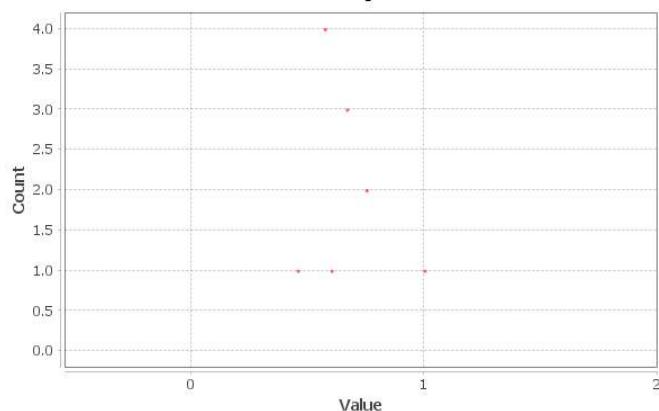


## 6. Betweenness and closeness centrality:

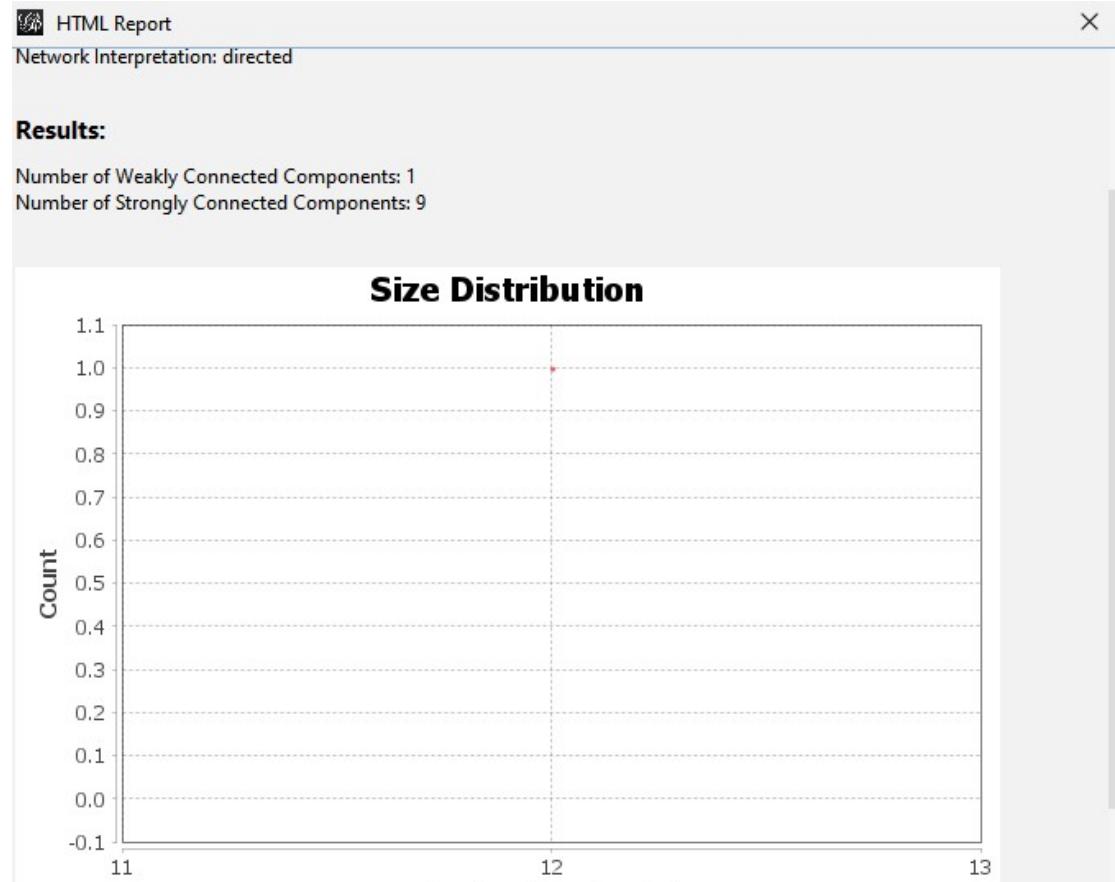
Betweenness Centrality Distribution



Closeness Centrality Distribution



## 7. Connected components



# 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 → B does not necessarily mean B → 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

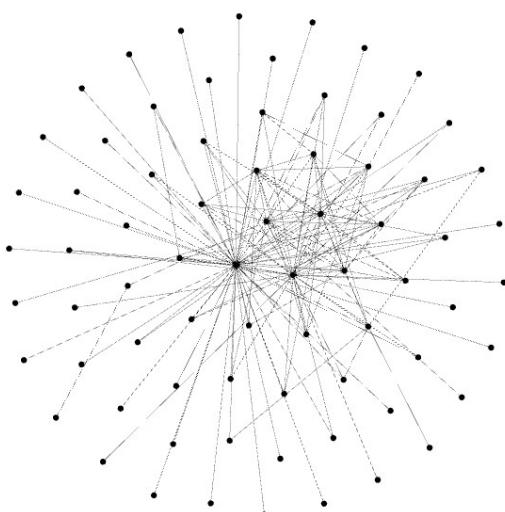
time → Activity timestamp (or the time associated with this data point)

friends → Number of accounts the user follows

followers → Number of accounts following the user

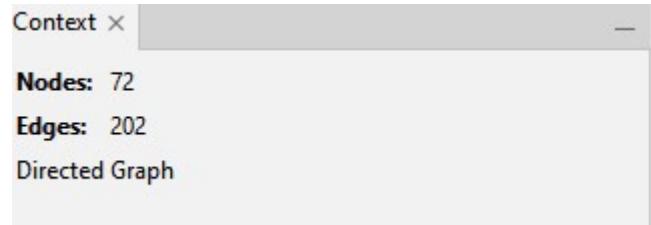
◇ These attributes help describe how active or influential a user might be.

## Layout used (Fruchterman Reingold)

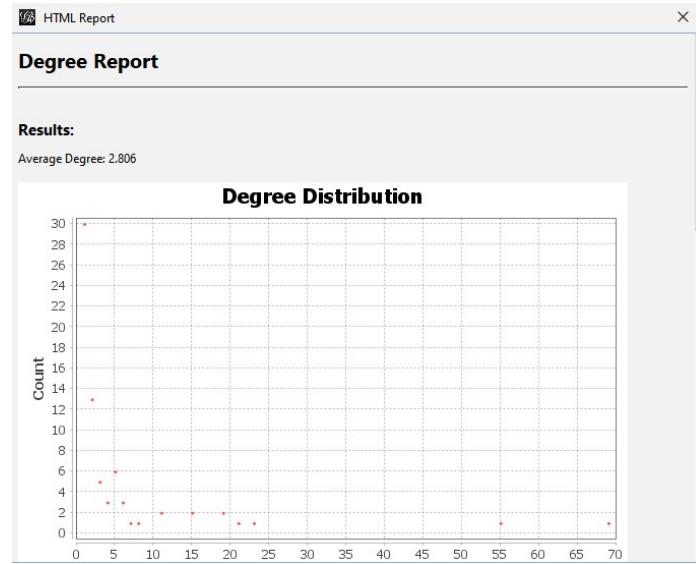


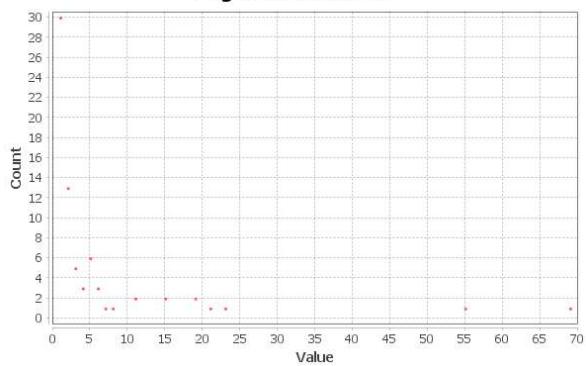
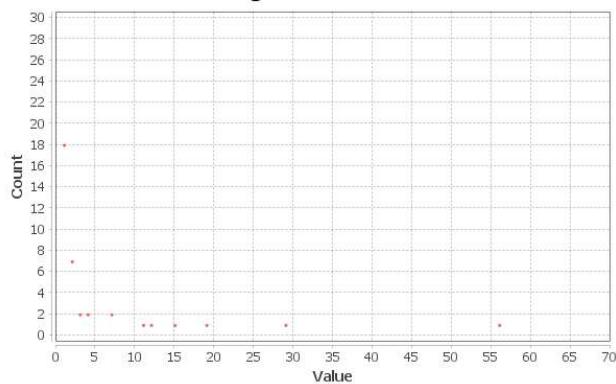
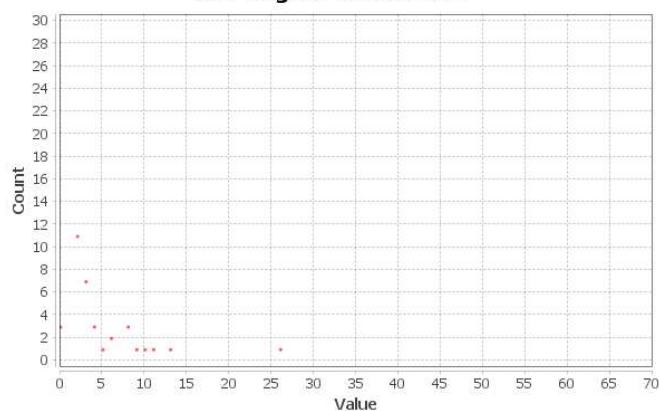
# Statistics

## 1. Number of Nodes and Edges



## 2. Average Degree



**Degree Distribution****In-Degree Distribution****Out-Degree Distribution**

### 3. Graph Density

HTML Report ×

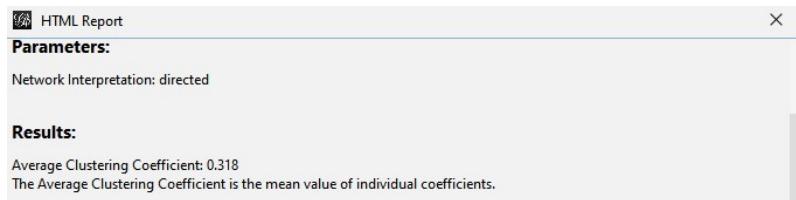
#### Graph Density Report

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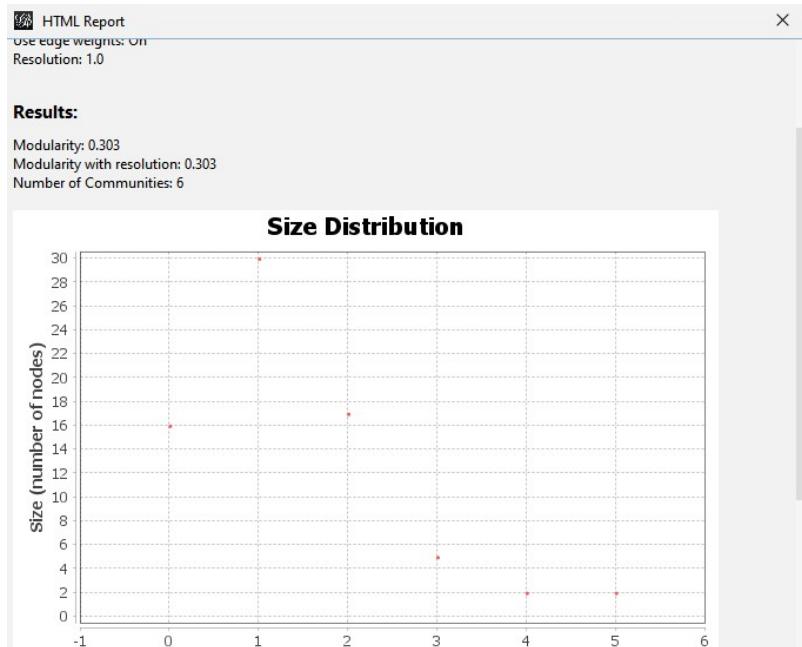
**Parameters:**  
Network Interpretation: directed

**Results:**  
Density: 0.040

## 4.Average Clustering Coefficient

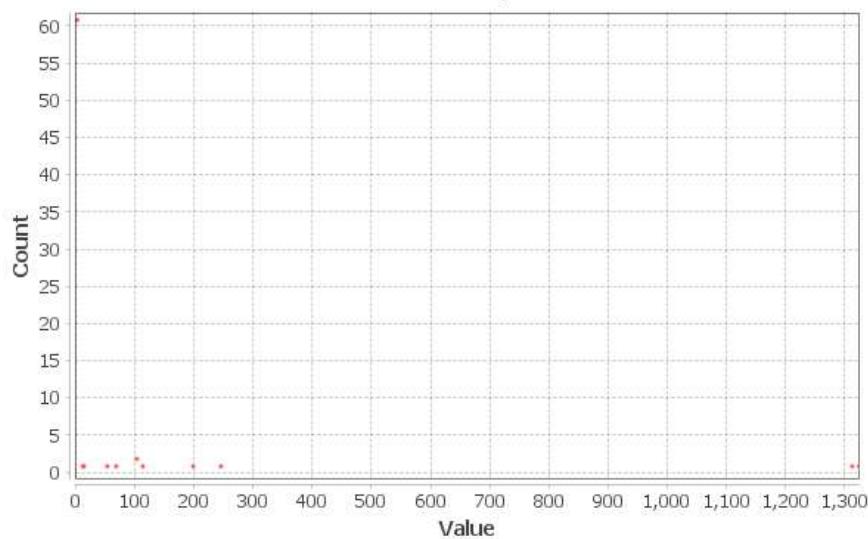


## 5.Modularity

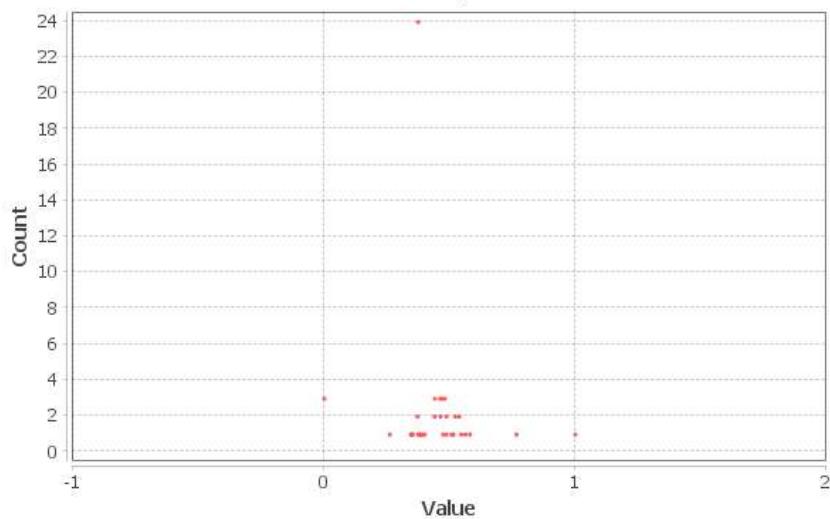


## 6.Betweenness and closeness centrality

**Betweenness Centrality Distribution**



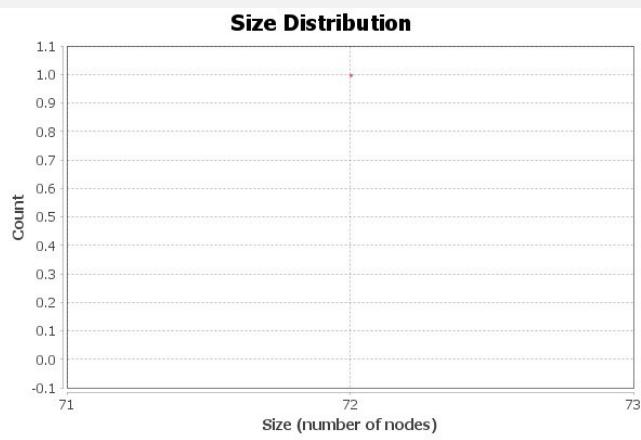
**Closeness Centrality Distribution**



## 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.