OMIS 670 – Spring 2023  
Assignment 2: Build Networks in NodeXL and Calculate Metrics  
Available Date: 2/14/2023  
Due Date: **2/28/2023** at **11:59 PM** on **Blackboard**  
Instructor: Dr. Amin Vahedian

Consider the following data on LinkedIn endorsement activity:

|  |  |  |
| --- | --- | --- |
| **Endorsement By** | **The Endorsed** | **Skill** |
| Ann | Patrick | R Programming |
| Nick | Xun | Python Programming |
| Lisa | Bhupesh | Python Programming |
| Nick | Patrick | R Programming |
| Xun | Nick | Python Programming |
| Bhupesh | Ann | R Programming |
| Xun | Ann | R Programming |
| Patrick | Lisa | C++ Programming |
| Patrick | Ann | R Programming |
| Ann | Bhupesh | R Programming |
| Patrick | Nick | R Programming |

Consider each person to be a vertex in a social network. Do the following tasks:

* Consider the connection definitions in each of the tables below. For each definition, build networks based on the defined connection. Label the vertices and use the label as the shape of the vertices. Then, calculate the listed metrics.

|  |  |
| --- | --- |
| **Connection Definition:**  *There is a directed link from A to B if, A endorses B.* | |
| **Screenshot of the Network:** | |
| **Calculate the Following Metrics and enter them in the table:** | |
| Total Edges | *11* |
| Connected Components | *1* |
| Maximum Geodesic Distance | *3* |
| Average Geodesic Distance | *1.3888889* |
| Graph Density | *0.366666667* |
| **Degree: indegree, Out degree** | |
| Lisa | 1, 1 |
| Xun | 1, 2 |
| Patrick | 2, 3 |
| Bhupesh | 2, 1 |
| Nick | 2, 2 |
| Ann | 3, 2 |
| **Betweenness Centrality:** | |
| Lisa | 1.667 |
| Xun | 1.667 |
| Patrick | 6.667 |
| Bhupesh | 1.667 |
| Nick | 1.667 |
| Ann | 6.667 |
| **Closeness Centrality:** | |
| Lisa | 0.556 |
| Xun | 0.556 |
| Patrick | 0.714 |
| Bhupesh | 0.556 |
| Nick | 0.556 |
| Ann | 0.714 |
| **Clustering Coefficient** | |
| Lisa | 0.000 |
| Xun | 0.000 |
| Patrick | 0.000 |
| Bhupesh | 0.000 |
| Nick | 0.000 |
| Ann | 0.000 |

|  |  |
| --- | --- |
| **Connection Definition:**  *There is a connection between A and B if, A and B are endorsed for the same skill.* | |
| **Screenshot of the Network:** | |
| **Calculate the Following Metrics and enter them in the table:** | |
| Total Edges | 9 |
| Connected Components | 1 |
| Maximum Geodesic Distance | 2 |
| Average Geodesic Distance | 0.96 |
| Graph Density | 0.8 |
| **Degree:** | |
| Lisa | 0 |
| Xun | 2 |
| Patrick | 3 |
| Bhupesh | 4 |
| Nick | 4 |
| Ann | 3 |
| **Betweenness Centrality:** | |
| Lisa | 0 |
| Xun | 0 |
| Patrick | 0 |
| Bhupesh | 1.000 |
| Nick | 1.000 |
| Ann | 0.000 |
| **Closeness Centrality:** | |
| Lisa | 0 |
| Xun | 0.667 |
| Patrick | 0.800 |
| Bhupesh | 1.000 |
| Nick | 1.000 |
| Ann | 0.800 |
| **Clustering Coefficient** | |
| Lisa | 0 |
| Xun | 0.667 |
| Patrick | 0.800 |
| Bhupesh | 1.000 |
| Nick | 1.000 |
| Ann | 0.800 |

Note: For all the networks, use Fruchterman-Reingold layout with the following parameters:

* Strength of the repulsive force between vertices: **1.5**
* Iterations per layout: **20**