The Problem

The most famous mathematical problem of this century is certainly the four-color problem. The problem, simply stated, is the following:

Suppose you draw a map on a piece of paper -- any map. What is the minimum number of colors you can use to color this map, with the restriction that no two neighboring "countries" get the same color?

It is quite easy to see that you cannot do it in general with three colors, and you can always do it with five. So the problem is: Are there maps that could not be colored with four colors? Or, alternatively, could you always color a map with four colors?

Kenneth Appel and Wolfgang Haken, who exhibited methods that cleverly segmented the map into a large number of submaps, solved this problem in 1976. They showed that if each submap could be colored with four colors, then the entire map could also be colored with four colors. They proved that all the submaps could be colored by “coloring” the individual submaps with a computer system.

Your assignment is do the same thing that they did, except with the following map. Show it can be colored with only four colors. (Hint: Can you see the graph in this problem?)
Comments

Good design of this program, good classes and data encapsulation is required on this problem. This is a class where object oriented programming methods are required of the students, and we will begin to examine the code for good design.