

## **Criterion A: Planning**

### **Defining the Problem**

The client (myself) wants to create software solution that is open source that solves calculus problems and shows how the solution was found. Calculus often times is the bane of every high schooler's existence. Calculus contains complicated concepts such as derivatives, integrals, and series. These problems can be extremely frustrating to solve even with the answer. Many times the only way to figure out how what one is doing wrong is to see the process of calculating the answer, not just the answer itself.

This application will be an exploratory project to see the difficulties of doing such a large scale product. This piece of software will not be able to solve all parts of calculus, but will instead focus on an application that reliably solves the derivatives of functions using the "power rule" of calculus. From this base application I will continue to develop this app in my free time over the next few years as I continue my studies in computer science.

### **Rationale for the Proposed Solution**

I've decided to create a stand alone application for this application, because it is the easiest way to implement a program that is user friendly to the high school audience that I am aiming for and compatible on the range of devices a high school student would have access to.

I want to write this piece of software because often times I will be working on a calculus assignment and I can not figure out a problem and the answer in the back of the book is not enough. I want a program that shows me how to find the answer that is open source. Wolfram alpha has software that achieves this, but the software is not open source and is not free. Also, large scale, I want this to be a resource for high schoolers everywhere that are attempting to learn the difficulties of calculus.

I chose to use java, because it aligned with the AP course work for AP programming and java is easily portable to multiple computer environments.

### **Success Criteria (in order of importance)**

1. Application is able to reliably calculate derivatives of basic functions.
2. Application is able to reliably calculate derivatives of slightly complex functions that are slightly harder to parse.
3. Application is able to reliably calculate the derivatives of complex functions that are very difficult to parse.
4. Application is able to output the steps necessary to find the derivative of the user input String.