SMA Lab Assignment 2: Calculating network centrality measures using networkx

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In [14]:
```
pip install networkx
```

```
Requirement already satisfied: networkx in c:\users\arulk\anaconda3\lib
\site-packages (2.8.4)
Note: you may need to restart the kernel to use updated packages.
```

In [15]:
```
import networkx as nx
graph = nx.Graph()
# Load the graph from the input file
with open('sma_labass23.txt', 'r') as file:
    for line in file:
        source, target = line.strip().split()
        graph.add_edge(source, target)
```

In [16]:
```
# Degree Centrality
degree_centrality = nx.degree_centrality(graph)

# Betweenness Centrality
betweenness_centrality = nx.betweenness_centrality(graph)

# Closeness Centrality
closeness_centrality = nx.closeness_centrality(graph)

# Eigenvector Centrality
eigenvector_centrality = nx.eigenvector_centrality(graph)
```

In [17]:

```
print("Degree Centrality:")
for node, centrality in degree_centrality.items():
    print(f"{node}: {centrality}")

print("\nBetweenness Centrality:")
for node, centrality in betweenness_centrality.items():
    print(f"{node}: {centrality}")

print("\nCloseness Centrality:")
for node, centrality in closeness_centrality.items():
    print(f"{node}: {centrality}")

print("\nEigenvector Centrality:")
for node, centrality in eigenvector_centrality.items():
    print(f"{node}: {centrality}")
```

```
Degree Centrality:
Asha: 0.125
Rajkumar: 0.125
john: 0.125
Arul: 0.125
Rajesh: 0.125
Laksh: 0.25
regina: 0.125
reginna: 0.125
sri: 0.125

Betweenness Centrality:
Asha: 0.0
Rajkumar: 0.0
john: 0.0
Arul: 0.0
Rajesh: 0.0
Laksh: 0.03571428571428571
regina: 0.0
reginna: 0.0
sri: 0.0

Closeness Centrality:
Asha: 0.125
Rajkumar: 0.125
john: 0.125
Arul: 0.125
Rajesh: 0.16666666666666666
Laksh: 0.25
regina: 0.16666666666666666
reginna: 0.125
sri: 0.125

Eigenvector Centrality:
Asha: 6.042995103360709e-06
Rajkumar: 6.042995103360709e-06
john: 6.042995103360709e-06
Arul: 6.042995103360709e-06
Rajesh: 0.4999999999452233
Laksh: 0.7071067811090815
regina: 0.4999999999452233
reginna: 6.042995103360709e-06
sri: 6.042995103360709e-06
```

1.Degree Centrality: This measures the number of direct connections (edges) in each node.

2.Betweenness Centrality: This measures the number of times a node acts as a bridge along the shortest path between other nodes.

3.Closeness Centrality: This measures how close a node is to all other nodes in the network.

4.Eigenvector Centrality: This assigns a score to each node based on the centrality of its neighbors.

In [ ]:

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