

CRA - ITB

SYSC 3999

Software Engineering Work Term Report

Karim Hersi,100865348

Work Term Report #: 2

Email: karimhersi@cmail.carleton.ca

Supervisor: Ahmad Al-Munayer, A.A.

Department: CRA - ITB

Term: Fall, 2017

Introduction

The purpose of this report is to convey the academic, professional and interpersonal aspects of my co-op work term experience. This report will discuss my learnings, accomplishments, acquired experience and challenges encountered. The report is divided into sections. The first section will detail the organizational context. In this section, a brief overview about my employer, department, and product will be provided. This next section will detail my work term experience. This section will discuss my initial objectives and assigned duties at the Canada Revenue Agency. I will also include my accomplishments, challenges faced, and solutions to these challenges. The concluding section will be a reflection about my work term. I will reflect on my contributions and how my work placement connects with my academic studies.

Organizational Context

The Canada Revenue Agency (CRA) is a federal organization that is responsible for administering tax laws to almost all provinces and territories in Canada. The CRA also administers international trade legislations and provides numerous social assistance programs to Canadians. The CRA's headquarters is situated in Ottawa, Ontario.

The Information Technology Branch (ITB) department in the Canada Revenue Agency is primarily responsible for maintaining the organizations software systems. ITB is also responsible for developing new computing solutions for business use.

Objectives

The main objective before the term was to gain exposure with developing web based solutions to business problems. In today's market, most software applications are run on the internet. There is a large demand for software developers with web related skills. Some of these skills include web design patterns, modern web development technologies and database management skills. This content is not thoroughly taught academically due to practicality. An additional objective was to exercise written and verbal communication with non-technical coworkers. In an academic environment, students are generally grouped with peers who have very similar skills, discipline and academic background. Working in the public sector provided a unique opportunity to interact with various professionals in different career fields.

The Nature of the Work

I was assigned to work on a software tool that is used to manage various business workflows. My primary responsibility was to assist team members with developing new features specified by our business clients. I was also responsible for fixing software issues that existed in the system.

The Work Environment

The code base that I was working on was written in the Java programming language. The company used the CVS version control system to record changes and manage different versions of the code base. The application was built using the Apache Struts 2 framework. This is a common framework for Java web applications. The primary advantage of using the Struts 2 framework is its ability to separate the visible components (also known as the view) and the business logic of the application (also known as the model). The application server used to deploy the application was RedHat's JBoss. It was chosen primarily for its effectiveness in handling small web applications, its short learning curve and its free availability. Finally, the application interfaced with a database to store business information. The database used was Postgres SQL database.

The Work Experience

The work term began with the task of setting up my work environment. This included configuring desktop settings, installing various software and many more set up procedures. I also had to create a CVS account. Once the environment was set up correctly, the second stage was to gain a broad understanding of the software's business logic. Fortunately, there was a lot of well written documentation to assist with this stage. I had no trouble understanding the business logic and requirements after reading up on all the documentation. I also had to read and gain exposure with the Struts 2 framework. I spent a few days watching video tutorials, reading documentation, and talking with team members to get a broad understanding of the framework.

The first task assigned was to create a web interface that could get data reports from the database, and present it to non-technical users. This was an excellent introductory task because it involved all components of the web application (the front end, the database and the Java programming) while not being too overwhelming. My next task involved creating an online application form that collects information from the users, updates existing databases, and emails the events to a small list of business users. This task required a stronger knowledge of all the tools and the code base.

Resolving Software Issues

There was a portion of the term that was allocated to resolving software issues. These issues were detailed on *a bug* tracking system called PSL (Program Support Log). They are identified by the clients who use the application daily. The process of resolving issues begins with gathering information about when the issues occurs. This typically involves the web page, the activity sequence that triggers the issue, and questions about the environment. The goal is to be able to reproduce the issue on a local computer. If the cause of the issue has to do with a variable specific to the end user, then it can require custom tools to reproduce the issue. Once the issue can be reproduced, the next step is to walk through the code sequence and identify the location in the code base that is causing the issue. After brainstorming for viable solutions, the team discusses which of these is solutions is optimal. Once the team reaches a consensus, the solution is implemented and tested. If the issue disappears on the developers end, the changes will be pushed to the user. The issue is considered resolved when the user approves of the fix. Resolving existing issues made me more familiar with the code base and the Struts 2 framework. I was also able to learn a lot from the mistakes made by myself and other team members.

Challenges and Solutions

There were a few environment issues early in the term. These were caused by an incorrect initialization of a few system plugin files. Although they were easy to fix, they were difficult to understand the cause of the issue. There were a few times throughout the term where the client did not like the look and feel of the features we had developed. We had to re-organize parts of the application to make it more user friendly.

Contributions

I was able to complete a few features that were specified by our business client. I contributed in reducing the existing software issues. I contributed in migrating some of the software to new platforms. I also transferred knowledge about the project to new members of the team.

Relations to Academic Studies

The tasks at my co-op work term were directly related to what I learned at school. There were applications of Object Oriented Programming, Software Design Project and Algorithms and Data Structures. Strong understanding in these courses were essential for doing the tasks that were assigned. There were uses of Database Management Systems as well. Although I was previously exposed to these materials in school, it took some time being able to effectively apply them in a work environment.

Career Development

The work term helped strengthen many of my technical and non-technical work skills. From a technical standpoint, I was able to gain exposure working with web based applications. I was introduced to various industry design patterns for managing information technology systems. From a non-technical standpoint, I was able to collaborate daily with others, many of which worked in entirely different fields. These skills are very difficult to gain in an academic environment.

Summary

I achieved the objectives that I had set out at the start of the work term. I received some exposure to industry standard software development. I learned a few tools and technologies that are very relevant in this field. I gained a lot of insight on what technical and non-technical skills I need to work on to be successful in a software work environment.