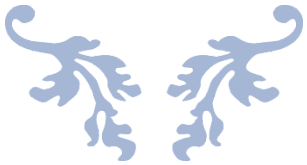
CS 598 (Senior Design I) – Fall 2021

INDIVIDUAL JOURNAL



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This document consists of a comprehensive individual journal for CS 598 (Senior Design I) during the Fall 2021 semester. It is broken down by Week #, and serves as a place to record best practices, good faith individual research, work products, assignment progress notes, development efforts, prototype activities, and lists the results and conclusions obtained.

Weeks 1 & 2 : 8/16/2021 to 8/29/2021

In the first two weeks, I was selecting and finalizing team members in our group. Our goal was to form a Computer Science group since we wanted to make it software based. We had a couple of issues with picking team members and had to select the skill sets of the team members carefully based on the needs of the group. For the second week, we didn't have team meeting since we were still in the process of picking a group. In addition, I wrote my Three Product Ideas and provided elaboration on how solving it in a certain manner would address the issue as a whole efficiently.

Week 3 : 8/30/2021 to 9/5/2021

In the third week, my team and I used Discord as a tool to communicate with others. We voted on a couple of product ideas initially brought up using their individual product ideas using Discord. First, we brought up Tan's idea, very similar to mine's, of making a consolidated app for WSU incoming freshmen and transfer students so all pertinent information is on one site, making life very easy for all who needs time to acclimate to college life. I then brought up the idea of making a shared Google Drive folder organized by Week number, making it easier for the project team lead and everyone to locate and submit their portions of the week's submittals. My team members and I talked about assigning project roles which consist of team lead (1), frontend (2), full stack (1), and backend (1). I picked the backend developer role since it gave me the chance to put my SQL programming skills into good use and also learn a couple of development frameworks easily.

Week 4 : 9/6/2021 to 9/12/2021

In the fourth week, my team and I ran into a couple of difficulties. One of the hurdles to overcome is gaining approval from the professor. On that Friday, we talked to the professor about our project on making a website and he asked us several questions about the practicality of the website, citing security concerns on accessing and storing student data, and hosting it onto a webpage. On the next day, the team and I had a Zoom meeting and we talked through the project topic and discussed the possibility of making it a service-learning project. Another team member reached out to Kim Wiseman and are waiting for him to respond. We gained approval and worked on our project proposals. I helped with crafting grammatically sound sentences for the project proposal. In the next few weeks, I hope to conduct more research on backend development and making a website in general, as well as learning Django framework / mySQL database server and integrate it with the developing skills from my CS 665 Databases that I currently take this fall.

Week 5 : 9/13/2021 to 9/19/2021

In the fifth week, my team and I brainstormed possible ways we can write the project planning paper. We briefly went over the project proposal and started thinking of ways to put our thoughts out on paper, discussed some risks and benefits associated with the project, what types of programming languages and frameworks we need to learn on our own so the transition was making the prototype and the final product would be easier on me. The team and I thought of making a 3D map for the website / app. I started paying more attention to my CS 665 Databases class since I chose the backend developer role of this project. I tried to identify any key gaps in comprehending the core concepts needed to successfully execute the project.

Week 6 : 9/20/2021 to 9/26/2021

In the sixth week, my team and I wrote out the project planning paper and made it very detailed and specific. I created a draft of the project paper that is to be used as a skeleton in helping the team perform any necessary grammatical modifications to sentence structures, vocabulary, synthesis of ideas. The goal was for all the team members and I to put our thoughts onto paper, even though the ideas are not fully fleshed out and finalized yet. I did the team skills matrix analysis, legal and ethical analysis, and software development model. The team and I discussed some ethical issues, such as domain names, data retention, SQL injections, etc. We proposed possible solutions and documented it in the planning paper. We also formed an overall first semester schedule plan, which was instrumental to getting everything done as we now have a layout in knowing what is to be expected in the coming weeks. Andy sent us an email about the possibility of changing to a mobile app development project in place of the As for my personal contribution in the future weeks, I am developing an interest in relational databases and SQL programming, as well as looking up popular frameworks used to develop the backend portion of the website / mobile application.

Week 7 : 9/27/2021 to 10/3/2021

In this week, my team and I prepared to change our topic from LoRaWan to the one from Tabor College. The team and I had a meeting with Dr Rangel from Tabor College where the team and I asked a series of questions to help us ensure the conversation goes as smoothly as possible. Some initial questions we asked included the “How to host the app into the tech world?”, “What are some security concerns raised by making the app?”, “Coordinating schedules and tasks in a streamlined manner?”. Those are the questions asked in preparation for next week’s midterm presentation.

Week 8 : 10/4/2021 to 10/10/2021

In this week, my team and I narrowed down the project scope after the conversation with Dr Rangel. The team and I had to do our own parts and present a midterm review presentation to Andy. I was in charge of the backend development of the app. A few useful information I got out of the preliminary research from making the PowerPoint slides are as follows: we can connect to Firebase, which is a hosting platform from Google, it automatically updates the database in real-time and has a strong authentication feature. A backend component is very much essential feature because I need a way to integrate Tabor College's data into the mobile app. A couple of follow-up questions I had were: "Is JavaScript a faster way of app development, can the application be easily scaled up, and how to handle more I/O (input/output) requests without sacrificing time?" My portion of the slides is attached below as Figure 1.

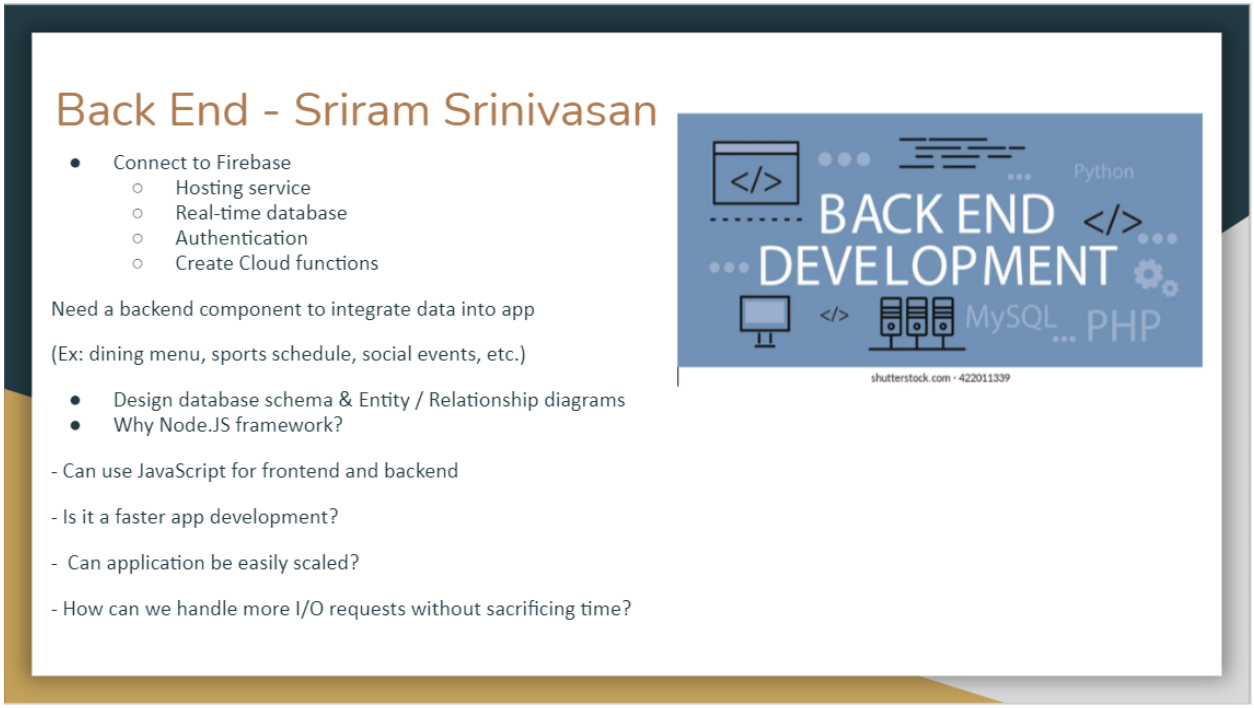

Figure 1 (Midterm Presentation Slide)

Week 9 : 10/11/2021 to 10/17/2021

In this week, the team and I focused on preparation for the skills assessment (for grade). Apart from that, the team and I also started developing channels for project management. Two of them was using Trello and Figma. Trello is a software developed for task management purposes, which organizes by categories (To-do, Backlog, Done, Work

in Progress). This allows us to have a visual blueprint of what needs to be done at which time. Certain tasks can be labeled as well, which allows us to be more efficient with our workflow and focus on certain tasks at a certain period of time. I added myself onto a couple of tasks to learn, for example, how to create a GitHub repository and manage them, and learning new programming languages needed for this project. The team and I also set up Figma, which is a software design implementation tool, which allows to create a concept map of the software design process. Annotations and other features can be done as well. As for my personal contribution, my tasks for the upcoming weeks is to do a solid research on Firebase and start learning JavaScript and learning how to use some API frameworks such as ReactNative. Trello and Figma will be attached below as Figures 2 and 3 respectively.

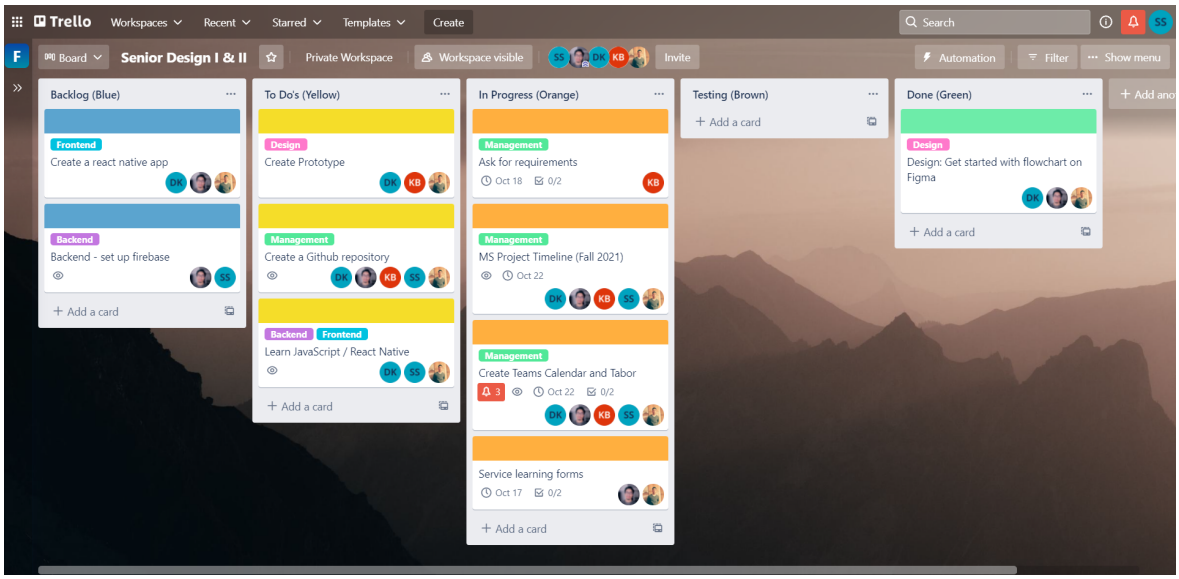

Figure 2 (Trello)

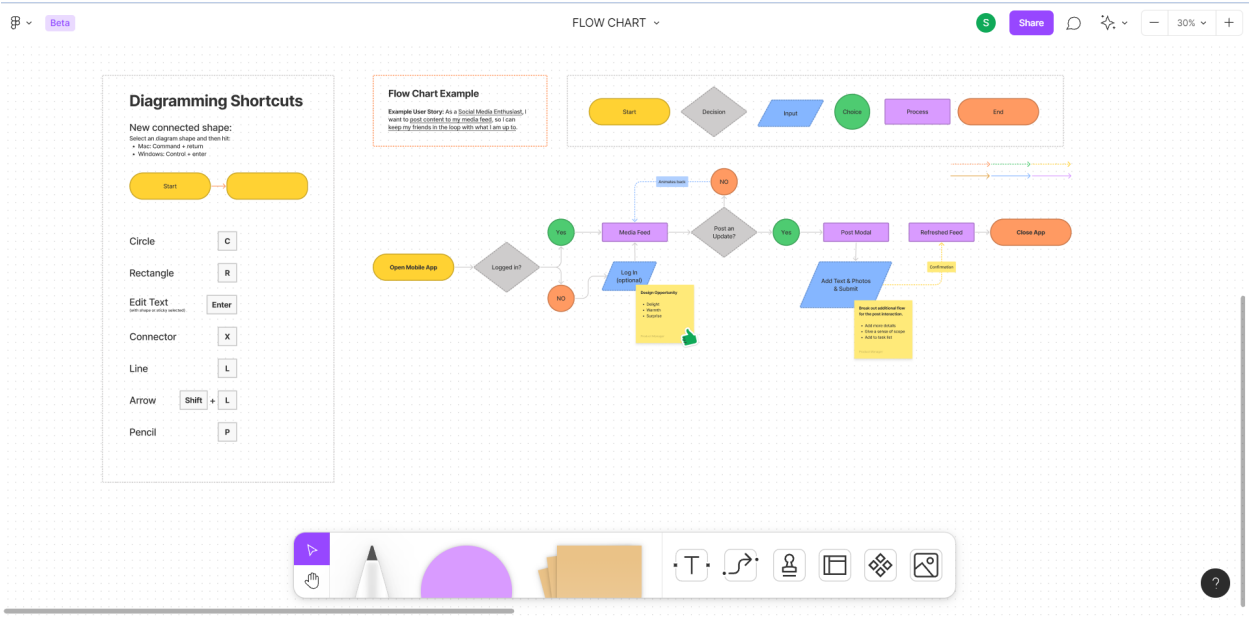

Figure 3 (Figma)

Week 10 : 10/18/2021 to 10/24/2021

In this week, the team and I hustled and wrote the Technical Product Specifications Paper. The paper focused on the product description where we focused on the main purpose of making the app for Tabor College, product constraints which consists of realistic limits on what the end deliverable can actually contain. It also has specific requirements such as IOS and Android compatibility, log-in authentication features, and self-contained documentation for future developer use. Users also have requirements. For instance, that includes buttons and a menu interface. Software tools such as Git, Linux, Expo CLI, and web scraping is used to extract data from websites. Software products and tech stack requirements are also included, which has Firebase, React Native, and UI libraries. Tan and I personally helped out on fleshing out on the initial ideas on writing the paper, and it helps a lot in getting my other team members to finish out the paper.

Week 11 : 10/25/2021 to 10/31/2021

This week, I focused on making a block diagram for my backend development. I first wrote down a design layout on paper about what features I want my block diagram to contain. I focused on Firestore database and connected it with the API, which acts as a messenger between Firestore and any software accessing it. The database itself also have secured sign-on (SSO) authentication features and a storage component to store static API files. The database would then run server-side scripts that handle requests and extract the necessary data from the database. For that, a scripting and framework-based language such as JavaScript with ReactNative would be used to interact with the

database. Subsequently, the database would use cloud functions to interact with the API which then consists of the server. All of that is connected to the Internet / cloud which initiates push request / response methods to the front-end of the Tabor College mobile application. The block diagram made on Figma will be attached below as Figure 4.

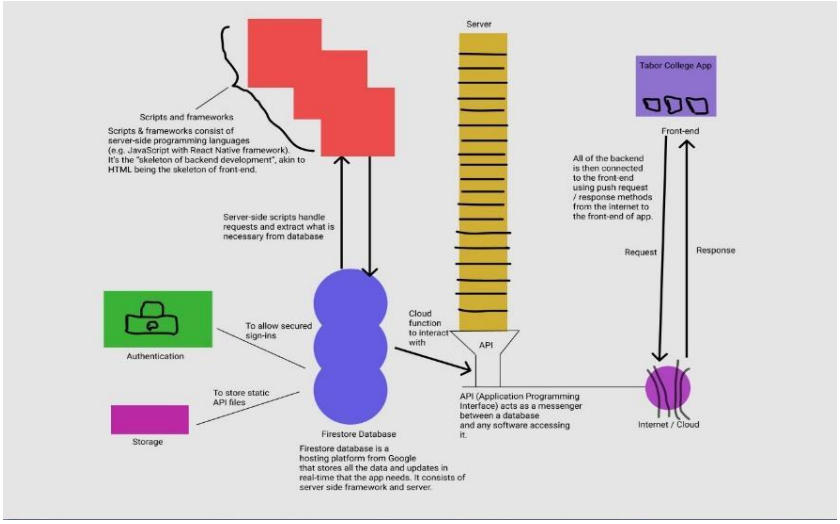

Figure 4 (Backend Block Diagram on Figma)

Week 12 : 11/1/2021 to 11/7/2021

This week, my team and I worked on the Product Reflection Paper. On my end, I interviewed my friend who comes to GEEKS regularly for seeking help with his courses. He is an Applied Computing major and is a returning adult student, so I figured it will be worth the time spent to ask him for his perspective on my team's mobile application development. A couple of questions I asked included "How do the project requirements look like?" I showed him the notes our sponsor from Tabor College made and overall, he said it is a fantastic idea. He also suggested to personalize the recommendations for academics based on students' majors. Instead of selecting every option that pertains to them, it will be easier to have a drop-down menu that only asks questions relevant to the students' interests. That way, it is easier for students to receive pertinent information from the application. My interviewee also inquired the purpose of the guest login, and I clarified that it is meant to have a secured way to access the guest-needed only features of the application (general public information) without a privacy breech on secured students / faculty personal information such as grades and financial aid.

With regards to the project itself, my team member Fitri Rozi shared a few general resources for backend development for us to get started on. He sent me YouTube links on learning how Firebase and ReactNative , as well as GitHub, work. I learnt useful information on how authentication is handled, and how convenient and easy it is for the database to update information in real-time. I also learnt how to push/pull Git repositories and how to fork an existing one into my own code that I can mess around

with. My next steps are to get the Firebase database app running and to do more research on the network and security protocols that come with backend development. The Firebase YouTube screenshot will be attached below as Figure 5.

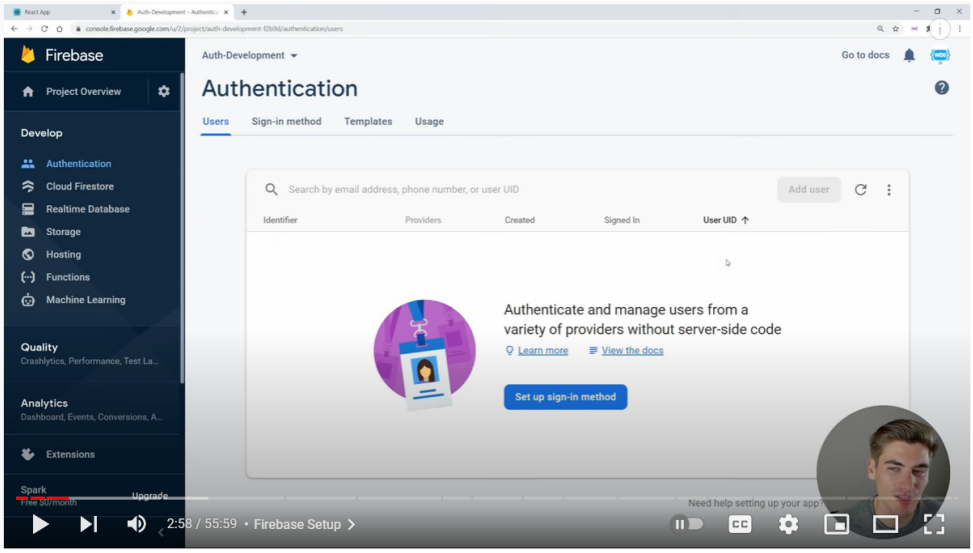

Figure 5 (Firebase Research screenshot from YouTube)

Week 13 : 11/8/2021 to 11/14/2021

This week, Fitri, our project lead member, sent us a link on our group's Discord to research more backend specific requirements such as authentication features and how JSON objects work. Karishma, my backend co-developer, and myself plan on designing the backend development by drawing out Entity / Relationship (E/R) diagrams and relational schemas for the requirements Fitri acquired from last week's meeting with sponsors from Tabor College. Karishma and I plan on contacting Tabor College's IT department to learn more about more specific backend requirements that my other team members couldn't do so from initial meetings. Below is the individual work package that is written here, and is also posted on Blackboard as well.

Personal Product Reflection:

I personally feel that the project's idea and motive was very well-received by everyone we interviewed.

In my case, it is with an applied computing student whom I tutor for at GEEKS every day. I figured he had a really good experience with computing thus it is much easier to ask him with the requirements. He was overall very impressed with the project. He commented that even though the project requirements look complicated, it should be doable. He commented on whether the app is just for academic concerns and not for other issues. And I said that it is for all issues that pertain to Tabor College. He suggested me to include a drop-down menu so that all majors are categorized according to subject

areas instead of selecting all the areas that apply. I agreed with him on that since it is easier for students to select by subject area and drop-down menu. With students' lives being ever busier, it is important to make sure they have access to a good and reliable app that doesn't waste time fiddling with unnecessary issues.

In addition, the interviewee also inquired the purpose of the guest login. I mentioned that it is to provide everyone access to Tabor's app, with two pathways separate. Tabor affiliated people (faculty and students) can access grades, classes, financial aid, advising appointments, emails, etc. Whereas non-Tabor affiliated can only access general Tabor information that is for public use (parking lots, places to eat, game days / events, etc.) I really liked this feature as it allows us to have one single app but to make 2 separate copies that perform 2 distinct operations. It allows everyone to have a peace of mind knowing that the data is encrypted privately and there is no unauthorized access to secured data.

He also inquired the purpose of the administrator feature. I mentioned that it is just to have department chairs sent out department-wide announcements to all students. overall, I feel it is a solid project that is doable, and I can't wait to for Senior Design II!