Christine Lee and Francesco Serio
Dr. Kenneth Moorman
CS-4444
29 January 2020

Moosnick Museum Website Project Proposal

1. Introduction

For our Senior Seminar in the year of 2020, we will be creating a website for the Moosnick Medical Museum. This proposal will be divided into three main sections, not including the Introduction and Conclusion sections. The first section, *The Project*, aims to give a detailed description of the project, discussing topics such as projected goals for the project, target audience. The second section, *The Group Makeup*, will give a background on each of the group members with regards to their skills, past experience, and what they intend to gain from the project. Furthermore, the languages and developmental tools that the group intends to use are discussed at length. The third and final section, *The Client*, is concerned with detailing who the clients are for this project, their backgrounds, what they want to get out of this project, and how the group will be evaluated for their work.

2. The Project

The goal of this project is to create a functioning website for the Moosnick Medical Museum. This website will be easy for Dr. England to maintain after we graduate. Our site will aim to adhere to the most recent of industry standards and serve as an easy medium for users to find the information they seek. The project has the potential to reach a wide range of target audiences, from prospective students of Transylvania to researchers around the world. Current students who may be doing research for school work could simply look online to peruse through the website instead of going through the process of contacting Dr. Day to set up a meeting or a tour in person. If they need the information and not necessarily see it in person, having direct access to the data would be more efficient. Prospective students who are interested in the medical curiosities that Transylvania has to offer, as well as the rich history of medicine at this university. Because Dr. Day is a full-time professor at Transylvania as well as the sole curator of the collection, his availability for tours is limited. Prospective students who cannot schedule a tour with Dr. Day can still see the collection online. Transylvania University may be small in size, but it is rich in history as well as the collections of rare scientific resources. Researchers of medicine, physics, and biology from all around the world would have access to the information regarding the items in the Moosnick collection. There does not exist a website that already presents the information about the Moosnick Museum in the way that we plan to. Website builders like WordPress, Wix, and Squarespace exist. However, we do not know if they are compatible with Firebase, the type of database we are using.

3. The Group Makeup

Francesco did not choose this project in particular but was placed in it. DO NOT let that detract from the fact that he is extremely excited to be working on the project. He is interested in this project mainly because he believes in the “use it or lose it” principle. It has been about a year since the last time he has had to do any interfacing between a front end (website) and a back end (database) for class. This project will serve as a refresher in software engineering practices, front end and back end interfacing, and be an opportunity to either learn a new scripting language or improve upon the knowledge that he has of Ruby. On one hand, this project does not tie directly in to his concentration area, French, however, it would be hard to find one that would

from the pool of projects that were proposed. On the other hand, this project will be affected greatly by the knowledge he has amassed in having done three and a half years of Computer Science courses prior to taking Senior Seminar.

In particular, the *Software Engineering*, *Operating Systems*, and *Database Management* courses will directly impact his abilities. The first course was where he became well acquainted with the jargon of the software engineering world, where he had to do his first project (remaking the TURING Lab website) for a "real-world" client (with whom we met multiple times), and where he learned the process of making a website from scratch (using HTML5, CSS, JavaScript, and some PHP) while working in a group. Because he will be making a website from scratch, will be working and meeting with a real-world client, and will be working in a group where a streamlined workflow and clear understanding of the jargon will be necessary, *Software Engineering* will have been an invaluable class to have taken. The importance of the second course mentioned lies in its direct impact on the way that he has grown to write code in a group setting. In *Operating Systems*, he learned the true importance of good documentation when his group had to use other groups' header files with no comments besides the names of the files. It was a lot more difficult to test for which parts of their files were working or not because Francesco's group were not sure what already did or did not work or what certain functions were supposed to do. Another thing that he learned from that class was the importance of starting projects as soon as they are assigned and meeting with one's group frequently. His groups found very quickly that problems have a nice way of arising at the most inopportune moments, when writing code especially. They found that meeting almost daily was the best way to give ourselves time to be able to handle all the compilation and run-time errors that could arise. Lastly, he learned the importance of when to use pair programming. This was the way that his group got the most work done for that class. It is nice to have a physical "rubber duck" in the form of a human to bounce ideas off of and often, one's group-mates can see things that one does not in the code and vice-versa. Because *Senior Project* necessitates group-work, he finds that all of the above mentioned experiences apply and can help inform this group-based project. *Database Management* will help him because it was in this class that he learned how to create and manipulate tables and populate them with any information necessary. It was also in this class that he learned the importance of being efficient with form changes and the significance of differing keys. This will be relevant in his understanding of the database framework that has been implemented by one of his other peers, who was doing a database-tied application for the Moosnick Museum.

One of the specific skills that he brings to the project are his knowledge and experience with web development (using HTML5, JavaScript, CSS, and Ruby) across 2 projects for school, the creation of a weather web application using an API for an internship coding interview, and the maintenance of two websites while working for a semester at the internship. Another relevant skill that he picked up through working at the internship is a small coding team's workflow toolkit. He honed his skills in the Unix terminal, Git and GitHub usage and became well acquainted with Trello as a tool for keeping track of the pieces of the project as it comes to completion. He has skills with using Firebase as a back end for an app he was working on for Awesome Inc, where his internship was held. This familiarity will allow for him to better understand the database implemented by fellow student, Adriaan. The last and most relevant skill that he brings to the project is his experience in working with a group to accomplish the completion of a large, semester based coding project. This, he acquired through taking various

Computer Science classes at Transylvania University, as well as, working in different small groups in his internship at Awesome Inc.

Christine proposed the idea of the Moosnick website to the class. In terms of prior knowledge regarding the project, she has little. Because Christine decided to switch to Computer Science as a major right before her Junior year, she did not have the luxury of having many choices of different CS courses outside of the core major requirements. She missed the opportunity to take *Database Management* because she had to take the fundamental courses instead. However, Christine has been always interested in learning web development and databases. Extrinsically, it would increase her marketability as a programmer in the job market. Intrinsically, she's wanted to learn how to code an interface a person would interact with that is accessible and aesthetically pleasing. Christine's concentration of Spanish does not directly pertain to this project. It is hard to argue how Spanish and Computer Science would be directly related in general. However, her Spanish minor shows that she had, and still has, a desire to learn a foreign language. Christine considers programming languages very similar to human languages, and she immensely enjoys learning new languages, both programming and human. The same desire to learn is why Christine chose to propose the project even though she does not possess the skills required. However, that does not mean that Christine knows nothing. In *Operating Systems*, she utilized GitHub for version control in her group projects and will use it for this project to keep Fran up to date on her progress. She will be honing her terminal skills while working with GitHub as well.

Our group envisions the usage of the following languages for this project: HTML5, CSS, and JavaScript. We will be using HTML5 because it is the basic block upon which most websites are built. We will be using CSS because it allows us to retain consistency across pages and allows us to maintain content organization. We will be using JavaScript because we need to to interface with Adriaan's Firebase database. Also to be noted, it will allow for us to have an interactive website.

We will be using GitHub, Trello, the jQuery Library, and Visual Studio Code. GitHub will be essential to our operation for version control because of testing, SRS updates, working on separate branches, and workflow. We will be using Trello because it enhances group member communication, accountability, and work management. The group can vouch for its efficiency and effectiveness in these regards. Also, according to Faisal Rehman on lifehack.org, "[Trello] is a fast and flexible way of organizing all your project components into various columns and cards by easily dragging and dropping, adding supporting details and comments as well as assigning to various persons in your team" (Rehman 2018). We will be using the jQuery Library because "jQuery is a powerful tool that offers a simple way to achieve a variety of common JavaScript tasks quickly and consistently across all major browsers and without any fallback code needed" (Duckett 294). To be noted, we will need to build a strong foundation in JavaScript before being able to take advantage of all that jQuery has to offer. We will be using Visual Studio Code because we are both well acquainted with it and feel very comfortable using its powerful features. A possible development tool that we may use in the future is Jekyll. Jekyll allows us to run local host servers from our machines to have a pseudo-sandbox environment to test changes and updates to the website without affecting the stable version.

HTML5, CSS, and JavaScript are three languages that we have had little exposure to as a group. This project will challenge us by requiring us to learn these languages within a short period of time and be proficient enough to create a website that adheres to the HCI guidelines. Gaining the knowledge in JavaScript will allow us to expand our knowledge further by using

jQuery for further efficiency and utility. The group has very limited experience in Firebase. Because the database for Moosnick was created by Adriaan, we do not have to worry about setting up one ourselves. However, we learned that the database is Firebase-based. This provides us with the opportunity to learn about a completely new database framework. Since Firebase is intended for mobile applications primarily, we will also have to learn how Firebase interfaces with web applications and languages. Firebase is not perfect whatsoever; there are many downsides with using the database. Firebase utilizes dynamic storage that is efficient regarding storing the data. However, getting the data back through querying is not intuitive. In an old Firebase blog post, it states that "querying has been a frequently requested feature." A database should not have querying as a requested feature in the first place. There are no relational queries in Firebase. Firebase utilizes JSON instead of traditional databases, which treats data as loose objects. There are no tables, nor reference keys. We are responsible for data searching and dealing with the problems that may arise with querying. There is the problem of cost. Firebase is free, until it isn't. If for some reason, the website exceeds storage, database, cloud functions, and so forth, there is a charge that comes with it. Google has a 'pay as you go' plan that would begin as soon as the application exceeds the cap. Granted, the free storage that is allotted for free users is very big, and the scope of the data that would be handled by the website for Moosnick would be below the limit by a large margin. The risk, however small it may be, is still a risk. Given the powerful nature of the real-time database of Firebase, it may be an overkill to utilize Firebase for this project as well. Some of the biggest uses for Firebase is to support real-time messaging and real-time database that one can manipulate as they go. The main purpose of the website for Moosnick is not to use it as a messaging hub, or directly manipulating the database by the users.

In spite of these cons, we have decided to move forward with using Firebase because of the following reasons: the Firebase database already exists, the introduction of another (My)SQL database would mean that the person or group maintaining the database would have to enter data twice (allowing for chances for inconsistency across databases), and the current database allows for Dr. Day to add, edit, and take things out of it with an app that was made for that express purpose.

Learning the languages, and familiarization with JavaScript and jQuery, in particular will prove to be the most time consuming part of this project with regards to front-end coding because on our past projects, other group members of ours have taken JavaScript as their part.. On the back-end, learning the intricacies of Firebase and its website integration will take a while, as it differs greatly from our experience with MySQL. Alternatively, coordinating regular meetings with our clients and advisors will be the most challenging on the "real-world" side because of their differing schedules. Making the website be objectively the best with regards to the most updated guidelines for website design will take a lot of reading upfront.

4. The Client

As a group, we decided to have more than one client for the project for different aspects. Our primary client for content and general usability is Dr. Day, because of his role as the curator for the Moosnick Museum. Dr. Day is interested in this project because he does not want to build a website on his own, and a website would be a centralized hub for information. There has been a website 15-20 years ago that has not been maintained. Dr. Day attempted to find the website, but to no avail. He is passionate about researching and collecting scientific oddities and equipment, which reflects in his work as the curator and his wish to bring awareness to Transylvania's rich history in science and medicine. This project would aid Dr. Day in doing so, as well as have a tangible database for the museum instead of having everything stored in his head. Dr. Day is not

concerned about the programming aspect of this project, but the usability, intuitiveness, and aesthetics. The primary evaluation of the success from Dr. Day's end would deal with how intuitively obvious the interface is, the information presented through the website, and the overall look of the finished product.

Our client for quality assurance and maintainability is Dr. England. We decided to have a separate client for quality and maintainability because our goal is to have a solid product that can be maintained to be used for a long time, even after our graduation. Dr. England has agreed to be responsible for maintaining the code in the future. The idea of this project was derived from an independent project that Dr. England oversees. We knew that Adriaan was building a database for the museum under Dr. England's guidance for a mobile application, and we wanted to see if we could build a website instead. Dr. England is interested in supporting this project because he has promised Dr. Day for 10 years to provide public electronic access to the collection. He has 41+ years of code quality control, which makes him qualified to be the client for quality assurance and maintainability. From the past classes he has taught at Transylvania, Dr. England oversaw the creation of an iOS application interface that lacked back-end. He has never been successful at creating a fleshed out, fully functioning product for use. Dr. England's evaluations of the project would take into consideration the quality of code, sufficient document for future reference, maintainability of the product, and constant reviewing and asking about the structure and functionality of code. Meaning, he will sit down and go line by line to question the group if we understand what the code is doing.

5. Conclusion

As shown in the proposal, the aim of the project is to create a website for Transylvania University's Moosnick Museum. The general goal of the group is to be able to learn and program in various languages while adapting to a new database to incorporate into the front-end. Front-end will be created with HTML5, CSS, JavaScript, and Firebase will be utilized for back-end database. The main clients will be Dr. Day and Dr. England, for user experience and quality assurance, respectively. We foresee this project to be challenging, yet rewarding experience for the members of the group. It will challenge us to also greatly consider user experience and design, instead of just focusing on the programming aspect.

Works Cited

Day, Jamie. Personal Interview. 28 Jan. 2020.

de Croos, Peter. “When You Should (and Shouldn't) Use Firebase.” *Codementor*, 4 Jan. 2018, www.codementor.io/@cultofmetatron/when-you-should-and-shouldn-t-use-firebase-f62bo3gxv.

“Documentation | Firebase.” *Google*, Google, firebase.google.com/docs.

Duckett, Jon, et al. *JavaScript & JQuery: Interactive Front-End Web Development*. Wiley, 2015.

Duckett, Jon. *HTML & CSS: Design and Build Websites*. John Wiley & Sons, Inc., 2015.

England, Robert, and Adriaan Engelbrecht. Personal Interview. 24 Jan. 2020.

England, Robert. Personal Interview. 28 Jan. 2020.

Jamin, Baptiste. “Reasons Not To Use Firebase.” *Crisp Insights*, Crisp Insights, 3 Dec. 2019, crisp.chat/blog/why-you-should-never-use-firebase-realtime-database/.

Koepke, Alex. Personal Interview. 27 Jan. 2020.

Nathan, Lee. “Firebase Pros and Cons.” *Medium*, One Tap Software, 20 May 2019, medium.com/one-tap-software/firebase-pros-and-cons-ce37c766190a.

Rehman, Faisal. “10 Must-Have Personal Project Management Tools.” *Lifehack*, Lifehack, 17 Jan. 2018, www.lifehack.org/articles/productivity/10-must-have-personal-project-management-tools.html.