Project Journal

June 22 - July 5, 2024

- **Task**: Finding Research Topic and Defining Project Scope and Objectives
- **Details**: Explored various topics in fractal geometry and visualization, finally settling on the interactive visualization of Mandelbrot and Julia sets.
- **Duration**: 2 weeks

July 6 - July 12, 2024

- **Task**: Preliminary Literature Review
- **Details**: Reviewed academic papers and online resources on fractal geometry, specifically focusing on Mandelbrot and Julia sets, to understand mathematical foundations and visualization techniques.
- **Duration**: 1 week

July 13 - July 8, 2024

- **Task**: Developing Project Proposal
- **Details**: Compiled the project scope, objectives, and methodology based on research findings and submitted the project proposal.
- **Duration**: 1 week

July 20 - July 26, 2024

- **Task**: Detailed Project Planning
- **Details**: Created a project timeline, identified necessary tools and technologies, and established milestones for development stages.
- **Duration**: 1 week

July 27 - August 2, 2024

- **Task**: Setting Up Development Environment
- **Details**: Installed and configured WebGL, JavaScript libraries, and other development tools to create a suitable environment for real-time fractal rendering.
- **Duration**: 1 week

August 3 - August 9, 2024

- **Task**: Data Collection and Preparation
- **Details**: Prepared complex number datasets for the Mandelbrot and Julia sets and organized data manipulation techniques for visualization.
- **Duration**: 1 week

August 10 - August 23, 2024

- **Task**: Implementing Mandelbrot Set
- **Details**: Developed the base code for generating and rendering the Mandelbrot set, including escape time calculations and basic color mapping.
- **Duration**: 2 weeks

August 24 - September 6, 2024

- **Task**: Implementing Julia Set
- **Details**: Implemented real-time Julia set generation based on selected Mandelbrot points, ensuring interactive updates.
- **Duration**: 2 weeks

September 7 - September 13, 2024

- **Task**: Adding Infinite Zoom to Mandelbrot and Julia Sets
- **Details**: Integrated infinite zoom functionality using adaptive resolution techniques for smooth, high-detail zooming.
- **Duration**: 1 week

September 14 - September 20, 2024

- **Task**: Adding Mandelbrot (x, y) Value to Julia Set Constant
- **Details**: Enabled dynamic selection of Mandelbrot points to set the complex constant ccc for Julia set generation, linking the two fractals.
- **Duration**: 1 week

September 21 - September 27, 2024

- **Task**: Preparing Data for Visualization
- **Details**: Refined color mappings, smoothing techniques, and iteration thresholds to enhance the visual quality of fractals.
- **Duration**: 1 week

September 28 - October 4, 2024

- **Task**: Adding Julia Power Option
- **Details**: Experimented with and added a feature for users to adjust the power in the Julia set formula, offering additional visualization options.
- **Duration**: 1 week

October 5 - October 11, 2024

- **Task**: Implementing Visualization Tools
- **Details**: Added zoom, pan, and color adjustment controls to improve user interactivity and engagement with the visualization.
- **Duration**: 1 week

October 12 - October 18, 2024

- **Task**: Preparing Side-by-Side Visualizations

- **Details**: Set up a layout to display the Mandelbrot and corresponding Julia sets side-by-side, allowing users to observe changes in real time.
- **Duration**: 1 week

October 19 - October 21, 2024

- **Task**: Identifying and Presenting Key Findings
- **Details**: Summarized key observations on fractal behavior and visual relationships between Mandelbrot and Julia sets.
- **Duration**: 3 days

October 25, 2024

- **Task**: Writing Final Report
- **Details**: Compiled project report, covering methodology, visual outputs, challenges, and future work suggestions.
- **Duration**: 1 day