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DE Discrete Structures and Object-Oriented Programming

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222.07b Assignment Description

For the 222.07b Fractals Assignment, I wrote a basic program that draws a custom fractal I developed over a base polygon. In my fractal, a square two-fifths the length of the original edge is placed on the left perimeter of the edge. Another square with the same length is placed on the right end. An equilateral triangle fills the space in the middle fifth of the original edge. The pattern is repeated on the top edge of both squares. The fractal can be drawn over a triangle, square, pentagon, or hexagon. Furthermore, users have the option to select the size of the polygon and the smallest size the fractal can be. There are limits to prevent an overflow of tasks and ensure the program does not crash.

To make the program, I added a drawing panel and an information panel on a JFrame. The drawing panel has a paintComponent method that allows the program to draw the fractal and other shapes. The information panel has various prompts the user must fill out to customize how the program draws the fractal. When the creation of a fractal is triggered with a JButton, the program checks for illegal input. If there is an illegal input, a JOptionPane message dialog will appear and tell the user to fix their input. If all inputs are legal, the program will create a polygon using the desired size and shape provided by the user. Polygons are built through an array of edges, which hold starting and ending points along with their angle. Next, the polygon's edges are used to make the fractal. The fractal is made by establishing a list of edges for the drawing panel to draw using trigonometry and the length of the line on which the fractal will be built. The

method is recursively called until the length of the fractal is smaller than the minimum fractal

size. The fractal creation method and the drawing process are done using a SwingWorker,

allowing the recursion to be done on a background thread. This allows the program to run

smoothly. If I had to add more to the program, it would be the ability for users to customize the

fractal itself.