This Website

This has been one of the most intense projects I have ever worked on with roughly 50 total work hours. The inspiration to put together a personal website arose from my summer 2017 internship with Sikorsky Aircraft Corporation. One of my tasks (discussed in the Sikorsky Aircraft Corporation section) was to design and implement a SharePoint site for the Blades Product Center. This required that I become familiar with several different programming languages that I had never worked with before; including HTML, CSS, JavaScript, and JQuery. I decided to put my new knowledge to the test and design a website that could showcase my work, interests, and skills I have acquired over the years.

The website utilizes a responsive grid-system infrastructure called Bootstrap to facilitate web design for both desktop and mobile devices. In simple terms, the website will look appealing on both mobile and desktop platforms. Try it out! Adjust the browser window size on your desktop computer and the website will respond accordingly.

Aside from the linked Bootstrap CSS and JavaScript files, the entire website was developed from homemade code. This has been the most extensive programming project I had ever worked on. Sample CSS and HTML code is displayed below.

Trust me, you learn a great deal about yourself when you stare at code on a computer screen for extended periods of time. However, in the end, the reward of completing such a project makes it worth while. I hope that this website can demonstrate my ability and willingness to step out of my comfort zone and take on complicated projects of any kind. At the very least, my ability to effectively use Google to troubleshoot problems and solutions must be made apparent.

Autonomous Transport Vehicle

During my summer 2016 internship with Sikorsky Aircraft Corporation, I participated in a company-wide engineering competition. Ten teams consisting of five engineers from different disciplines competed in the competition.

The goal of the competition was to design an autonomous vehicle that could transport one gallon of water from Point A to Point B. The project seemed relatively easy at first until they introduced several different obstacles and design specifications:

1. The path that needed to be followed was made of a white LED strip. The LED strip eventually broke off into two pathways, one green and the other red. The Car needed to follow the Green LED strip.
2. To adhere to the competition’s design specifications, the vehicle had to be very narrow and top-heavy.
3. The vehicle could only use the two low torque DC motors that were provided.

After a week of brainstorming, we put our ideas to work. We began by creating the vehicle’s framework. The DC and Servo motors were then rigged to the vehicle. Following this, we began developing a rough circuit for the vehicle using Arduino components provided by the company. Shortly after, we hit our first milestone. The vehicle could travel in a straight line!

Although it seems like we were very far in the project, there was a great deal of work left to do. To track the LED strip, we designed an overhang at the front of the vehicle. The overhang was rigged with four photosensors; one on the far left, left of center, right of center and far right. The job of the photosensors was to act like a sweeper arm for the LED strip and realize when the vehicle was falling off course. When falling off course, commands would be sent to the servo motor to steer the vehicle in the right direction. After countless hours of trial and error, we had our vehicle working and ready to compete at the competition.

On race day, we came across several issues we had not considered when first designing our vehicle. Regardless of these challenges, our vehicle performed exceptionally well and placed fourth overall.

This project has certainly been one of the most diverse and intricate ones I have ever been a part of. It is an excellent example of how a team can unite and utilize everyone’s skillset to achieve a common goal.

Reverse Engineering of RC Car

During my first semester freshman year, I was assigned a project in the Introduction to Engineering course I was enrolled in. The goal of the project was to have a team of four disassemble and reassemble a complex object. When brainstorming potential objects to reverse engineer, it dawned upon me that I owned a TACON RC Racecar that I used to race with my father that was not working properly. This project was the perfect opportunity to get to the root cause of this problem while learning a great deal about how cars work at a macro level.

As a team, we documented each disassembly step with pictures to ensure a successful reassembly. Along the way, we discovered the many different mechanisms that were involved in such a car. Eventually, we disassembled the rear axle gearbox only to discover the root cause of the vehicle’s failure. The gear box had an excessive amount of contaminants (mostly dirt) that prevented the transfer of motion from the DC motor to the rear wheels. After a quick clean and reassembly, the vehicle was working like new.

Our team’s deliverable for the project was a PowerPoint over 100 slides in total, providing insight on all our findings. The professor enjoyed our project so much that he selected us to present the project to the entire lecture of roughly 500 students. This was a very interesting way to start off my college career.

3D Printing Independent Research Project

As a sophomore, I was offered the opportunity to take the MEM3229 Independent Research course by the Management for Engineering and Manufacturing program coordinator. The deliverable for the course was to assemble, configure, and document the procedures for using an Afinitbot 3D Printer so it can be used by students for the MEM2212 course. I was paired up with a close friend of mine to take on this task.

To our luck, the instruction manual was written entirely in Chinese, making the assembly process extremely cumbersome and complicated. Both Google and trial and error were our best friends throughout this process. Eventually, we had the skeleton of the printer ready to go for the electrical configuration stage.

Unfortunately, as shown in the picture below, we experienced great difficulty setting up the circuit at first. There were instructions on which terminals to connect, however there were none on how to package the wires and electrical components on the printer.

Over time, my partner and I were able to perfect the configuration so it was both efficiently packed and aesthetically pleasing. Once in this state, we powered up the printer and began troubleshooting all startup issues. The printer was now ready to perform its first print (depicted below).

The printer is currently located in the MEM Laboratory in the Engineering II Building for students to use.

Homemade Two-Stroke Bicycle

This summer I decided to experiment with a project unlike anything I had ever undertaken. The idea arose one day when I entered my garage, only to find a broken bicycle and broken weed wacker. Before my father could throw them away, I decided to turn one man’s trash into another man’s treasure. I perceived this as an opportunity to learn more about the mechanical nature of these items and set out to create a motorized bicycle.

My first objective was to repair the bicycle back into a proper working condition. Since the bike frame was still intact, all I had to do was diagnose, repair and replace the broken parts to bring the bike back to life. After replacing the rear wheel rim, bike chain, and rear derailleur, the bicycle was working like new. To ensure its reliability, I took the bike for a few long distance trips across town.

Now that the bicycle was working, it was time for me to fix the broken STIHL FS80R 25cc Weed Wacker. At first, this was an extremely daunting task to set out and accomplish as I had never worked hands-on with engines in the past. I performed a great deal of research beforehand to understand the complexities of such machines. Before disassembling the engine, I performed a couple of tests to diagnose the different issues the motor had. The engine failed a compression test, yielding 50 psi upon startup (below the minimum allowable of 60 psi). Additionally, the engine failed an electricity test, therefore the ignition coil would need to be replaced. Upon disassembling the engine, it was further discovered that the piston assembly and cylinder were harshly damaged from debris and would need to be replaced. Once these issues were resolved, the engine performed like new.

The next step was to develop a working design for the motorized bicycle. The plan was to transmit the torque of the motor to the rear wheel. To begin, a motor mount needed to be created at the rear of the bike. With the use of an arc welder and square metal tubing, a sturdy motor mount was rigged to bike. Now, with the clutch and flywheel adjacent to the rear wheel, the final step is to transmit the torque from the engine to the rear wheel.

Unfortunately, the project was cut short due to my return to school. The project will likely be complete during the winter intersession. In the meantime, several different solutions are being researched to transmit torque to the rear wheel.

Arduino Projects

Several times throughout my college career, I have incorporated the use of Arduino hardware and software to compliment my coursework and curriculum. Arduino is hardware and software company that facilitates the creation of complex electronic circuits.

In my computer science course, I teamed up with a classmate to design a circuit that could transmit binary code from an LED light to a photosensor. To begin, each alphanumeric character was assigned an 8-digit binary string as per the American Standard Code for Information Interchange (ASCII). A program was created to send these binary strings in a Morse-code like fashion. When the LED light blinked quickly, a “0” was denoted. When the LED light blinked for a longer duration of time, a “1” was denoted. After eight successive LED blinks, an alphanumeric value would be indicated from the string of 0’s and 1’s. Below is the setup we used to transmit this information from one computer to another. When the string was sent to one computer it would be returned to the other in the same fashion. The program was also capable of sending multiple alphanumeric characters at once so words and phrases could be transmitted. Thus, we performed the renowned “Hello World!” experiment.

During my freshman year, I competed in a catapult design competition. The goal of the project was to create a catapult capable of firing a ping pong ball at targets of different distances. Below is the finished design for my team’s catapult.

To prevent variability in the firing of the catapult, I designed a pin release mechanism controlled by a servo motor. This was a rather simple circuit, however the added consistency and control we gained from this modification improved our catapult’s performance considerably.

Our team placed 6th in the catapult competition out of roughly 100 teams. Much of our success was attributed to the addition of the Arduino firing mechanism.

Sikorsky Aircraft Corporation

During my three internships with Sikorsky Aircraft Corporation, I have been an integral part in many different projects. Given the nature of the company, I am unable to discuss each of these projects at length. However, I will provide a general overview of several different initiatives I’ve been involved in.

Raw Material Automation

The goal of this project was to propose a solution for composite raw material handling and storage of the Blades Product Center. The solution must ensure that all composite raw material in the freezer and on the shop-floor is conforming to company and industry specifications to minimize potential escapes; lowering costs associated with expired and nonconforming material. The team I worked with successfully benchmarked three different software solutions in the composite tracking and nesting industry. Based on user experience with the software, a proposal has been developed for the approval of upper management to implement a new kiosk system onto the shop-floor.

SharePoint Site for Blades Product Center

Last summer, I successfully developed a comprehensive SharePoint site to improve connectivity and infrastructure within the Blades Product Center. This tool will provides employees with a central repository for important documentation, allows for enhanced reporting, and eases the friction that arises from cross-discipline information sharing.

Automation of Clerical Work using VBA

During my internships, I have been given several different responsibilities that involve performing regular clerical work. Personally, I am not one to be thrilled when it comes to doing the same task over and over again, especially when it takes a substantial amount of time. Therefore, I set out to automate each of these processes using Visual Basic (VBA). Once programmed, I reduced the total time performing these tasks from roughly 20 mins to under 10 seconds. These programs saved coworkers and myself a great deal of time daily.

Lean Six Sigma Green Belt Certification

On July 31, 2017, I acquired my official Six Sigma Green Belt Certification from Lockheed Martin based on my training, expertise, and involvement with six sigma methodologies within the corporation.

Process Feedback Management Tool

In the summer of 2016, I was co-leader of the Process Feedback Management team in an effort to design a replacement system for an outdated UTC software across Lockheed Martin Rotary and Mission Systems. The team collected and analyzed all of the requirements for such a software, then put together a proposal for IT to develop. Today, the software is used to manage cross-discipline process discrepancies across the enterprise.

Philanthropy & Community Service Projects

I am glad you have chosen to learn more about these projects as they are the ones I am the most pride of. Over the past three years, I have been extremely involved in the growth and development of philanthropic endeavors at the University of Connecticut. In the Spring 2017 semester, I was nominated for the Individual Community Service Award for my philanthropic and community service contributions within the university and the surrounding town of Mansfield.

As a sophomore, I felt called to run for the philanthropy chair position of my fraternity because I wanted to expand our organization’s efforts and have a valuable impact on the community. I was elected philanthropy chair for a year, where I worked hard to shape our values and improve all our efforts. As philanthropy chair, I successfully planned and executed six different philanthropy events, raising roughly $18,000 for a diverse set of charities and causes; including the Violence Against Women Prevention Program(VAWPP), Court Appointed Special Advocates (CASA), Wounded Warrior Project, Connecticut Children’s Medical Center, These Hands Don’t Hurt campaign, and the Women’s Center at the University of Connecticut. Below showcases the many different philanthropy events I helped organize for Alpha Kappa Lambda.

During my time as philanthropy chair, I felt that there needed to be a position within the organization to organize and create community service opportunities for Alpha Kappa Lambda’s members. Thus, I created and took on the new position of Community Service Chairman. I began this effort by beginning Alpha Kappa Lambda’s Town of Mansfield Service Project. The purpose of this project was to give back to the surrounding community. Alpha Kappa Lambda was seeking to help aid surrounding neighborhoods in any way they may need. To my surprise, as many as 20 families responded to my flier in hopes that our organization could provide assistance with several different odd jobs. Over the last three years, our organization has given back over hundreds of service hours to the university and surrounding towns.

Today, I am the President of Alpha Kappa Lambda at the University of Connecticut. My efforts with this organization have had a lasting impact on how we operate and the values we uphold. It is truly an amazing feeling to know how far our organization has come and how it stands as a role model for others on campus today.