

Senior Design Project Intro

Our senior design project focuses on improving a server developed last year by some of Dr. Abuaitah's students, which provides modules for his current students to practice with. At present, the modules are hard-coded, so our task is to create code that dynamically converts C code into Assembly, including animations and corresponding output. This project incorporates many concepts my team and I have studied and worked with, such as Assembly and C programming, user interface design, compiler and software development, networking, and language translation processes. While I have academic experience in most of these areas, I have had limited exposure to language conversion, but my co-op experiences have helped bridge this gap. Ultimately, this project will benefit students learning and working with C and Assembly.

College Curriculum

I have completed several computer science courses that I believe will contribute significantly to the success of our project. One of these is User Interface Design (CS5167). This course covered essential UI design principles that will help us create interactive and user-friendly modules tailored for teaching students. It also taught me how to guide the user experience by asking the right questions, making the application intuitive and logical for its audience and purpose. Another valuable course was Software Engineering (EECE3093), which emphasized proper project setup and team organization—skills we are currently applying through our GitHub practices. The course also provided experience with full-stack development, blending UI design with backend functionality, both of which are essential to our senior design project. Additionally, Computing Systems (CS2011) and Operating Systems (EECE4029) have equipped me with practical knowledge of Assembly and C, which will be invaluable for accurately calibrating our modules for student use. Beyond technical skills, these courses taught me key soft skills, such as effective collaboration, managing long-term projects, and staying organized—all of which will support the success of our senior design project.

Co-op Experience

In my co-op experiences, my first two roles at Siemens Digital Industry were as a Software Engineer and then as an Engineering Consultant. In both positions, I focused on UI development and creating more efficient tools for developers. Our team used GitHub and Jira for project management, so I gained both technical skills in UI design and debugging as well as valuable project management practices, which I can bring to our project to keep everything on track and support the team effectively. At Midmark, where I worked as a Software Developer in my last two co-ops, I gained experience in language conversion, networking, and infrastructure development. My projects included updating language versions across platforms and ensuring compatibility with our customized modules, which is directly relevant to the language conversion process we'll be undertaking in our senior design project. I also worked extensively with Terraform for infrastructure and network development, which gives me a foundational understanding of these areas, even though we may be using different tools. Additionally, I took on a Business Analyst role within my team, where I developed soft skills in cross-team collaboration, identifying solutions to complex and abstract problems, creating flowcharts, and breaking down long-term projects into manageable steps. These skills will be particularly useful for team management and in dividing our project into smaller, more manageable tasks. This experience should help our team maintain smooth transitions and clear task allocation.

Motivation, preliminary approach, expected result, self-evaluate contributions

I'm motivated by the opportunity this project provides to work with multiple areas of computer science, allowing me to expand my technical skills. I'm also excited about developing an application that will aid students in understanding code conversions while offering professors an interactive teaching tool.

Our initial project approach will be to collaborate as a team to outline the primary components of the project and assign initial tasks. Creating a general task list, which we can refine throughout the semester, will help us stay organized and allow each team member to leverage their areas of expertise. One expected outcome is an application that visually demonstrates C code conversion to Assembly in an interactive way, making it easy for students to follow. This will include a feature to display the Assembly stack and a user-friendly UI that allows users to step through the code. If time permits, we also plan to implement a login feature so users can save their code progress.

For self-evaluation, I'll measure my contributions by staying on schedule with my tasks and completing them to the best of my ability. Since our team's tasks will often depend on each other, keeping up with deadlines will be key to ensuring that I'm supporting my team effectively. I'll

know I'm finished when we've accomplished all our goals, the project is running smoothly, and all tasks are being completed on time. Our success will be evident when we can demonstrate the code conversion with animations that are both clear and helpful. I'll know I've done a good job if we have a compiler that is efficient, intuitive, and easy for students and professors to use as a learning tool.