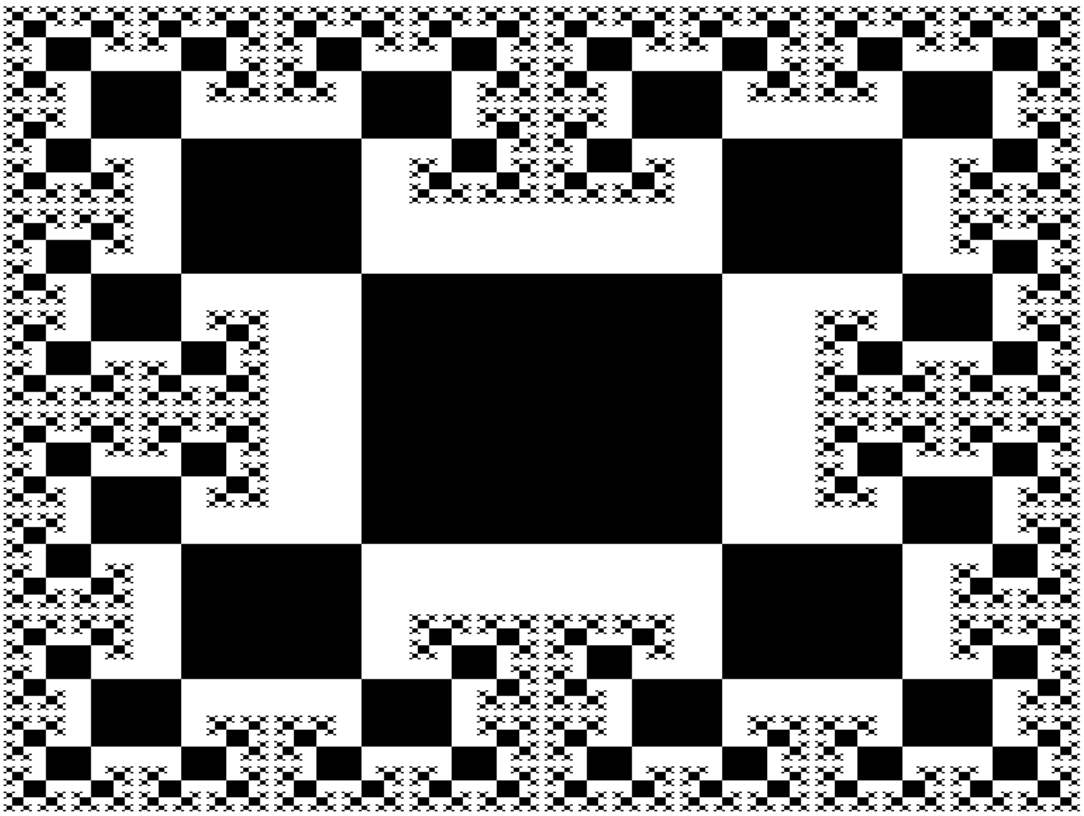
Computer Science III Honors
Recursion Lab Part 2
Fractals

Write a program that draws a rectangle fractal. Fractals are images that keep repeating their own image in ever-smaller versions. There exists numerous fractals and some fractals rely on computation of advanced mathematics. All fractals have a recursive quality and provide an ideal platform for practicing recursive concepts. This lab assignment is easiest to explain by first looking at the result of the execution below. You will note that from the four corners of the center rectangle, smaller rectangles are drawn and each rectangle in turn continues to draw three smaller rectangles until the rectangle is the size of one pixel.



The starter version of the program in Fractals.java demonstrates that the **paint** method only makes a single method call. This is a call to method **drawRectangle**, which is the very first rectangle to be drawn, in the center of the monitor. The parameters represent the dimensions of the graphics window. Your program needs to be written in such a manner that the graphics display adjusts itself to the initial resolution parameters that are provided. This way you only need to alter one small set of parameters.

Method **drawRectangle** gets the ball rolling and draws a solid rectangle in the center of the screen. The initial rectangle needs to be 1/3 the width and height of the applet window. This explains why it is important to know the screen resolution and why this information is passed by parameter. Method **drawRectangle** needs to make four method calls to draw each one of the four rectangles attached to the initial rectangle. Each one of the succeeding rectangles is **half the width and height** of the preceding rectangle.

To get started, draw four rectangles at each corner of every rectangle. This does happen from the initial rectangle, but in the pictured output, you can observe that later rectangles are only attached at three corners. Attaching three rectangles is more complicated. Initially, though, you can keep on calling rectangle methods until the size of the size of the rectangle reaches one pixel. The result is that later, smaller rectangles will cover over earlier, larger rectangles.

Then, modify the code so that you only draw three rectangles at each corner of every rectangle, except for the initial rectangle. **You will need additional methods, and you will need to use mutual recursion.**

Use Thread.sleep (in a try..catch) to delay program execution and slow down the drawing – it's more interesting that way.

```
try
{
        Thread.sleep(pause);
}
catch(InterruptedException e){ }
```

BONUS: Make the squares at each "level" a unique, random color.