Mini-Project 4

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Format Data into Edges and Nodes

```
load("nigeriaData")

# create edges df with renamed variables
ng_edges <- nigeriaData %>%
  rename(source = Var1, target = Var2, conflict = value, year = L1)


# get unique source and target actors
uniq_s <- unique(ng_edges$source)
uniq_t <- unique(ng_edges$target)
# are they equal to each other? (result is TRUE, they are equal to each other)
# all_equal(uniq_s, uniq_t)
uniq_orgs <- unique(ng_edges$source)

id <- 1:length(uniq_s)

# create nodes df
ng_nodes <- as.data.frame(uniq_orgs)
ng_nodes <- cbind(ng_nodes, id) # add id variable
names(ng_nodes) <- c("actor", "ID") # rename nodes column headers
```

Add Weights and Create Graph Object

```
# need to adjust the edges df so it has weights
# make the edges df cumulative conflict over the years rather than yes no conflict each
 year

# for each source of conflict their total years conflicting with each target
ng_edges_weight <- ng_edges %>%
  select(source, target, conflict) %>%
  group_by(source, target) %>%
  summarise_all(sum)
# filter out pairs of sources and targets that had zero conflicts
ng_edges_weight <- ng_edges_weight %>%
  filter(conflict !=0)

# graph from the df, directed is TRUE because the conflict has sources and targets
ng_g <- graph_from_data_frame(d = ng_edges_weight, vertices = ng_nodes, directed = TRUE)
# set weights manually
ng_g <- set_edge_attr(ng_g, "weight", value = ng_edges_weight$conflict)
# check to make sure ng_g is weighted, TRUE so it is
# is_weighted(ng_g)
```

Data Wrangling for Custom Sizes

Sizes will be based on each organizations number of conflicts.

```
# size of nodes, can be based on the total number of conflicts occurred with an organization (could be source or target of conflict)
# need to get the total number of years with conflict for each organization regardless of source/target
# create two summary tables one grouped by source, and one by target, with total conflict of each organization
source_conf <- ng_edges_weight %>%
  group_by(source) %>%
  summarize(
    source_conflicts = sum(conflict)
  ) %>%
  rename(organization = source)


source_conf
```

```
## # A tibble: 34 x 2
##    organization                          source_conflicts
##    <fct>                                            <dbl>
##  1 Bassa Ethnic Militia (Nigeria)                       2
##  2 Berom Ethnic Militia (Nigeria)                       3
##  3 Ebira Ethnic Militia (Nigeria)                       1
##  4 Fulani Ethnic Militia (Nigeria)                     33
##  5 Hausa Ethnic Militia (Nigeria)                      11
##  6 Ijaw Ethnic Militia (Nigeria)                       23
##  7 Itsekiri Ethnic Militia (Nigeria)                    2
##  8 Jukun Ethnic Militia (Nigeria)                       4
##  9 Kuteb Ethnic Militia (Nigeria)                       3
## 10 Military Forces of Nigeria                          43
## # … with 24 more rows
```

```
target_conf <- ng_edges_weight %>%
  group_by(target) %>%
  summarize(
    target_conflicts = sum(conflict)
  ) %>%
  rename(organization = target)


target_conf
```

```
## # A tibble: 32 x 2
##    organization                          target_conflicts
##    <fct>                                            <dbl>
##  1 Bassa Ethnic Militia (Nigeria)                       1
##  2 Berom Ethnic Militia (Nigeria)                       8
##  3 Ebira Ethnic Militia (Nigeria)                       2
##  4 Fulani Ethnic Militia (Nigeria)                     20
##  5 Hausa Ethnic Militia (Nigeria)                      14
##  6 Ijaw Ethnic Militia (Nigeria)                        9
##  7 Itsekiri Ethnic Militia (Nigeria)                   12
##  8 Jukun Ethnic Militia (Nigeria)                       7
##  9 Military Forces of Nigeria                          29
## 10 Muslim Militia (Nigeria)                             5
## # … with 22 more rows
```

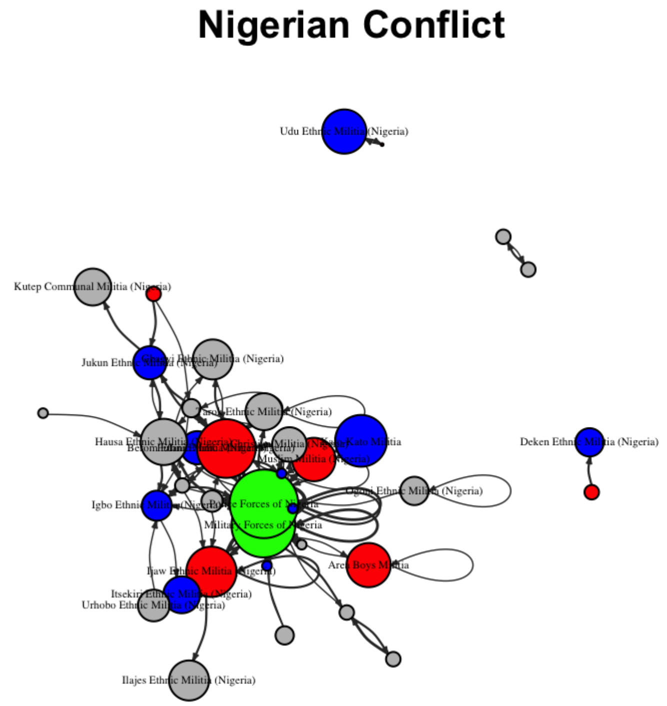
```
# want to join these two dataframes to get the true total conflicts, regardless of sourc
e/target position
# full_join() puts NA for orgs that don't appear in one of the datasets as their source/
target value
# change NAs to zeros to ensure the total column adds up correctly
conflicts <- full_join(source_conf, target_conf, by = "organization", keep = TRUE)
conflicts$source_conflicts[is.na(conflicts$source_conflicts)] <- 0
conflicts$target_conflicts[is.na(conflicts$target_conflicts)] <- 0

# create a new column in conflicts, that sums the source and target conflicts to get a c
ount of total conflicts for each organization
conflicts <- conflicts %>%
  mutate(
    total_conflicts = source_conflicts + target_conflicts
  )
```

Add Vertex and Edge Attributes

```
# need to get orgs and total conflicts into named vector format to add it as a column fo
r V()
confs <- as.numeric(conflicts$total_conflicts)
names(confs) <- conflicts$organization
confs <- log(confs +1)

# now set total confs as the size variable for vertex attributes
V(ng_g)$size = confs

# only put organization name on the node if they had 5+ years with conflicts since 1997
V(ng_g)$label = ifelse(
  confs > 2,
  V(ng_g)$name,
  NA
)

# add width of edges
E(ng_g)$width = log(E(ng_g)$weight + 1)


# set color of nodes that are primarily sources red, primarily targets blue, undecided o
r other as black
# need to do manually
# red = primarily source
# blue = primarily target
# green = Nigerian police/military
# grey = neutral
# category is determined by a >= 3 difference in either direction makes you primarily th
at side
# is less than 3 you are neutral, unless you have a 0 in one side then youre categorized
as the one with values

V(ng_g)$color = c('grey', 'blue', 'grey', 'red', 'grey', 'red' ,'blue' ,'blue', 'red',
'green', 'red', 'green',
                  'grey', 'blue', 'grey', 'grey', 'grey', 'grey', 'red', 'grey', 'grey',
'grey', 'grey', 'blue',
                  'red', 'grey', 'grey', 'grey', 'grey', 'blue', 'red', 'grey', 'grey',
'blue', 'blue', 'blue',
                  'blue')
```

Plot

```
# plot network
# rescale for visualization
V(ng_g)$nodeSize = rescale(V(ng_g)$size, to=c(1, 25))

set.seed(23)
plot.igraph(
  ng_g,
  layout = layout_with_fr,
  vertex.color = V(ng_g)$color, # changes the color of the nodes
  vertex.size = V(ng_g)$nodeSize, # controls the sizing of the nodes
  vertex.label = V(ng_g)$label, # controls what text is displayed on the nodes
  vertex.label.color = 'black', # changes the color of the label text
  vertex.label.cex = .35, # change size of labels to 50% of original scale
  edge.curved = .25, # controls level of curving to dataset (25%)
  edge.color = 'grey20',
  edge.width = E(ng_g)$width, # assigns edge width
  edge.arrow.size = .18, # controls arrow size (18%)
  main = "Nigerian Conflict",
  xlim = c(0,.25),
  ylim = c(-.9,.9)
)
```


Nigerian Conflict
Udu Ethnic Militia (Nigeria)
Kutep Communal Militia (Nigeria)
Jukun Ethnic Militia (Nigeria)
Chawai Ethnic Militia (Nigeria)
Tarok Ethnic Militia (Nigeria)
Hausa Ethnic Militia (Nigeria)
Christian Militia (Nigeria)
Kato Militia
Muslim Militia (Nigeria)
Deken Ethnic Militia (Nigeria)
Ogoni Ethnic Militia (Nigeria)
Igbo Ethnic Militia (Nigeria)
Police Forces of Nigeria
Military Forces of Nigeria
Area Boys Militia
Ijaw Ethnic Militia (Nigeria)
Itsekiri Ethnic Militia (Nigeria)
Urhobo Ethnic Militia (Nigeria)
Ilajes Ethnic Militia (Nigeria)