Homework 2

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```
#Loading the libraries I need
library(igraph)
```

```
## Warning: package 'igraph' was built under R version 4.4.1
```

```
##
## Attaching package: 'igraph'
```

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

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

```
library(ggraph)
```

```
## Loading required package: ggplot2
```

```
library(sna)
```

```
## Warning: package 'sna' was built under R version 4.4.1
```

```
## Loading required package: statnet.common
```

```
## Warning: package 'statnet.common' was built under R version 4.4.1
```

```
##
## Attaching package: 'statnet.common'
```

```
## The following objects are masked from 'package:base':
##
##     attr, order
```

```
## Loading required package: network
```

```
## Warning: package 'network' was built under R version 4.4.1
```

```
##
## 'network' 1.19.0 (2024-12-08), part of the Statnet Project
## * 'news(package="network")' for changes since last version
## * 'citation("network")' for citation information
## * 'https://statnet.org' for help, support, and other information

##
## Attaching package: 'network'

## The following objects are masked from 'package:igraph':
##
##     %c%, %s%, add.edges, add.vertices, delete.edges, delete.vertices,
##     get.edge.attribute, get.edges, get.vertex.attribute, is.bipartite,
##     is.directed, list.edge.attributes, list.vertex.attributes,
##     set.edge.attribute, set.vertex.attribute

## sna: Tools for Social Network Analysis
## Version 2.8 created on 2024-09-07.
## copyright (c) 2005, Carter T. Butts, University of California-Irvine
##  For citation information, type citation("sna").
##  Type help(package="sna") to get started.

##
## Attaching package: 'sna'

## The following objects are masked from 'package:igraph':
##
##     betweenness, bonpow, closeness, components, degree, dyad.census,
##     evcent, hierarchy, is.connected, neighborhood, triad.census
```

2. Loading in the ego-centric data

```
#Importing the node and edge csvs
nodes <- read.csv('/Users/TomTheIntern/Desktop/Mendoza/Mod 4/Networks/Homework1 /msbr_70340_SP25_socioc
summary(nodes)
```

```
##      ego_id   ego_section
##  Min.   : 1   Length:69
##  1st Qu.:18   Class :character
##  Median :35   Mode  :character
##  Mean   :35
##  3rd Qu.:52
##  Max.   :69
```

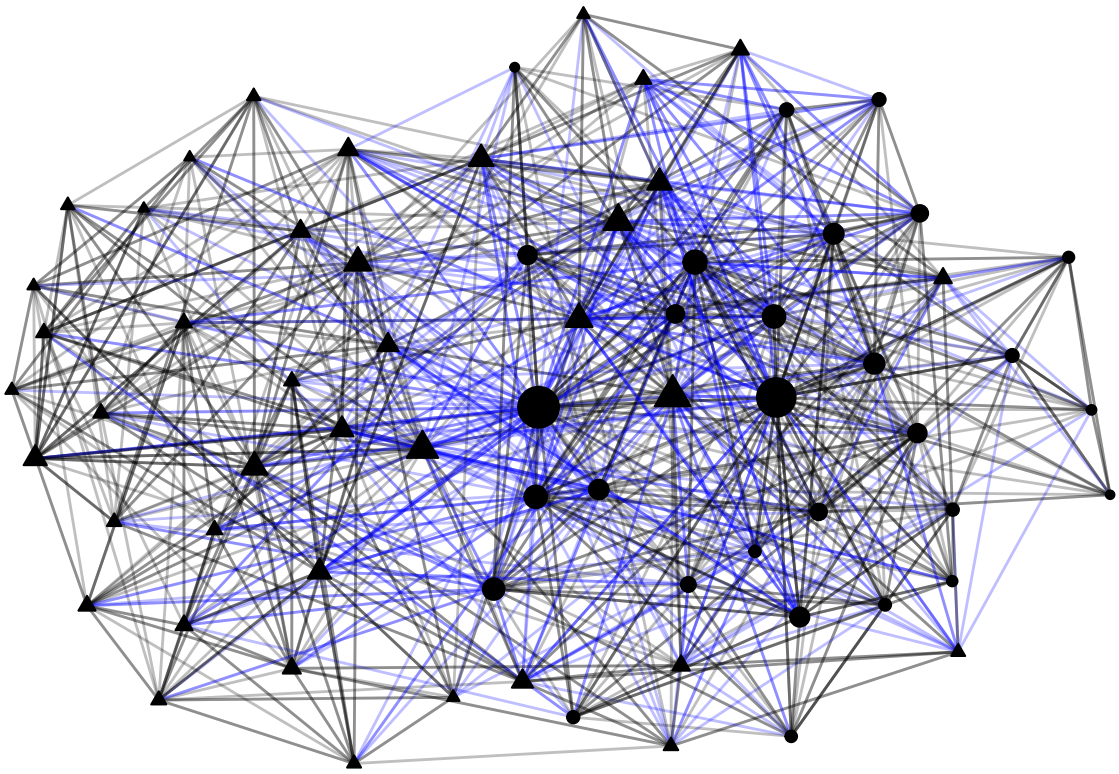
```
edges <- read.csv('/Users/TomTheIntern/Desktop/Mendoza/Mod 4/Networks/Homework1 /msbr_70340_SP25_socioc
summary(edges)
```

```
##      ego_id         alter_id     ego_section        alter_section
##  Min.   : 1.00   Min.   : 1.00   Length:1237        Length:1237
##  1st Qu.:20.00   1st Qu.:17.00   Class :character   Class :character
##  Median :34.00   Median :33.00   Mode  :character   Mode  :character
##  Mean   :34.11   Mean   :33.86
##  3rd Qu.:49.00   3rd Qu.:51.00
##  Max.   :69.00   Max.   :69.00
```

```
net <- graph_from_data_frame(edges, directed = F, vertices = nodes)
net
```

```
## IGRAPH a5bcb9b UN-- 69 1237 --
## + attr: name (v/c), ego_section (v/c), ego_section (e/c), alter_section
## | (e/c)
## + edges from a5bcb9b (vertex names):
##  [1] 1--47 1--28 1--22 1--53 1--52 1--56 1--1  1--4  1--25 1--31 2--7  2--62
## [13] 3--45 3--29 3--21 2--3  3--16 3--41 3--55 3--60 3--39 3--53 3--61 3--52
## [25] 3--32 3--7  3--33 1--3  3--34 3--25 3--67 3--20 3--30 3--69 3--62 4--6
## [37] 4--47 4--14 4--64 4--15 4--65 4--26 4--66 4--68 4--53 4--61 4--52 4--23
## [49] 1--4  4--48 4--36 4--20 5--51 5--24 5--12 5--19 5--49 5--10 5--34 5--43
## [61] 5--30 6--47 6--14 6--15 6--8  6--26 2--6  6--49 6--18 3--6  6--66 6--22
## [73] 6--41 6--61 6--52 6--56 6--33 1--6  4--6  6--48 6--25 6--20 6--62 7--29
## + ... omitted several edges
```

```
ggraph(net, layout = "kk") +
  geom_edge_link0(edge_colour = ifelse(E(net)$ego_section == E(net)$alter_section,
                                       "black", "blue"), alpha = 0.25) +
  geom_node_point(size = igraph::degree(net, mode = "all") / 15,
                  shape = ifelse(V(net)$ego_section == "SP25-MSBR-70340-01", 24, 21),
                  fill = 'black') +
  ggnetwork::theme_blank(legend.position = "none")
```



```r
# betweenness centralization####
cent_bet <- centr_betw(net)$centralization
round(cent_bet, digits = 2)
```

```
## [1] 0.13
```

```r
# degree centralization####
cent_deg <- centr_degree(net, mode = "all")$centralization
round(cent_deg, digits = 2)
```

```
## [1] 0.99
```

```r
round(max(igraph::betweenness(net)))
```

```
## [1] 320
```

```r
round(max(igraph::degree(net)))
```

```
## [1] 103
```