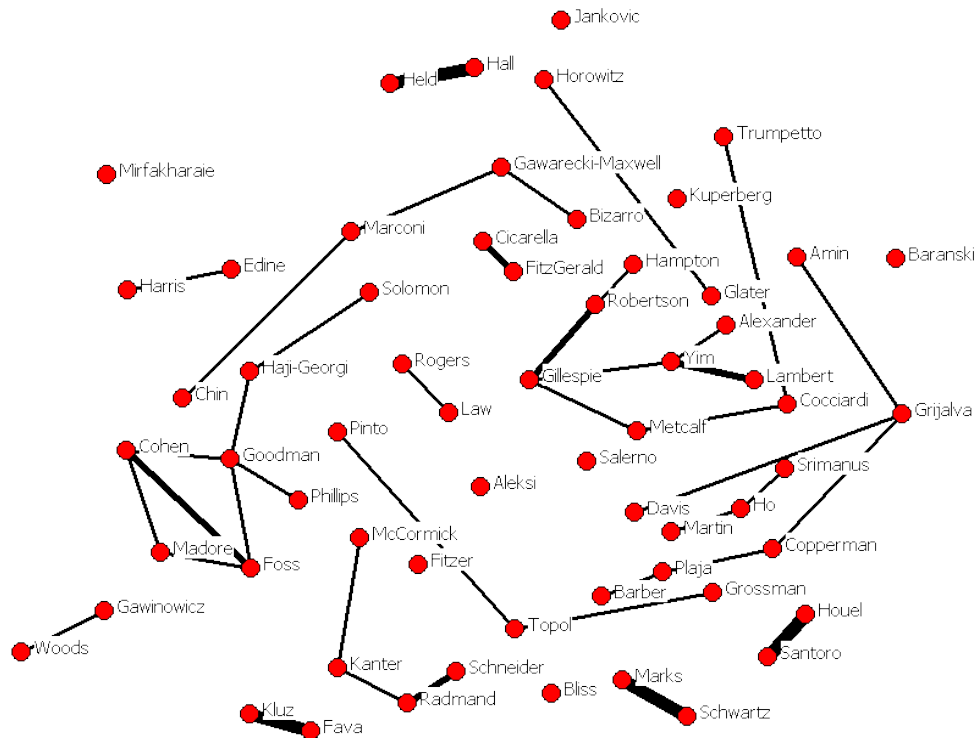


**CS-103: Introduction to Internet Technologies and Web Programming**  
**Extra Credit: Homework 7**  
**You do not have to submit solutions to HW7**

**HW7 is primarily a study aid for the Oct 27 midterm. Answers to the following questions will be posted and discussed in class Wed Oct 25. Students who submit solutions to the following problems by the beginning of class Wed Oct 25 will receive extra credit. There will be no extra credit given for solutions submitted after lecture starts.**

- Match the network types on the left with the appropriate examples on the right
 

Affiliation	About.com
Tree	Internet
Scale-free	TheyRule.net
- Sometimes you ask a simple question and get curious to learn more than you originally asked for. Give an example of a Joe Friday question followed by a deep thought question or voyager question that builds on it. Be clear if your example is “deep thought” or “voyager.”
- What is the largest connected component in the student discussion network (below)? Express your answer as a set of vertices and a set of edges using explicit set notation.



- What is the maximum possible number of edges in the student discussion network (above)? Show how you calculate this.
- What is the density of the student discussion network? Show how you calculate this.
- Suppose we remove all edges incident to Foss from the above student discussion network (hypothetically, of course). The resulting graph is a forest. What is the maximum number of edges you can add to the resulting graph and still have a forest?
- Actually draw two versions of your answer to #6, using the following guidelines: Find your name in the network above. If you are not in the network then substitute “Aleksi” where it says “your node” below:
  - In one network, add edges so that your node has high degree centrality and low betweenness centrality. Draw the resulting network as a map and also list the edges you add using explicit set notation.
  - In the other network, add edges so that your node has low degree centrality and high betweenness centrality. Draw the resulting network as a map and also list the edges you add using explicit set notation.