Recursive Patterns
AP Computer Science

The twentieth-century Dutch painter Piet Mondrian developed a style of abstract painting that exhibited simple recursive patterns. For example, an “idealized” pattern from one of his paintings might look like that shown in the picture below:

To generate such a pattern with a computer, an algorithm would begin by drawing a rectangle, and then repeatedly draw two unequal subdivisions, as shown in the series of pictures below:

As you can see, the algorithm continues this process of subdivision for a number of levels, until an “aesthetically right moment” is reached. In this version, the algorithm appears to divide the current rectangle into portions representing one-third and two-thirds of its area, and it appears to alternate the subdivisions randomly between the horizontal and vertical axes.

1. Design, implement, and test a program that uses a recursive method to draw such patterns. (Use the Fractal C-Curve Program as an example.) Allow the user to choose the number of levels of division.

2. Modify the program so that it fills the rectangular areas in the picture with randomly generated colors.

3. Modify the program so that the smaller rectangular area is randomly placed on the left/right or top/bottom. The initial program always placed the smaller rectangle on the left or on the top.