

Criterion A: Planning

Defining the Problem

Math, as a subject, can be quite difficult to comprehend on the educational level. Most people benefit from visual aids that show the user how a specific problem or equation works. Students looking at the Mandelbrot set and math students interested in fractals (the clients) would use this application to explore the inner depths and complex patterns formed by the Mandelbrot set. A fractal is an infinitely complex pattern that is similar across different scales. They are created by repeating a simple process over and over in an ongoing feedback loop, driven by recursion. Beyond the availability of a few pictures to show basic fractal designs, there is limited software to actually explore the inner workings of a fractal. Therefore, creating a graphical application for the user to explore the depths of complex fractal would be ideal for solving for this problem.

Rationale for the Proposed Solution

A standalone application for this project is the best option for multiple reasons. First, by running the application through a user's preferred IDE, it solves for issues of cross-browser compatibility and the lack of internet connection. Second, launching directly from an icon or package can be more useful for the client because they wouldn't have to go through a series of URL's to be able to run the application.

However, the use of a zip file to contain the files to be run is also another practical solution. This is probably the easiest to package and send to the user and allows them to run the application from any Java friendly IDE.

I chose to use Java as the programming language for this application because Java is very commonly used and standardized across platforms to run this application. I am also more familiar with the Java language more than any of the others available to me like Python. Currently, this application is only used by myself and also by a few friends who find some entertainment and interest value from it. Hopefully this can be uploaded to the internet and available for public use so that others interested in fractals can enjoy.

Starting Success Criteria

1. Creates user-friendly and simple GUI for the user to manipulate the two (2) variables used in the Mandelbrot Set to dictate the fractal generated.
2. Produces a fractal image to the screen as dictated by the Mandelbrot Set.
3. The user is able to navigate from the main menu to the viewing frame and vice versa.
4. The user is able to change the initial variables to create their own fractals.
5. The user is able to explore the fractal through navigation dictated by clicks of the mouse.