

Blaise Iradukunda & Daniel Evans

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This summer we, Daniel Evans and Blaise Iradukunda, worked on developing a mobile application that we nicknamed “My Sewanee” under the supervision of Dr. Lucia Dale. The application will have 4 parts when it is done: the customized news with Sewanee emails, a hiking component giving hikers directions in the woods, events on Sewanee campus, and information about and the menus of local restaurants including McClurg. Blaise worked mainly on the front end (the user interface) while Daniel worked on the back end (providing the data and functionality of the app), and together we worked to link the two together. With the helpful insight of Dr. Dale, we started the first step of the application, which we believe will be a big change in the Sewanee community once finished. We learned how to design, manage, and collaborate on a large project, and developed our work ethic, which we believe is a big step towards our career goal of being software engineers. We summarized the progress of our progress on a five-week timeline.

In the first week, we set up Android Studio on a computer in the lab, decided on the views (user interface) to use for each activity of the application (activities may be interpreted as tabs on a web browser), and we started building the interface from scratch. Setting up the Studio was hard because of the security of the public computers used in the computer science lab as they are directly connected to the Sewanee server which manages important University information. We ended up using our personal computers because the configuration of the Studio on the lab computers was limited and buggy due to the connection to the server. During this

week we finished a written design of the application. As we were building the application from scratch, we started learning how to properly use XML, a language that Android uses to link various screen views to the Android SDK(Software Development Kits) . We also learned how to make Java customized views that are used in the Android SDK.

During the second week, on the front end, we made a custom view for the application's personalized news page. The idea behind this page was to allow each user easy access to news they care about while also providing important sent out from the University. On the back end, we started making a program that scrapes websites for news-related information, and we decided an API (short for application programming interface; they provide application programmers convenient access to a company's data such as news data) to use in order to collect enough news data for the user to choose from a variety of sources and topics. The data gathered through web-scraping was intended to be used on the websites that do not provide APIs for their data like Sewanee Purple and CNN and APIs.

During the third week, we installed an Apache/Tomcat local server to serve news data and other information required by the software. We made a simple program to test that it correctly sends and receives data requests. We had to read more documentation about how to build a Restful API. Restful APIs follow a set of convention and protocols for sending and receiving data through computer networks. Furthermore, we finished the user interface for the splash screen that starts the application. We also finished coding the main screen view of the application that directs the user to every activity in the application. We consider this to be the main controller or "home" page of the application.

At the end of the third week, we agreed to develop two supporting applications used both for gathering more data for the main software and for providing an interface for the University to send information to our app. The first one was a path tracer to collect the outdoors trails data (coordinates and pictures) in order to enable the hiking using our application. The other is a Gmail email manager to connect the Sewanee emails to our application. The fourth and fifth week of our project, we developed the two applications. We continued working on these extensions of our main application after the five weeks of our summer project were finished. The links to our final project is on GitHub¹ and the pictures of the compiled applications are on Flickr.²

During the research assistantship, I (Daniel) worked mainly on the “back-end”, providing the data and core functionality needed to create meaningful and useful software applications such as the Gmail email manager and the path tracer for the hiking component of the MySewanee phone application. I learned about the software development lifecycle and how to work together with another developer on a software project. An important software tool I learned about during the internship is a version control system called Git. It is used widely in the software industry to control and merge all the changes that collaborating developers make to the “master” branch of a software project source code. The “master” branch contains the code that will be delivered to real users so properly merging code into this branch is of paramount importance as incorrect deletions or additions could cause the software to malfunction. Furthermore, I learned about how to automate the program testing. Essentially, this involves writing code that tests the functionality of the software against an expected output. These tests are commonly referred to as

¹ <https://github.com/Blezzoh/SewaneeMessengerTry2> -> link to software source code

²

“unit tests” in the software industry because they test the smallest components of the software in an environment isolated from the rest of the program, and we used various testing frameworks such as phpunit and junit to test our Php and Java code.

Unit tests and Git are essential tools for a software engineer and are perhaps some of the most important things about software engineering I learned during the internship. However, I also learned about how to program efficiently by improving workflow productivity via various tools available to developers, design large, complex software (the amount of code written for MySewanee and the supporting applications totals more than 8000 lines) using proven design patterns like Model-View-Controller, persevere through problems even when a solution seems impossible, and finally how to teach myself almost anything about software development. While there are many other things that I learned throughout this internship, these are by far some of the most important. Finally, this internship has made it clear to me that I want to pursue a software engineering career after college, and I believe that this internship, all of the many things I learned during it, and my supervisor, Professor Lucia Dale, have all helped guide me down that path.

During this summer the main experience I (Blaise) gained is managing a large project. I was exposed to a new architecture called “Model-View-Controller”, managing the code using a tool called “Git”, and working overtime if necessary. My focus was on the “front-end”, coding the look and feel of the application and providing necessary methods to add data to the user interface. I acquired knowledge of an architecture known in the software industry as “Model-View-Controller”. This method is used to separate data from the interface for the safety of the application. It is also used in order to make the updates of the applications less buggy and the code more readable and manageable for future programmers. Our main application and the

two extensions have more than 8000 lines of code and need to be updated every working day by more than two people. In order to combine our code daily we learned a managing tool called “Git”. Lastly, I was exposed to a reality I already knew but this time on a large scale, bugs. Often times this summer, we had bugs in our code and hindered the daily goals. Those were the moments we had to work overtime and it helped a lot. This reality made a big boost on my work ethic.

This project made an impact on my career goal of becoming a software engineer/developer. It introduced me to a planning and running a medium-scale software project which is the daily task of a developer. It has also increased the amount of work I can do by myself under no supervision, and I believe that it will help me in my personal projects and during the regular school year. I would like to thank Career Services for the opportunity and especially Dr. Dale for her support throughout this internship, even after the end of the research period.