Abstract:

This website is about my (Ryan Stamp's) third co-op work term: the company, my experience on the job, and most importantly, the goals I had going in and the skills I took away. By reading this website, I hope you, the reader, learn something about my experience at Natural Resources Canada, and hopefully even get inspired to figure out what you might want to take away from your future endeavors.

About Natural Resources Canada:

The Company:

Natural Resources Canada (NRCan) is part of the Canadian government and is responsible for managing the research of Canada's geography and natural resources. Of course, being a part of the government, NRCan is huge, and I can only speak for the small part I worked in. I was part of the Lands and Minerals Sector, which focussed its research on subsurface Canada and locations of different minerals types. Just this one sector is also quite large, and their tasks are numerous. Some specific examples include creating 3D models of various surface and sub-surface volumes of Canada and using seismic surveying data to locate buried mineral deposits.

Culture and People:

Compared to my previous work terms, NRCan has quite a different atmosphere. NRCan has a verity of different job types, such as geographers, researches and Ph.D. students, programmers, etc. This leads to a very diverse atmosphere and was a nice change of pace from the pure tech-savvy culture I had experienced in previous work terms.

Job Description:

Job Overview:

My job at NRCan was fairly unique. My main task was to research and develop methods for loading and rendering massive 3D geospatial models on the web using a JavaScript framework called CesiumJS. This framework allowed the models to be georeferenced and displayed on a virtual globe, and then be styled based on its associated properties for analytical analysis.

Required Skills:

Unlike my previous work terms, I feel like there were some prior skills required. Had I not had some prior experience with common 3D graphic techniques such as normal vectors, texture mapping, and projections, then I may have struggled a bit. Basic knowledge of JavaScript would also be useful as CesiumJS is a JavaScript framework. I would also say a more advanced level of general programming was also required since this project was built from the ground up with no prior written code. You needed to be able to write large programs from scratch which may require more advanced coding skills.

Learning Goals:

Learning Goal 1:

My first learning goal this work term was to learn how to write a technical report. My role of researching and prototyping ways of visualizing NRCan's data on the web required a report at the end to document the process, so I wanted to take this opportunity to learn how to write one. By the end of my co-op term, I had learned the importance of describing the project in a non-technical way so anyone, with a programming background or not, could read and understand it. Then, all technical details were put in the report's appendix, linked in various places in the main sections, so someone with a programming background could learn about the more technical parts of the project if they wished. Not only does this ability to write a technical report demonstrate strong written communication (a skill asked for by almost every employer), but also being able to communicate research through reports specifically can be a well-valued skill in the industry.

Learning Goal 2:

My second learning goal this work term was to practice the process of creating requirements, stories, and tasks to help guide my project. My job was mostly unstructured, with just a broad end goal and no strictly defined requirements. This was because of the experimental nature of my work, in which I discovered what the requirements are, as opposed to being given them. During the work term, I successfully created a decent range of requirements (about 9 in the end) and broke each one up into various stories and tasks, while also applying time estimates on each task. Then, the time estimates could be added up to create the total estimated time for each story and requirement. These time estimates allowed me to better plan out which tasks to focus on so I could make sure I was making good progress towards completing the requirements. Overall, I felt like this helped me stay organized and it helped me reach the project's end goal in a timely and more organized fashion.

Learning Goal 3:

My final learning goal this work term was to experiment with and practice using multiple technologies and languages together in the same project. Since my project was a calculation-heavy web app, I had to choose the right languages and tools for different parts of the project. I wrote the calculation heavy converter in C++, the main pipeline using node.js, and the web app using JavaScript and webpack. I was then able to connect the different stages using various techniques such as running scripts using node.js or using npm packages like the Foreign Function Interface (FFI) package to run the C++ DLL as part of the pipeline. This allowed me to create a fluid application that takes advantage of multiple languages and technologies and use their various strengths. Overall, this taught me how to better choose a language for a particular task and how to develop solutions to combine the pieces into a functioning whole.

Conclusion:

Overall, NRCan was another great experience. It was a different type of experience, being more focused on research then developing software, but just as useful in the long term. This work term gave me the chance to develop and have a hand in designing a project from scratch and taught me what it's like to work a tech position in a non-tech company. I hope to continue to receive new and different experiences in future work terms and beyond.