# 3-2 Milestone Two: Enhancement One: Software Design and Engineering

# Artifact Description

The artifact I selected is the Arrow Grain Calculator App, a web-based tool I originally created prior to this course as a passion project. The initial version of the application had a simple HTML layout with plain input fields and a basic button to calculate the total weight of an arrow based on user-entered components. It did not offer much in terms of user experience or interactivity.

# Justification for Inclusion in ePortfolio

I selected this artifact because it demonstrates my growth in front-end development, UI/UX design, and full-stack engineering. In its original form, the calculator was functional but minimal. In this enhancement, I rebuilt the app using React and Tailwind CSS, introduced an interactive SVG diagram of an arrow, and implemented component-focused highlighting and navigation. Each section of the arrow visually lights up when hovered and smoothly scrolls to the respective input field when clicked. This showcases my skills in JavaScript event handling, DOM manipulation, component-based architecture, and responsive UI design.

# Course Outcomes Addressed

This enhancement aligns strongly with the following program outcomes:

* Designing and evaluating computing solutions using algorithmic principles and appropriate computer science practices.
* Using innovative tools and techniques in software engineering and interface design to deliver industry-relevant solutions.
* Creating professional-quality visual communication that is clear, accessible, and user-friendly.

My original plan was to improve the software design and user experience of the application. I met these goals by integrating modern frameworks, improving component interactivity, and enhancing the overall aesthetic and usability of the application.

# Reflection on the Enhancement Process

Throughout the enhancement process, I gained hands-on experience working with React and Tailwind CSS, focusing heavily on modular design, responsiveness, and dynamic user interaction. One of the most challenging parts was integrating SVG interactivity in a React environment. Making different arrow parts clickable and linking them to specific form fields required carefully handling React state and DOM interactions. This gave me a deeper appreciation for how user-centric design improves the effectiveness of software. Additionally, implementing backend routing and MongoDB integration allowed me to round out the project as a full-stack solution.

**Before:**

A calculator with text and numbers

AI-generated content may be incorrect.

**After:**

A screenshot of a computer

AI-generated content may be incorrect.