

Lab 2

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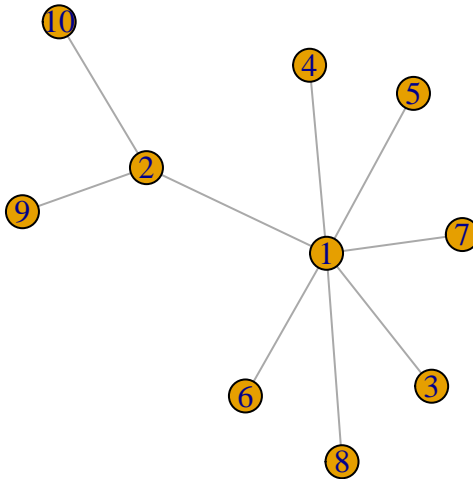
Loading Packages

```
library(igraph)  
library(statnet)  
library(UserNetR)
```

Question 1

Constructing your own tree network

```
tree <- make_tree(10, children = 7, "undirected")  
plot(tree)
```



Question 2

Descriptives of the Network

```
cbind(  
  size = vcount(tree),  
  density = edge_density(tree))
```

```
##      size density  
## [1,]   10     0.2
```

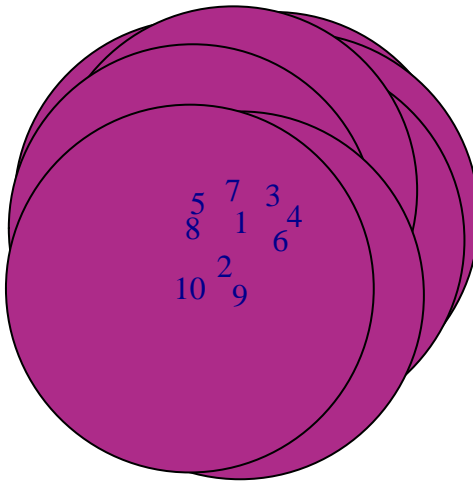
The size of our network is 10 and the density is .2. The size is ten because that is the number of nodes we have in our tree (which we set in the previous code chunk). Then the density is the proportion of observed ties in a network to the maximum possible ties. So in this undirected network the possible number of ties should be $L/k(k-1)/2$ where L is the number of ties observed and k is the total number of people. So since the density goes between 0 and 1, and our density is .2 we know that our network is not very interconnected.

Question 3

Visualizing Network

```
plot(tree, vertex.size = 700, vertex.color = '#AD2B89')  
title(main="the most ugly tree youve ever seen", sub= 'this tree does not work')
```

the most ugly tree youve ever seen



this tree does not work

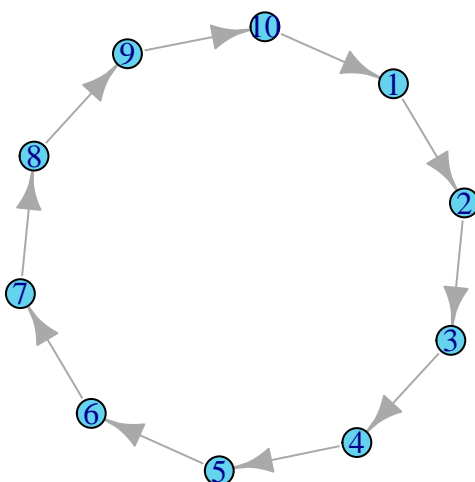
I made it silly, hope that was alright :)

Question 4

Make a ring network and customize its plot

```
circle_baby <- make_ring(n = 10, directed= TRUE)  
plot(circle_baby, vertex.size = 13, vertex.color = '#66D3EE')  
title(main="A Beautiful Ring Netowork", sub= 'this tree does work!')
```

A Beautiful Ring Network



this tree does work!

Question 5

Use code to show the ring network's size and density

```
cbind(  
  size = vcount(circle_baby),  
  density = edge_density(circle_baby))
```

```
##      size  density  
## [1,]   10 0.1111111
```

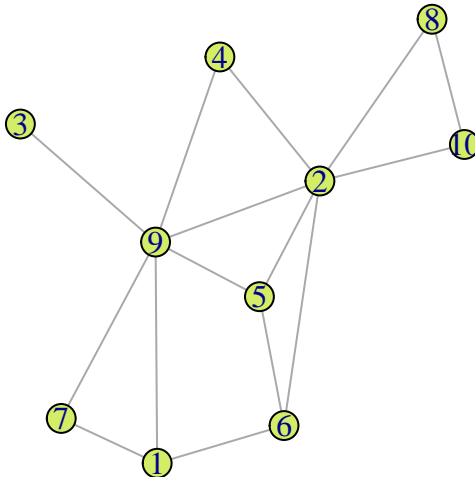
The size of the network is 10 because there are 10 nodes/vertices in the tree. Also the density is .11. This refers to how connected the network is, so closer to 1 is more connected and 0 is less. So this graph is less connected.

Question 7

Produce a random graph using the `sample_gnm` function and plot it with a title

```
random_net <- sample_gnm(n = 10, m = 15, directed = FALSE)
plot(random_net, vertex.size = 13, vertex.color = '#D3EE66')
title(main="Random Graph!", sub= 'this tree does work (which is very cool)!')
```

Random Graph!



this tree does work (which is very cool)!

Question 8

Calculate the network density and size, and determine if there are isolates in your network.

```
cbind(
  size = vcount(random_net),
  density = edge_density(random_net))
```

```
##      size  density
## [1,]   10 0.3333333
```

There are no isolates in the network when I ran this originally, however every time we run the code we get a new random network, so sometimes there are isolates.

Question 9

Create Edgelist

```
#create data
links <- data.frame(
  source=c("A","B", "A", "A", "A","F", "B"),
  target=c("B","A", "C", "D", "F","A","E")
)
```

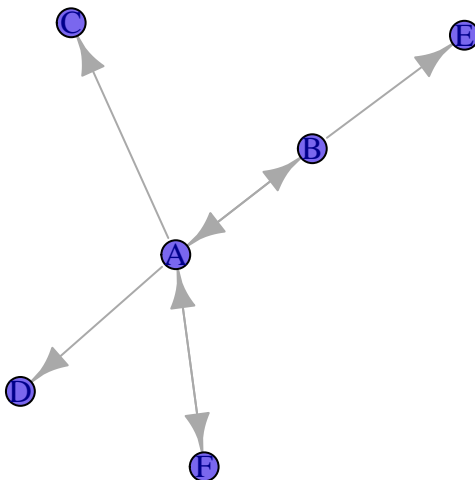
There are seven observations.

Question 10

Convert Dataframe to a Network Object and plot it

```
#plot(links)
#doesn't work!
network <- graph_from_data_frame(links, directed=T)
#now it works!
plot(network, vertex.size = 13, vertex.color = '#7A67EE')
title(main="Graphing Our Own Network", sub= 'this tree does work (which is very cool)!')
```

Graphing Our Own Network



this tree does work (which is very cool)!

Question 11

Describe the network

```
cbind(  
  size = vcount(network),  
  density = edge_density(network))  
  
##      size  density  
## [1,]    6 0.2333333
```

Our network is directed with 6 nodes and 7 edges. The density is .23, and there are no isolates nor loops.

Question 12

Lastly, in your own words describe the following concepts: node, edge, network density, loop, isolate.

A node is a single actor, or the people we are looking to model the connections between. An edge is a connection between two actors in our relationship. A network is a group of people who interact with each other in some way that we are looking to model. The density is the measure of how interconnected a network is (between 0 and 1). A loop is when a node can have an edge with itself. Finally an isolate is a node without an edge to any other node in our group.