

exercise2

2024-03-26

```
library(igraph)

##
## Attaching package: 'igraph'

## The following objects are masked from 'package:stats':
##
##      decompose, spectrum

## The following object is masked from 'package:base':
##
##      union

# Create the graph
g <- graph.empty(n = 10, directed = FALSE)

# Add nodes for each seat
V(g)$name <- c('1', '2', '3', '4', '5', '6', 'A', 'B', 'C', 'D')

# Add edges based on seat adjacency
edges <- c('A', '2', 'A', 'B', 'A', 'C',
           'B', 'A', 'B', 'C', 'B', 'D', 'B', '3', 'B', '6',
           'C', 'B', 'C', '3', 'C', '4',
           'D', '3', 'D', '5', 'D', '6',
           '1', '2', '2', 'A', '3', '5', '3', 'D', '3', '4', '3', 'B', '3', 'C',
           '4', '3', '4', 'C', '5', 'D', '5', '3', '6', '5', '6', 'D', '6', 'B')

# Add the edges to the graph
for (i in seq(1, length(edges), by = 2)) {
  g <- add_edges(g, c(edges[i], edges[i+1]))
}

# Compute centrality measures
degree <- degree(g) / (vcount(g) - 1) # Normalize degree
closeness <- closeness(g)
betweenness <- betweenness(g)

# Create a dataframe to display the centralities
centrality_data <- data.frame(
  Node = V(g)$name,
  Degree = degree,
  Closeness = closeness,
  Betweenness = betweenness
)
```

```
)

# Display the dataframe
print(centrality_data)
```

```
##   Node    Degree Closeness Betweenness
## 1     1 0.1111111 0.03333333  0.0000000
## 2     2 0.3333333 0.04545455  8.0000000
## 3     3 1.1111111 0.06250000  7.1809524
## 4     4 0.4444444 0.05000000  0.0000000
## 5     5 0.5555556 0.04761905  0.3428571
## 6     6 0.5555556 0.05263158  0.8500000
## A     A 0.5555556 0.06250000 14.0000000
## B     B 1.0000000 0.07142857 12.7047619
## C     C 0.7777778 0.06666667  5.3857143
## D     D 0.7777778 0.05882353  1.5357143
```

Seat A is ideal for those seeking to connect broadly as people come and go, thanks to its high betweenness centrality. Seat B, with the highest degree and closeness centrality, is perfect for extensive networking, though it might hinder deep conversations due to frequent interruptions. Seat C offers a social yet not overwhelming experience, striking a balance in connectivity. Seat D, suitable for those wanting to engage without being the main focal point, has moderate centrality but lower betweenness. For networking in a professional setting, Seat B is best for maximum interaction, albeit at the cost of quiet preparation time.

```
# Plot the network
plot(g, vertex.size = degree*50, vertex.label = V(g)$name,
     vertex.label.cex = 0.8, vertex.label.dist = 0.5,
     edge.arrow.size = 0.5, main = "Bus Seat Network")
```

Bus Seat Network

