Exercise 2 - Fakebook Bus

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Introduction

This analysis aims to determine the best seat on the Fakebook bus for maximizing networking opportunities by using network analysis centrality measures. We will calculate degree, closeness, and betweenness centrality for each available seat to understand which seat offers the best potential for building informal connections.

Import and explore data

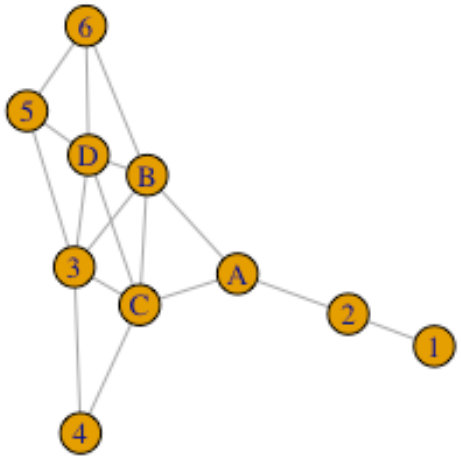
I provided and attached dataset Fakebook_bus.csv, containing the edges representing possible communication lines between seats.

```
bus_data = read.csv('/Users/sheidamajidi/Desktop/Winter2024/Winter2024-
2/ORGB672/Exercises/Exercise 2/Fakebook_bus.csv')
print(bus_data)
```

```
##    node_1 node_2
## 1       6      5
## 2       6      D
## 3       6      B
## 4       1      2
## 5       2      A
## 6       A      B
## 7       A      C
## 8       B      C
## 9       B      D
## 10      B      3
## 11      C      D
## 12      C      3
## 13      C      4
## 14      D      3
## 15      D      5
## 16      3      5
## 17      3      4
```

Build the network graph

Now, I'll create a graph object from the data to analyze the seating arrangement network.



Centrality measures calculation

At this step, I'll calculate degree, closeness, and betweenness centrality to identify the most strategic seat.

```
##   Seat Degree  Closeness Betweenness
## 6    6      3 0.05263158   0.9333333
## 1    1      1 0.03333333   0.0000000
## 2    2      2 0.04545455   8.0000000
## A    A      3 0.06250000  14.0000000
## B    B      5 0.07142857   9.0333333
## C    C      5 0.07142857   8.6000000
## D    D      5 0.06250000   3.2666667
## 3    3      5 0.06250000   4.6333333
## 5    5      3 0.04761905   0.5333333
## 4    4      2 0.05000000   0.0000000
```

Analyze seat choices

Now, I'll analyze the centrality measures for open seats (A-D) to identify the best seat for networking.

```
##   Seat Degree  Closeness Betweenness
## A    A      3 0.06250000   14.000000
## B    B      5 0.07142857    9.033333
## C    C      5 0.07142857    8.600000
## D    D      5 0.06250000    3.266667
```

Analysis/ Discussion:

From the results, I can observe the centrality measures for each available seat (A, B, C, and D):

- Seat A: Degree = 3, Closeness = 0.0625, Betweenness = 14
- Seat B: Degree = 5, Closeness = 0.07143, Betweenness = 9.03333
- Seat C: Degree = 5, Closeness = 0.07143, Betweenness = 8.6
- Seat D: Degree = 5, Closeness = 0.0625, Betweenness = 3.26667

Degree Centrality: Seats B, C, and D all have the highest degree centrality, which indicates that they have the most direct connections with other seats. This suggests that these seats would allow for interactions with more passengers directly.

Closeness Centrality: Seats B and C have the highest closeness centrality, suggesting that these seats are closest, on average, to all other seats in the network. This implies that information can travel more efficiently to and from these seats.

Betweenness Centrality: Seat A has the highest betweenness centrality, which implies that Seat A is most often on the shortest path between two other seats. This seat acts as a bridge in the communication network and can control the flow of information between other passengers.

Possible consequences of seat choice:

- Choosing Seat A might make a central point for passing information between different groups, which can be advantageous if the goal is to be seen as a connector or influencer. However, the lower degree centrality means one has fewer direct connections.
- Opting for Seat B or Seat C could be beneficial for having the most direct interactions and being closely connected to everyone else, which would be excellent for someone aiming to be approachable and highly networked.
- Selecting Seat D offers direct connections similar to B and C, but with a lower betweenness centrality, indicating it's less of a bridge for information flow.

Conclusion:

The choice of seat depends on the networking goals. If one aims to be a key influencer and control the flow of information, Seat A is a strategic choice. However, for maximum direct interactions and to be closely connected to all other nodes, Seats B or C are preferable. Finally, Seat D is also a good choice for direct connections but may not place the person as centrally in information paths.

While Seat B seems to be the most balanced option with high degree and closeness centrality and reasonably high betweenness centrality, Seat A's high betweenness centrality cannot be overlooked for its strategic importance in the network.

In essence, one's choice should align with your personal networking strategy: whether to engage with many directly (B or C), be a key connector (A), or have a balance of both aspects (B).