

Visualization of Subgroups and Communities in a Network

Using the Teacher-Student network

```
library(igraph)
```

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

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

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

```
g4 <- graph( c('Susann', 'Jeag4te', 'Harrison', 'Myron', 'Julie', 'Colten', 'Brandyn', 'Leland', 'Catherine',  
, 'Tracy', 'Bee', 'Maureen', 'Annika', 'Hans', 'Spenser', 'Angelo', 'Blanche', 'Stanford', 'Hope', 'Catherin  
e', 'Almira', 'Thomas', 'Henry', 'Ralph', 'Louvenia', 'German', 'Lura', 'Wilma', 'Lauretta', 'Maudie', 'Mar  
tha', 'Henry', 'Loyd', 'Mayra', 'Noelle', 'Fabian', 'Ira', 'Zenobia', 'Noelle', 'Natalie', 'Brooke', 'German',  
, 'Lauretta', 'Zenobia', 'Hallie', 'Braxton', 'Lorraine', 'Alicia', 'Allie', 'Jaylon', 'Myrna', 'Darrel', 'L  
Lura', 'Hermon', 'Wyatt', 'Raoul', 'Althea', 'Laurel', 'Leola', 'Darrel', 'Giles', 'Merritt', 'Angelo', 'Ken  
drick', 'Travis', 'Henry', 'Owen', 'Almira', 'Michelle', 'Lou', 'Stephan', 'Leola', 'Wyatt', 'Allie', 'Eli',  
, 'Brandyn', 'Mayra', 'Chin', 'Clarence', 'Marlee', 'Glenn', 'Reid', 'Glenn', 'Jerrold', 'Dale', 'Helena',  
, 'Alvie', 'Elden', 'Chaim', 'Merritt', 'Augustine', 'Curtiss', 'Alvie', 'Allie', 'Pollie', 'Catherine', 'Ang  
elita', 'Glenn', 'Allie', 'Braden', 'Manford', 'Raoul', 'Dwight', 'Pollie', 'Zona', 'Reggie', 'Dominic', 'Am  
y', 'Santos', 'Faron', 'Leslie', 'Etha', 'Maureen', 'Juanita', 'Gust', 'Noelle', 'Darrel', 'Darin', 'Faron',  
, 'Zona', 'Myron', 'Hans', 'German', 'Elden', 'Mayra', 'Merritt', 'Myron', 'Gerald', 'Andrea', 'German', 'A  
ngelita', 'Giles', 'Reggie', 'Wyatt', 'Alvie', 'Darrel', 'Jarrett', 'Newell', 'Brandyn', 'Eloisa', 'Santos',  
, 'Lou', 'Quintin', 'Zechariah', 'Leola', 'Anthony', 'Eliga', 'Gust', 'Obie', 'Obie', 'Brandyn', 'Brooke', 'D  
ominic', 'Jacob', 'Maureen', 'Hardie', 'Noelle', 'Braxton', 'Noelle', 'Leola', 'Marlee', 'Helena', 'Ira', 'K  
ermit', 'Wilda', 'Eli', 'Chance', 'Hardie', 'Andrea', 'Johnnie', 'Lauretta', 'Tracy', 'Kathryn', 'Spenser',  
, 'Lou', 'Dana', 'Dominic', 'Rachelle', 'Glenn', 'Darrel', 'Deidra', 'Orpha', 'Hermon', 'Rosalind', 'Hans', 'C  
urtis', 'Josue', 'Wyatt', 'Agatha', 'Wyatt', 'Chance', 'Glenn', 'Kendrick', 'Brooke', 'Hollie', 'Beverly',  
, 'Katarina', 'Josue', 'Leslie', 'Colten', 'Mayra', 'Darin', 'Hermon', 'Myron', 'Alicia', 'Leila', 'Kermit',  
, 'Lamar', 'Dana', 'Johnnie', 'Althea', 'Judson', 'Colten', 'Hope', 'Gust', 'Clarence', 'Leland', 'Matthew', 'L  
Lorraine', 'Althea', 'Colten', 'Jewel', 'Leila', 'Eli', 'Zenobia', 'German', 'Jaylon', 'Henry', 'Michelle',  
, 'Johnie', 'Judson', 'Johnnie', 'Leslie', 'Wyatt', 'Lou', 'Maureen', 'Jacob', 'Noelle', 'Johnnie', 'Alvie',  
, 'Leila', 'Myron', 'Wilda', 'Brandyn', 'Kendrick', 'Gerald', 'Tyson', 'Jacob', 'Ari', 'Theo', 'Harrison', 'C  
Carmen', 'Leonard', 'Braden', 'Desi', 'Zona', 'Maureen', 'Ralph', 'Thomas', 'Myron', 'Austin', 'Leola', 'Lo  
yd', 'Quintin', 'Lorraine', 'Glenn', 'Merritt', 'Janet', 'Myron', 'Alicia', 'Maureen', 'Leslie', 'Carla', 'V  
Vicky', 'Harley', 'Leslie', 'Hannah', 'Gust', 'Andrea', 'Giles', 'Wilma', 'Henry', 'Hermon', 'Stefani', 'Hen  
ry', 'Harley', 'Noelle', 'Kermit', 'Laurel', 'Hermon', 'Sebastian', 'Andrea', 'Eliga', 'Sigmund', 'Darrel',  
, 'Noelle', 'Urban', 'Almira', 'Noelle', 'Dwight', 'Beverly', 'Wyatt', 'Juanita', 'Reid', 'Kermit', 'Myrna', 'P  
Pollie', 'Hope', 'Leola', 'Leslie', 'Jacob', 'Pollie', 'Tiffany', 'Gust', 'Leland', 'Eliga', 'Lamar', 'Ira',  
, 'Dale', 'Noelle', 'Jarrett', 'Zenobia', 'Orpha', 'Glenn', 'Amy', 'Hermon', 'Myrna', 'Brandyn', 'Nell', 'L  
Leslie', 'Edd', 'Lura', 'Kendrick', 'Obie', 'Augustine', 'Zona', 'Glenn', 'Dominic', 'Jennifer', 'Rachelle',  
, 'Faron', 'Darrel', 'Pollie', 'Almira', 'Glenn', 'Wilma', 'Angus', 'Leila', 'Sherri'))
```

```
## Warning in matrix(edges, ncol = 2, byrow = TRUE): data length [349] is not a  
## sub-multiple or multiple of the number of rows [175]
```

```
V(g4)$name
```



```
net.sym <- as.undirected(g4, mode= "collapse",
                        edge.attr.comb=list(weight="sum", "ignore"))
```

1. Finding cliques and plotting them

```
cliques(net.sym) # list of cliques
```

```
## [[1]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Noelle
##
## [[2]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Glenn
##
## [[3]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Leslie
##
## [[4]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Myron
##
## [[5]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Henry
##
## [[6]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Brandyn
##
## [[7]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Pollie
##
## [[8]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] German
##
## [[9]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Johnnie
##
## [[10]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Zona
##
## [[11]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Lou
##
## [[12]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Kendrick
##
## [[13]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Merritt
##
## [[14]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Allie
##
## [[15]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Eliga
##
## [[16]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Althea
##
```

```
""
## [[17]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Ira
##
## [[18]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Laretta
##
## [[19]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Lura
##
## [[20]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Beverly
##
## [[21]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Josue
##
## [[22]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Rachelle
##
## [[23]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Hardie
##
## [[24]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Quintin
##
## [[25]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Jarrett
##
## [[26]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Darin
##
## [[27]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Juanita
##
## [[28]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Amy
##
## [[29]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Helena
##
## [[30]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Clarence
##
## [[31]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Raoul
##
## [[32]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Spenser
##
## [[33]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Susann
##
## [[34]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Angus
##
```

```
## [[35]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Tiffany
##
## [[36]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Urban
##
## [[37]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Sebastian
##
## [[38]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Stefani
##
## [[39]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Hannah
##
## [[40]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Vicky
##
## [[41]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Austin
##
## [[42]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Leonard
##
## [[43]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Carmen
##
## [[44]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Theo
##
## [[45]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Tyson
##
## [[46]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Johnie
##
## [[47]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Jewel
##
## [[48]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Matthew
##
## [[49]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Agatha
##
## [[50]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Curtis
##
## [[51]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Rosalind
##
## [[52]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Deidra
##
## [[53]]
```

```
## + 1/146 vertex, named, from 5f93cb3:
## [1] Anthony
##
## [[54]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Curtiss
##
## [[55]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Chin
##
## [[56]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Stephan
##
## [[57]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Owen
##
## [[58]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Hallie
##
## [[59]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Stanford
##
## [[60]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Annika
##
## [[61]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Bee
##
## [[62]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Julie
##
## [[63]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Darrel
##
## [[64]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Darrel Darin
##
## [[65]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Darrel Glenn
##
## [[66]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Darrel
##
## [[67]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Leila
##
## [[68]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leila Angus
##
## [[69]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myron Leila
##
## [[70]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Kermit
##
## [[71]]
## + 2/146 vertices, named, from 5f93cb3:
```

```
## + 2/146 vertices, named, from 5f93cb3:
## [1] Ira Kermit
##
## [[72]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Kermit
##
## [[73]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Giles
##
## [[74]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Giles Merritt
##
## [[75]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Hope
##
## [[76]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hope Pollie
##
## [[77]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Wilda
##
## [[78]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Brandyn Wilda
##
## [[79]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Jacoby
##
## [[80]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Jacoby Tyson
##
## [[81]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Pollie Jacoby
##
## [[82]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Jacoby
##
## [[83]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Santos
##
## [[84]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lou Santos
##
## [[85]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Reggie
##
## [[86]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Zona Reggie
##
## [[87]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Elden
##
## [[88]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] German Elden
##
## [[89]]
## + 1/146 vertex, named, from 5f93cb3:
```

```
## [1] Laurel
##
## [[90]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Althea Laurel
##
## [[91]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Lorraine
##
## [[92]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lorraine Althea
##
## [[93]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lorraine Glenn
##
## [[94]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Mayra
##
## [[95]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Mayra Chin
##
## [[96]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Mayra Darin
##
## [[97]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Mayra Merritt
##
## [[98]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Ralph
##
## [[99]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Henry Ralph
##
## [[100]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Thomas
##
## [[101]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myron Thomas
##
## [[102]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Tracy
##
## [[103]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Tracy Laretta
##
## [[104]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Sherri
##
## [[105]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Susann Sherri
##
## [[106]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Jennifer
##
## [[107]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Rachelle Jennifer
```

```
##
## [[108]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Edd
##
## [[109]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lura Edd
##
## [[110]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Nell
##
## [[111]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leslie Nell
##
## [[112]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Sigmund
##
## [[113]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Eliga Sigmund
##
## [[114]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Harley
##
## [[115]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Henry Harley
##
## [[116]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leslie Harley
##
## [[117]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Carla
##
## [[118]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Carla Vicky
##
## [[119]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Janet
##
## [[120]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Merritt Janet
##
## [[121]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Desi
##
## [[122]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Zona Desi
##
## [[123]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Ari
##
## [[124]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Ari Theo
##
## [[125]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Judson
##
```

```
##
## [[126]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Althea Judson
##
## [[127]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Johnnie Judson
##
## [[128]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Katarina
##
## [[129]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Josue Katarina
##
## [[130]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Hollie
##
## [[131]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hollie Beverly
##
## [[132]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Orpha
##
## [[133]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Deidra Orpha
##
## [[134]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Glenn Orpha
##
## [[135]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Dana
##
## [[136]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lou Dana
##
## [[137]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Johnnie Dana
##
## [[138]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Kathryn
##
## [[139]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Spenser Kathryn
##
## [[140]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Chance
##
## [[141]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hardie Chance
##
## [[142]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Glenn Chance
##
## [[143]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Obie
##
```

```
## [[144]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Kendrick Obie
##
## [[145]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Zechariah
##
## [[146]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Quintin Zechariah
##
## [[147]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Eloisa
##
## [[148]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Brandyn Eloisa
##
## [[149]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Newell
##
## [[150]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Jarrett Newell
##
## [[151]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Gerald
##
## [[152]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Kendrick Gerald
##
## [[153]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myron Gerald
##
## [[154]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Gust
##
## [[155]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Gust Hannah
##
## [[156]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Gust Tiffany
##
## [[157]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Clarence Gust
##
## [[158]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Gust Eliga
##
## [[159]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Gust
##
## [[160]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Etha
##
## [[161]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leslie Etha
##
## [[162]]
```

```
## + 1/146 vertex, named, from 5f93cb3:
## [1] Dwight
##
## [[163]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Pollie Dwight
##
## [[164]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Dwight
##
## [[165]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Manford
##
## [[166]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Raoul Manford
##
## [[167]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Braden
##
## [[168]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Braden Leonard
##
## [[169]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Allie Braden
##
## [[170]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Augustine
##
## [[171]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Augustine Curtiss
##
## [[172]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Augustine Zona
##
## [[173]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Chaim
##
## [[174]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Merritt Chaim
##
## [[175]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Dale
##
## [[176]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Dale Helena
##
## [[177]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Dale
##
## [[178]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Jerrold
##
## [[179]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Glenn Jerrold
##
## [[180]]
## + 1/146 vertex, named, from 5f93cb3:
```

```
## + 1/146 vertex, named, from 5f93cb3:
## [1] Reid
##
## [[181]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Reid Juanita
##
## [[182]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Glenn Reid
##
## [[183]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Marlee
##
## [[184]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Clarence Marlee
##
## [[185]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Marlee Helena
##
## [[186]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Michelle
##
## [[187]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Michelle Johnie
##
## [[188]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Michelle Lou
##
## [[189]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Travis
##
## [[190]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Henry Travis
##
## [[191]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Jaylon
##
## [[192]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Allie Jaylon
##
## [[193]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Henry Jaylon
##
## [[194]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Braxton
##
## [[195]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hallie Braxton
##
## [[196]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Braxton
##
## [[197]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Brooke
##
## [[198]]
## + 2/146 vertices, named, from 5f93cb3:
```

```
## [1] Brooke Kendrick
##
## [[199]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] German Brooke
##
## [[200]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Brandyn Brooke
##
## [[201]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Natalie
##
## [[202]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Natalie
##
## [[203]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Zenobia
##
## [[204]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Zenobia Jarrett
##
## [[205]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Laretta Zenobia
##
## [[206]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Ira Zenobia
##
## [[207]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] German Zenobia
##
## [[208]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Fabian
##
## [[209]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Fabian
##
## [[210]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Martha
##
## [[211]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Henry Martha
##
## [[212]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Maudie
##
## [[213]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Laretta Maudie
##
## [[214]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Wilma
##
## [[215]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lura Wilma
##
## [[216]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Henry Wilma
```

```
##
## [[217]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Wilma Glenn
##
## [[218]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Louvenia
##
## [[219]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Louvenia German
##
## [[220]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Blanche
##
## [[221]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Blanche Stanford
##
## [[222]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Angelo
##
## [[223]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Spenser Angelo
##
## [[224]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Angelo Kendrick
##
## [[225]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Hans
##
## [[226]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Annika Hans
##
## [[227]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hans Curtis
##
## [[228]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myron Hans
##
## [[229]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Leland
##
## [[230]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leland Matthew
##
## [[231]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leland Eliga
##
## [[232]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Brandyn Leland
##
## [[233]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Harrison
##
## [[234]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Harrison Carmen
##
```

```
##
## [[235]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Harrison Myron
##
## [[236]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Jeag4te
##
## [[237]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Susann Jeag4te
##
## [[238]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Lamar
##
## [[239]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Kermit Lamar
##
## [[240]]
## + 3/146 vertices, named, from 5f93cb3:
## [1] Ira Kermit Lamar
##
## [[241]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Ira Lamar
##
## [[242]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Andrea
##
## [[243]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Giles Andrea
##
## [[244]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Andrea Sebastian
##
## [[245]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Andrea Johnnie
##
## [[246]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] German Andrea
##
## [[247]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Faron
##
## [[248]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Santos Faron
##
## [[249]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Darrel Faron
##
## [[250]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Zona Faron
##
## [[251]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Dominic
##
## [[252]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Dominic Jacoby
##
```

```
## [[253]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Dominic Amy
##
## [[254]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Dominic Rachelle
##
## [[255]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Glenn Dominic
##
## [[256]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Angelita
##
## [[257]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Giles Angelita
##
## [[258]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Glenn Angelita
##
## [[259]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Alvie
##
## [[260]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Alvie Elden
##
## [[261]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Darrel Alvie
##
## [[262]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Allie Alvie
##
## [[263]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Alvie Johnnie
##
## [[264]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Eli
##
## [[265]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Eli Wilda
##
## [[266]]
## + 3/146 vertices, named, from 5f93cb3:
## [1] Brandyn Eli Wilda
##
## [[267]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Eli Leila
##
## [[268]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Brandyn Eli
##
## [[269]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Leola
##
## [[270]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Darrel Leola
##
## [[271]]
```

```
## + 3/146 vertices, named, from 5f93cb3:
## [1] Noelle Darrel Leola
##
## [[272]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leola Stephan
##
## [[273]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leola Anthony
##
## [[274]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leola Austin
##
## [[275]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Leola Leslie
##
## [[276]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Noelle Leola
##
## [[277]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Wyatt
##
## [[278]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Wyatt Reggie
##
## [[279]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Wyatt Agatha
##
## [[280]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Wyatt Raoul
##
## [[281]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Wyatt Josue
##
## [[282]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Wyatt Beverly
##
## [[283]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Allie Wyatt
##
## [[284]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Wyatt Leslie
##
## [[285]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Hermon
##
## [[286]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hermon Laurel
##
## [[287]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hermon Rosalind
##
## [[288]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hermon Stefani
##
## [[289]]
## + 2/146 vertices, named, from 5f93cb3:
```

```
## + 2/146 vertices, named, from 5f93cb3:
## [1] Hermon Amy
##
## [[290]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lura Hermon
##
## [[291]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myron Hermon
##
## [[292]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Myrna
##
## [[293]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myrna Kermit
##
## [[294]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myrna Darrel
##
## [[295]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Brandyn Myrna
##
## [[296]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Alicia
##
## [[297]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Lorraine Alicia
##
## [[298]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Alicia Leila
##
## [[299]]
## + 3/146 vertices, named, from 5f93cb3:
## [1] Myron Alicia Leila
##
## [[300]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Myron Alicia
##
## [[301]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Loyd
##
## [[302]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Loyd Mayra
##
## [[303]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Loyd Quintin
##
## [[304]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Almira
##
## [[305]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Almira Thomas
##
## [[306]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Almira Owen
##
## [[307]]
## + 2/146 vertices, named, from 5f93cb3:
```

```
## [1] Almira Urban
##
## [[308]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Almira Pollie
##
## [[309]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Maureen
##
## [[310]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Maureen Ralph
##
## [[311]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Bee      Maureen
##
## [[312]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Maureen Juanita
##
## [[313]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Maureen Hardie
##
## [[314]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Maureen Lou
##
## [[315]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Maureen Leslie
##
## [[316]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Catherine
##
## [[317]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Catherine Tracy
##
## [[318]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Catherine Hope
##
## [[319]]
## + 3/146 vertices, named, from 5f93cb3:
## [1] Catherine Hope      Pollie
##
## [[320]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Catherine Pollie
##
## [[321]]
## + 1/146 vertex, named, from 5f93cb3:
## [1] Colten
##
## [[322]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Colten Hope
##
## [[323]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Julie Colten
##
## [[324]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Colten Jewel
##
## [[325]]
## + 2/146 vertices, named, from 5f93cb3:
## [1] Colten Leslie
```

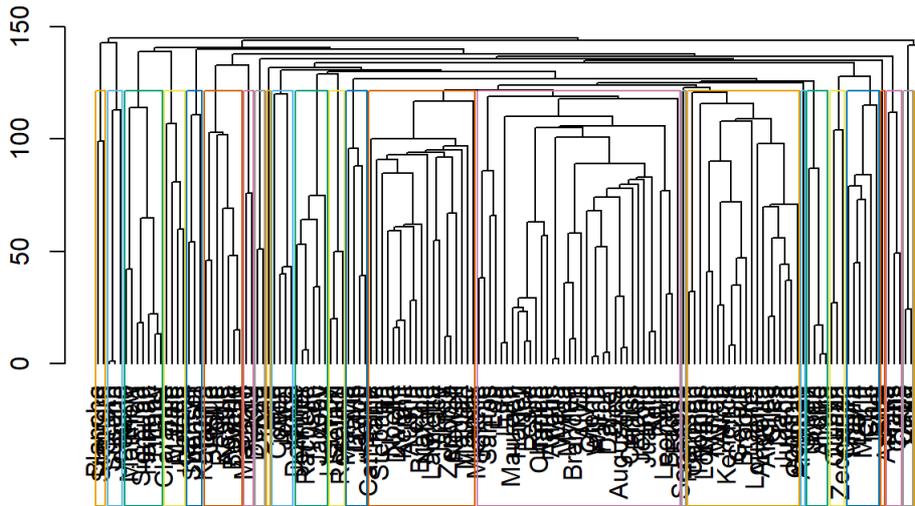


```
ceb <- cluster_edge_betweenness(g4)
```

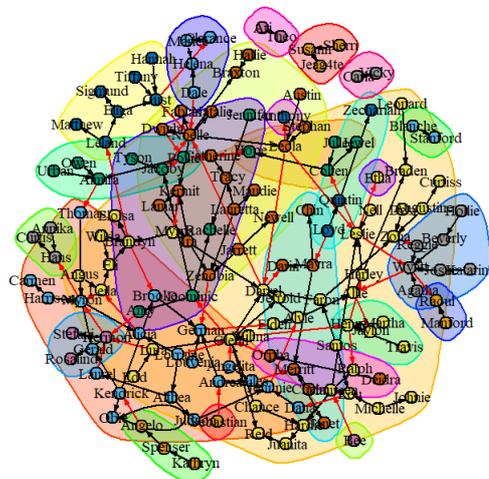
```
## Warning in cluster_edge_betweenness(g4): At community.c:460 :Membership vector  
## will be selected based on the lowest modularity score.
```

```
## Warning in cluster_edge_betweenness(g4): At community.c:467 :Modularity  
## calculation with weighted edge betweenness community detection might not make  
## sense -- modularity treats edge weights as similarities while edge betweenness  
## treats them as distances
```

```
dendPlot(ceb, mode="hclust")
```



```
plot(ceb, g4, edge.arrow.size=.2, vertex.label.color="black", vertex.label.dist=0.1, vertex.size=6, vertex.lab  
el.cex= 0.6)
```



```
class(ceb)
```

```
## [1] "communities"
```

```
length(ceb) # number of communities
```

```
## [1] 25
```

```
membership(ceb) # community membership for each node
```

```
## Susann Jeag4te Harrison Myron Julie Colten Brandyn Leland
## 1 1 2 2 3 3 4 5
## Catherine Tracy Bee Maureen Annika Hans Spenser Angelo
## 6 6 7 4 8 8 9 9
## Blanche Stanford Hope Almira Thomas Henry Ralph Louvenia
## 10 10 3 11 2 12 4 2
## German Lura Wilma Lauletta Maudie Martha Loyd Mayra
## 2 4 4 6 6 12 13 14
## Noelle Fabian Ira Zenobia Natalie Brooke Hallie Braxton
## 6 6 6 6 6 2 6 6
## Lorraine Alicia Allie Jaylon Myrna Darrel Hermon Wyatt
## 2 2 4 12 4 4 15 16
## Raoul Althea Laurel Leola Giles Merritt Kendrick Travis
## 17 2 2 6 2 14 2 12
## Owen Michelle Lou Stephan Eli Chin Clarence Marlee
## 11 4 4 6 4 14 18 18
## Glenn Reid Jerrold Dale Helena Alvie Elden Chaim
## 4 4 4 18 18 4 4 14
## Augustine Curtiss Pollie Angelita Braden Manford Dwight Zona
## 4 4 11 2 4 17 6 4
## Reggie Dominic Amy Santos Faron Leslie Etha Juanita
## 16 19 19 4 4 4 20 4
## Gust Darin Gerald Andrea Jarrett Newell Eloisa Quintin
## 5 14 2 2 6 6 4 13
## Zechariah Anthony Eliga Obie Jacoby Hardie Kermit Wilda
## 13 21 5 2 19 4 6 4
## Chance Johnnie Kathryn Dana Rachelle Deidra Orpha Rosalind
## 4 2 9 2 19 22 22 15
## Curtis Josue Agatha Hollie Beverly Katarina Leila Lamar
## 8 16 16 16 16 16 4 6
## Judson Matthew Jewel Johnnie Tyson Ari Theo Carmen
## 2 5 3 4 19 23 23 2
## Leonard Desi Austin Janet Carla Vicky Harley Hannah
## 4 4 6 14 24 24 4 5
## Stefani Sebastian Sigmund Urban Tiffany Nell Edd Jennifer
## 15 25 5 11 5 4 4 19
## Angus Sherri
## 4 1
```

```
modularity(ceb) # how modular the graph partitioning is
```

```
## [1] 0.5730185
```

```
crossing(ceb, g4) # boolean vector: TRUE for edges across communities
```

```
## Susann|Jeag4te Harrison|Myron Julie|Colten Brandyn|Leland
## FALSE FALSE FALSE TRUE
## Catherine|Tracy Bee|Maureen Annika|Hans Spenser|Angelo
## FALSE TRUE FALSE FALSE
## Blanche|Stanford Hope|Catherine Almira|Thomas Henry|Ralph
## FALSE TRUE TRUE TRUE
## Louvenia|German Lura|Wilma Lauletta|Maudie Martha|Henry
## FALSE FALSE FALSE FALSE
## Loyd|Mayra Noelle|Fabian Ira|Zenobia Noelle|Natalie
## TRUE FALSE FALSE FALSE
## Brooke|German Lauletta|Zenobia Hallie|Braxton Lorraine|Alicia
```

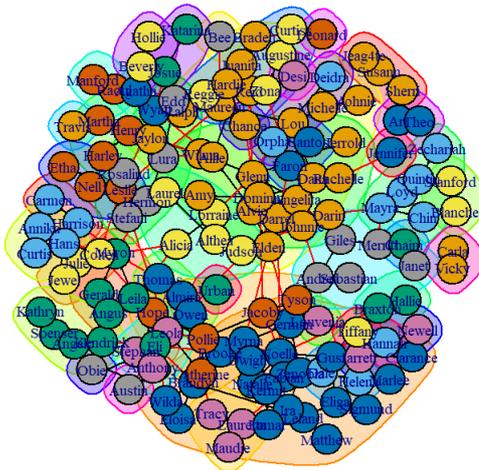
##	FALSE	FALSE	FALSE	FALSE
##	Allie Jaylon	Myrna Darrel	Lura Hermon	Wyatt Raoul
##	TRUE	FALSE	TRUE	TRUE
##	Althea Laurel	Leola Darrel	Giles Merritt	Angelo Kendrick
##	FALSE	TRUE	TRUE	TRUE
##	Travis Henry	Owen Almira	Michelle Lou	Stephan Leola
##	FALSE	FALSE	FALSE	FALSE
##	Wyatt Allie	Eli Brandyn	Mayra Chin	Clarance Marlee
##	TRUE	FALSE	FALSE	FALSE
##	Glenn Reid	Glenn Jerrold	Dale Helena	Alvie Elden
##	FALSE	FALSE	FALSE	FALSE
##	Chaim Merritt	Augustine Curtiss	Alvie Allie	Pollie Catherine
##	FALSE	FALSE	FALSE	TRUE
##	Angelita Glenn	Allie Braden	Manford Raoul	Dwight Pollie
##	TRUE	FALSE	FALSE	TRUE
##	Zona Reggie	Dominic Amy	Santos Faron	Leslie Etha
##	TRUE	FALSE	FALSE	TRUE
##	Maureen Juanita	Gust Noelle	Darrel Darin	Faron Zona
##	FALSE	TRUE	TRUE	FALSE
##	Myron Hans	German Elden	Mayra Merritt	Myron Gerald
##	TRUE	TRUE	FALSE	FALSE
##	Andrea German	Angelita Giles	Reggie Wyatt	Alvie Darrel
##	FALSE	FALSE	FALSE	FALSE
##	Jarrett Newell	Brandyn Eloisa	Santos Lou	Quintin Zechariah
##	FALSE	FALSE	FALSE	FALSE
##	Leola Anthony	Eliga Gust	Obie Obie	Brandyn Brooke
##	TRUE	FALSE	FALSE	TRUE
##	Dominic Jacoby	Maureen Hardie	Noelle Braxton	Noelle Leola
##	FALSE	FALSE	FALSE	FALSE
##	Marlee Helena	Ira Kermit	Wilda Eli	Chance Hardie
##	FALSE	FALSE	FALSE	FALSE
##	Andrea Johnnie	Lauretta Tracy	Kathryn Spenser	Lou Dana
##	FALSE	FALSE	FALSE	TRUE
##	Dominic Rachelle	Glenn Darrel	Deidra Orpha	Hermon Rosalind
##	FALSE	FALSE	FALSE	FALSE
##	Hans Curtis	Josue Wyatt	Agatha Wyatt	Chance Glenn
##	FALSE	FALSE	FALSE	FALSE
##	Kendrick Brooke	Hollie Beverly	Katarina Josue	Leslie Colten
##	FALSE	FALSE	FALSE	TRUE
##	Mayra Darin	Hermon Myron	Alicia Leila	Kermit Lamar
##	FALSE	TRUE	TRUE	FALSE
##	Dana Johnnie	Althea Judson	Colten Hope	Gust Clarance
##	FALSE	FALSE	FALSE	TRUE
##	Leland Matthew	Lorraine Althea	Colten Jewel	Leila Eli
##	FALSE	FALSE	FALSE	FALSE
##	Zenobia German	Jaylon Henry	Michelle Johnnie	Judson Johnnie
##	TRUE	FALSE	FALSE	FALSE
##	Leslie Wyatt	Lou Maureen	Jacoby Noelle	Johnnie Alvie
##	TRUE	FALSE	TRUE	TRUE
##	Leila Myron	Wilda Brandyn	Kendrick Gerald	Tyson Jacoby
##	TRUE	FALSE	FALSE	FALSE
##	Ari Theo	Harrison Carmen	Leonard Braden	Desi Zona
##	FALSE	FALSE	FALSE	FALSE
##	Maureen Ralph	Thomas Myron	Austin Leola	Loyd Quintin
##	FALSE	FALSE	FALSE	FALSE
##	Lorraine Glenn	Merritt Janet	Myron Alicia	Maureen Leslie
##	TRUE	FALSE	FALSE	FALSE
##	Carla Vicky	Harley Leslie	Hannah Gust	Andrea Giles
##	FALSE	FALSE	FALSE	FALSE
##	Wilma Henry	Hermon Stefani	Henry Harley	Noelle Kermit
##	TRUE	FALSE	TRUE	FALSE
##	Laurel Hermon	Sebastian Andrea	Eliga Sigmund	Darrel Noelle
##	TRUE	TRUE	FALSE	TRUE
##	Urban Almira	Noelle Dwight	Beverly Wyatt	Juanita Reid
##	FALSE	FALSE	FALSE	FALSE
##	Kermit Myrna	Pollie Hope	Leola Leslie	Jacoby Pollie
##	TRUE	TRUE	TRUE	TRUE
##	Tiffany Gust	Leland Eliga	Lamar Ira	Dale Noelle
##	FALSE	FALSE	FALSE	TRUE
##	Jarrett Zenobia	Orpha Glenn	Amy Hermon	Myrna Brandyn
##	FALSE	TRUE	TRUE	FALSE
##	Nell Leslie	Edd Lura	Kendrick Obie	Augustine Zona
##	FALSE	FALSE	FALSE	FALSE

```
##      Glenn|Dominic Jennifer|Rachelle      Faron|Darrel      Pollie|Almira
##      TRUE      FALSE      FALSE      FALSE      FALSE
##      Glenn|Wilma      Angus|Leila      Sherri|Susann
##      FALSE      FALSE      FALSE
```

Visualization of Community detection based on edge betweenness (Newman-Girvan)

3. Community detection based on based on propagating labels

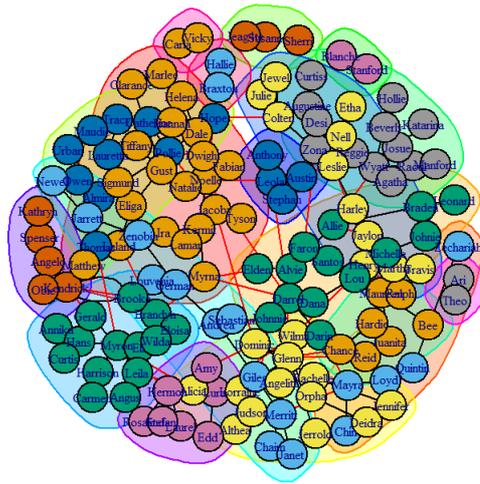
```
clp <- cluster_label_prop(g4)
plot(clp, g4, edge.arrow.size=.05,vertex.label.cex= 0.6)
```



Visualization of Community detection based on based on propagating labels

4. Community detection based on greedy optimization of modularity

```
cfg <- cluster_fast_greedy(as.undirected(g4))
plot(cfg, as.undirected(g4), vertex.label.cex=0.5, edge.arrow.size=.05)
```



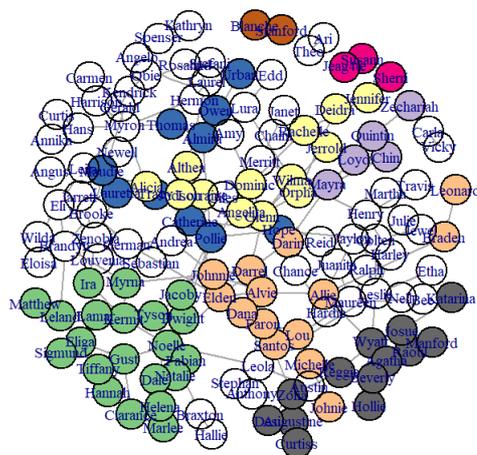
Visualization of Community detection based on greedy optimization of modularity

5. Plotting the communities without relying on their built-in plot

```
library("RColorBrewer")
V(g4)$community <- cfg$membership
colrs <- adjustcolor( col=brewer.pal(n = 10, name = "Accent"))
```

```
## Warning in brewer.pal(n = 10, name = "Accent"): n too large, allowed maximum for palette Accent is 8
## Returning the palette you asked for with that many colors
```

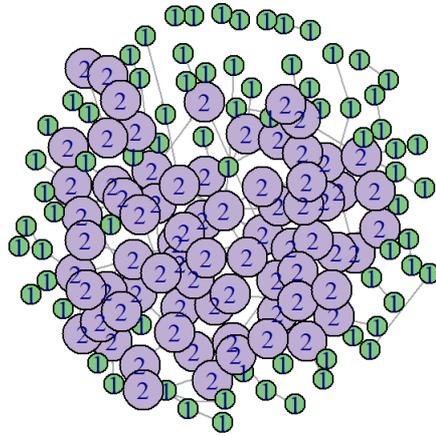
```
plot(g4, vertex.color=colrs[V(g4)$community], vertex.label.cex= 0.6, edge.arrow.size=.05)
```



Result: A number of algorithms aim to detect groups that consist of densely connected nodes with fewer connections across groups were applied

6. K-core decomposition

```
kc <- coreness(g4, mode="all")
plot(g4, vertex.size=kc*10, vertex.label=kc, vertex.color=colrs[kc],edge.arrow.size=.05)
```



Result: The result here gives the coreness of each vertex in the network. A node has coreness D if it belongs to a D -core but not to $(D+1)$ -core

Conclusion: Visualized various subgroups and communities in a network using Cliques, Community detection and K-core decomposition