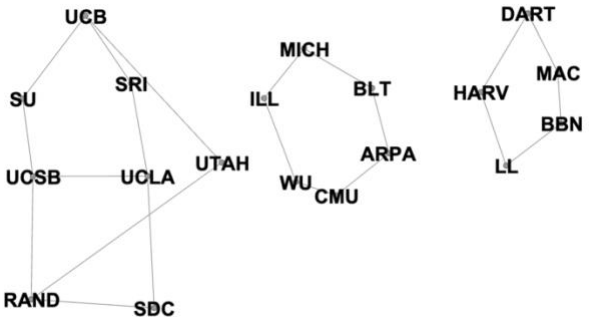
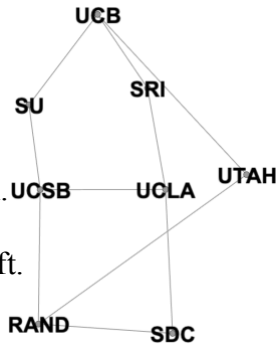
Angela Tseng
INFSCI 1070
HW2

1) This isolates the clusters and eliminates the bridges. The original had a connection between SU and MAC, SDC and WU, UTAH and ILL, SRI and HARV, CMU and BBN, MICH and DART, and ARPA and BTL. In addition, there are no numbers on this map. The similarities lie in how this map has similar nodes and connections besides bridges.

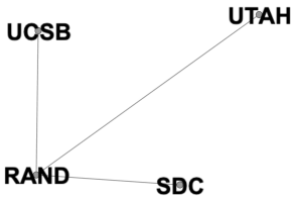


2)

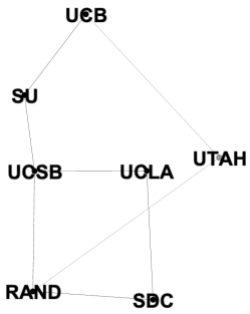
a. The smaller clusters are eliminated so the largest one remains.
b. Ego Network
   i. Only nodes with a depth of 1 in the largest cluster are shown.
   ii. Further nodes are shown on the map.
   iii. This filter shows +n nodes starting from the cluster on the left.



2a



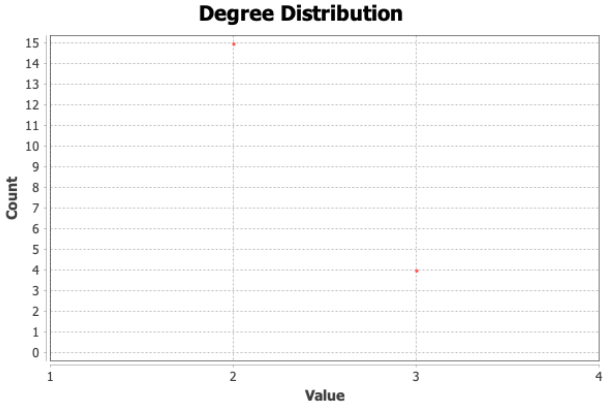
2bi



2bii

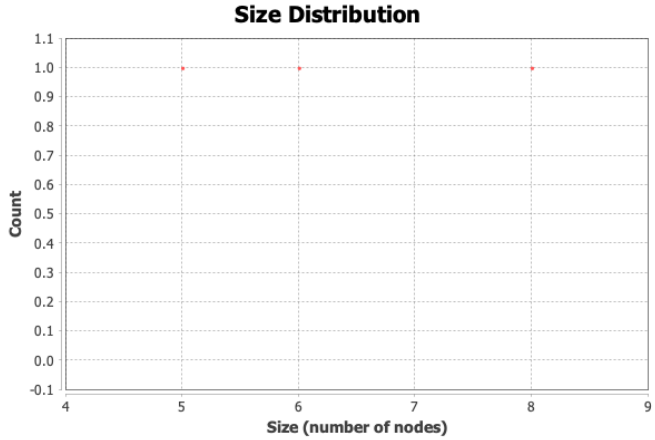
3)

a. Average Weighted Degree: 2.211



b. Network Interpretation: undirected
   i. Density: 0.123
c. Network Interpretation: undirected

i. Number of Weakly Connected Components: 3



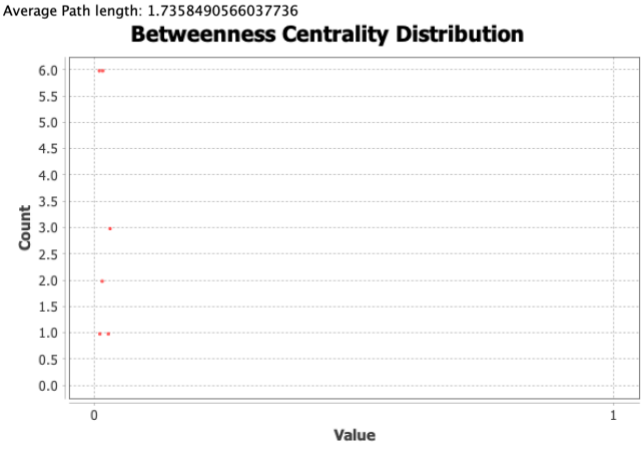
4) 0.011
5) Gephi

Parameters:

Network Interpretation: undirected

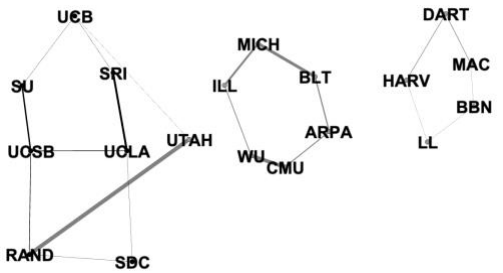
Results:

Diameter: 3
Radius: 2
Average Path length: 1.7358490566037736



a.
b. 0.011983
c. Highest betweenness centrality: RAND, UCLA, UCSB
Lowest: LL, BBN, HARV
d. Nodes with higher betweenness centrality are part of the larger neighborhood and have more connections between each other compared to the small neighborhood that LL, BBN, and HARV belong to

6)



6a

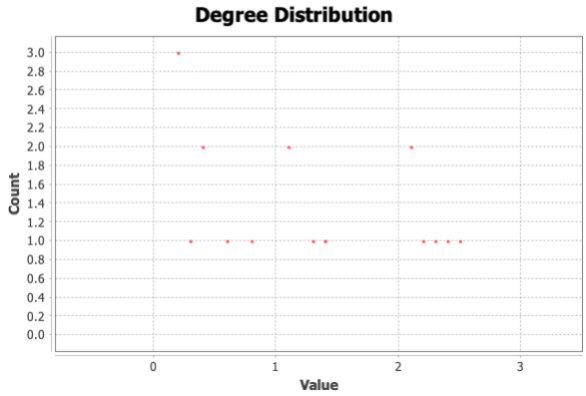
Angela Tseng
INFSCI 1070
HW2

Edges

a. The lines have changed in thickness and darkness to show weight of each edge.

b. **Results:**

Average Weighted Degree: 1.211



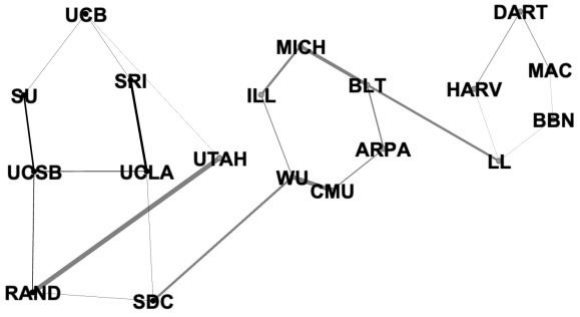
i. Top three nodes in degree: MAC, RAND, UCLA

ii. Top three nodes in weighted degree: MICH, RAND, CMU

iii. The node degree is the number of edges of the nodes, while the weighted degree distinguishes the number of incoming and outcoming neighbors of a vertex.

7)

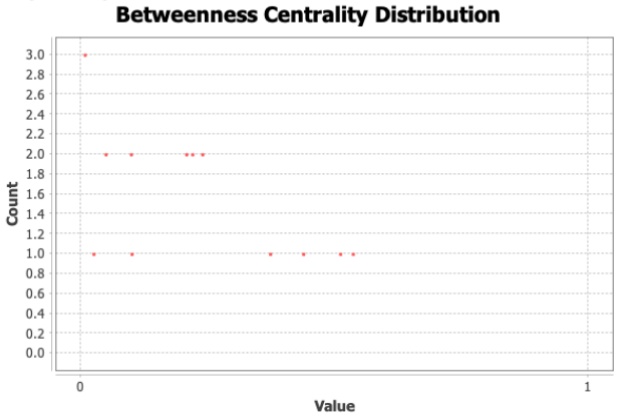
a.



b.

i. **Results:**

Diameter: 10
Radius: 5
Average Path length: 4.239766081871345



ii. Top three nodes with highest betweenness: WU, SDC, BLT
Instead of RAND, UCLA, and UCSB being the nodes with the highest betweenness centrality, the values adjusted to accommodate the distance between WU and SDC, BLT and LL since they are now bridges between neighborhoods.

c. Average Path length: 4.239766081871345

8) SU to MAC spans the far side of three different components and is listed as having a weighted degree of 8.
SRI to HARV would also span three different components and should have the same weighted degree as SU to MAC.

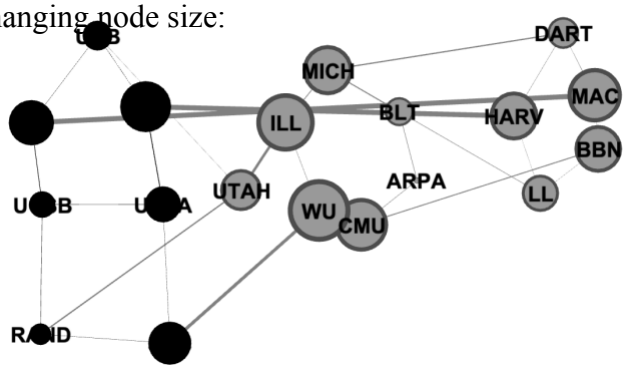
9) Highest betweenness: SU, MAC, SDC
Average Path length: 3.216374269005848
The betweenness centrality values changes and spread out to accommodate the addition of the new edge. Instead of WU, SDC, and BLT being the nodes with highest betweenness, SU and MAC are now prioritized.

10) The nodes with the highest betweenness are the same: SU, MAC, SDC
Average Path length: 2.9766081871345027

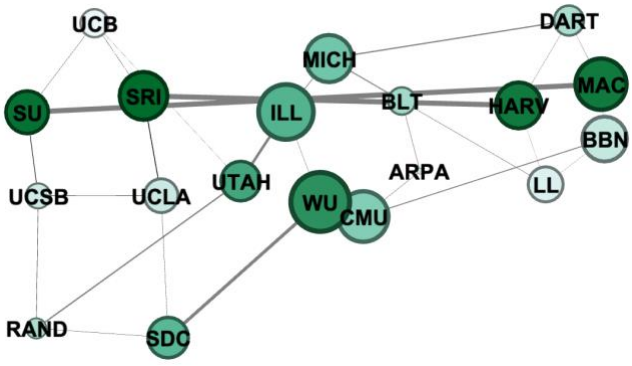
11) Average Degree: 2.947
Average Weighted Degree: 4.242
Average Path length: 2.5672514619883042
a. The average path length decreases when all of the edges are added.
b. The three nodes with the highest value are: WU, ILL, and MAC

12)

a. Changing node size:



b.



c. The large dark nodes are indicative of nodes that have greater weight and higher betweenness centrality, while the large light nodes are associated with lower weight and higher betweenness centrality.

13) Average Path length: 3.391812865497076 (was 2.5672514619883042 before filter)
Diameter: 7 (was 5 before filter)