R Notebook for Network & belongingness Paper

Contents

Introduction

Clear Environment

```
rm(list = ls(all.names = TRUE))
```

Load Libraries

```
#install.packages("CTT")
#install.packages("GGally")
#install.packages("ggplot2")
#install.packages("lattice")
#install.packages("gridExtra")
#install.packages("igraph")
#install.packages("dplyr")
#install.packages("tidyr")
```

```r
#install.packages("igraph")
#install.packages("statnet")

library(CTT)
library(GGally)
library(ggplot2)
library(lattice)
library(gridExtra)
library(reshape)
library(igraph)
library(tidyverse)
```

setwd & load data

```r
setwd("T:/Research folders/CCWTG/Analyses/Data for Stats Dept/FINAL DATA")

#elmk <- read_csv("CC_edgelist.csv")
#saveRDS(elmk,"cc_edgelist.rds")
elmk <- readRDS("cc_edgelist.rds")
youth_att <- read_csv("Mentee_Attributes.csv")
staff_att <- read_csv("Staff_Attributes_Final.csv")
```

Format Edgelist

```r
elmk <- elmk %>%
  filter(Receiver_Missing == 0,
         Sender_missing == 0,
         Sender_Final_ID != Receiver_Final_ID) %>%
  mutate(sn1 = ifelse((sn1 == 1 & sn2 == 0), NA, sn1), #marking NA for nominated, but weight = 0
         sn2 = ifelse(is.na(sn1), NA, sn2)) %>%
  select(-Receiver_Missing, -Sender_missing)
```

Format Attributes

```r
youth_att <- youth_att %>%
  mutate(Final_ID = final_ID,
         role1 = Role,
         night1 = tolower(night),
         night2 =NA,
         role2 = NA,
         mentee = NA
         ) %>%
  select(Final_ID, semester, night1, night2, mfcond, role1, role2, room, gender, mentee, impnotes, date_

staff_att <- staff_att %>%
  mutate(date_dropped = NA,
```

```
         no_start = NA,
         Final_ID = FInal_ID) %>%
  select(Final_ID, semester, night1, night2, mfcond, role1, role2, room, gender, mentee, impnotes, date_

staff_youth_att <- rbind(staff_att, youth_att)

staff_youth_att <- staff_youth_att %>%
    #Easier to work with numbers
  mutate(role_num = ifelse(role1 == "mentee", 0, NA),
         role_num = ifelse(role1 == "mentor", 1, role_num),
         role_num = ifelse(role1 == "mentor coach", 2, role_num),
         role_num = ifelse(role1 == "lead mentor coach", 3, role_num),
         role_num = ifelse(role1 == "instructor", 4, role_num),
         role_num = ifelse(role1 == "Instructor", 4, role_num),

         role1 = ifelse(role1 == "Instructor", "instructor", role1),
         #Set role colors
         role_col = ifelse(role_num == 0, "orange", NA),
         role_col = ifelse(role_num == 1, "green", role_col),
         role_col = ifelse(role_num == 2, "dodgerblue", role_col),
         role_col = ifelse(role_num == 3, "red", role_col),
         role_col = ifelse(role_num == 4, "grey50", role_col)
         )
```

Create Useful Functions

```
#use this function to create plots Adjust here if necessary.

my_sn_g <- function(g, title = "", vertex.label = NA, vertex.size = 10, edge.color = "black", edge.arrow
  plot(g,
     vertex.label = NA,
     vertex.size = 10,
     edge.color = 'black',
     edge.arrow.size = 0.05,
     layout = layout_nicely(g),
     main = title)
}

#function to make legend creation cleaner
#Create vectors of attributes colors & corresponding colors
my_leg <- function(att, colors) {
  legend("bottomright", legend=att  , col = colors , bty = "o", pch=20 , pt.cex = 1, cex = 1, text.col=
}
```

Create General Graphs

F15

```
temp <- elmk %>% filter(semester == "F15")

mon <- temp %>% filter(night == "monday")
tue <- temp %>% filter(night == "tuesday")
wed <- temp %>% filter(night == "wednesday")
thu <- temp %>% filter(night == "thursday")

sem <- list(mon = mon,
            tue = tue,
            wed = wed,
            thu = thu)

rm(mon);rm(tue);rm(wed);rm(thu)
```

Summary

```
sem$mon <- group_by(sem$mon, survnum)
sem$tue <- group_by(sem$tue, survnum)
sem$wed <- group_by(sem$wed, survnum)
sem$thu <- group_by(sem$thu, survnum)

summarize(sem$mon, day = "mon", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 mon      69        76    0.361
## 2       2 mon      65       441    2.09
## 3       3 mon      61       672    3.19
## 4       4 mon      58       834    3.96
## 5       5 mon      59       887    4.21
```

```
summarize(sem$tue, day = "tue", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 tue      62        73    0.387
## 2       2 tue      61       389    2.06
## 3       3 tue      60       623    3.31
## 4       4 tue      60       760    4.03
## 5       5 tue      61       871    4.62
```

```
summarize(sem$wed, day = "wed", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 wed      67       104    0.482
## 2       2 wed      64       482    2.23
## 3       3 wed      64       731    3.39
## 4       4 wed      64       859    3.98
## 5       5 wed      63      1004    4.65
```

```
summarize(sem$thu, day = "thu", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 thu      71       126    0.528
## 2       2 thu      71       568    2.38
## 3       3 thu      69       772    3.23
## 4       4 thu      67       830    3.48
## 5       5 thu      67       877    3.67
```

```
sem$mon <- ungroup(sem$mon)
sem$tue <- ungroup(sem$tue)
sem$wed <- ungroup(sem$wed)
sem$thu <- ungroup(sem$thu)
```

Monday

```
temp_night <- temp %>% filter(night == "monday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
```

```
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
```

```
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create Monday List

```
monday <- list(edgelists = day, graphs = graphs)
rm(day);rm(graphs)
```

Tuesday

```
temp_night <- temp %>% filter(night == "tuesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
```

```
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
```

```
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]
```

```
graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
tuesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Wednesday

```
temp_night <- temp %>% filter(night == "wednesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
```

```
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
```

```
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
wednesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Thursday

```
temp_night <- temp %>% filter(night == "thursday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
```

```
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
```

```
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]
```

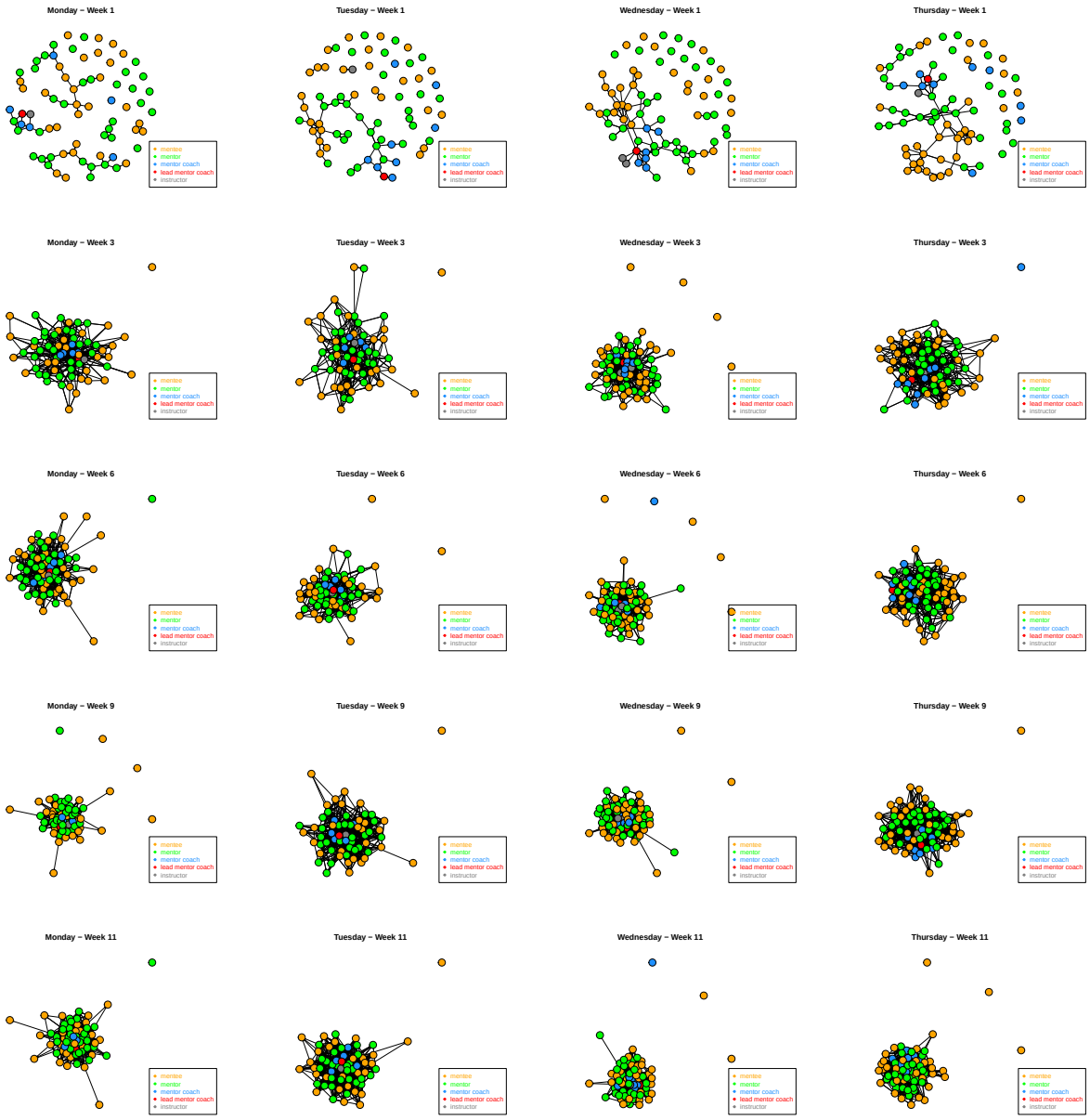
```
graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
thursday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Plot Graphs

```
par(mfrow=c(5,4)) # To plot two plots side-by-side

   my_sn_g(monday$graphs$g1,      title = "Monday - Week 1");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g1,     title = "Tuesday - Week 1");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g1,   title = "Wednesday - Week 1");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g1,    title = "Thursday - Week 1");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g2,      title = "Monday - Week 3");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g2,     title = "Tuesday - Week 3");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g2,   title = "Wednesday - Week 3");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g2,    title = "Thursday - Week 3");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g3,      title = "Monday - Week 6");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g3,     title = "Tuesday - Week 6");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g3,   title = "Wednesday - Week 6");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g3,    title = "Thursday - Week 6");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g4,      title = "Monday - Week 9");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g4,     title = "Tuesday - Week 9");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g4,   title = "Wednesday - Week 9");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g4,    title = "Thursday - Week 9");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g5,      title = "Monday - Week 11");my_leg(att = role, colors = color) #Socia
  my_sn_g(tuesday$graphs$g5,     title = "Tuesday - Week 11");my_leg(att = role, colors = color) #Socia
my_sn_g(wednesday$graphs$g5,   title = "Wednesday - Week 11");my_leg(att = role, colors = color) #Socia
 my_sn_g(thursday$graphs$g5,    title = "Thursday - Week 11");my_leg(att = role, colors = color) #Socia
```



Create Semester List

```
F15 <- list(monday = monday, tuesday = tuesday, wednesday = wednesday, thursday = thursday)
rm(monday);rm(tuesday);rm(wednesday);rm(thursday)
rm(temp)
```

S16

```
temp <- elmk %>% filter(semester == "S16")

mon <- temp %>% filter(night == "monday")
tue <- temp %>% filter(night == "tuesday")
wed <- temp %>% filter(night == "wednesday")
```

```
thu <- temp %>% filter(night == "thursday")

sem <- list(mon = mon,
            tue = tue,
            wed = wed,
            thu = thu)

rm(mon);rm(tue);rm(wed);rm(thu)
```

Summary

```
sem$mon <- group_by(sem$mon, survnum)
sem$tue <- group_by(sem$tue, survnum)
sem$wed <- group_by(sem$wed, survnum)
sem$thu <- group_by(sem$thu, survnum)

summarize(sem$mon, day = "mon", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 mon      75        86    0.342
## 2       2 mon      71       454    1.80
## 3       3 mon      66       652    2.59
## 4       4 mon      66       799    3.18
## 5       5 mon      64       789    3.14
```

```
summarize(sem$tue, day = "tue", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 tue      69        87    0.364
## 2       2 tue      68       419    1.75
## 3       3 tue      64       679    2.84
## 4       4 tue      65       927    3.88
## 5       5 tue      63      1062    4.45
```

```
summarize(sem$wed, day = "wed", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 wed      75       110    0.432
## 2       2 wed      73       404    1.59
## 3       3 wed      66       674    2.65
## 4       4 wed      67       854    3.35
## 5       5 wed      67       917    3.60
```

```
summarize(sem$thu, day = "thu", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 thu      72       136    0.546
## 2       2 thu      71       545    2.19
## 3       3 thu      70       827    3.32
```

```
## 4       4 thu      69       924    3.71
## 5       5 thu      69      1035    4.15
```

```
sem$mon <- ungroup(sem$mon)
sem$tue <- ungroup(sem$tue)
sem$wed <- ungroup(sem$wed)
sem$thu <- ungroup(sem$thu)
```

Monday

```
temp_night <- temp %>% filter(night == "monday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
```

```
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
```

```
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
monday <- list(edgelists = day, graphs = graphs)
rm(day);rm(graphs)
```

Tuesday

```
temp_night <- temp %>% filter(night == "tuesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
```

```
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))
```

```
day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")
```

```
rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
tuesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Wednesday

```
temp_night <- temp %>% filter(night == "wednesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
```

```
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
```

```
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
wednesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Thursday

```
temp_night <- temp %>% filter(night == "thursday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
```

```
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))
```

```
day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")
```

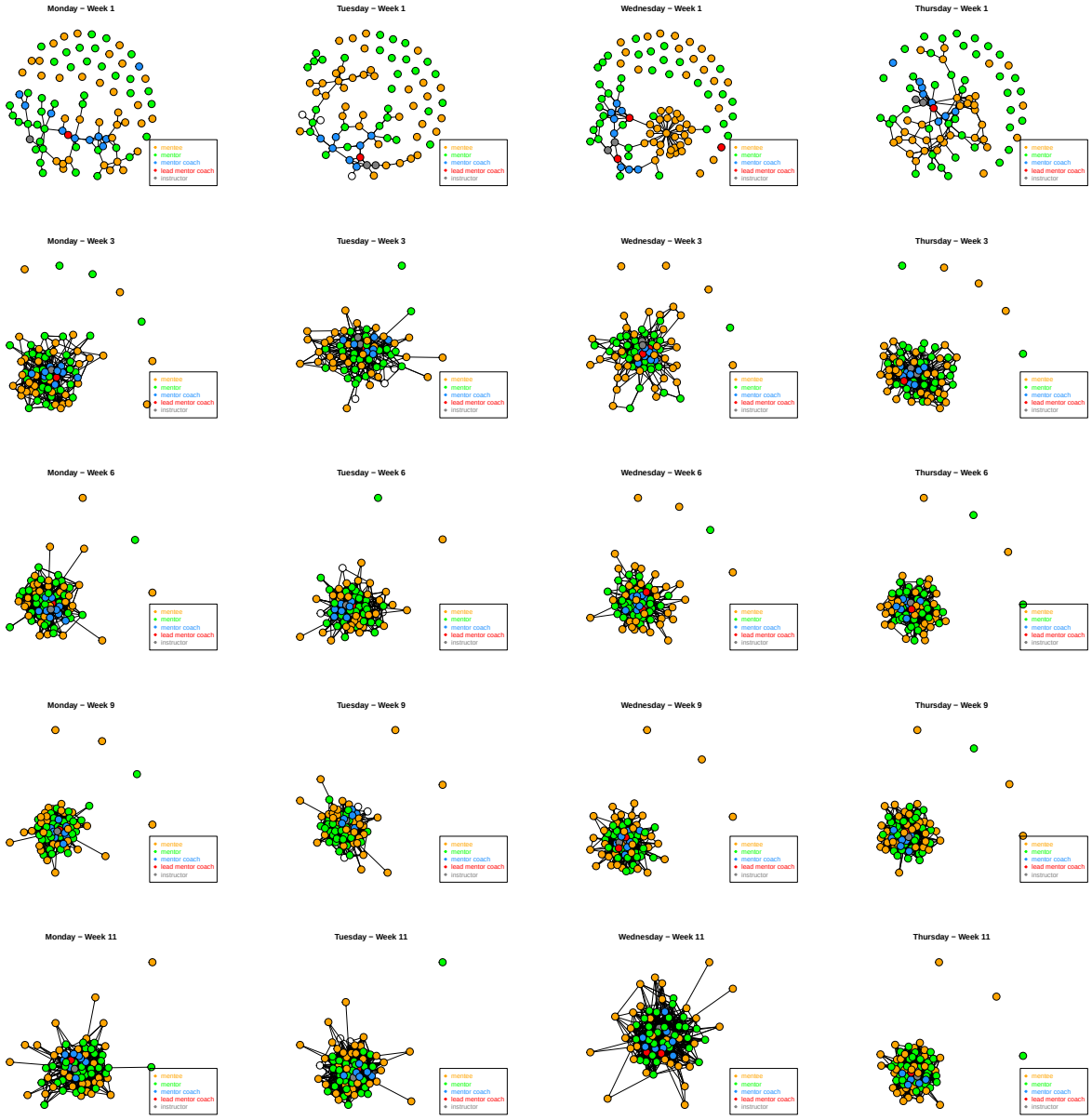
```
rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
thursday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Plot Graphs

```
par(mfrow=c(5,4)) # To plot two plots side-by-side

   my_sn_g(monday$graphs$g1,      title = "Monday - Week 1");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g1,     title = "Tuesday - Week 1");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g1,   title = "Wednesday - Week 1");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g1,    title = "Thursday - Week 1");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g2,      title = "Monday - Week 3");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g2,     title = "Tuesday - Week 3");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g2,   title = "Wednesday - Week 3");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g2,    title = "Thursday - Week 3");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g3,      title = "Monday - Week 6");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g3,     title = "Tuesday - Week 6");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g3,   title = "Wednesday - Week 6");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g3,    title = "Thursday - Week 6");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g4,      title = "Monday - Week 9");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g4,     title = "Tuesday - Week 9");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g4,   title = "Wednesday - Week 9");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g4,    title = "Thursday - Week 9");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g5,      title = "Monday - Week 11");my_leg(att = role, colors = color) #Socia
  my_sn_g(tuesday$graphs$g5,     title = "Tuesday - Week 11");my_leg(att = role, colors = color) #Socia
my_sn_g(wednesday$graphs$g5,   title = "Wednesday - Week 11");my_leg(att = role, colors = color) #Socia
 my_sn_g(thursday$graphs$g5,    title = "Thursday - Week 11");my_leg(att = role, colors = color) #Socia
```



Create Semester List

```
S16 <- list(monday = monday, tuesday = tuesday, wednesday = wednesday, thursday = thursday)
rm(monday);rm(tuesday);rm(wednesday);rm(thursday)
rm(temp)
```

F16

```
temp <- elmk %>% filter(semester == "F16")

mon <- temp %>% filter(night == "monday")
tue <- temp %>% filter(night == "tuesday")
wed <- temp %>% filter(night == "wednesday")
```

```
thu <- temp %>% filter(night == "thursday")

sem <- list(mon = mon,
            tue = tue,
            wed = wed,
            thu = thu)

rm(mon);rm(tue);rm(wed);rm(thu)
```

Summary

```
sem$mon <- group_by(sem$mon, survnum)
sem$tue <- group_by(sem$tue, survnum)
sem$wed <- group_by(sem$wed, survnum)
sem$thu <- group_by(sem$thu, survnum)

summarize(sem$mon, day = "mon", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 mon      63        73    0.383
## 2       2 mon      60       482    2.53
## 3       3 mon      60       705    3.70
## 4       4 mon      58       794    4.16
## 5       5 mon      58       842    4.41
```

```
summarize(sem$tue, day = "tue", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 tue      64        76    0.394
## 2       2 tue      61       319    1.65
## 3       3 tue      61       623    3.23
## 4       4 tue      60       804    4.17
## 5       5 tue      60       912    4.73
```

```
summarize(sem$wed, day = "wed", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 wed      66        93    0.466
## 2       2 wed      64       382    1.91
## 3       3 wed      62       632    3.17
## 4       4 wed      62       808    4.05
## 5       5 wed      60       716    3.59
```

```
summarize(sem$thu, day = "thu", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 thu      64        96    0.474
## 2       2 thu      62       535    2.64
## 3       3 thu      62       814    4.02
```

```
## 4       4 thu      61       909    4.49
## 5       5 thu      58       902    4.45
```

```
sem$mon <- ungroup(sem$mon)
sem$tue <- ungroup(sem$tue)
sem$wed <- ungroup(sem$wed)
sem$thu <- ungroup(sem$thu)
```

Monday

```
temp_night <- temp %>% filter(night == "monday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
```

```
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
```

```
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
monday <- list(edgelists = day, graphs = graphs)
rm(day);rm(graphs)
```

Tuesday

```
temp_night <- temp %>% filter(night == "tuesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
```

```
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))
```

```
day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")
```

```
rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
tuesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Wednesday

```
temp_night <- temp %>% filter(night == "wednesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
```

```
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
```

```
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
wednesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Thursday

```
temp_night <- temp %>% filter(night == "thursday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
```

```
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))
```

```
day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")
```

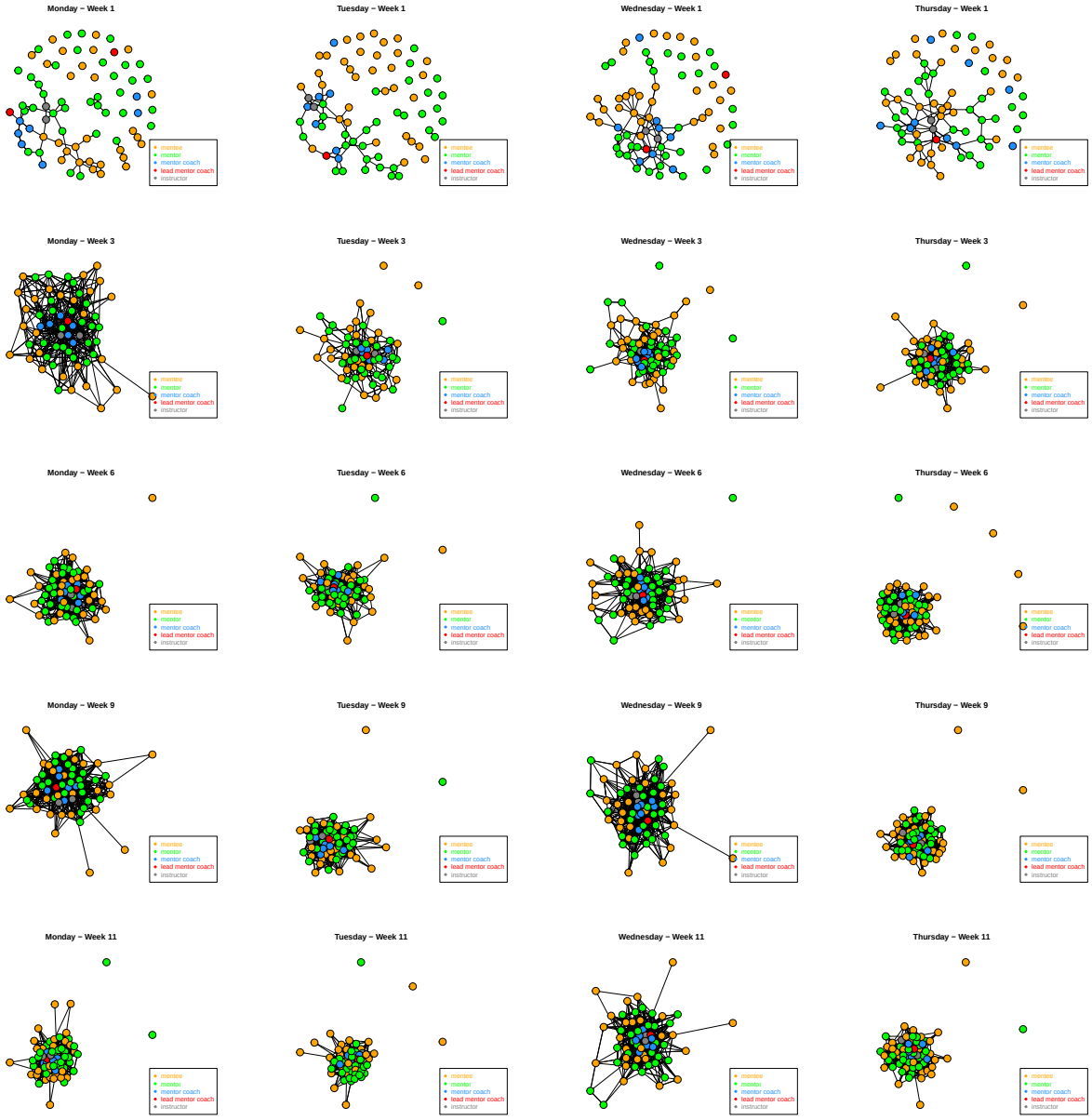
```
rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
thursday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Plot Graphs

```
par(mfrow=c(5,4)) # To plot two plots side-by-side

   my_sn_g(monday$graphs$g1,      title = "Monday - Week 1");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g1,     title = "Tuesday - Week 1");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g1,   title = "Wednesday - Week 1");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g1,    title = "Thursday - Week 1");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g2,      title = "Monday - Week 3");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g2,     title = "Tuesday - Week 3");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g2,   title = "Wednesday - Week 3");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g2,    title = "Thursday - Week 3");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g3,      title = "Monday - Week 6");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g3,     title = "Tuesday - Week 6");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g3,   title = "Wednesday - Week 6");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g3,    title = "Thursday - Week 6");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g4,      title = "Monday - Week 9");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g4,     title = "Tuesday - Week 9");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g4,   title = "Wednesday - Week 9");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g4,    title = "Thursday - Week 9");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g5,      title = "Monday - Week 11");my_leg(att = role, colors = color) #Socia
  my_sn_g(tuesday$graphs$g5,     title = "Tuesday - Week 11");my_leg(att = role, colors = color) #Socia
my_sn_g(wednesday$graphs$g5,   title = "Wednesday - Week 11");my_leg(att = role, colors = color) #Socia
 my_sn_g(thursday$graphs$g5,    title = "Thursday - Week 11");my_leg(att = role, colors = color) #Socia
```



Create Semester List

```
F16 <- list(monday = monday, tuesday = tuesday, wednesday = wednesday, thursday = thursday)
rm(monday);rm(tuesday);rm(wednesday);rm(thursday)
rm(temp)
```

S17

```
temp <- elmk %>% filter(semester == "S17")

mon <- temp %>% filter(night == "monday")
tue <- temp %>% filter(night == "tuesday")
wed <- temp %>% filter(night == "wednesday")
```

```
thu <- temp %>% filter(night == "thursday")

sem <- list(mon = mon,
            tue = tue,
            wed = wed,
            thu = thu)

rm(mon);rm(tue);rm(wed);rm(thu)
```

Summary

```
sem$mon <- group_by(sem$mon, survnum)
sem$tue <- group_by(sem$tue, survnum)
sem$wed <- group_by(sem$wed, survnum)
sem$thu <- group_by(sem$thu, survnum)

summarize(sem$mon, day = "mon", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 mon      66       149    0.702
## 2       2 mon      65       451    2.12
## 3       3 mon      63       664    3.13
## 4       4 mon      62       797    3.75
## 5       5 mon      61       839    3.95
```

```
summarize(sem$tue, day = "tue", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 tue      65        86    0.409
## 2       2 tue      64       466    2.22
## 3       3 tue      63       768    3.66
## 4       4 tue      62       841    4.00
## 5       5 tue      62      1006    4.79
```

```
summarize(sem$wed, day = "wed", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 wed      64       139    0.685
## 2       2 wed      64       432    2.13
## 3       3 wed      62       648    3.19
## 4       4 wed      62       846    4.17
## 5       5 wed      62       932    4.59
```

```
summarize(sem$thu, day = "thu", n = length(unique(Sender_Final_ID)), tie_count = sum(sn1, na.rm = TRUE)
```

```
## # A tibble: 5 x 5
##   survnum day       n tie_count tie_prop
##     <int> <chr> <int>     <int>    <dbl>
## 1       1 thu      66        92    0.425
## 2       2 thu      65       440    2.03
## 3       3 thu      64       700    3.23
```

```
## 4       4 thu      63       867    4.01
## 5       5 thu      63       954    4.41
```

```
sem$mon <- ungroup(sem$mon)
sem$tue <- ungroup(sem$tue)
sem$wed <- ungroup(sem$wed)
sem$thu <- ungroup(sem$thu)
```

Monday

```
temp_night <- temp %>% filter(night == "monday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
```

```
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
```

```
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
monday <- list(edgelists = day, graphs = graphs)
rm(day);rm(graphs)
```

Tuesday

```
temp_night <- temp %>% filter(night == "tuesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
```

```
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))
```

```
day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")
```

```
rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
tuesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Wednesday

```
temp_night <- temp %>% filter(night == "wednesday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
```

```
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
```

```
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")


rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
wednesday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Thursday

```
temp_night <- temp %>% filter(night == "thursday")

#Surv_1
surv_1 <- temp_night %>%
  filter(survnum == 1) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates1 <- surv_1 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_1 <- surv_1 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 2
surv_2 <- temp_night %>%
```

```
  filter(survnum == 2) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates2 <- surv_2 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_2 <- surv_2 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 3
surv_3 <- temp_night %>%
  filter(survnum == 3) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates3 <- surv_3 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_3 <- surv_3 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 4
surv_4 <- temp_night %>%
  filter(survnum == 4) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates4 <- surv_4 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_4 <- surv_4 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))

#Surv 5
surv_5 <- temp_night %>%
  filter(survnum == 5) %>%
  mutate(Receiver_Final_ID = ifelse(is.na(sn1), NA, Receiver_Final_ID)) #%>%
#Getting isolates
isolates5 <- surv_5 %>%
  mutate(sn1 = ifelse(is.na(sn1), 0, sn1)) %>%
  group_by(Sender_Final_ID) %>%
  summarize(isolate = sum(sn1)) %>%
  filter(isolate < 1) %>%
  select(Sender_Final_ID)
surv_5 <- surv_5 %>%
   select(Sender_Final_ID, Receiver_Final_ID) %>% filter(!(is.na(Receiver_Final_ID)))
```

```
day <- list(sur1 = surv_1,
            sur2 = surv_2,
            sur3 = surv_3,
            sur4 = surv_4,
            sur5 = surv_5,
            iso1 = isolates1,
            iso2 = isolates2,
            iso3 = isolates3,
            iso4 = isolates4,
            iso5 = isolates5)

rm(surv_1);rm(surv_2);rm(surv_3);rm(surv_4);rm(surv_5)
rm(isolates1);rm(isolates2);rm(isolates3);rm(isolates4);rm(isolates5)
rm(temp_night)
```

General Graphs

```
sur1 <- as.matrix(day$sur1)
sur2 <- as.matrix(day$sur2)
sur3 <- as.matrix(day$sur3)
sur4 <- as.matrix(day$sur4)
sur5 <- as.matrix(day$sur5)


# Convert friends matrix to an igraph object
g1 <- graph.edgelist(sur1, directed = TRUE) + vertices(day$iso1$Sender_Final_ID) #Graph edgelist + Add
g2 <- graph.edgelist(sur2, directed = TRUE) + vertices(day$iso2$Sender_Final_ID) #Graph edgelist + Add
g3 <- graph.edgelist(sur3, directed = TRUE) + vertices(day$iso3$Sender_Final_ID) #Graph edgelist + Add
g4 <- graph.edgelist(sur4, directed = TRUE) + vertices(day$iso4$Sender_Final_ID) #Graph edgelist + Add
g5 <- graph.edgelist(sur5, directed = TRUE) + vertices(day$iso5$Sender_Final_ID) #Graph edgelist + Add

#Add staff Role Attribute

V(g1)$role  <- staff_youth_att$role1[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$role  <- staff_youth_att$role1[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$role  <- staff_youth_att$role1[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$role  <- staff_youth_att$role1[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$role  <- staff_youth_att$role1[match(V(g5)$name, staff_youth_att$Final_ID)]

#Add role colors

V(g1)$color <- staff_youth_att$role_col[match(V(g1)$name, staff_youth_att$Final_ID)]
V(g2)$color <- staff_youth_att$role_col[match(V(g2)$name, staff_youth_att$Final_ID)]
V(g3)$color <- staff_youth_att$role_col[match(V(g3)$name, staff_youth_att$Final_ID)]
V(g4)$color <- staff_youth_att$role_col[match(V(g4)$name, staff_youth_att$Final_ID)]
V(g5)$color <- staff_youth_att$role_col[match(V(g5)$name, staff_youth_att$Final_ID)]

graphs <- list(g1 = g1,g2 = g2, g3 = g3,g4 = g4, g5 = g5)

#For Legend roles & corresponding colors
role <-  c("mentee", "mentor", "mentor coach", "lead mentor coach", "instructor")
color <- c("orange","green","dodgerblue", "red", "grey50")
```

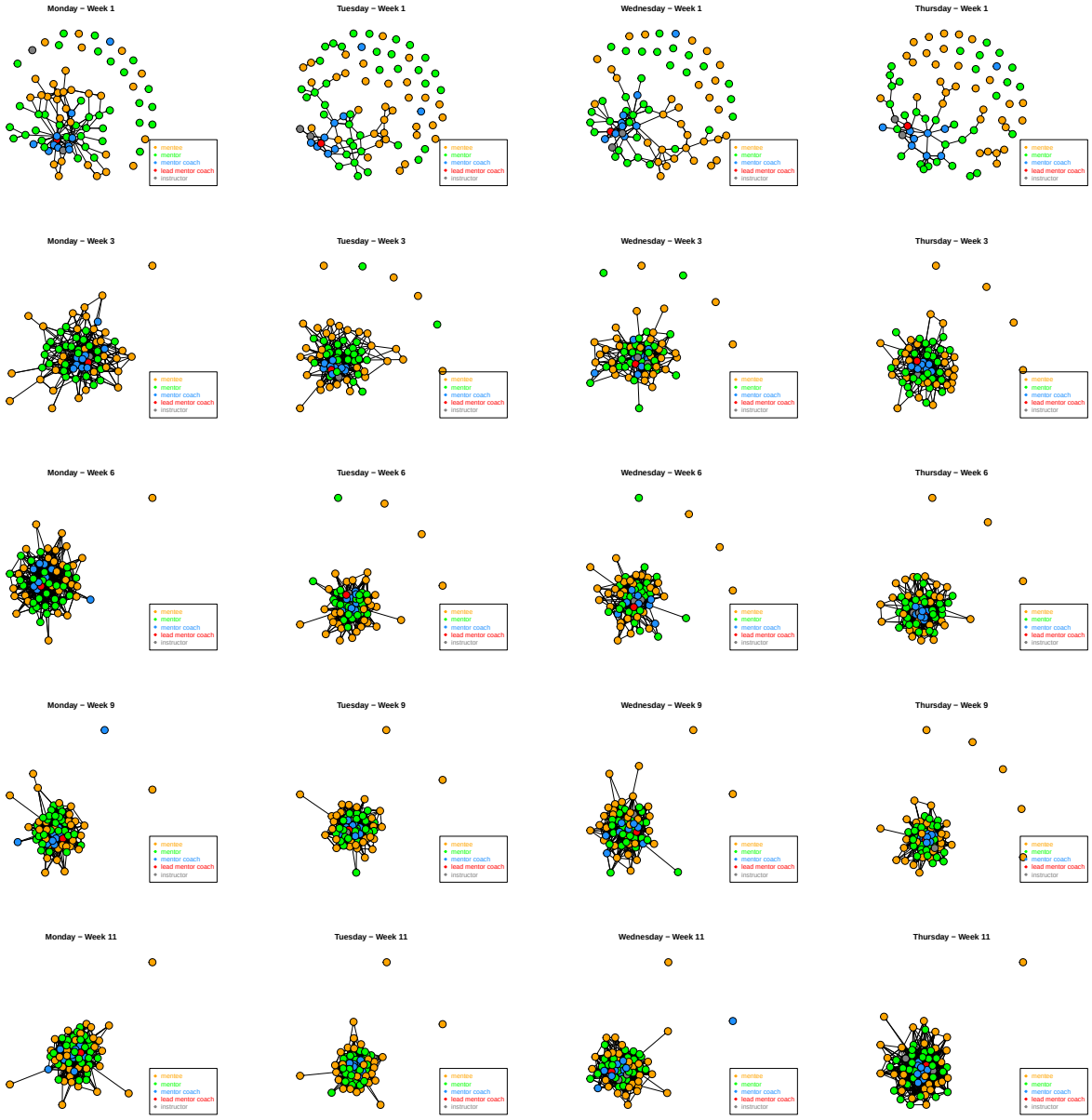
```
rm(g1); rm(g2); rm(g3); rm(g4); rm(g5)
rm(sur1);rm(sur2);rm(sur3);rm(sur4);rm(sur5)
```

Create List

```
thursday <- list(edgelists = day, graphs = graphs)
rm(day); rm(graphs)
```

Plot Graphs

```
par(mfrow=c(5,4)) # To plot two plots side-by-side

   my_sn_g(monday$graphs$g1,      title = "Monday - Week 1");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g1,     title = "Tuesday - Week 1");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g1,   title = "Wednesday - Week 1");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g1,    title = "Thursday - Week 1");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g2,      title = "Monday - Week 3");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g2,     title = "Tuesday - Week 3");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g2,   title = "Wednesday - Week 3");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g2,    title = "Thursday - Week 3");my_leg(att = role, colors = color) #Social


   my_sn_g(monday$graphs$g3,      title = "Monday - Week 6");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g3,     title = "Tuesday - Week 6");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g3,   title = "Wednesday - Week 6");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g3,    title = "Thursday - Week 6");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g4,      title = "Monday - Week 9");my_leg(att = role, colors = color) #Social
  my_sn_g(tuesday$graphs$g4,     title = "Tuesday - Week 9");my_leg(att = role, colors = color) #Social
my_sn_g(wednesday$graphs$g4,   title = "Wednesday - Week 9");my_leg(att = role, colors = color) #Social
 my_sn_g(thursday$graphs$g4,    title = "Thursday - Week 9");my_leg(att = role, colors = color) #Social

   my_sn_g(monday$graphs$g5,      title = "Monday - Week 11");my_leg(att = role, colors = color) #Socia
  my_sn_g(tuesday$graphs$g5,     title = "Tuesday - Week 11");my_leg(att = role, colors = color) #Socia
my_sn_g(wednesday$graphs$g5,   title = "Wednesday - Week 11");my_leg(att = role, colors = color) #Socia
 my_sn_g(thursday$graphs$g5,    title = "Thursday - Week 11");my_leg(att = role, colors = color) #Socia
```



Create Semester List

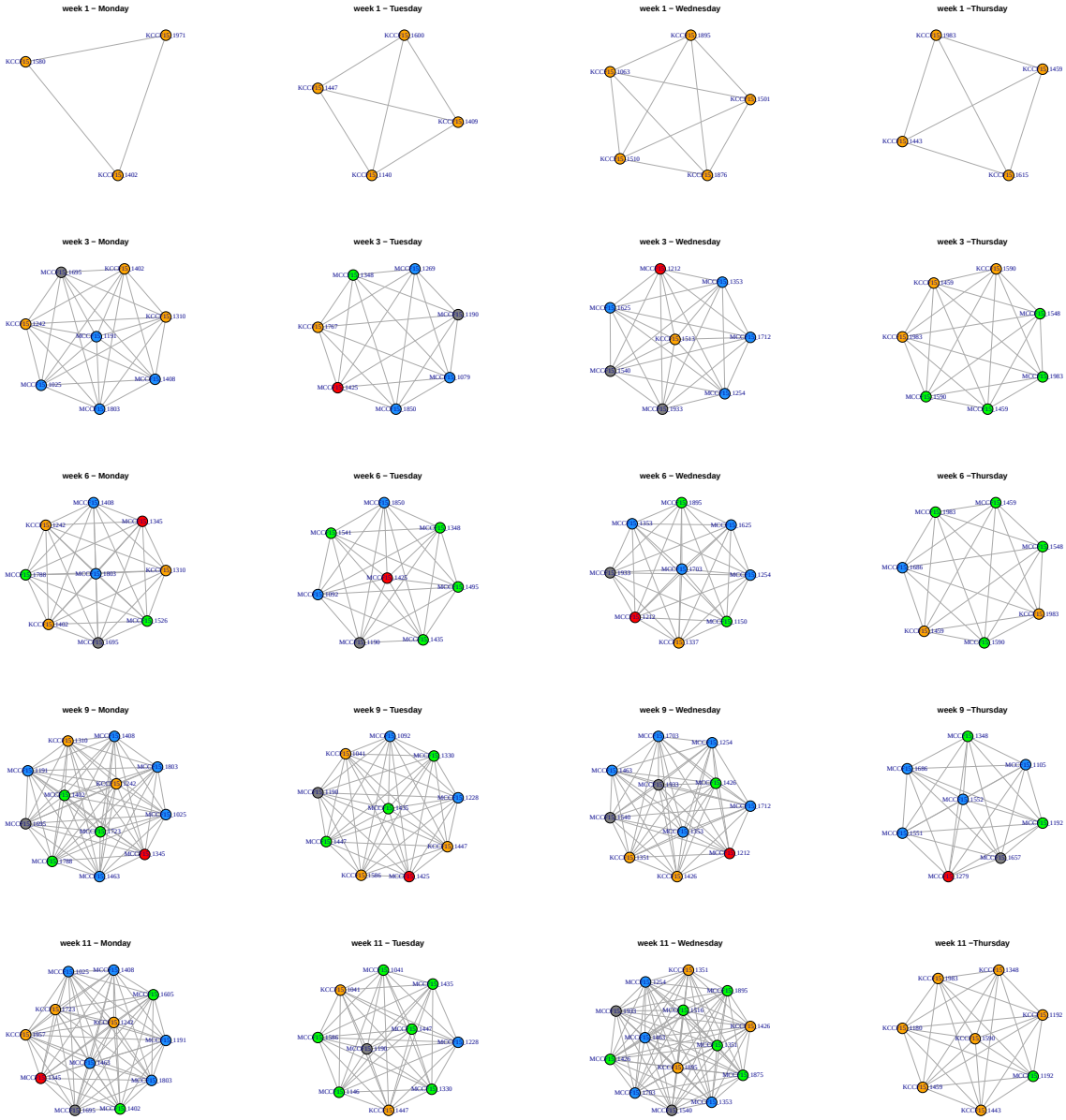
```
S17 <- list(monday = monday, tuesday = tuesday, wednesday = wednesday, thursday = thursday)
rm(monday);rm(tuesday);rm(wednesday);rm(thursday)
rm(temp)
```

Combine Semesters to list

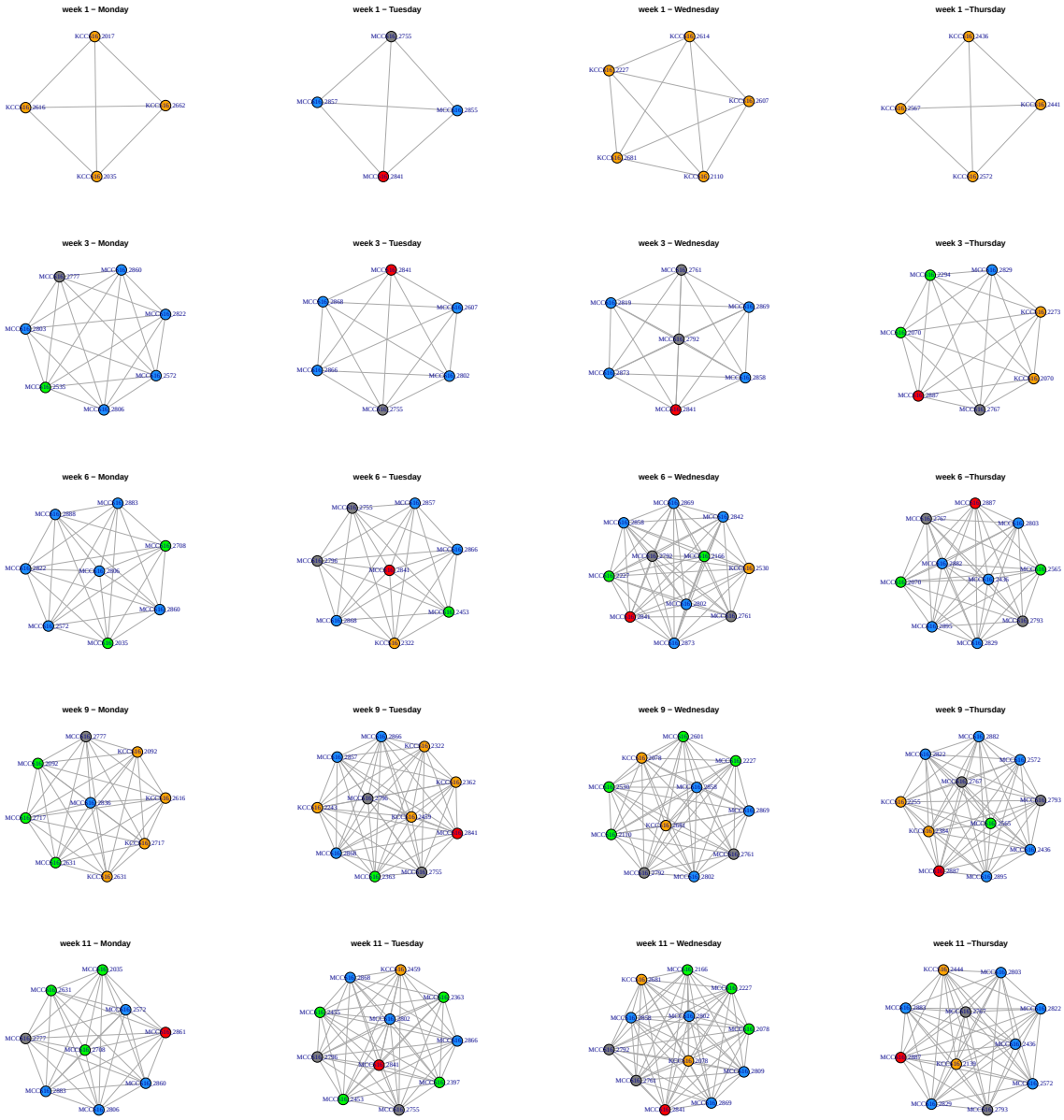
```
ALL <- list(F15 = F15, S16 = S16, F16 = F16, S17 = S17)
rm(F15);rm(S16);rm(F16);rm(S17)
```

Examine Cliques

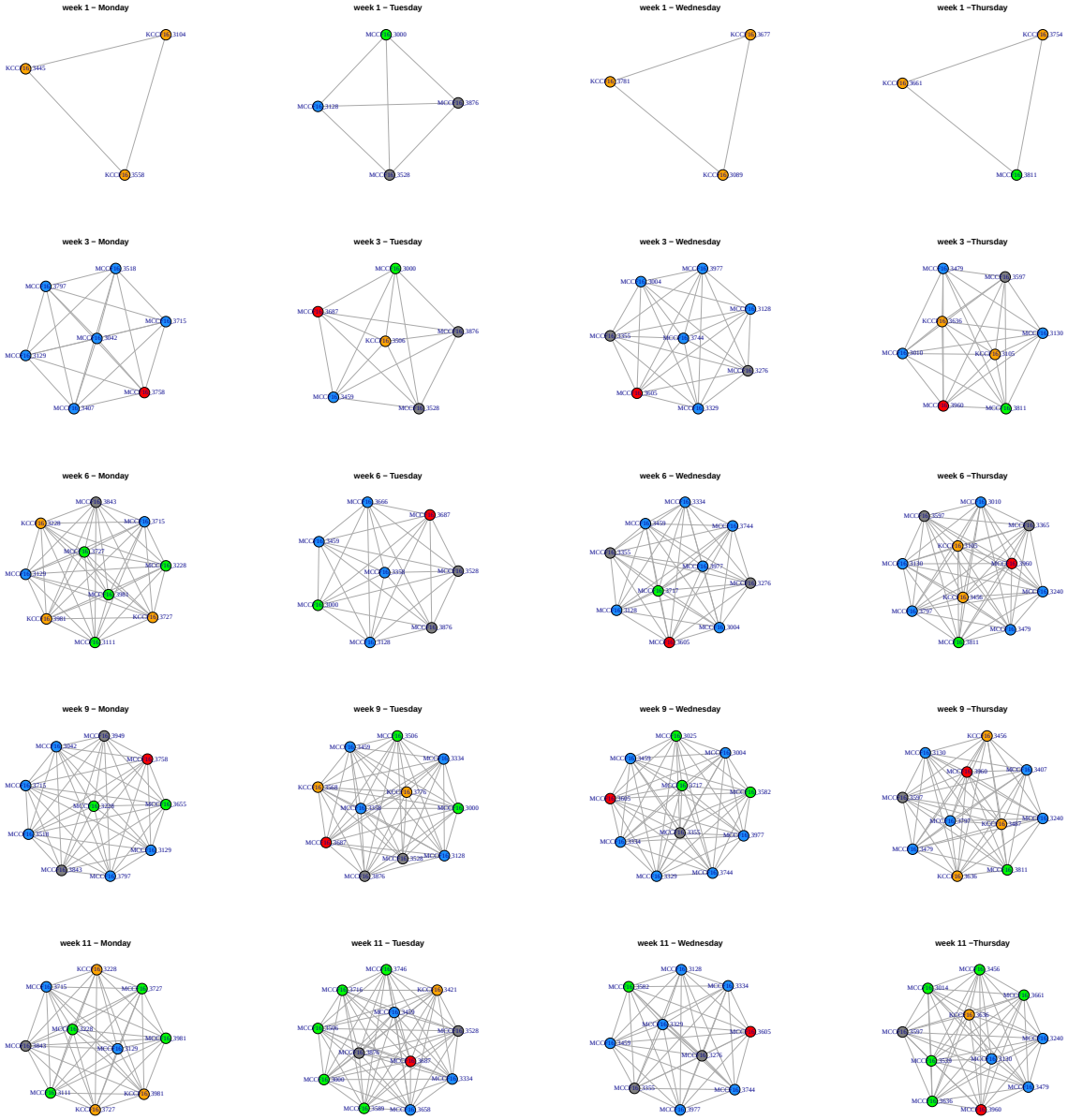
F15



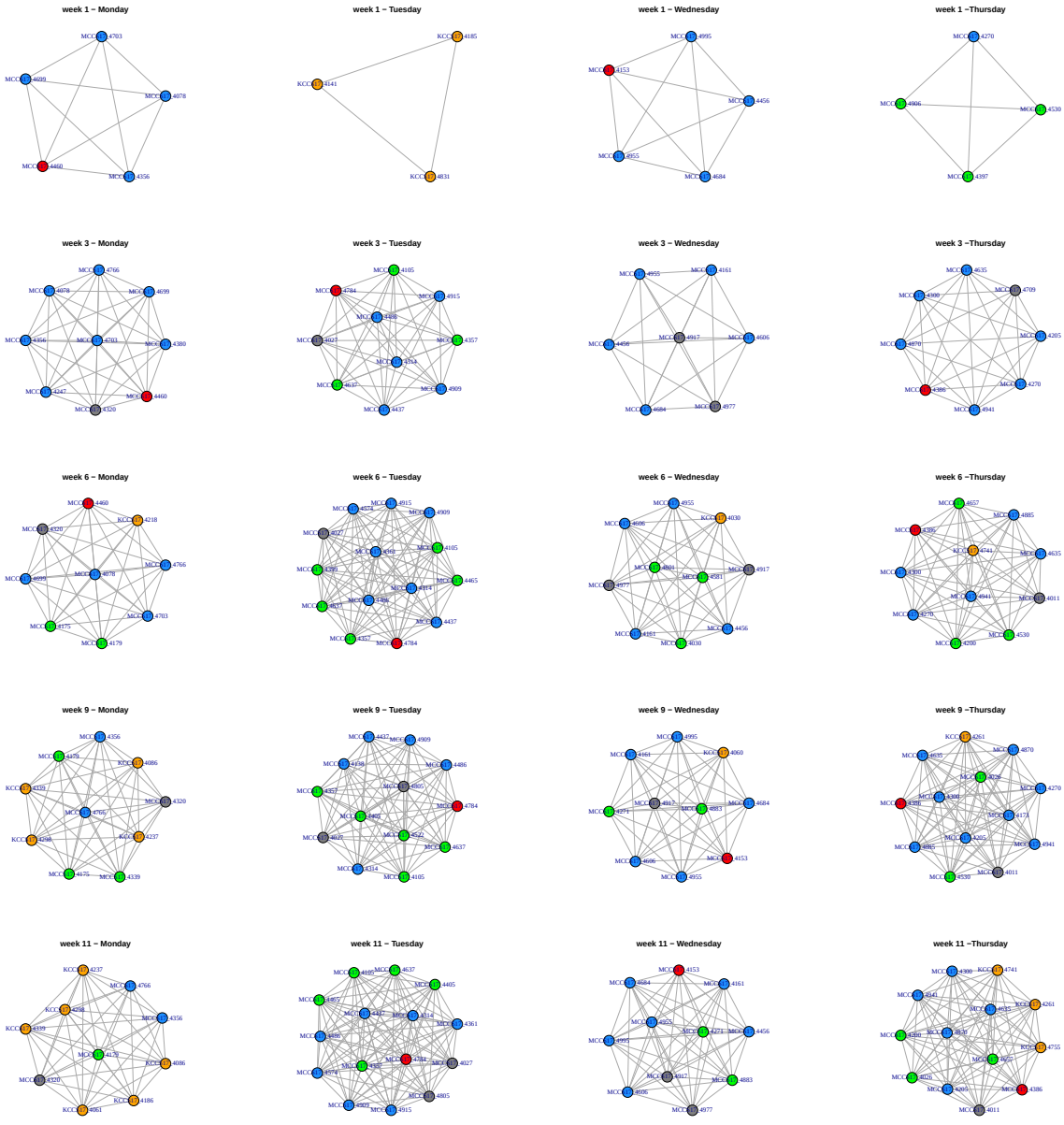
S16


week 1 – Monday
week 1 – Tuesday
week 1 – Wednesday
week 1 –Thursday
week 3 – Monday
week 3 – Tuesday
week 3 – Wednesday
week 3 –Thursday
week 6 – Monday
week 6 – Tuesday
week 6 – Wednesday
week 6 –Thursday
week 9 – Monday
week 9 – Tuesday
week 9 – Wednesday
week 9 –Thursday
week 11 – Monday
week 11 – Tuesday
week 11 – Wednesday
week 11 –Thursday

F16


week 1 – Monday
week 1 – Tuesday
week 1 – Wednesday
week 1 –Thursday
week 3 – Monday
week 3 – Tuesday
week 3 – Wednesday
week 3 –Thursday
week 6 – Monday
week 6 – Tuesday
week 6 – Wednesday
week 6 –Thursday
week 9 – Monday
week 9 – Tuesday
week 9 – Wednesday
week 9 –Thursday
week 11 – Monday
week 11 – Tuesday
week 11 – Wednesday
week 11 –Thursday

S17



##Combine Cliques

```
cliques <- list(F15 = F15, S16 = S16, F16 = F16, S17 = S17)
rm(F15);rm(S16);rm(F16);rm(S17)
```