University of Regina | Faculty of Engineering and Applied Science

Software Systems Engineering Project Experience Review Report

Pencil.

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1. Project Description: Pencil

With the advent of online entrepreneurs, more seamless customer scheduling experiences were also created. Instead of booking through a call, or booking in-person, many clients prefer to be able to book an appointment and schedule their lives using a smartphone or computer. Pencil was a solution for that problem. Currently services like SquareSpace and YouCanBook offer basic solutions. Pencil was built to be a single webpage application that would offer a scheduler that could be dynamic and easily customizable to the business' needs. Within the web application, both business owners and the customers would be able to use Pencil to advertise and find businesses. Additionally, with the ability to use Pencil as a business aggregator customers would be able to search for businesses in their area and book appointments. Those features would allow the business owner and customer to have a streamlined and smooth scheduling experience. Gamification aspects to promote recurring use with businesses were planned. The gamification model would promote a positive experience outside of the normal service/payment operation that many businesses conduct themselves under.

2. Project Planning

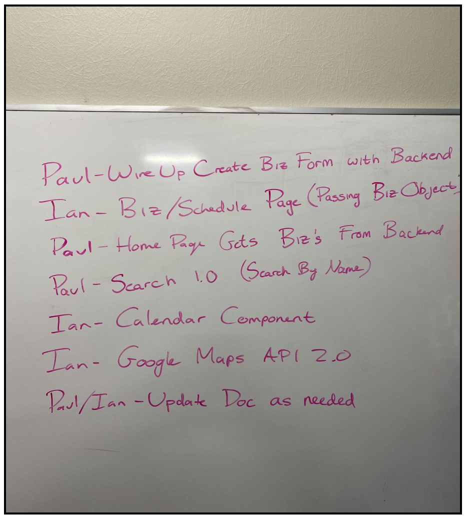
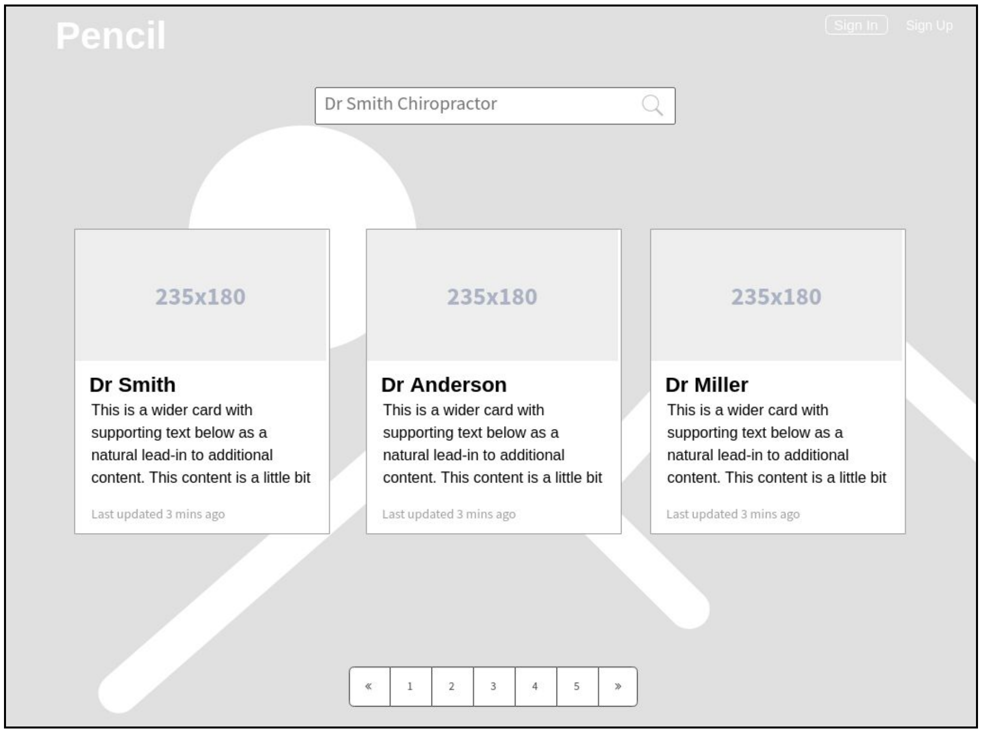

Paul-Wire Up Create Biz Form with Backend
Ian - Biz/Schedule Page (Passing Biz Object
Paul - Home Page Gets Biz's From Backend
Paul - Search 1.0 (Search By Name)
Ian- Calendar Component
Ian- Google Maps API 2.0
Paul/Ian - Update Doc as needed

Fig 1 - Sample Scrum Checklist

With only two members in the team for Pencil, the design process was kept to an agile design process. A mixture of both Kanban boards and the scrum process, (ScrumBAN) was used throughout the entire project. During the inception of the project, a kanban board was constructed based on the results of the User Stories. Those features then were developed as a team. A standup was performed at the beginning of each work session, touching base about what would need to be designed, developed, and tested during the work session. A 'sprint' checklist would be created, outlining the features or tasks that would be completed for the following work period. This can be seen in Fig 1. The standup meeting would also serve as a time for design discussion to occur.


Pencil
Sign In
Sign Up
Dr Smith Chiropractor
235x180
Dr Smith
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Last updated 3 mins ago
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Dr Anderson
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Dr Miller
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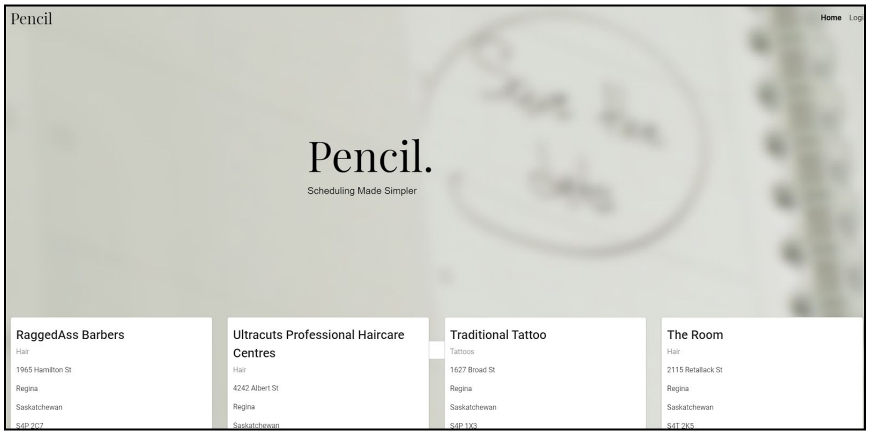
Fig 2 - Low Fidelity Prototype of Business Search Results

Low fidelity prototypes would be created, taking in input from both members. In Fig 2 we see the low fidelity mockup of the search results displaying on the homepage. Appropriate affordances and signifiers were added, like placeholder text for inputs, and clearly labelled pagination. With lo-fi mockups created, programming could be started.

The initial version of the different features were programmed individually according to the different strengths and learning goals of the two members. Once version 1.0 of the features were completed, a critique of the design decisions was performed as a group. The input from each of the group members would be implemented using paired programming. This was to ensure that errors were not overlooked. Sample errors that were corrected can be seen in Fig 3. Issues with website responsiveness could be spotted and corrected relatively quickly as a group as the initial programmer could have had tunnel vision while working on the feature. The exact cause of this error was due to programming on two different screens of different resolutions.



RaggedAss Barbers
Hair
1965 Hamilton St
Regina
Saskatchewan
S4P 2C7

Ultracuts Professional Haircare Centres
Hair
4242 Albert St
Regina
Saskatchewan

Traditional Tattoo
Tattoos
1627 Broad St
Regina
Saskatchewan
S4P 1X3

The Room
Hair
2115 Retallack St
Regina
Saskatchewan
S4T 2K5

Fig 3 - Responsive issue with Search Homepage in Initial build

The routine of referring to the Kanban board then having a standup meeting to plan the work session was kept throughout the entire project. Informal communication was also maintained using Slack and Facebook Messenger. The purpose of the informal communication was to maintain time estimates to complete the features.

3. Personal Reflections

3.1 Ian Quach's Reflections

Before beginning the Capstone project, the main learning goal of the project that Ian Quach had was to become more experienced working with larger scaled projects and front end work. Through coursework and competitions, a base level of understanding on UI and UX design was obtained. Pencil was programmed using Angular which was a new architecture that Ian has not used before beginning the Capstone. Angular was a learning curve due to the fact that it uses TypeScript, which is then compiled into JavaScript. Along with learning Angular, the FullCalendar API was used with the project. Angular was well documented, giving an easy to follow guide for component construction and general use. When issues arose, they could be easily tracked to related issues other programmers have run into in the past due to its popularity and age. Some functions that were used with Pencil had their operations changed between Angular 7 and Angular 8 and that was easily discovered on StackExchange due to the vast user base. When working with FullCalendar, the difference in support is easily identified. Due to the documentation being less clear, it was much more difficult to learn and use for Pencil. Vast changes occurred to FullCalendar between their 1.0 to the current 4.0 version. The documentation was less intuitive to learn for the latest version so development slowed dramatically when using the more niche API. Choosing the correct techstack aids in the development reducing the number of headaches that can arise.

Creating an intuitive webapp was the main goal of Pencil. Ian's inexperience with working on projects that would be used by a wide variety of people led to interesting design decisions that would have been caught by a more experienced developer. Throughout Pencil's development, constant growth in UI and UX skills has occurred.

Using lo-fi designs to map out the layout of the website aided with finding a layout that made sense to a majority of users, rather than building something before any planning occurred. This made it even clearer that documentation skill is something integral to the success of any software project.

3.2 Paul Hewitt's Reflections

Paul approached the Capstone project with two end goals in mind. The first, to strengthen his backend abilities by learning a completely new programming language foreign to him, and utilizing it to create a REST API. The second goal was to improve his documentation and project planning skills. Planning and designing a complete software system from start to finish is an incredibly complicated task, and at times it can feel overwhelming to decide on which design strategies and methodologies to begin with. Furthermore, software engineers do not exclusively work with other software engineers. They work, and collaborate with humans of all sorts of backgrounds, and technical skill levels. This requires the ability to create documents, both technical and non-technical, as it is crucial to make sure everyone has the same level of insight. It was Paul's understanding that not only can software engineers write code, they are also able to design, maintain, and ship complete, valuable, software systems.

Very few classes at the University of Regina offer the unique opportunity that Capstone presents. It is a very valuable time to gain precious experience before heading out into industry. Paul's experience with learning the new language, Go, went very well. He was able to write a complete RESTful API, and deeply integrate it with AWS, utilizing the new trend of serverless architecture. Writing a API from scratch with a brand new language is a great way to strengthen your skills as a fullstack developer, as it forces a new way of thinking about familiar concepts. One of the unique things about the Capstone project is how open it is. One is free to create just about anything, and can document and design it however they see fit. In this openness, lies the challenge. Pencil had to decide on processes, and defend those processes throughout development. Of course, there will always be unseen obstacles and variables, just like any engineering project, and engineering students must be able to demonstrate their ability to adapt, and overcome said difficulties. This is where the Pencil project met Paul’s second goal, which was to improve his documentation and project planning skills. Defending design processes/decisions, and writing technical and non-technical documentation were pivotal in meetings with the Capstone supervisor. Because of this, Paul found he was meeting his goal, if not exceeding it, as the Capstone project went on. Writing a REST API is one thing, but then documenting every step of the way and providing easy to understand explanations and diagrams is another.

Paul’s only complaint with the Capstone project would be lack of student bazaar days. Seeing what other students are working on can be fascinating, and it can spark innovation or an ‘Ah-Ha’ moment at any time. It also allows the different teams to compare their own work: are they behind on documentation, is their product too simple, etc. He thinks these bazaar days are excellent for setting, and maintaining ‘the bar’. Overall, Paul’s Capstone experience was a rewarding one. He gained technical skills in learning a new language, and dramatically improved his documentation and planning skills. He will never forget completing his Capstone during the extraordinary times of the COVID-19 Pandemic.