Final Project Log

Date of entry: 15/11

What I've worked on: Learning the basics of bokeh and creating a recursive red and blue circle.

What problems I encountered: I wanted to change the color of the circles gradually as they got smaller using a gradient, but I couldn't figure out how to do it, so I settled for alternating between two colors.

What I learned: The basics of how to use bokeh to create figures.

Which resources did I use: Bokeh's official documentation introduction pages.

Date of entry: 16/11

What I've worked on: Creating a Sierpinski triangle. Started trying to generate a Koch snowflake.

What problems I encountered: I wanted to implement sliders so that I could change the colors, recursion depth and other variables for the shapes, but all documentation I found about it used Javascript and I wasn't sure if there was a better way to do it without Javascript, so I put it off for now.

What I learned: Better understanding of how to use recursion to generate shapes.

Which resources did I use: Bokeh's official documentation, personal knowledge of famous simple recursive shapes such as the Koch snowflake.

Date of entry: 17/11

What I've worked on: Finished Koch's snowflake.

What problems I encountered: The generation of the snowflake takes very long. There's probably a faster way to implement it than I did, and it also makes it harder to make sliders like I originally planned since the rendering time is so high.

What I learned: Looked at complex numbers in Python in preparation for creating the Mandelbrot set.

Which resources did I use: Online resources on complex numbers in Python. Review of linear algebra for rotating vectors (for Koch's snowflake).

Date of entry: 19/11

What I've worked on: Redid the Sierpinski triangle using a chaos game. Created a solid color Barnsley fern also using a chaos game.

What problems I encountered:

What I learned: Started looking into chaos games as a way to generate self similar structures.

Which resources did I use: Bokeh's official documentation. Barnsley fern's Wikipedia page for the exact probabilities and functions involved. Introductory youtube videos on chaos games.

Date of entry: 21/11

What I've worked on: Color gradients on the Barnsley fern and setting up a simple fractal flame.

What problems I encountered: Understanding how the color mapping works, and getting the colors to map to an appropriate range to display the full range of the color map.

What I learned: Color mapping.

Which resources did I use: Wikipedia page on fractal flames. Bokeh's page on color mapping. ChatGPT to generate an example of color mapping usage.

Date of entry: 24/11

What I've worked on: Working on more varieties of fractal flame displays

What problems I encountered: Trying to figure out what percentages of what transforms create interesting visuals. Tried to implement fractal flames using a histogram but it was too complicated. Also, failed to implement sliders again.

What I learned: Theory behind fractal flames, affine transforms and post transforms. Assigning points brightness with logarithmic frequency.

Which resources did I use: A paper on fractal flame algorithms.

Date of entry: 1/12

What I've worked on: Mandelbrot and Julia set generations

What problems I encountered: Understanding the theory behind the Mandelbrot and Julia set enough to be able to generate it. Once again, getting the colors to map to an appropriate range to display the full range of the color map.

What I learned: Math behind mandelbrot and julia set, and how to generate it. First in black and white, then with colors

Which resources did I use: Online resources breaking down the logic behind the two sets.

Date of entry: 3/12

What I've worked on: Cleaning up code, writing docstrings for functions, and working on the report.

What problems I encountered:

What I learned:

Which resources did I use:

Date of entry: 5/12

What I've worked on: Cleaning up code, writing docstrings for functions, and working on the report.

What problems I encountered:

What I learned:

Which resources did I use:

Date of entry: 8/12

What I've worked on: Cleaning up code, writing docstrings for functions, and working on the report. Creating a Mandelbrot area approximation function and graph.

What problems I encountered: deciding how to approximate the area. Which parameters to use.

What I learned:

Which resources did I use:

Date of entry: 9/12

What I've worked on: Cleaning up code, writing docstrings for functions, and working on the report.

What problems I encountered:

What I learned:

Which resources did I use: