Calculus II Honors Project Reflection

My honors project for Calculus II involved working with both numerical root-finding methods and numerical integration methods. I set several goals in the project contract that were fulfilled by creating three deliverables at the end of the term. I wrote two technical papers and I also developed and delivered a forty-five minute technical presentation. The outcomes from my project included demonstrating knowledge of the theory for each method, developing a program for each method, and working through a real world application for both root-finding and integration techniques. These three outcomes were crucial to developing a great interdisciplinary project. The process of breaking down each method involved a math component. The algorithm development and software implementation were heavily grounded in computer science. The real world applications covered engineering and physical science disciplines. Each component of the project brought a different skill or discipline to the table.

Understanding the theory behind each method and implementing a software solution for each method were two separate outcomes of the project. However, both outcomes complimented each other throughout the project. My intended career field is software development. In that field, the ability to break a problem down into its basic pieces and procedures is very important. At that point, the process of a developing an algorithm and implementing a solution becomes much easier. My project combined the process of breaking down each method and then developing a solution. Compared to industry software, these programs are very simple. This gave me an opportunity to work on completing each step correctly. My previous programming coursework only covered basic software development principles. I became used to diving head first into an implementation without breaking down the problem completely and developing an algorithm first. This became an issue during my Data structures class this fall. The projects became so complex that I was having issues during the coding process because I hadn’t developed a good algorithm before I started. For our final Data structures project, I tried hard to adhere to the steps I used for my honors project and it helped me efficiently implement a good program. These are skills I plan to use throughout the rest of my academic career and into an industry career. I think these are applicable to more areas than software development; however it’s great to have a project with direct impacts in my area of interest. I believe it’s a good thing I learned this lesson early in my programming coursework.

Creating the deliverables for the project was the second most valuable component of the project. I’ve heard quite often that communication skills divide successful engineers from the rest. Both the presentation and the two papers were a struggle for me to write. I’ve never worked with presenting technical information. It was very easy to use big words and math jargon throughout the papers. All the concepts make sense in my head, but I had to work to make the content readable for less technical readers. Professor Thorp helped me identify the important components for the written papers. Writing technical papers is a skill I still need to work on. I thought it was great to get an early look at the processes and the skills required to write a good technical paper. The presentation was also good experience. I know I have a lot of room for improvement, but it was good to get that exposure early on in my academic career. During my practice run, I got too caught up in sounding technical. Professor Thorp told me to explain it like I would to someone from the math and physics help room. Approaching it from that angle really helped take away some of the anxiety, and it improved my delivery of the information. Again, it will take a lot more work to develop the written and oral skills I want to take into a career, but because of this project, I have an idea of some places to start improving my communication skills.

Out of my two honors projects, this one is my favorite. I liked working with my discipline professor on a regular basis. Our weekly meetings helped me keep a good schedule. I also had the opportunity to gather a lot of extra information from Professor Thorp. During our meetings, we talked about different aspects of the aerospace industry and software development. This was a great bonus from putting in time on my project. Each component of my project gave me something I can use in the future. I believe I have three solid pieces to add to my portfolio, and I got a good look at several different skills I need to work on to be successful in the software development industry.