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4/17/14
Final Project Proposal

Repeating Yourself Here on Fractal Rock

- **Problem Statement:** I will be using OpenGL and recursion to dynamically generate the Mandelbrot set, and possibly some other fractals, to observe some of the more interesting mathematical occurrences know to human kind.

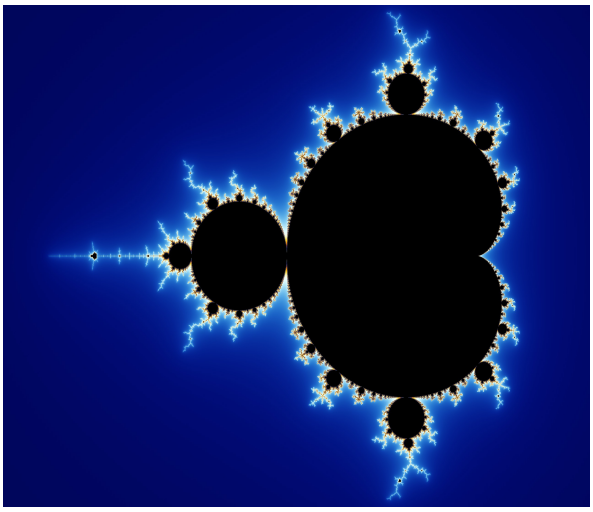

Illustration 1: Mandelbrot set example (Taken from: http://upload.wikimedia.org/wikipedia/commons/2/21/Mandel_zoom_00_mandelbrot_set.jpg)

- **Problem Analysis:** As fractals are in themselves recursive bodies, the main concept I will be employing will be recursion.
- **Data Set or Other Source Materials:** The actual images will be generated with the Racket implementation of OpenGL. I'll also be pulling from other Mandelbrot set tutorials and OpenGL tutorials (such as here: http://www.ozone3d.net/tutorials/mandelbrot_set.php) in order to learn how to both use OpenGL and create fractals.
- **Deliverable and Demonstration:** By the end of the project I hope to have working an interactive fractal builder that iterates dependent on how many iterations the user requests. I want to do it like this because it will allow me to showcase the fractal as it evolves in complexity the more iterations I request.
- **Evaluation of Results:** I will consider the project a success when I have a program can be executed simply and that produces an accurate fractal depend on the number of iterations

requested. Once I have that part of the project completed I will being to work on generating other fractals, along with an iterating color scheme so as the fractal generates the change from one iteration to another so does the color.

- **Major Components:**
  - **Part 1 – Learning OpenGL:** By this time I hope to have a better understanding of OpenGL in Racket. As I have no know extensive knowledge of OpenGL, taking some time to learn the systems will help me greatly. I hope to be ready to use OpenGL by April 23rd.
  - **Part 2 – Generating the Mandelbrot Set:** From here I will begin working on the actual generation of the Mandelbrot set. At the end of this part I hope to have working a program that generates a Mandelbrot set dependent on user input. This should be done by April 28th.
  - **Part 3 – Additional Content:** If I meet my time table for part 2 I will then begin working towards generating additional fractals such as a Julia set or Koch snowflake. Additionally I will also work on a way to create a coloring system that will change the color of the render as the fractal moves from iteration to iteration. With this we will be able to see the fractal change as we move from one iteration to another. Time permitting I hope to have this done by May 1st.

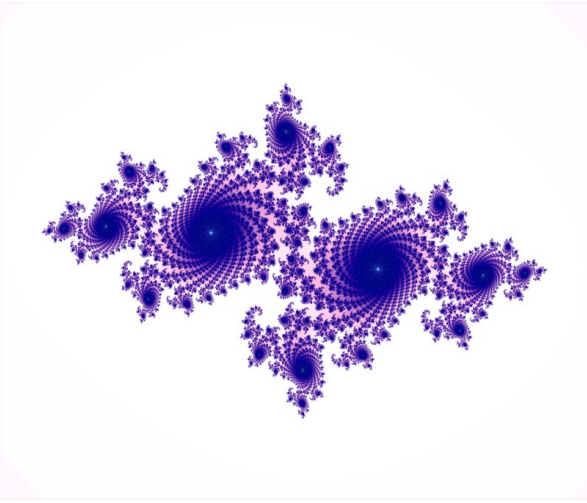

Illustration 2: Julia set example (Taken from: http://upload.wikimedia.org/wikipedia/commons/thumb/b/b1/Julia_set_(ice).png/800px-Julia_set_(ice).png)

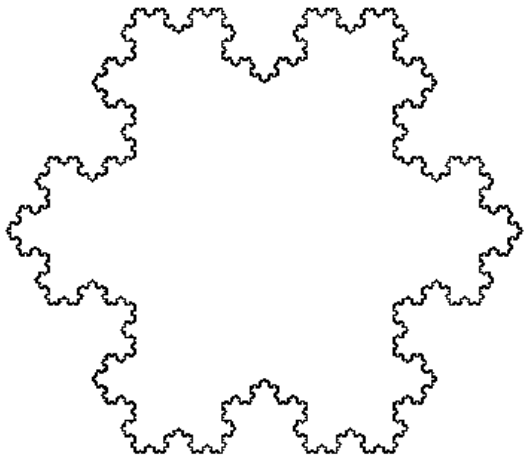

Illustration 3: Koch snowflake example (Taken from: http://mathtricks.org/wp-content/uploads/2010/01/koch-snowflake.png)