Extra Credit Assignment
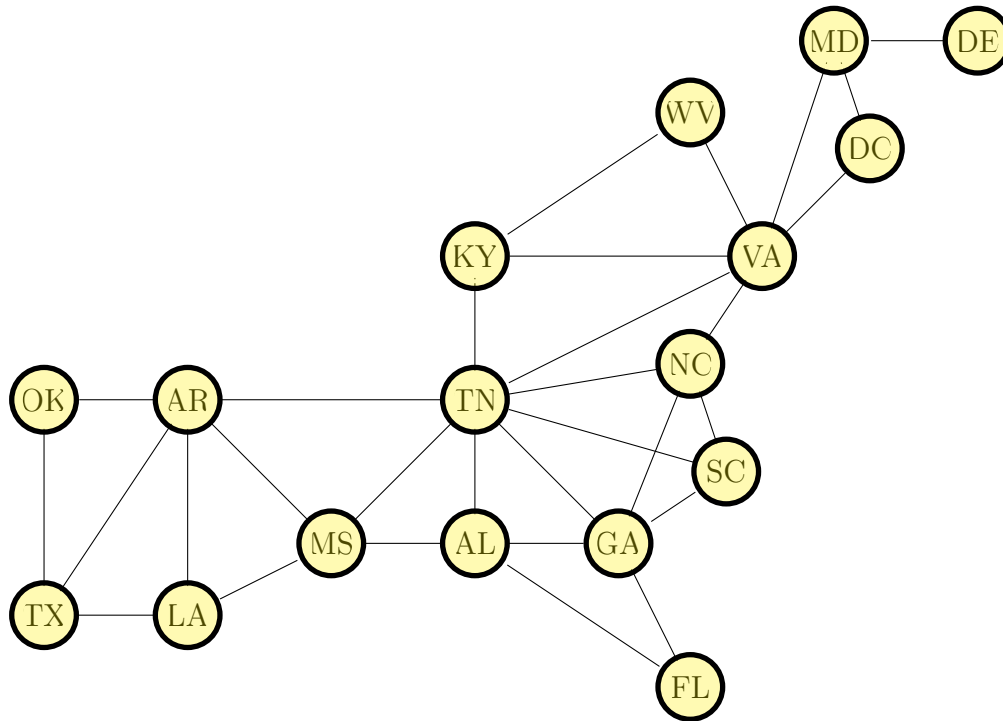
Applications of Graph Theory

The graph below represents the Southern United States (including the District of Columbia). Pairs of states are connected by an edge if they share a border.

1. Determine the number of vertices and edges for the graph.

2. Find the degree of each of the following vertices:

(**a**)   Texas

(**b**)   Tennessee

(**c**)   North Carolina

(**d**)   Virginia

3.   Explain in words what the degree of the vertex represents for a particular state.

4.   Is the graph connected? Is it planar?

5.   Imagine the graph was extended to represent the entire United States. Would this extended graph be connected? Explain.

6.   Draw a graph that represents the Western United States including Washington, Oregon, California, Idaho, Montana, Wyoming, Utah, Colorado, Arizona, and New Mexico.

Regions of the United States: `https://en.wikipedia.org/wiki/List_of_regions_of_the_United_States#/media/File:Census_Regions_and_Division_of_the_United_States.svg`