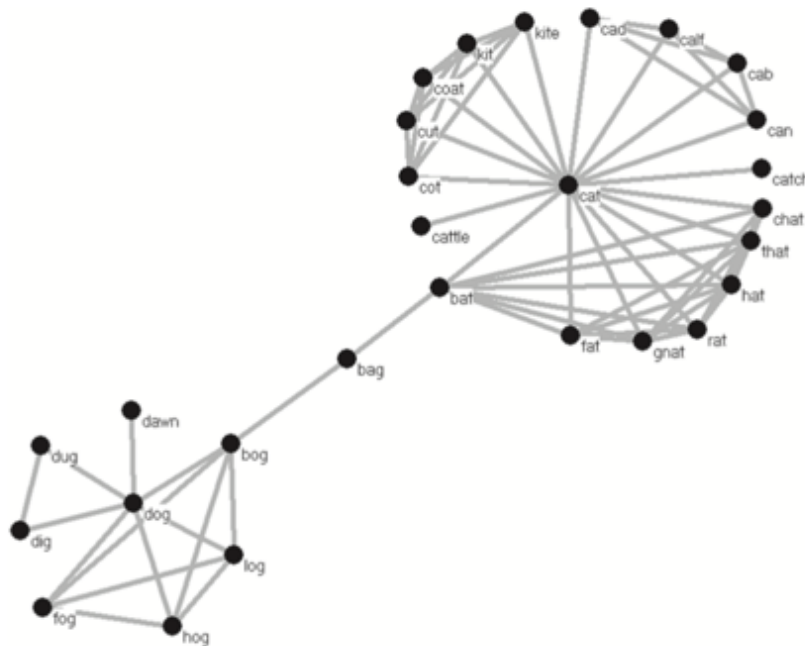**Homework 2 – A phonological network, paths and connectedness**
John Alderete, Language Network Science, Simon Fraser University

Create an undirected network for the Vitevitch phonological network shown below. This network is encoded with the adjacency list <vitevitch.adjlist> in the Data sets folder (also given at the end of this document). Once you have a path to this file, you can quickly create the network with the variable assignment: `G = nx.read_adjlist('vitevitch.adjlist')`

Use this network (let's call it the Vitevitch network) to answer the following questions about the network. The cheat sheet below shows the code you will need to answer these questions
- Is the Vitevitch network connected?
- What is the average shortest path in the network?
- What is the degree assortativity of the Vitevitch network, and would you characterize it as more assortative or dissortative?
- There are certain single nodes in the network that, if removed, result in a network that is not connected. List them. (Hint: Play around with G.remove_edge()).
- Among these nodes that make the network not connected, which one will, if removed, reduce the density of the network the least?
- After removing this node, produce a list of the components of the network

You may back up your answers with the relevant code or a Notebook, but it is not required.

Relevant code:
nx.is_connected(G) # is G a connected network? (does not work for directed graphs)
nx.average_shortest_path(G) # gives average shortest path for all node pairs, connected network
nx.degree_assortativity_coefficient(G) # gives degree assortativity, Pearson's correlation
`list(nx.connected_components(G))`

Adjacent list in <vitevitch.adjlist>

bog dog fog log hog bag
log bog dog fog hog
hog log bog dog fog
fog dog bog log hog
dig dog dug
dug dog dig
dawn dog
dog dawn dug dig fog hog log bog
bag bog bat
cattle cat
cot cat kite kit coat cut
cut cot cat kite kit coat
coat cut cot cat kite kit
kit kite cat cot cut coat
kite cat cot cut coat kit
cad cat calf cab can
calf cad cat cab can
cab calf cad cat can
can cat cab calf cad
catch cat
chat cat that hat rat gnat fat
that chat cat hat rat gnat fat
hat rat gnat fat cat chat that
rat gnat fat cat chat that hat
gnat fat cat chat that hat rat
fat cat chat that hat rat gnat
cat chat that hat rat gnat fat bat cattle cot cut coat kit kite cad calf cab calf cab can catch