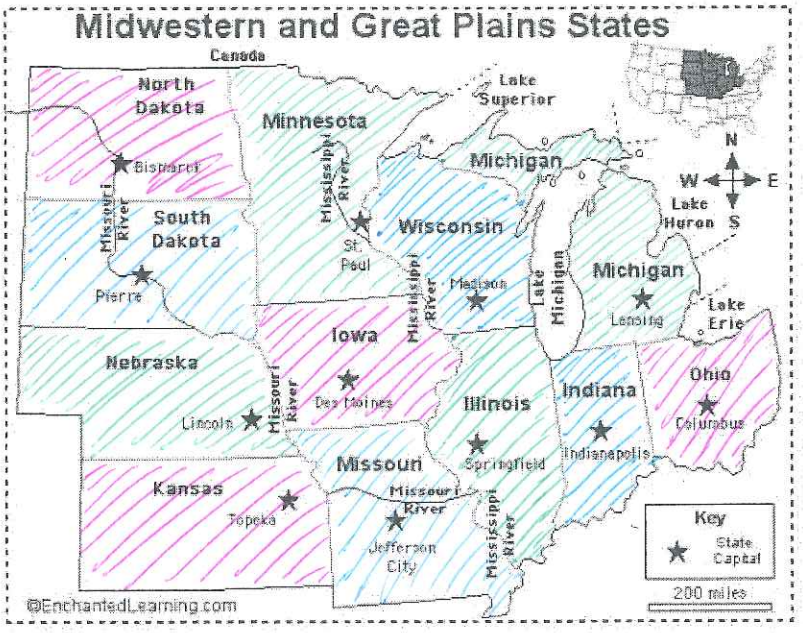
Math 111 Contemporary Mathematics
Fall 2015
Lecturer: Dr. Paullin

Name: Key

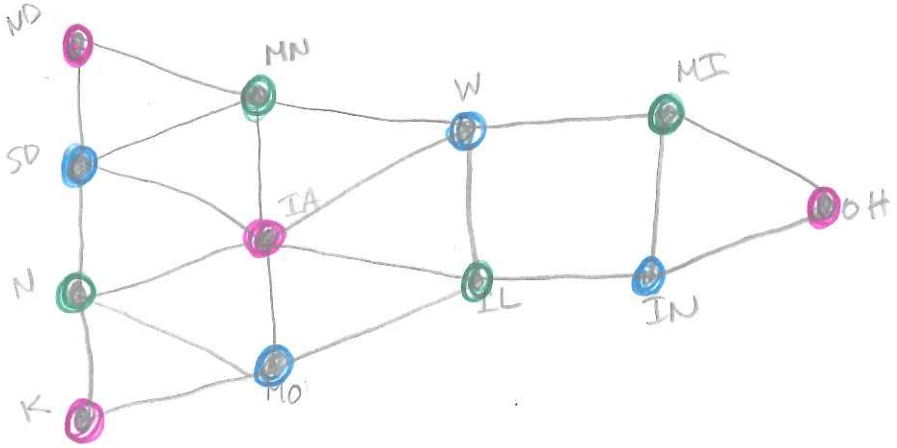
Graph Theory Day 5.5

Rand McNally has called you up to help color their maps! They want to sell a mini book of Regional Maps of the United States.

(1) Let's first consider the Midwest! Below is the map they want to include:



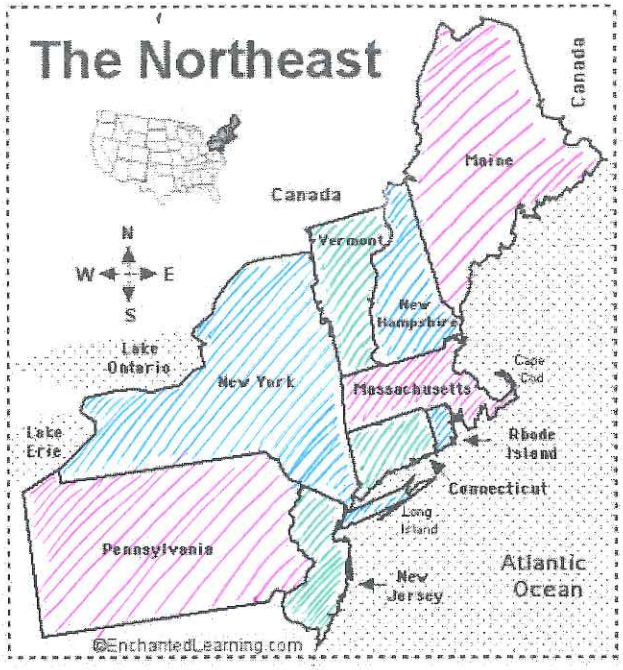
(a) Draw a graph with vertices for each state in the region. Let edges represent the states sharing a border. Then, color the graph vertices so that no two vertices that share an edge are the same color. Careful, there are two parts to Michigan!



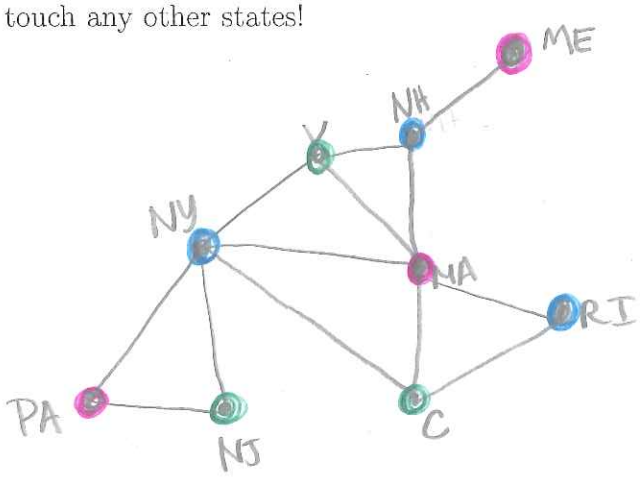
(b) What is the chromatic number? In other words, how many colors does Rand McNally need to load their printer with in order to print this map? 3

(c) Color the states in the picture above with the corresponding color of their vertex.

(2) Next consider the Northeast! Below is the map they want to include:



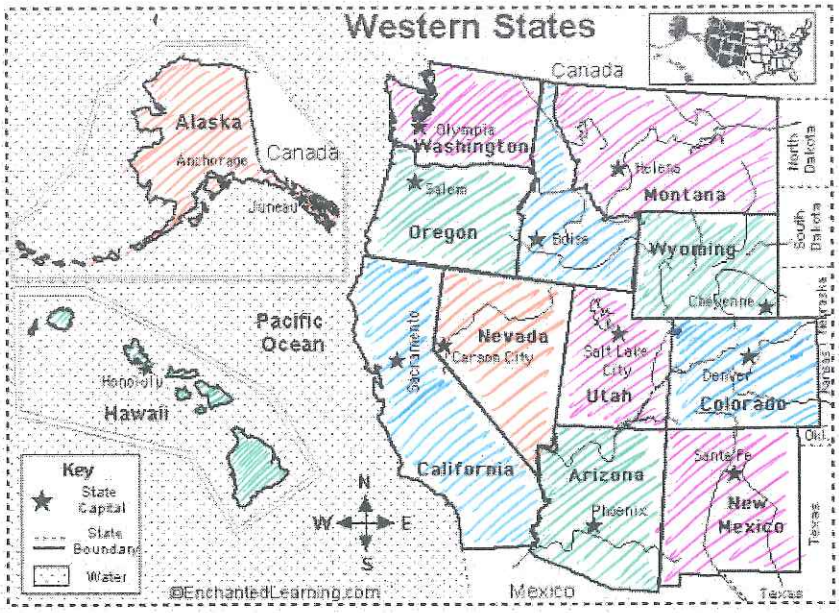
(a) Draw a graph with vertices for each state in the region. Let edges represent the states sharing a border.Color the graph vertices so that no two vertices that share an edge are the same color. Hint: Long Island is part of New York, but is an island, and therefore doesn't touch any other states!



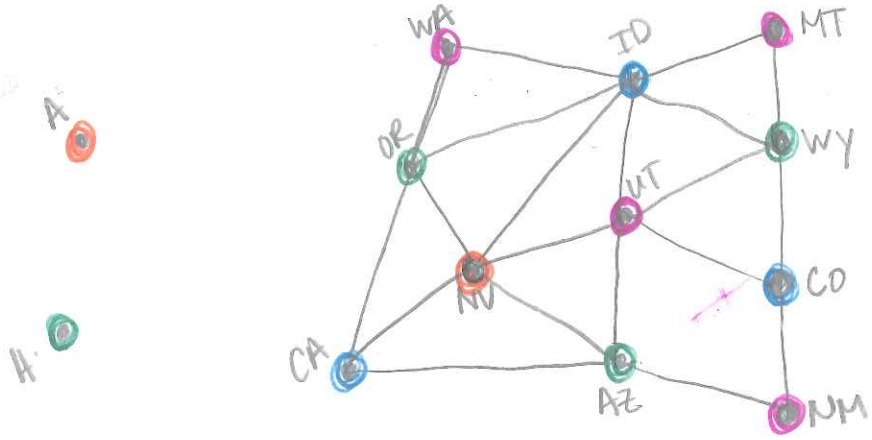
(b) What is the chromatic number? In other words, how many colors does Rand McNally need to load their printer with in order to print this map? 3

(c) Color the states in the picture above with the corresponding color of their vertex.

(3) Now consider the West! Below is the map they want to include:



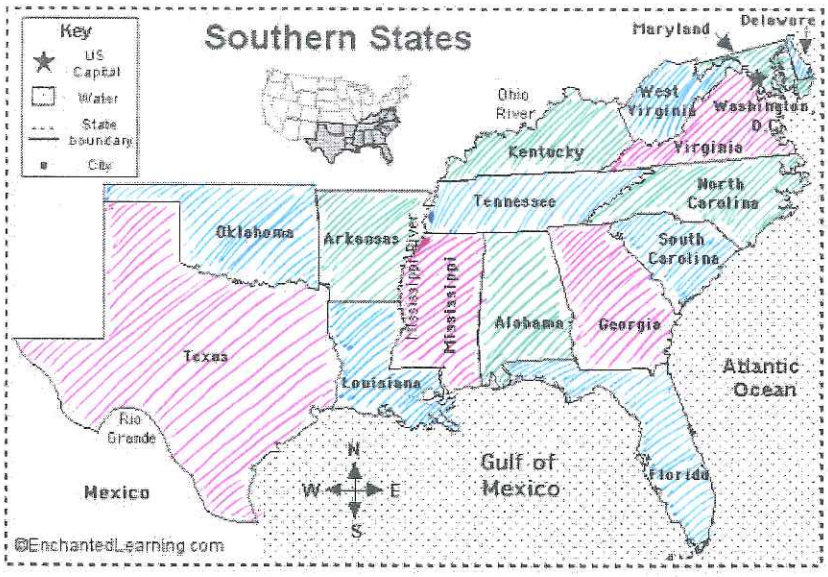
(a) Draw a graph with vertices for each state in the region. Let edges represent the states sharing a border. Color the graph vertices so that no two vertices that share an edge are the same color. Note that Alaska and Hawaii don't border any other states!



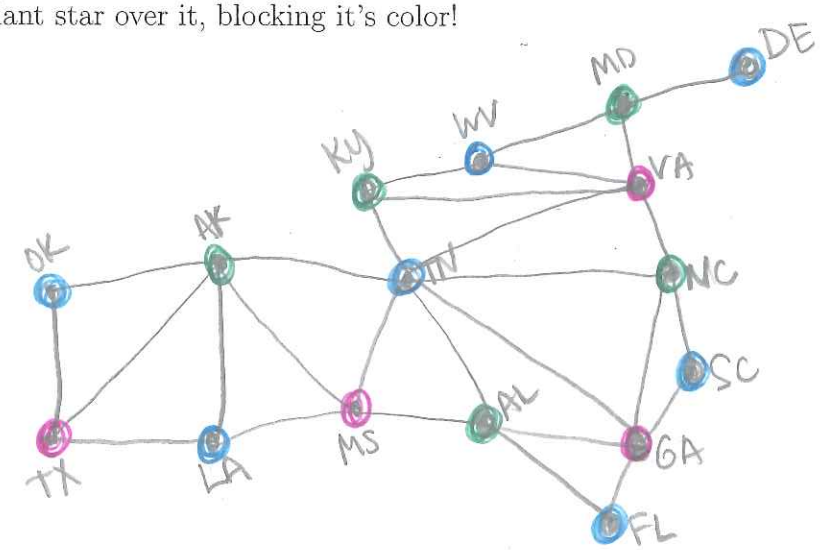
(b) What is the chromatic number? In other words, how many colors does Rand McNally need to load their printer with in order to print this map? 4

(c) Color the states in the picture above with the corresponding color of their vertex.

(4) Lastly consider the South! Below is the map they want to include:



(a) Draw a graph with vertices for each state in the region. Let edges represent the states sharing a border. Color the graph vertices so that no two vertices that share an edge are the same color. You may ignore Washington, D.C. since they are going to print a giant star over it, blocking it's color!



(b) What is the chromatic number? In other words, how many colors does Rand McNally need to load their printer with in order to print this map? 3

(c) Color the states in the picture above with the corresponding color of their vertex.

Rand McNally Maps thanks you!