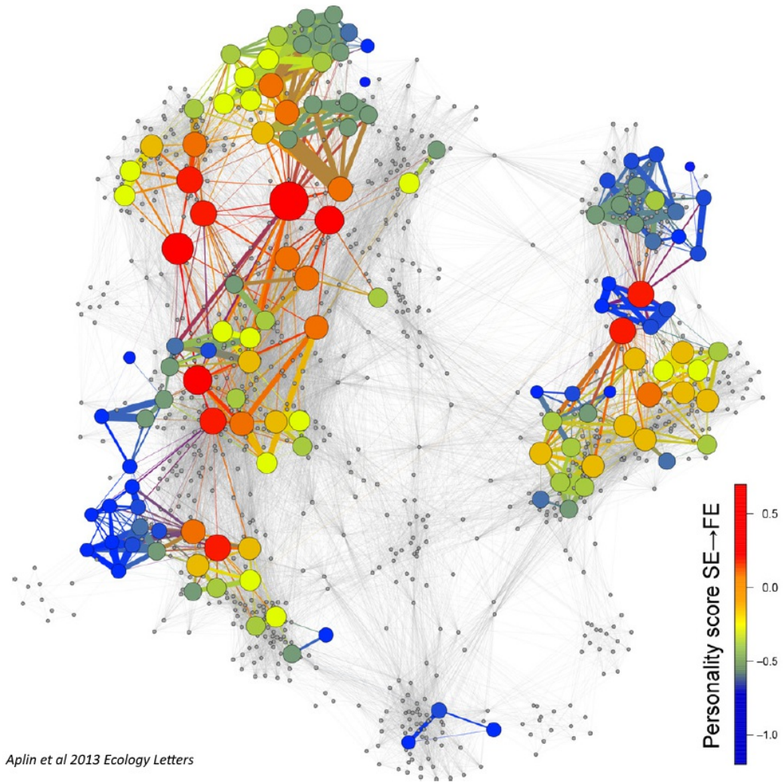
NETWORK ANALYSIS IN R

Close Relationships: Assortativity & Reciprocity

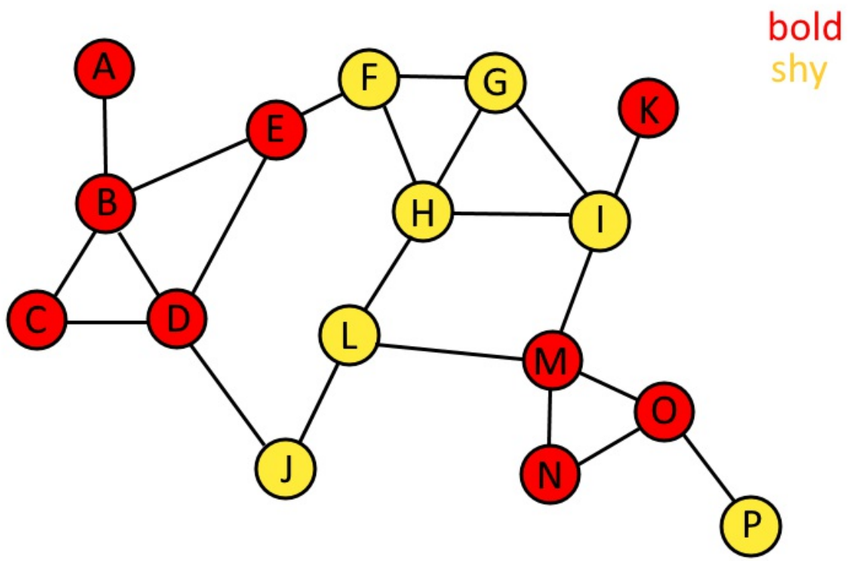
James Curley
Associate Professor,
University of Texas at Austin

Assortativity

The preferential attachment of vertices to other vertices that are similar in numerical or categorical attributes.



Assortativity

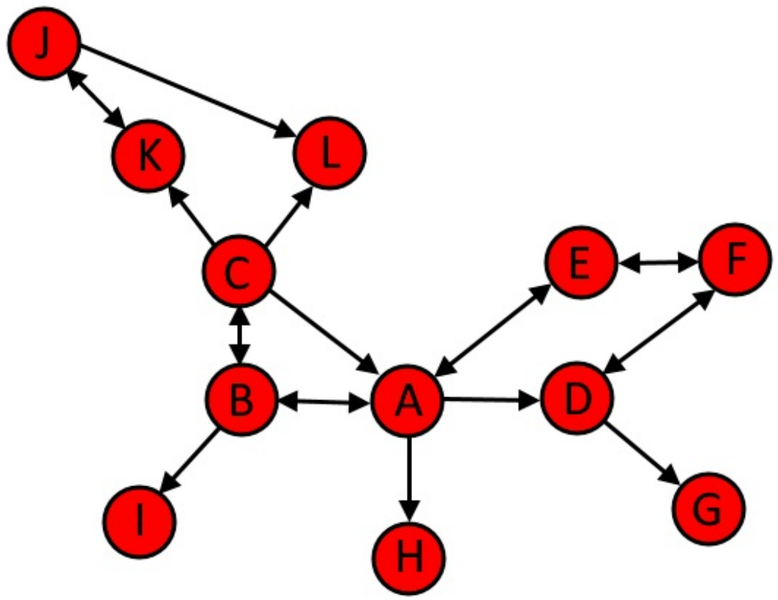


bold
shy

```
assortativity(g, values)
0.45


assortativity.degree(
    g,
    directed = FALSE
)
-0.31
```

Reciprocity




```
reciprocity(g)
0.6
```

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Let's practice!

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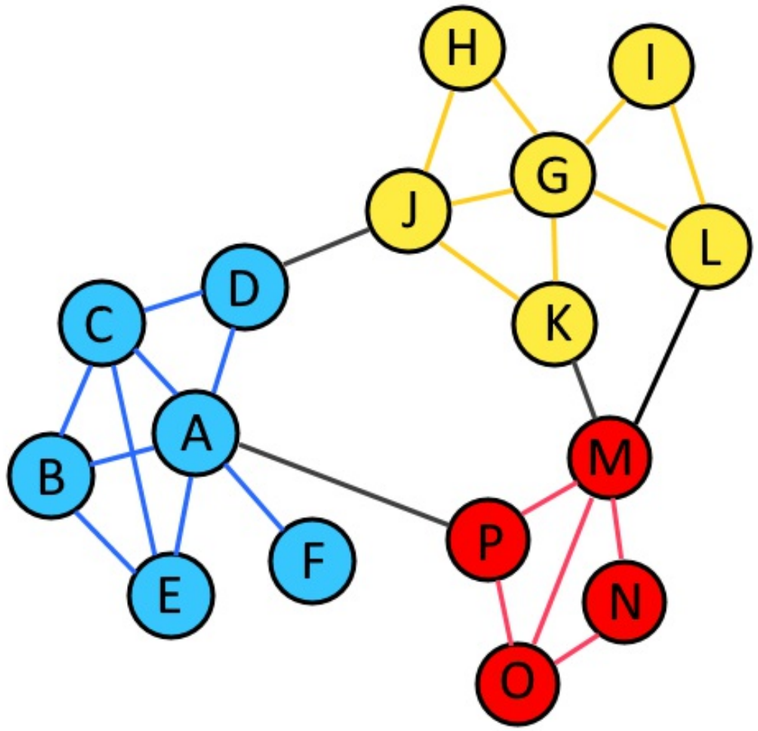
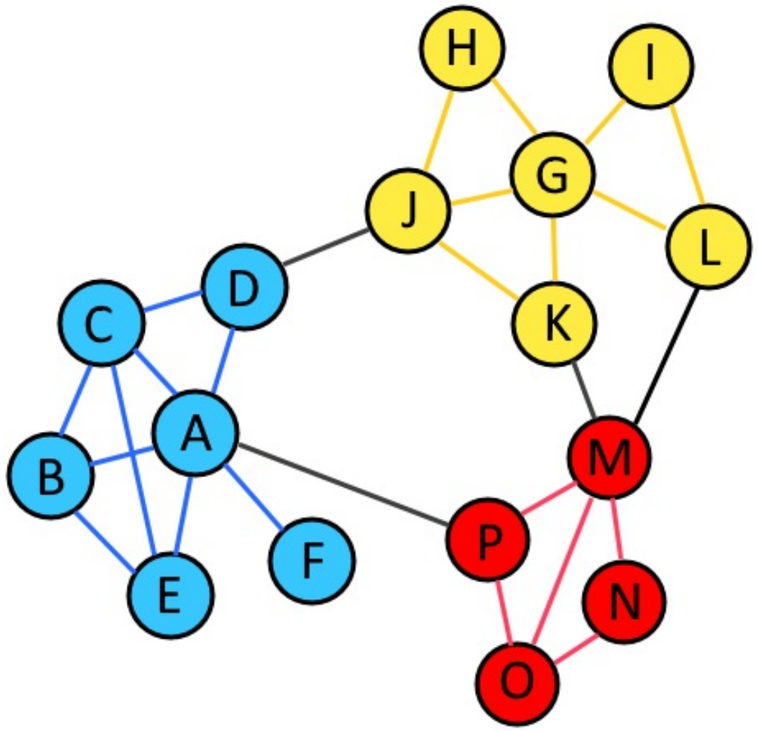
Community Detection

James Curley
Associate Professor,
University of Texas at Austin

Community Detection in Networks



Fast-Greedy Detection



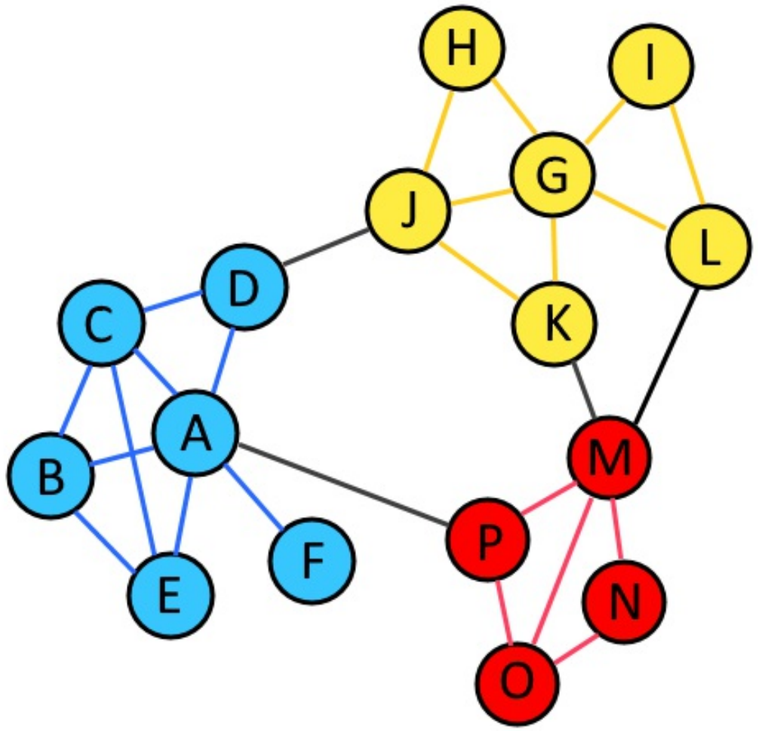

```
fastgreedy.community(g)

IGRAPH clustering fast greedy,
groups: 3, mod: 0.5
+ groups:
  $`1`
  [1] "A" "B" "C" "D" "E" "F"

  $`2`
  [1] "J" "G" "H" "I" "K" "L"

  $`3`
  [1] "M" "N" "O" "P"
```

Edge-Betweenness Detection



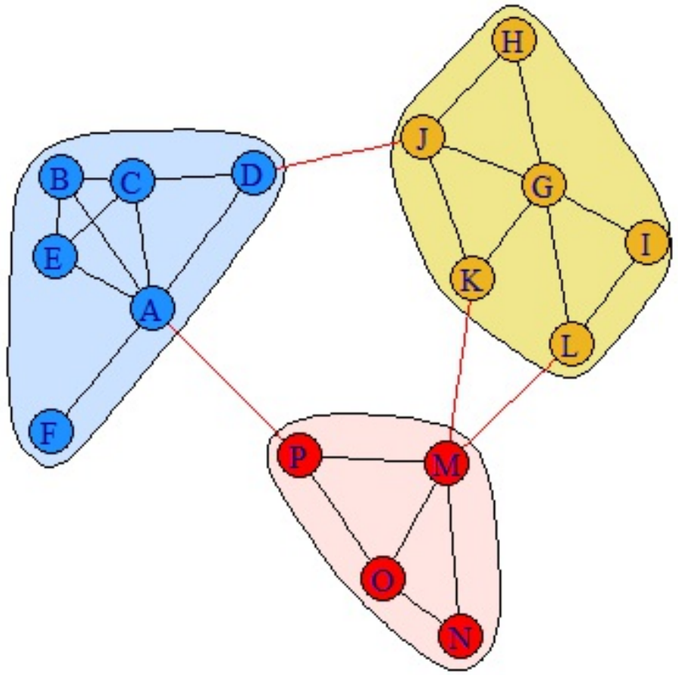

```
edge.betweenness.community(g)

IGRAPH clustering edge betweenness,
groups: 3, mod: 0.5
+ groups:
  $`1`
  [1] "A" "B" "C" "D" "E" "F"

  $`2`
  [1] "J" "G" "H" "I" "K" "L"

  $`3`
  [1] "M" "N" "O" "P"
```

Getting Community Information




```
x <- fastgreedy.community(g)

length(x)
 [1] 3

sizes(x)
 Community sizes
 1 2 3
 6 6 4

membership(x)
 A B C D E F J G H I K L M N O P
 1 1 1 1 1 1 2 2 2 2 2 2 3 3 3 3

plot(x, g)
```

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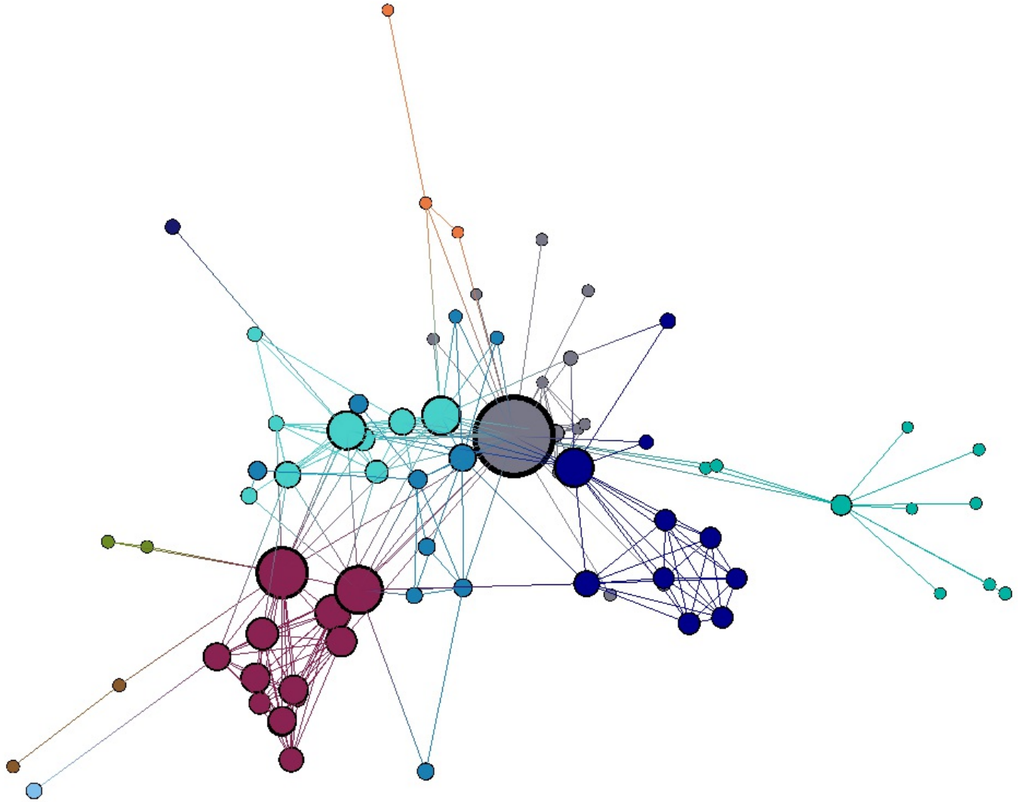
Interactive Network Visualizations

James Curley
Associate Professor,
University of Texas at Austin

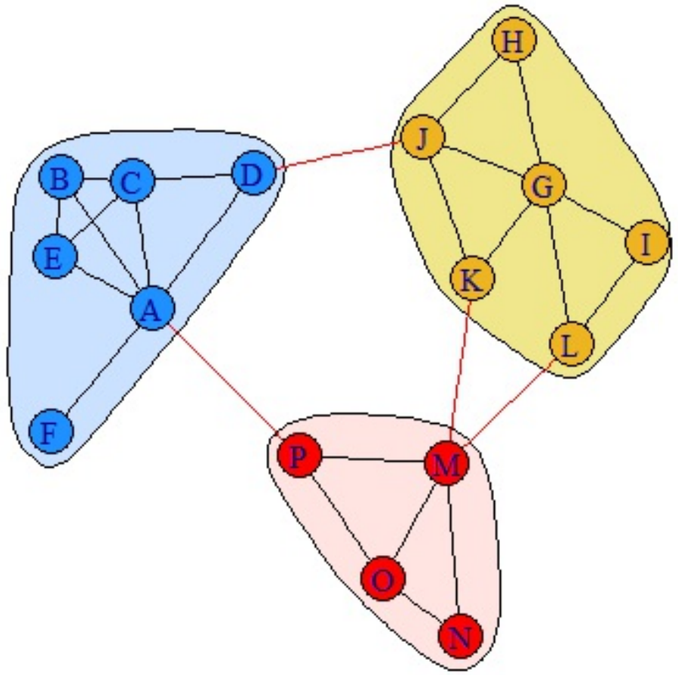
R Network Visualization Packages

- igraph
- statnet
- ggnet
- ggnetwork
- ggraph
- visNetwork
- networkD3
- visNetwork
- sigma
- rgexf (igraph to Gephi)
- **threejs**

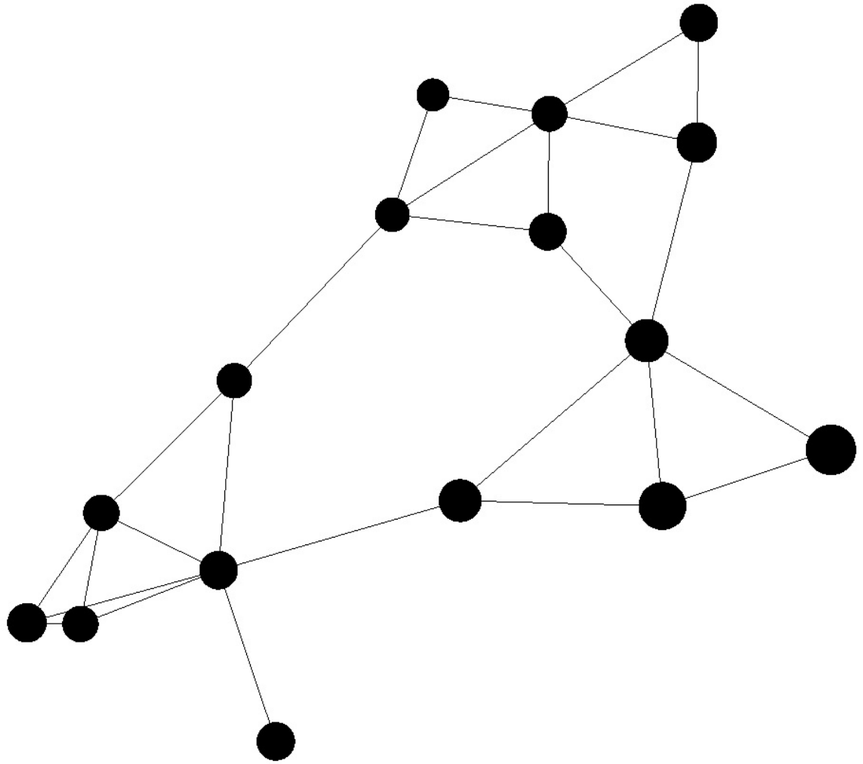
threejs



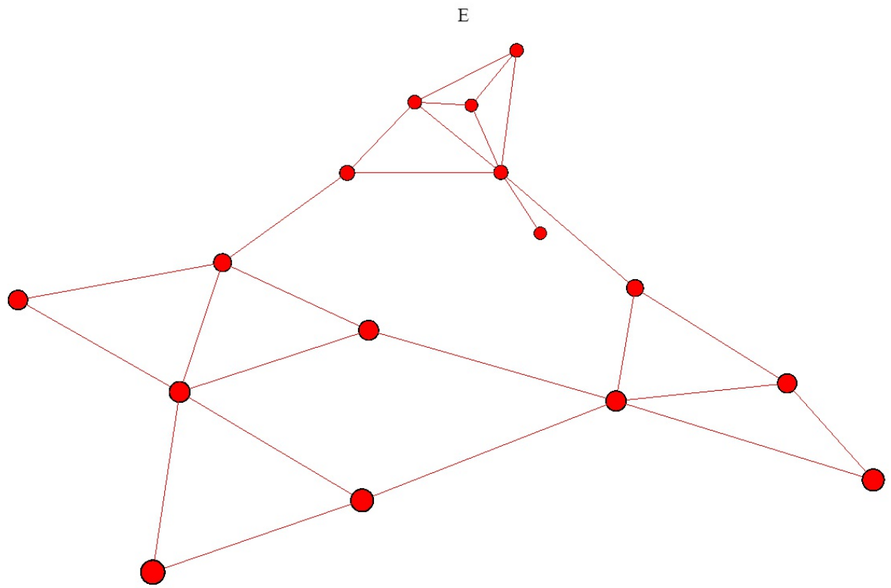
Creating a threejs visualization




```
library(threejs)
graphjs(g)
```



Adding Attributes



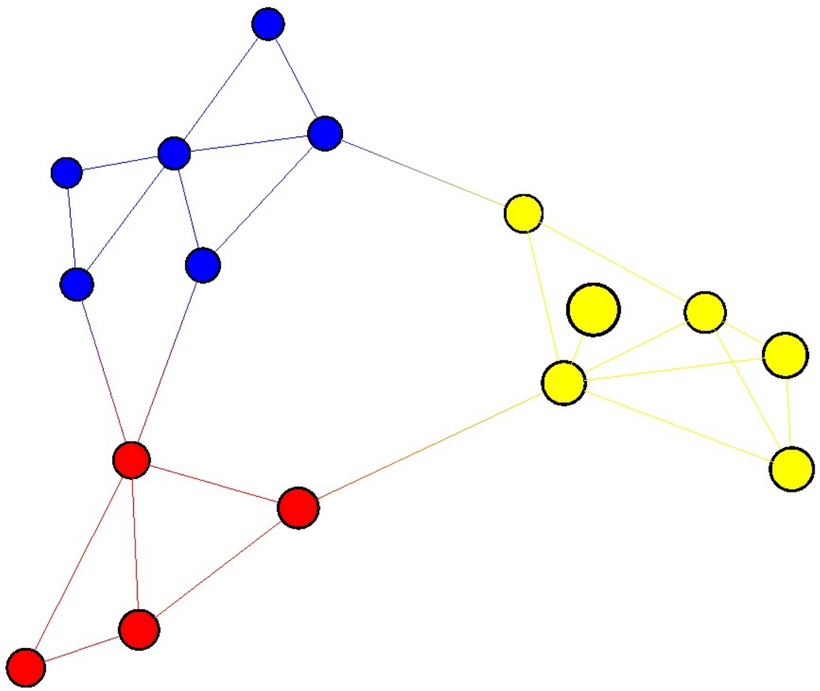

```
g <- set_vertex_attr(g, "label",
                     value=V(g)$name)



g <- set_vertex_attr(g, "color",
                     value="mistyrose")


graphjs(g, vertex.size = 1)
```

Coloring Communities



```
x = edge.betweenness.community(g)
i <-  membership(x)

g <- set_vertex_attr(g, "color",
value=c("yellow", "blue", "red")[i])

graphjs(g)
```

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