7Factor Staffing Tool

A Major Qualifying Project submitted to the faculty of Worcester Polytechnic Institute in partial fulfillment of the requirements for the Degree of Bachelor of Science.

In cooperation with 7Factor Software, LLC

Submitted (submission date)

By:

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Abstract

7Factor Software LLC is a software development and consulting company based in Atlanta, Georgia. The company designs, develops, deploys, and maintains well-engineered software solutions for tech-forward enterprises and ambitious start-ups with great ideas and a commitment to quality. To help foster the ambitions of 7Factor, our predecessors built a web application to track employee's hours to ensure reliability and efficiency. Our main goal as a team is to expand the use of this web application to all platforms employees will mostly use, since the previous development focused on desktop development. A new user interface was created using the same theme from the desktop version. The various platforms the web application can adapt to includes modern mobile displays (IOS and Android) and modern Tablet displays.

Acknowledgements

We would like to thank the following people for making this project possible with their continuous support:

Professor Joshua Cuneo (Project Advisor)

Jeremy Duvall (7Factor CEO)

Furthermore, we would like to acknowledge past MQP groups who have worked on this project, for giving us a good foundation to build on.

Dyllan Cole

Noah Olson

Andrew Whitney

Evan Llewellyn

Panagiotis Argyrakis

Rafael Pimentel

Nicholas Wood

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Executive Summary

Software Integration

With the growth of technology, and the introduction of numerous mobile devices in our everyday lives, the Staffing tool app, which was only available to desktop users, limited the usability of the application. Our goal as a team has been to make the website responsive on various devices, starting with mobile and tablet devices to improve user experience and convenience. The design concept of the desktop version of the website was kept throughout all pages, but the dimensions of elements of design were amended to suit different screens while preserving the functionality of the website. Users of the website can now perform essential functions on the application like entering time, creating rate cards, and viewing data analysis on various devices.

Responsive Design

Our main goal for this project was to design and implement the responsive design end of the software. That means ensuring that elements of the website are completely redesigned to suit various device sizes. Even though the design concept was kept the same, the positions of elements were adjusted as necessary to fit device sizes. An example is the hamburger. The hamburger was designed previously to appear on the left-hand side of the page when opened, but we found that on smaller device screens, it became a nuisance to the eye and thus negatively impacted the user experience. Therefore, the hamburger menu was implemented to cover the full screen to give the user full access to the menu without interruption from the current page. The application still uses PostgreSQL for the database, the Spring Boot Java framework for the REST API, and React for the frontend. In addition, our team took advantage of React and used the MUI (Material User Interface) library to implement design changes based on device screen sizes.

Results

With the resources we had available to us, we successfully created a responsive design website for most modern mobile and tablet devices. We started with creating mock UI designs using the Figma designing tool. All projected changes and adjustments of sizing were done first with mock UIs so we could visualize it before we started implementation. To test the responsive designs, we used the Figma prototyping tool to create a mock application on various screens to measure the user experience and evaluate implementation results. A priority for 7Factor was to make sure the analytics pages with data fitted all screen sizes.

Future Work

We suggest that future teams consider building on this project by either working on server-side role-based authentication or data transfer objects (DTO). The Staffing Tool platform currently does not fully support authentication for the site. This problem can be solved by simply validating Auth0 roles on the server side. Also, implementing Data Transfer Objects (DTO) will help to send and receive information from the frontend to the backend individually without sending information that has not been requested by the user.

Introduction

7Factor is a cloud-native software solutions company located in Atlanta, Georgia founded in 2016 by Jeremy Duvall, an entrepreneur, and Software Engineer. This Staffing Tool software is used to track time to make it easier to bill clients with varying rates, projects, and employees. 7Factor wanted the staffing tool software to be responsive to numerous platforms and not limited to a desktop environment. Thus, the purpose of this MQP was to build upon the previous teams' project and create a responsive design user interface that adapts to multiple modern Interface platforms such as mobile and tablet devices (iPhone and Android).

Background

7Factor

7Factor is a software and cloud services company based in Atlanta, Georgia, that helps to provide quality solutions to their clients. 7Factor is guided by its seven factors likes its name suggests. Those factors are “Teach and Elevate”, “Automate Everything”, “Do No Harm”, “Curiosity”, “Equality and Diversity”, “Good Things”, and “Love”. They have helped with the software solutions for some famous names including Delta Airlines, Aveanna Healthcare, WellEntry, SongSplits, iVita Financial, Welnys and more than one hundred other organizations (Quality Engineered Custom Software Solutions: Cloud native: 7Factor, 2023).

Previous Group Accomplishments

This Major Qualifying Project is a part of a continuous effort throughout many years and many different groups of talented WPI students to design and implement a working Staffing Tool platform for 7Factor. Our team is the third group to have contributed to this project. The first team worked on laying down the skeleton and foundations for the project. The next team mostly focused on adding on, revising, and improving the state of the user interface of the site. They redesigned the user interfaces for each existing page to make them more appealing and a better experience for users. They also added an Analytics page for users to see their information on the site in charts and graphs.

Previous Group’s Future Work

In the previous group’s MQP final report, they suggested several different routes for future work, including server-side role-based authentication, data transfer objects, and responsive design. According to the previous group, in terms of the server-side role-based authentication, a group needed to validate the Auth0 roles on the server side so that the UI is properly restricted based on roles that are verified by the backend. The goal of implementing data transfer objects is to modify the existing shortcoming of the frontend to send and receive large chunks of data, instead of transferring only the necessary information between the frontend and the backend. Finally, while the previous group had improved the desktop experience both visually and functionality-wise, it did not properly support any other displays like mobile phones, tablets, or other non-desktop platforms.

Methodology

Development Methodology

Agile

The Agile development process is an iterative approach to software development that can help teams deliver value to their customers faster and easier (Atlassian). We used the Agile development process with weekly meetings and weekly sprints. We systematically advanced the progress of the website and used weekly scrum meetings to reprioritize the items of the site that needed the most work. Most of the coding was done individually with weekly code reviews by the team.

Software Development Tools

MUI

MaterialUI (MUI) is a React component library that offers a comprehensive suite of user interface tools that can help you to design and implement new features faster (The React Component Library You always wanted. MUI ,2023). Material UI was used as the basis for the interface of our new system so most of the adjustments had to be made to the adaptive interface. The breakpoint system of MUI allows users to constrict and design the interface based on the size of the user's screen and have the system adapt accordingly. It was extremely helpful for the progress of our project, as it outlined how we needed to position each component depending on user display.

React

React is a JavaScript library that can help users to build user interfaces (React – a JavaScript library for building user interfaces). React was the base that the user interface of the

Staffing Tool Platform is built on. React works through a components system. Users can make complex UIs using React by building components that manage their own state and have their own attributes. The MaterialUI library is also built upon the React library.

Development Tools

Trello

Trello is a platform that helps to bring everyone on the team to the same page by detailing tasks shared by the team and what the status of each task currently is. Our team created a Trello board to keep track of all tasks for the Staffing tool platform project. We created a column for each sprint to keep track of every task that we had finished, were still working on, or had not started in that given sprint. We used labels to assign certain tasks to each member of the team and what each task entailed. For example, a task can be to "Redesign how each page of the site should look like on a mobile device" that can be assigned to one of our team members. On the task it should continuously be updated to show the status. Overall, Trello allowed us to organize our project better and provided more stability in the project.

Timeline

We created a timeline in Word. We outlined each week of the project and the expected workload for that week. After each week, we would change and edit the timeline depending on whether we had completed all the work expected for that week. If we did not get to finish all work for that week, we would come together and split the unfinished work to future weeks.

GitHub

GitHub is a tool that provides a platform of version control features and remote collaboration. It offers remote Git repository storage and features. The code for our project is split across a frontend repository, a backend API repository, and a database repository. GitHub is extremely useful when a team has multiple members working on the same project because

GitHub has a branching feature. This feature allows users to implement code without worrying about breaking the entire code base, and code is contributed only after a pull request is checked and merged onto the original code. GitHub served as an important tool throughout this project by helping us to continuously add code, prevent bugs that would break the code and bring team contribution together.

Figma

Before starting actual implementation in code, we needed to design the user interface pages in our intended display sizes. We used Figma to initially design how we wanted the interface to look in a mobile setting. Figma is an online tool that gives users the ability to design a user interface mockup. It contains tools that lets users to design each page with components of user's liking, acting as a prototype or example for actual code implementations. Figma also contains a prototyping feature that allows users to attach commands to each feature on the mockup (The Collaborative Interface Design Tool). For example, users can make buttons on the mockup run commands like navigate to a new page. Using this feature, we were able to configure the mockup to represent a copy of the actual implementation both in aesthetics and functions to some degree.

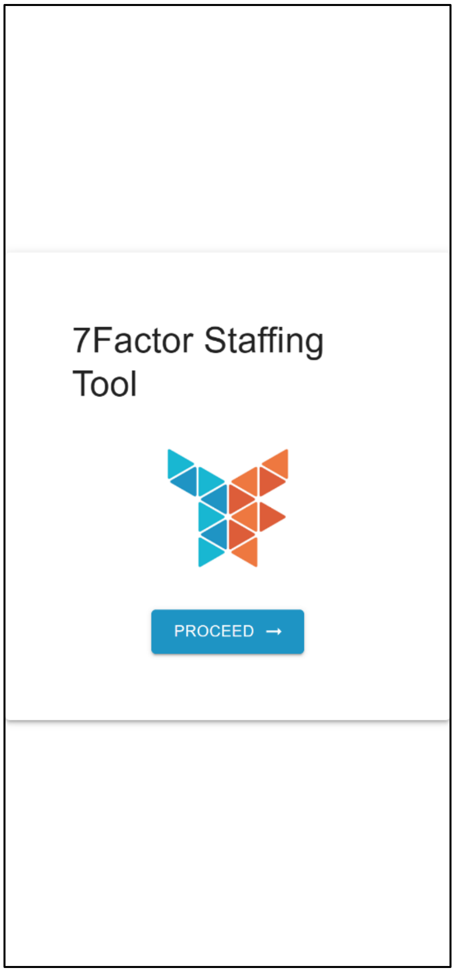
Results

User Interface: Before & After

After determining our primary goal for this project, we decided to work on the responsive design aspect of the staffing tool platform. When we took over the project, the backend and frontend were mostly implemented. That put our focus on extending the UI functionality and aesthetics to all other platforms including mobile (most important), tablets, and other non-standard displays. We created our mockups through Figma to redesign the displays of a mobile device.

Login Page

We did not make any significant edits to the login page. The previous team has already implemented responsive design to this page. This page is correct on all views including desktop, mobile, and tablet displays.



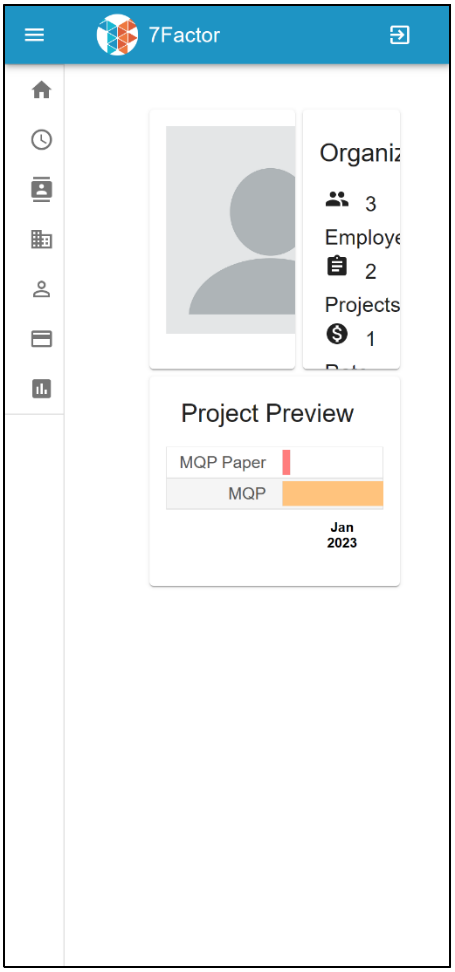
7Factor Staffing Tool

Figure 1: Login Page (Mobile), No changes

Home Page

The home page previously did not function properly and did not fit on any display other than desktop view, as you can see in Figure 2. The home page uses card formats that contain information about the logged-in user, including the organizations and projects associated with the user. However, because responsive design was not previously implemented, the page on all other displays shows the different cards distorted to fit on the screen.

Before



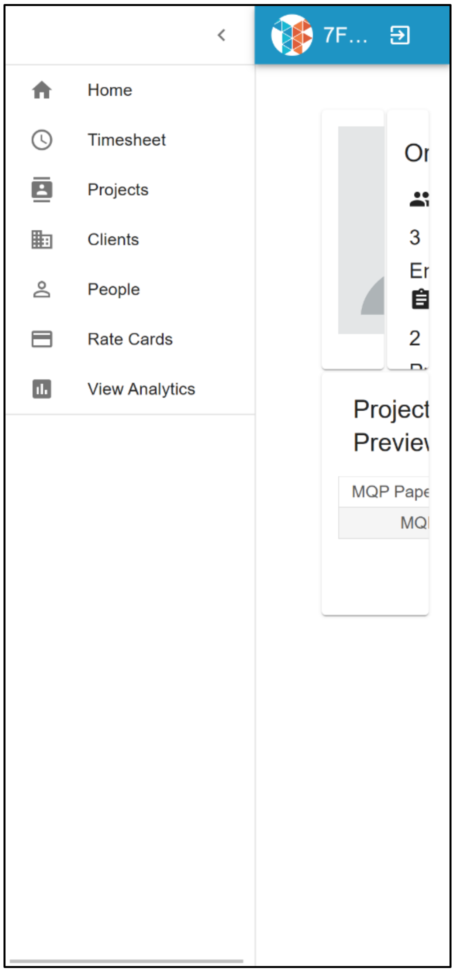
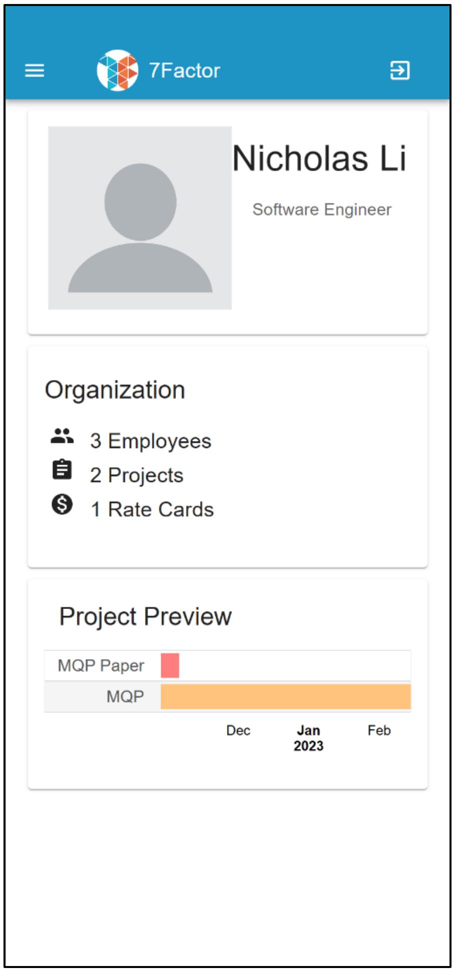


Figure 2 (Left): Home Page without hamburger expanded (Mobile Before)

Figure 3 (Right): Home Page hamburger expanded (Mobile Before)

After



7Factor

Nicholas Li

Software Engineer

Organization

3 Employees

2 Projects

1 Rate Cards

Project Preview

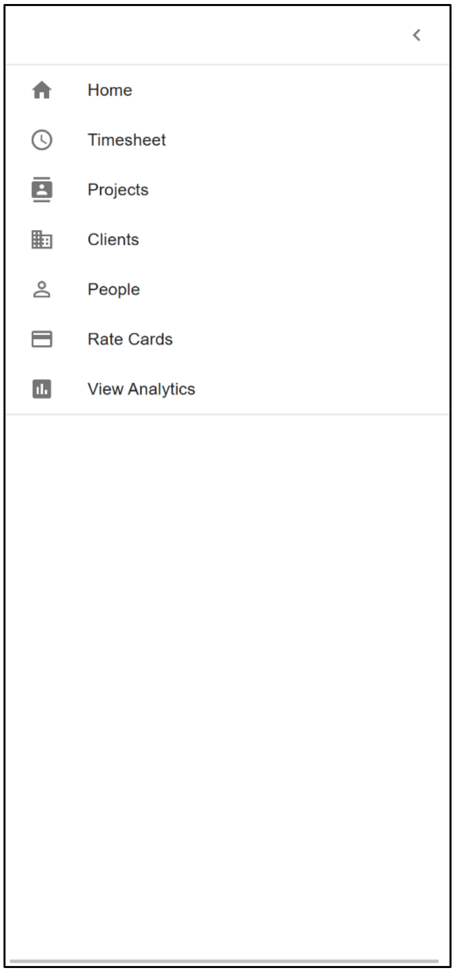


Figure 4 (Left): Home Page without hamburger expanded (Mobile After)

Figure 5 (Right): Home Page hamburger expanded (Mobile After)

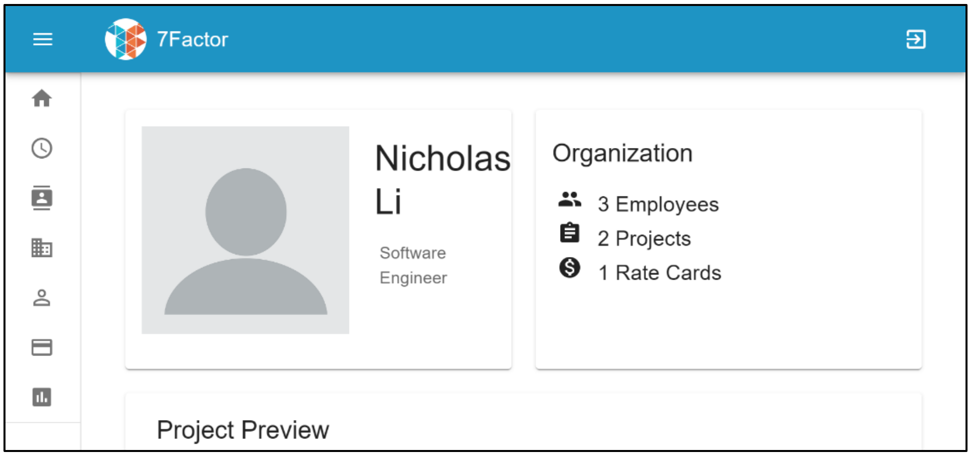


Figure 6: Home Page (Mobile Rotated After)

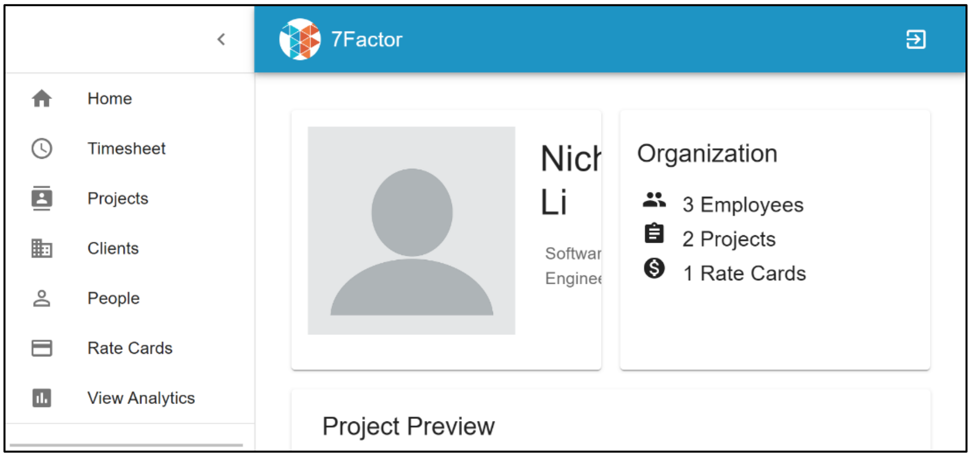


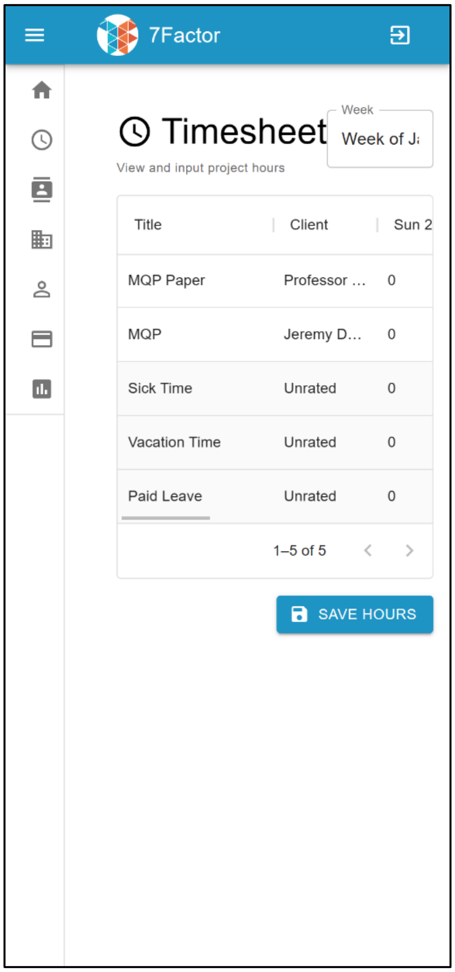
Figure 7: Home Page expanded Hamburger (Mobile Rotated After)

When we took over the project, we implemented responsive design using MaterialUI. The first thing that we did was to properly place the cards. For the mobile view, we decided to place the 3 different cards vertically with the user information card on the top, organization card in the middle, and the bottom is Project Preview card.

One of the most significant changes that we had to make for this page is the hamburger function. The original hamburger functions by pushing out from the left regardless of the display size. Because of that, it would mess with the functionality of some of the pages in displays with smaller widths. We decided to implement the hamburger function based on the width of the screen. For smaller screens such as the mobile view, we kept the hamburger button but removed the sidebar. When the hamburger button is clicked in this screen, the sidebar would then appear from the left and take up the whole screen. This way, the hamburger would not mess with the pages but would still be available when needed. For all other views, the hamburger would function the same way as previously implemented, where the sidebar is still visible and would push out from the left when clicked.

Timesheet Page

Before



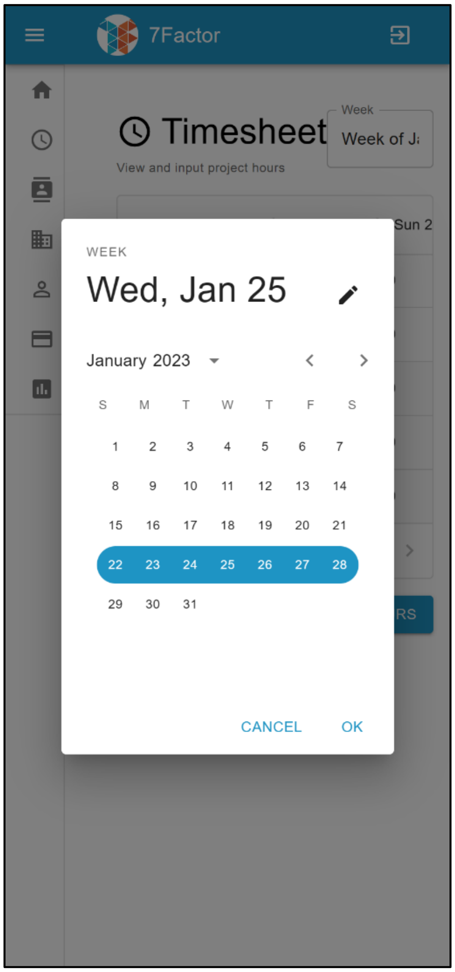
Timesheet

View and input project hours

Week of Ja

Title	Client	Sun 2
MQP Paper	Professor ...	0
MQP	Jeremy D...	0
Sick Time	Unrated	0
Vacation Time	Unrated	0
Paid Leave	Unrated	0

1–5 of 5



WEEK

Wed, Jan 25

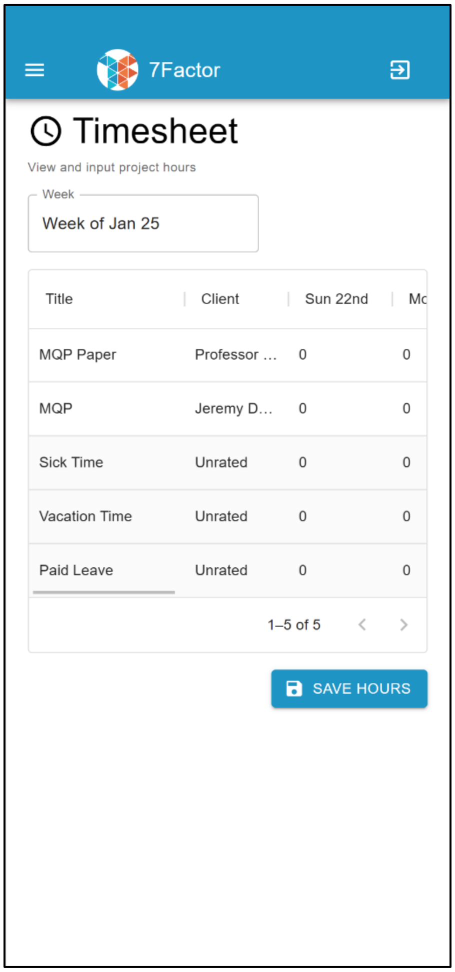
January 2023

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Figure 8 (Left): Timesheet Page (Mobile Before)

Figure 9 (Right): Timesheet Page Calendar (Mobile Before)

After



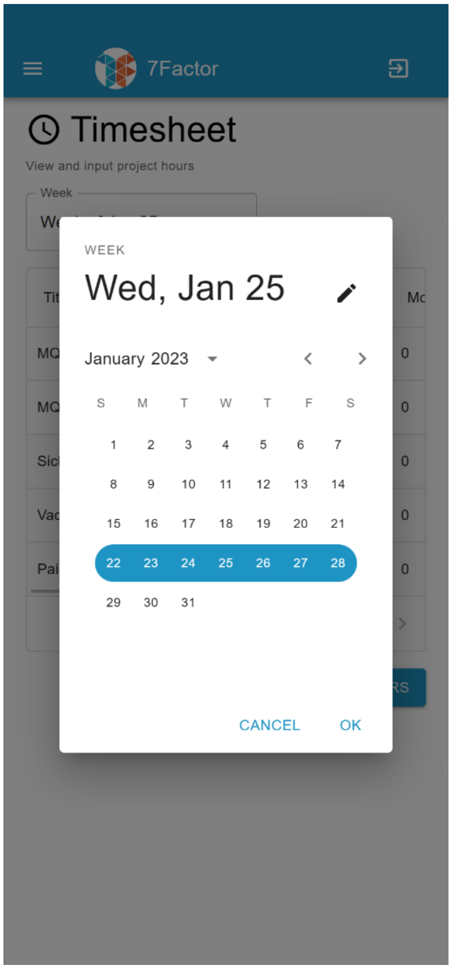
Timesheet

View and input project hours

Week: Week of Jan 25

Title	Client	Sun 22nd	Mc
MQP Paper	Professor …	0	0
MQP	Jeremy D…	0	0
Sick Time	Unrated	0	0
Vacation Time	Unrated	0	0
Paid Leave	Unrated	0	0

1–5 of 5



WEEK

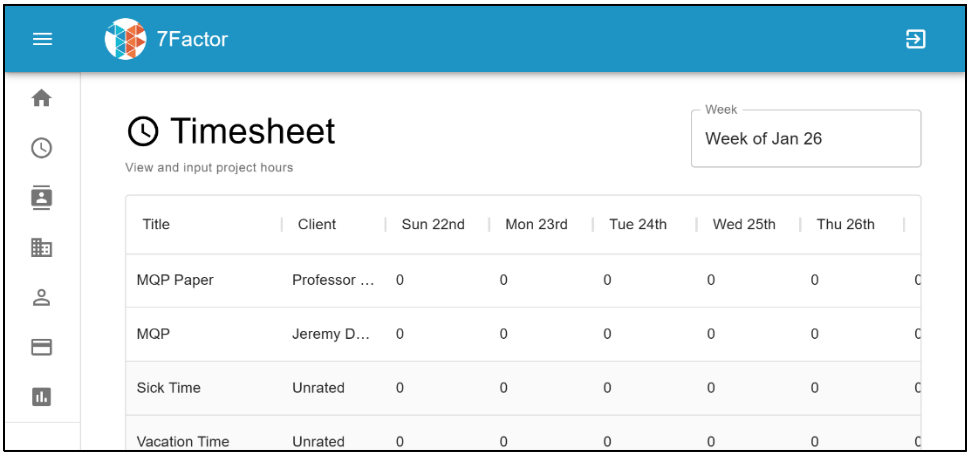
Wed, Jan 25

January 2023

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Figure 10 (Left): Timesheet Page (Mobile After)

Figure 11 (Right): Timesheet Page Calendar (Mobile After)



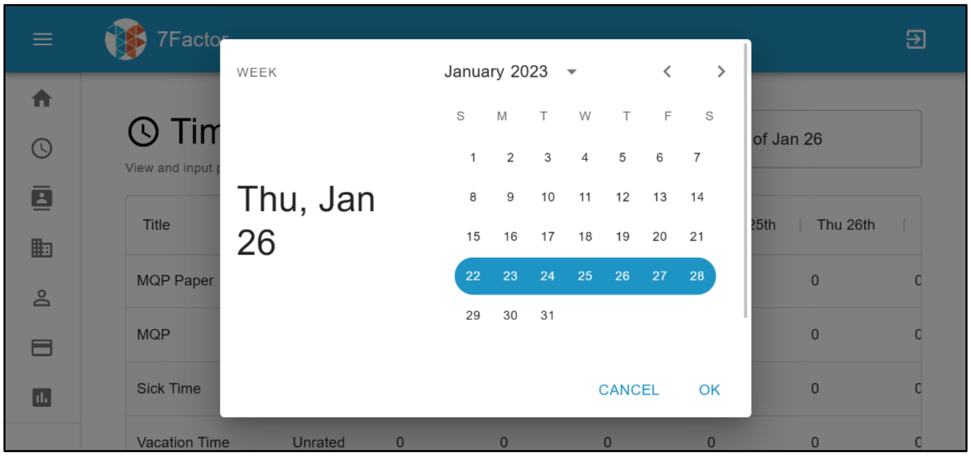
Timesheet

View and input project hours

Week: Week of Jan 26

Title	Client	Sun 22nd	Mon 23rd	Tue 24th	Wed 25th	Thu 26th
MQP Paper	Professor …	0	0	0	0	0
MQP	Jeremy D…	0	0	0	0	0
Sick Time	Unrated	0	0	0	0	0
Vacation Time	Unrated	0	0	0	0	0

Figure 12: Timesheet Page (Mobile Rotated After)



S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

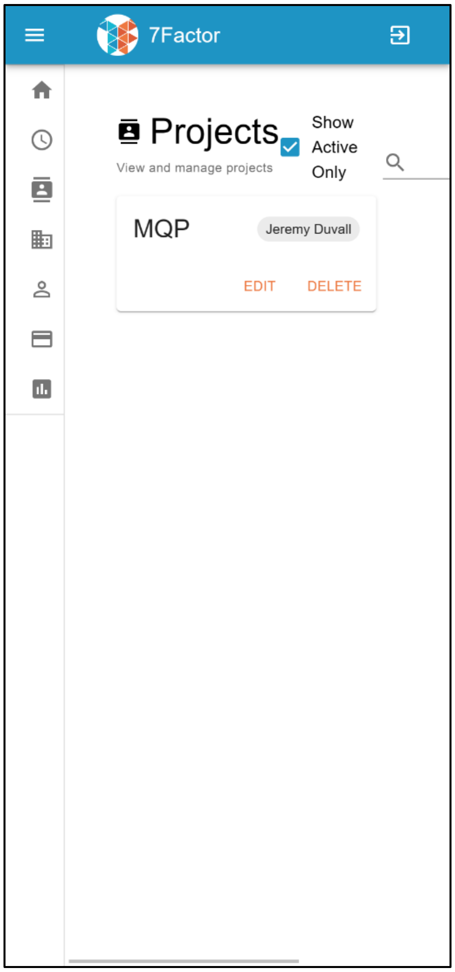
Figure 13: Timesheet Page Calendar (Mobile Rotated After)

Next is the Timesheet page. The page was functional, but it needed some aesthetic changes for all displays other than the desktop view. We changed the page to make sure that everything would fit on the screen and still contained all functionality. The title section did not originally fit on the mobile page but after implementing responsive design everything fits properly on the page.

Projects Page

Next, we implemented responsive design to the projects page. The largest area of improvement for this page is the top row that contains the title, search bar, and two buttons. Of course, that would not fit all in one row for a smaller screen like a mobile or tablet screen. For the mobile display size, we designed the page with title on the top, the description for the page underneath, and the refresh and add buttons, and finally the search bar. We changed the design for the buttons for smaller screens to provide a cleaner and more minimalistic view. We also centered thin one single column.

Before



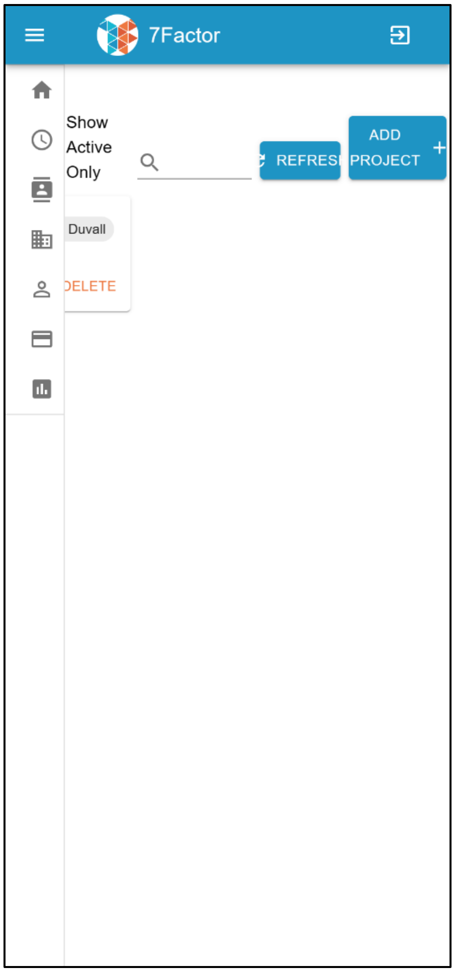
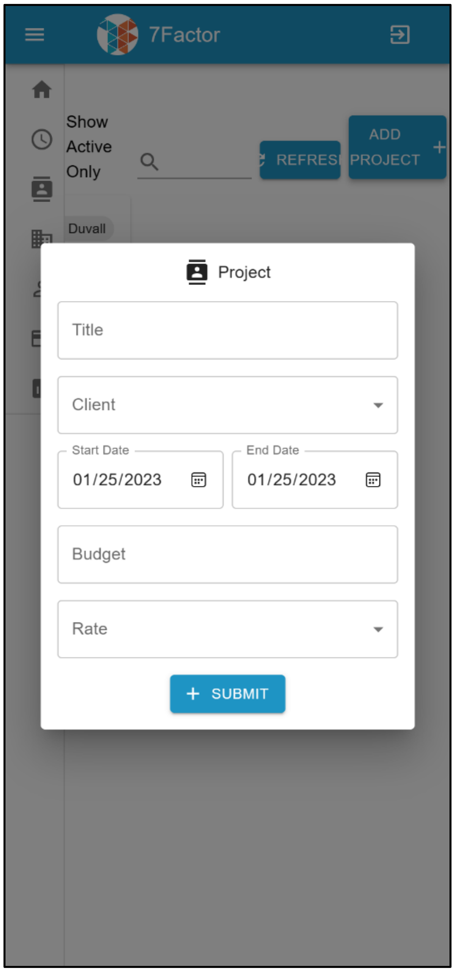


Figure 14 & 15: Projects Page (Mobile Before)

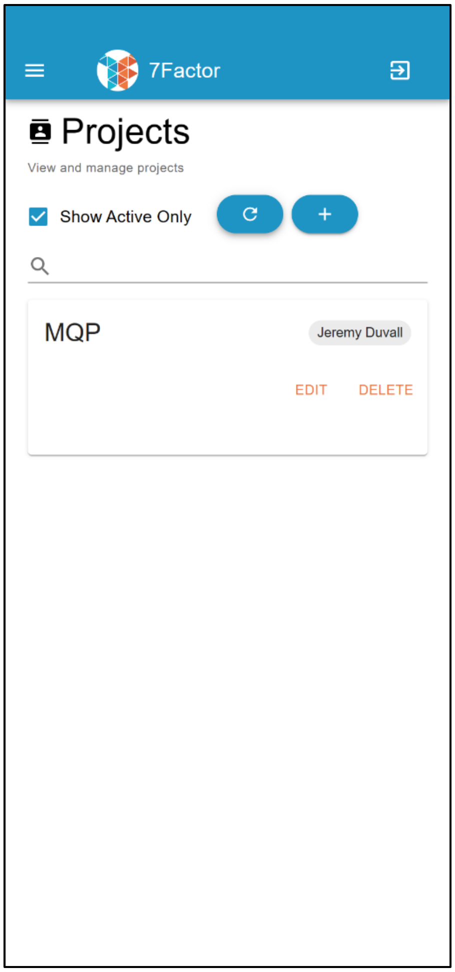


Start Date 01/25/2023

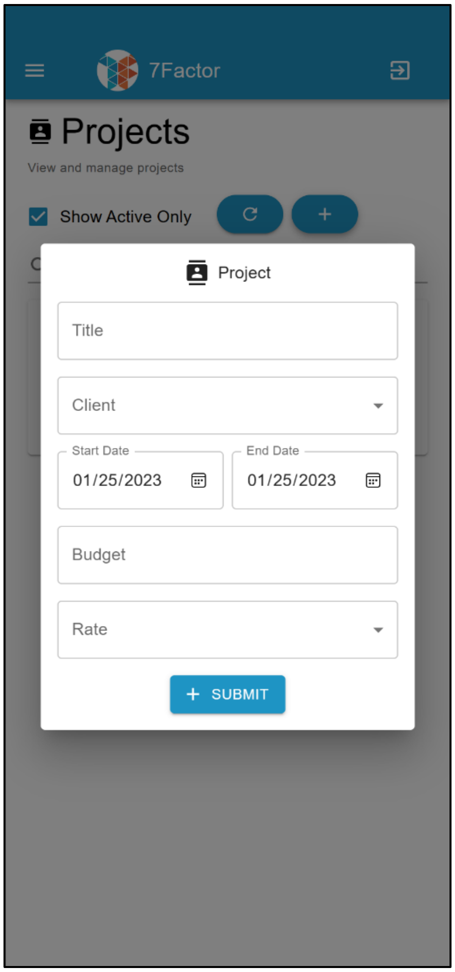
End Date 01/25/2023

Figure 16: Projects Page Add Project (Mobile Before)

After



☑ Show Active Only



☑ Show Active Only

Start Date: 01/25/2023

End Date: 01/25/2023

Figure 17 (Left): Projects Page (Mobile After)

Figure 18 (Right): Projects Page Add Project (Mobile After)

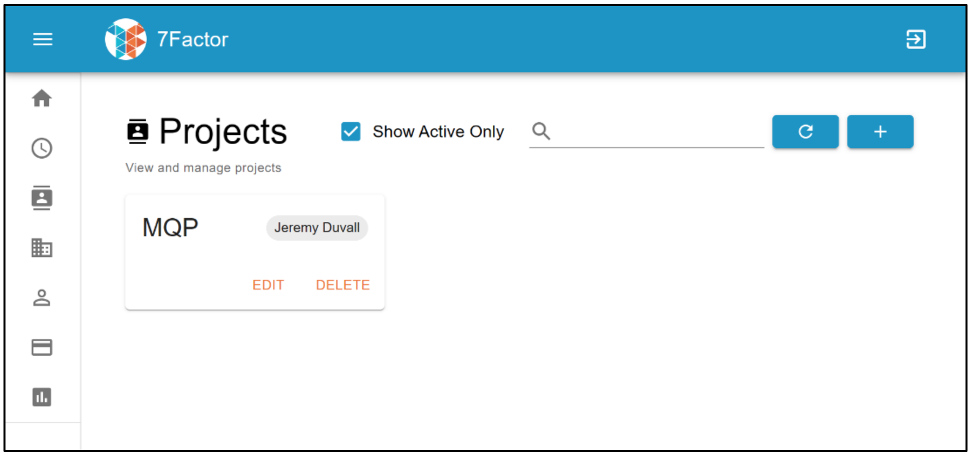
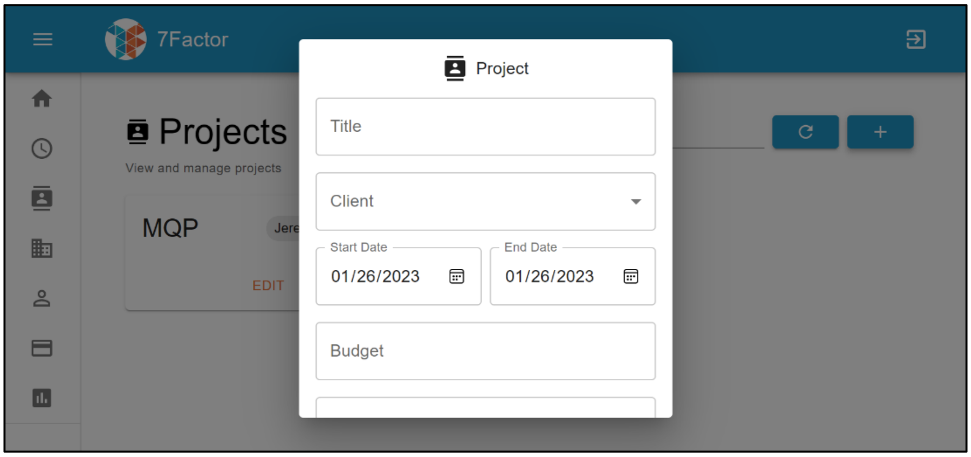


Figure 19: Projects Page (Mobile Rotated After)



Start Date 01/26/2023

End Date 01/26/2023

Figure 20: Projects Page Add Project (Mobile Rotated After)

Clients Page

The Clients page had similar issues to the Projects page. The top row was changed to fit and function for a smaller screen. The new design has the title at the very top, description underneath the title, then the two buttons below that, and finally the search bar at the bottom. Cards that contain clients are also centered and organized in a single column like the projects page.

Before

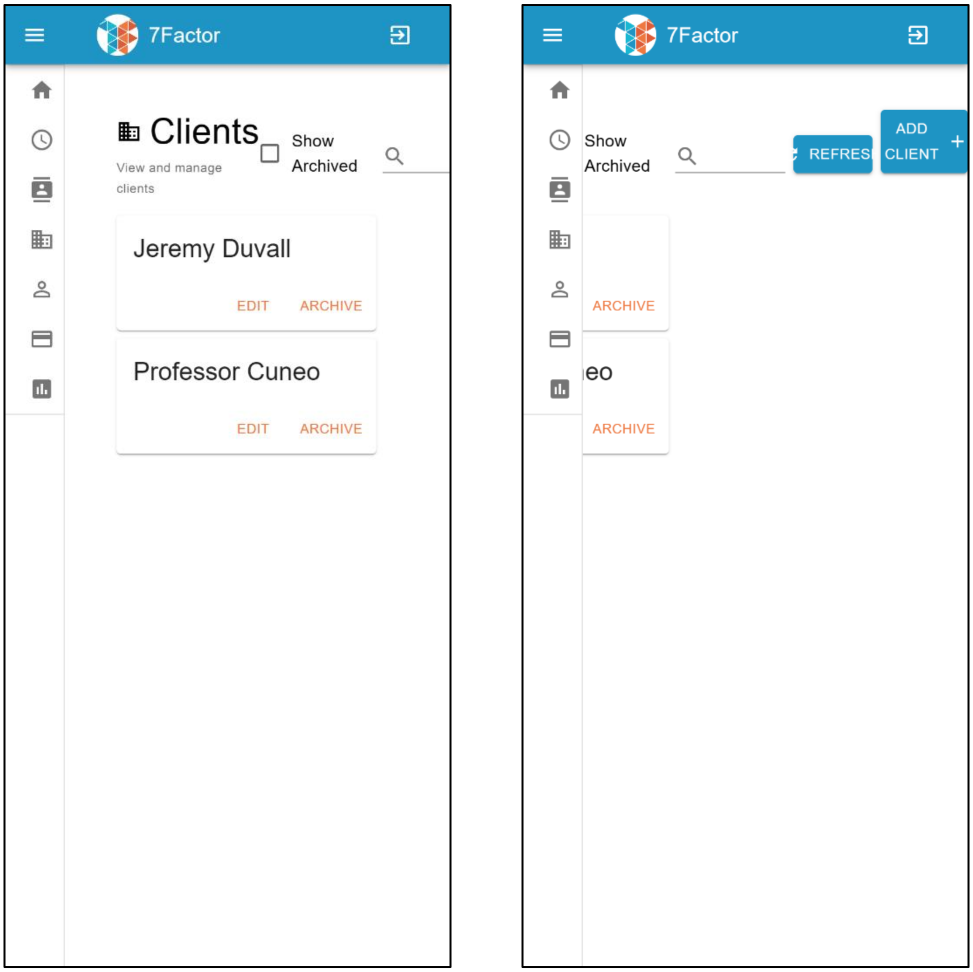


Figure 21 & 22: Clients Page (Mobile Before)

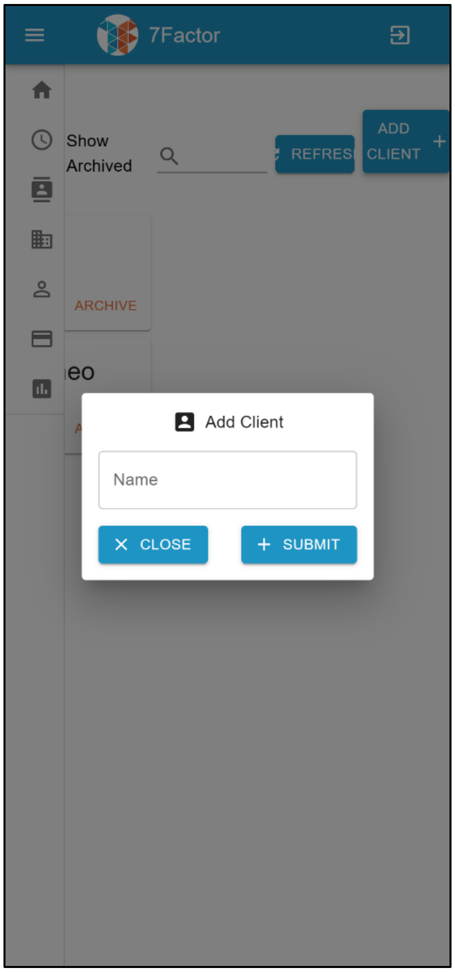
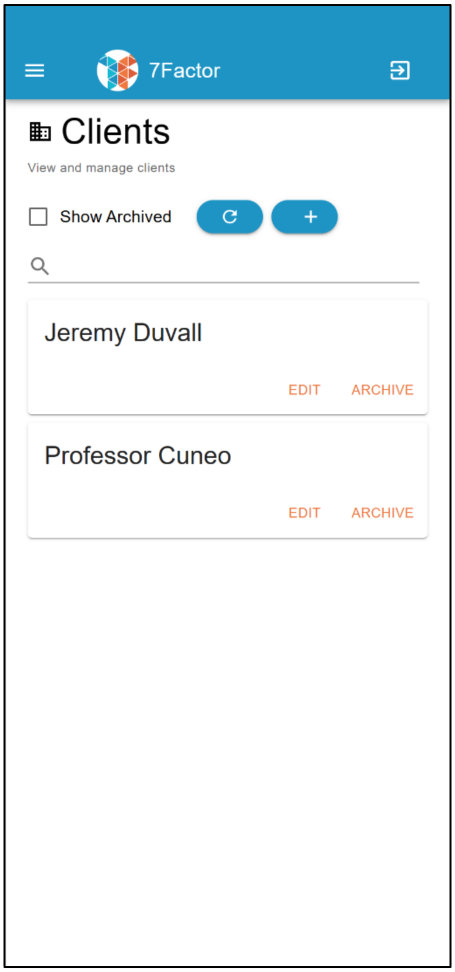


Figure 23: Clients Page Add Client (Mobile Before)

After



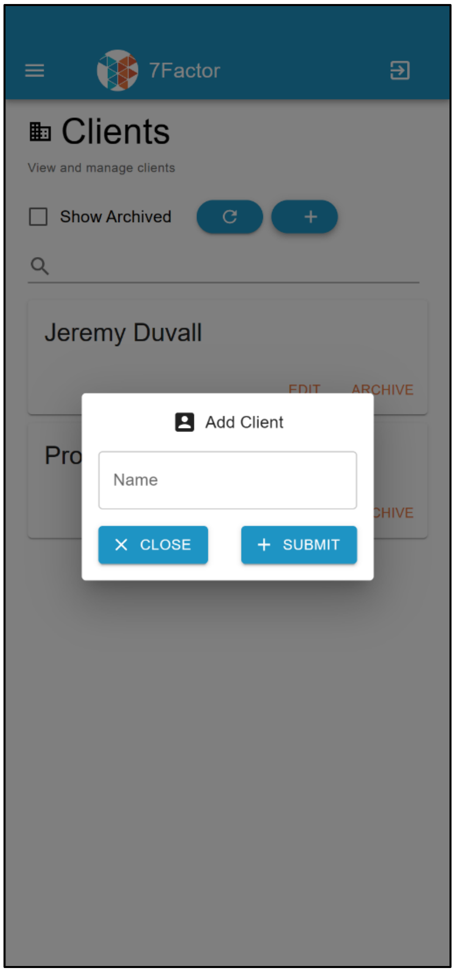
Clients

View and manage clients

□ Show Archived

Jeremy Duvall

Professor Cuneo



Clients

View and manage clients

□ Show Archived

Jeremy Duvall

Add Client

Name

Figure 24 (Left): Clients Page (Mobile After)

Figure 25 (Right): Clients Page Add Client (Mobile After)

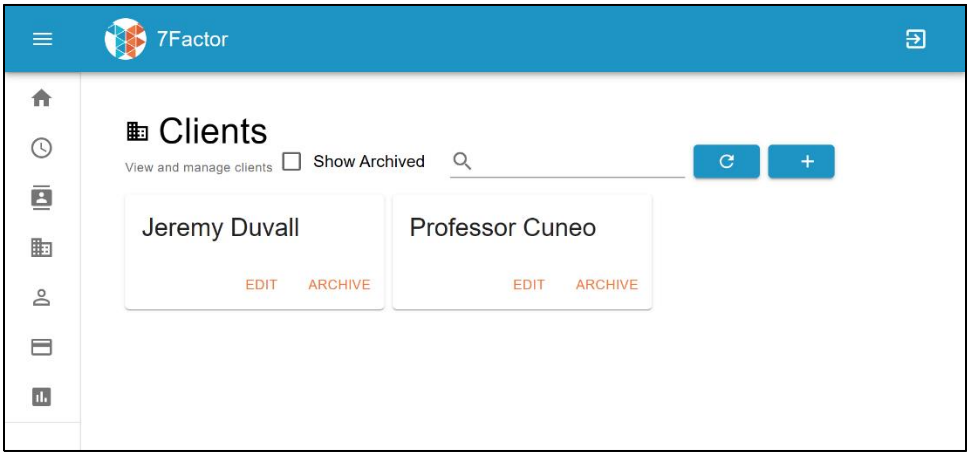


Figure 26: Clients Page (Mobile Rotated After)

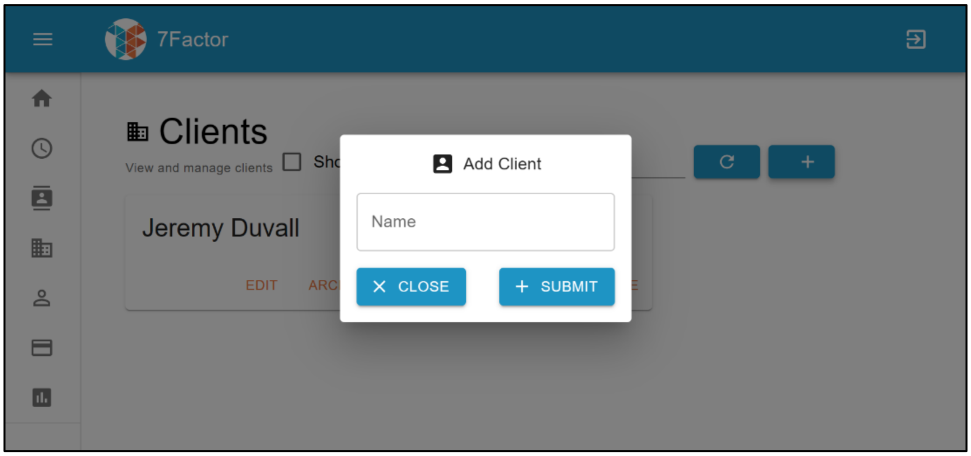
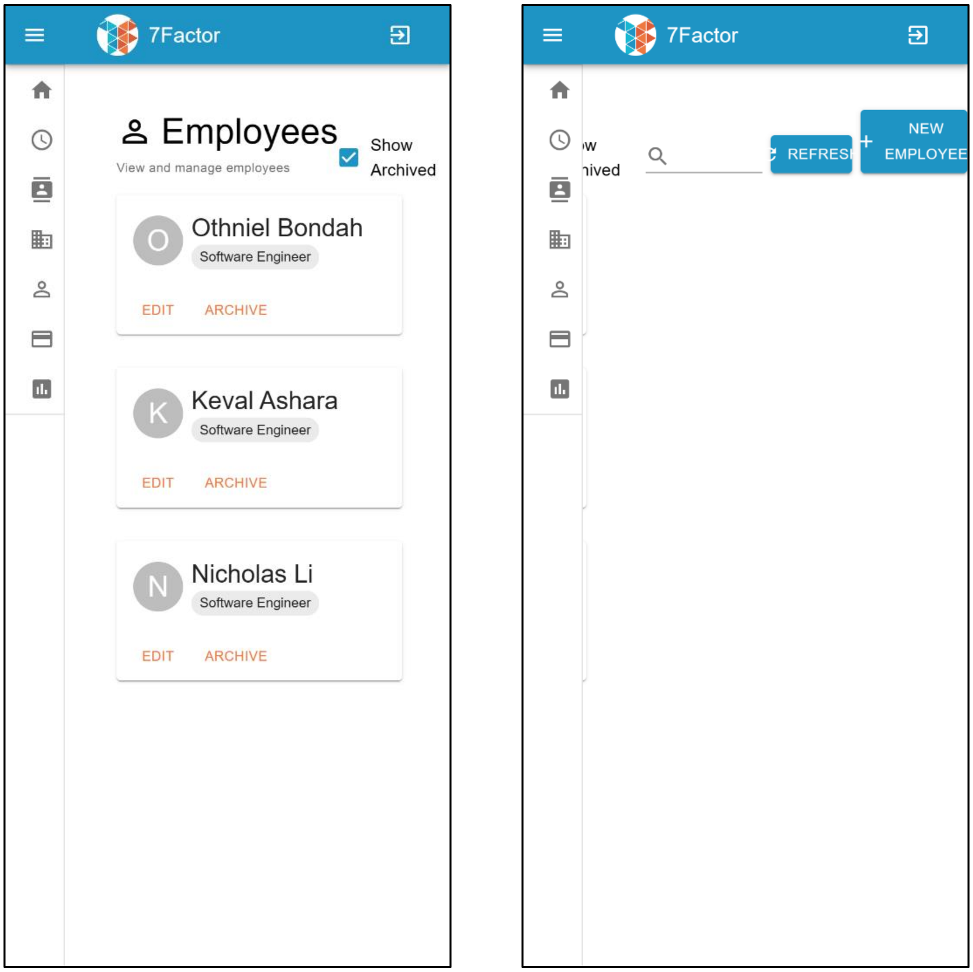


Figure 27: Clients Page Add Client (Mobile Rotated After)

Employees Page

The Employees page had very similar issues as well since they followed a similar design. Our new design for this page also follows the new design for the Projects and Clients Page as well to make the platform consistent in terms of design. The top row was changed to fit and function for a smaller screen. Cards that contain each employee are also centered and organized in a single column like the other similar pages.

Before



Employees

View and manage employees

Othniel Bondah

Software Engineer

Keval Ashara

Software Engineer

Nicholas Li

Software Engineer

Figure 28 & 29: Employees Page (Mobile Before)

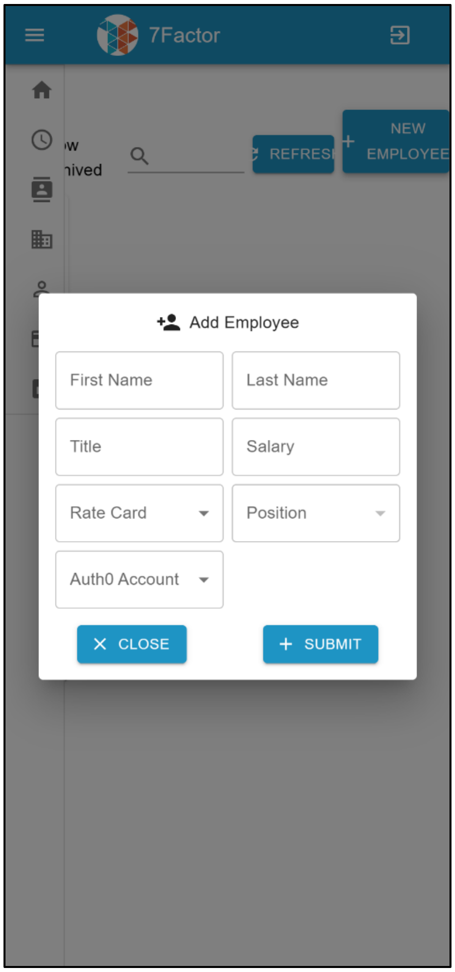
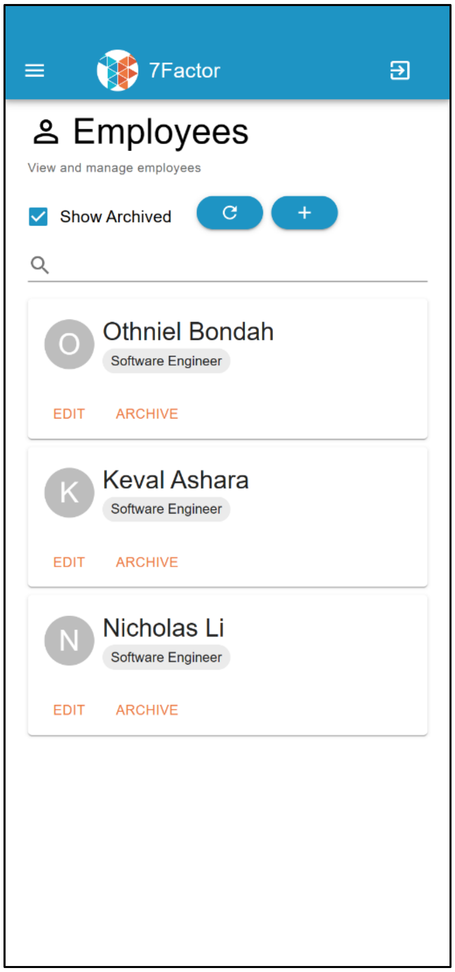


Figure 30: Employees Page Add Employee (Mobile Before)

After



Employees

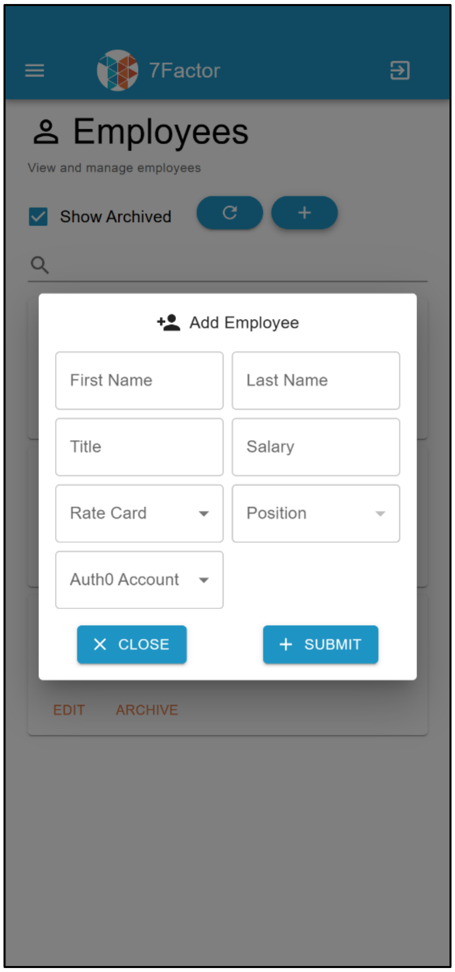
View and manage employees

☑ Show Archived

Othniel Bondah
Software Engineer

Keval Ashara
Software Engineer

Nicholas Li
Software Engineer



Employees

View and manage employees

☑ Show Archived

Add Employee

First Name
Last Name
Title
Salary
Rate Card
Position
Auth0 Account

Figure 31 (Left): Employees Page (Mobile After)

Figure 32 (Right): Employees Page (Mobile After)

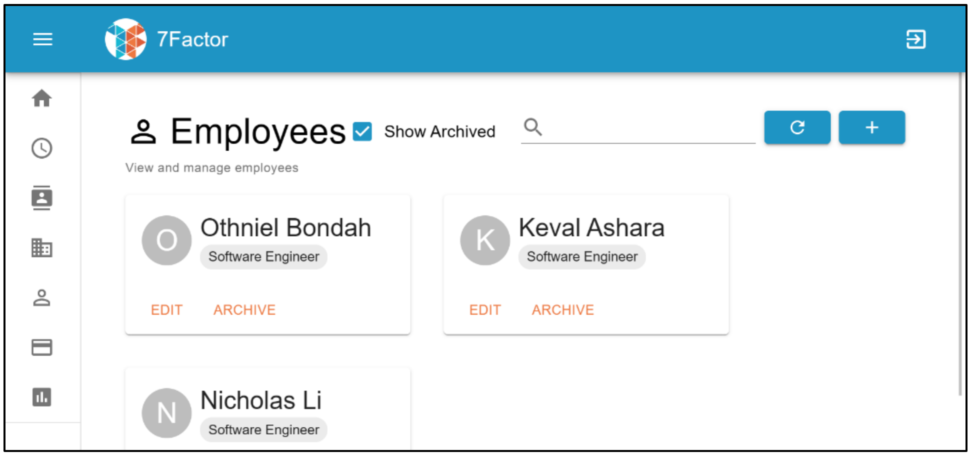


Figure 33: Employees Page (Mobile Rotated After)

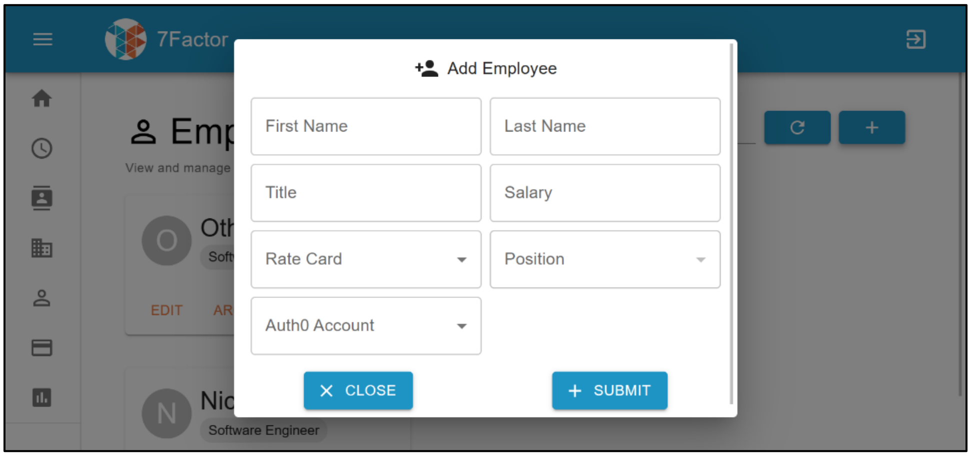


Figure 34: Employees Page Add Employee (Mobile Rotated After)

Rate Cards Page

The Rate Cards page also follows the other pages in terms of design for the overall page. Our new design for this page also follows the new design for design consistency. The top row was changed to fit and function for a smaller screen. Cards that contain each employee are also centered and organized in a single column like the other similar pages. However, the Add Rate

Card popup is a little problematic for this page for a smaller display because of how wide that menu popup is. We changed it to fit better in a smaller screen by making it vertically fit in one column.

Before

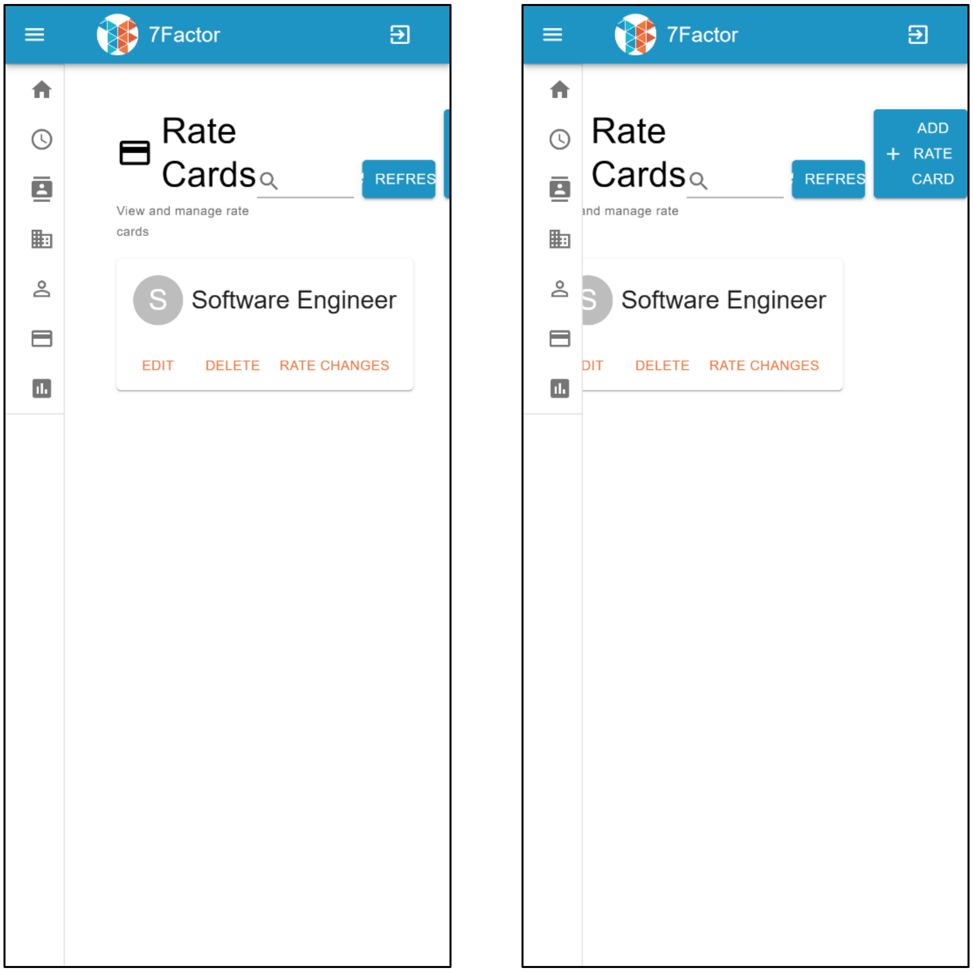


Figure 35 & 36: Rate Cards Page (Mobile Before)

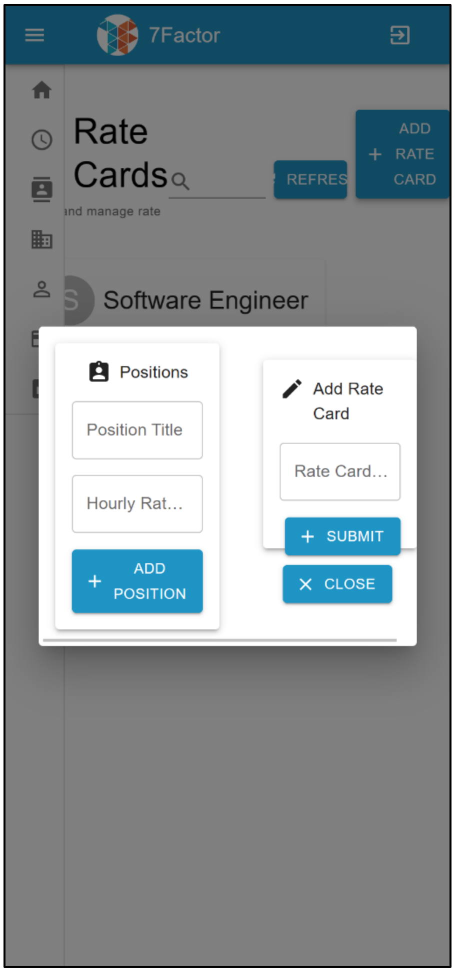
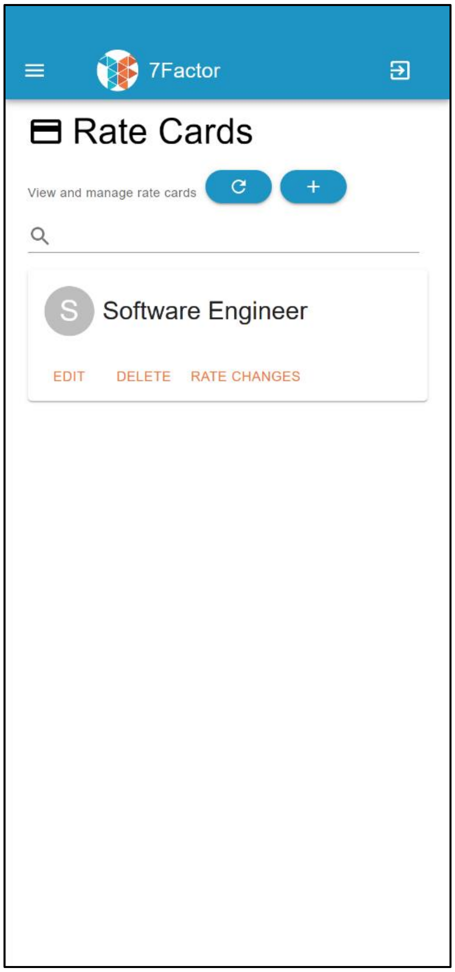


Figure 37: Rate Cards Page Add Rate Card (Mobile Before)

After



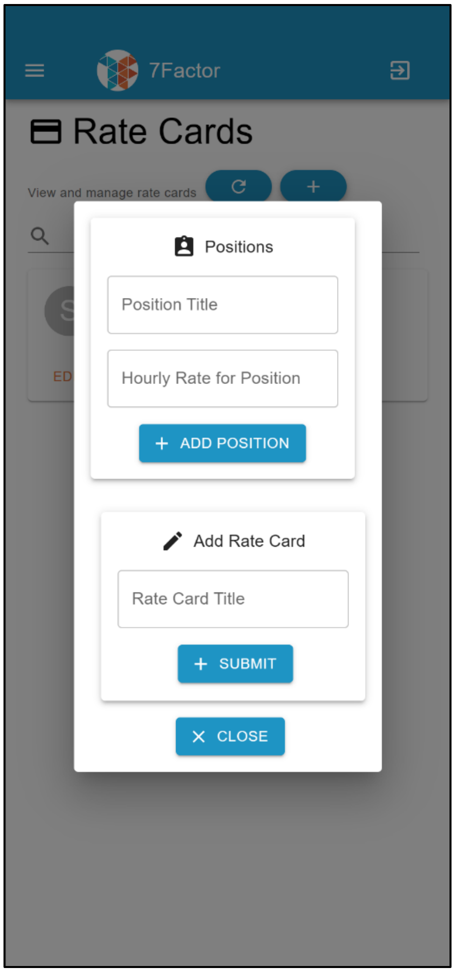
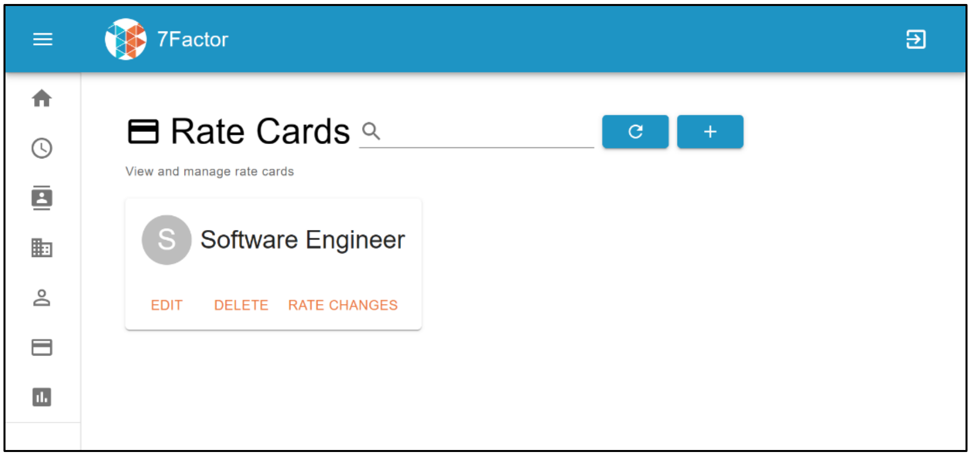


Figure 38 (Left): Rate Cards Page (Mobile After)

Figure 39 (Left): Rate Cards Page Add Rate Card (Mobile After)



View and manage rate cards

Figure 40: Rate Cards Page (Mobile Rotated After)

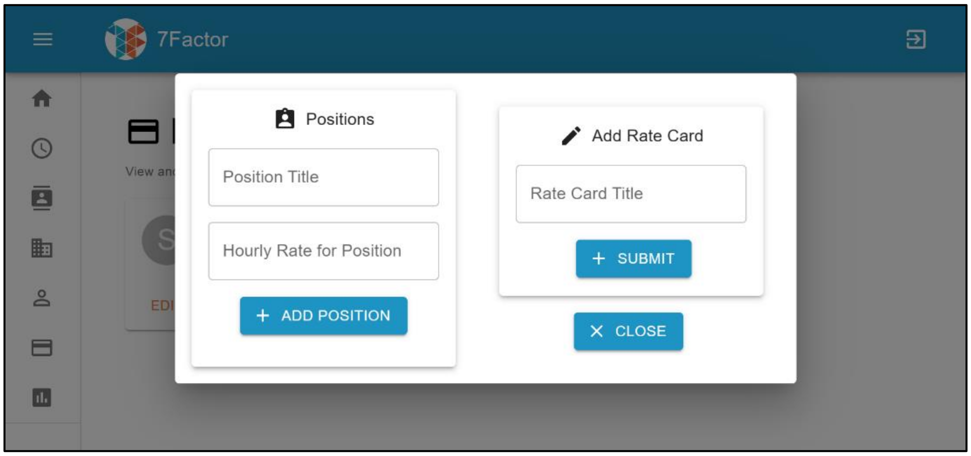
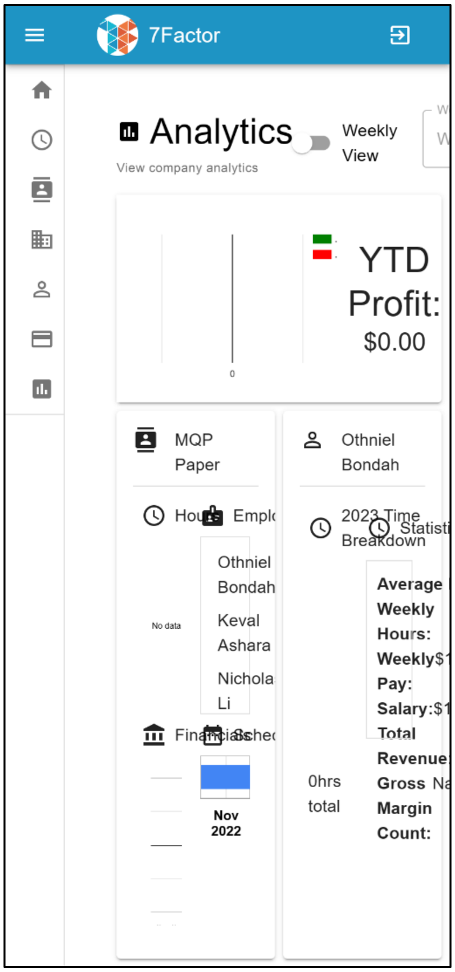


Figure 41: Rate Cards Page Add Rate Card (Mobile Rotated After)

Analytics Page

Finally, there's the responsive design for the Analytics page. This page is the most problematic, mainly because of the amount of data that this page displays. It is hard to fit so much data on a small display like a mobile device. Just like the other pages, we change the top row and make sure that everything fit on the page.

Before



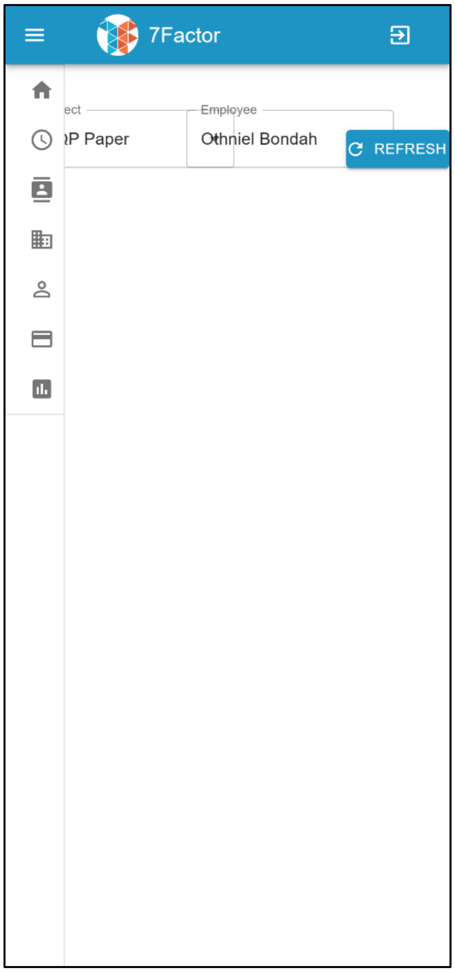
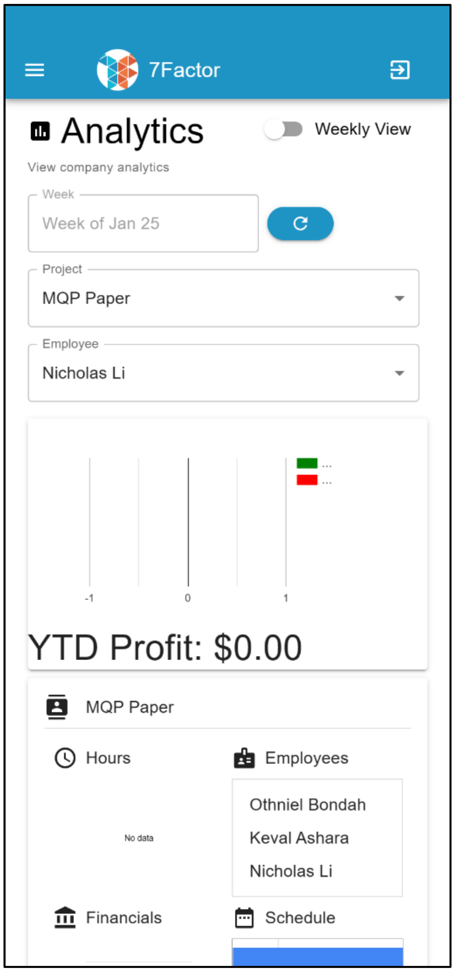


Figure 42 & 43: Analytics Page (Mobile Before)

After



Analytics

Weekly View

View company analytics

Week: Week of Jan 25

Project: MQP Paper

Employee: Nicholas Li

YTD Profit: $0.00

MQP Paper

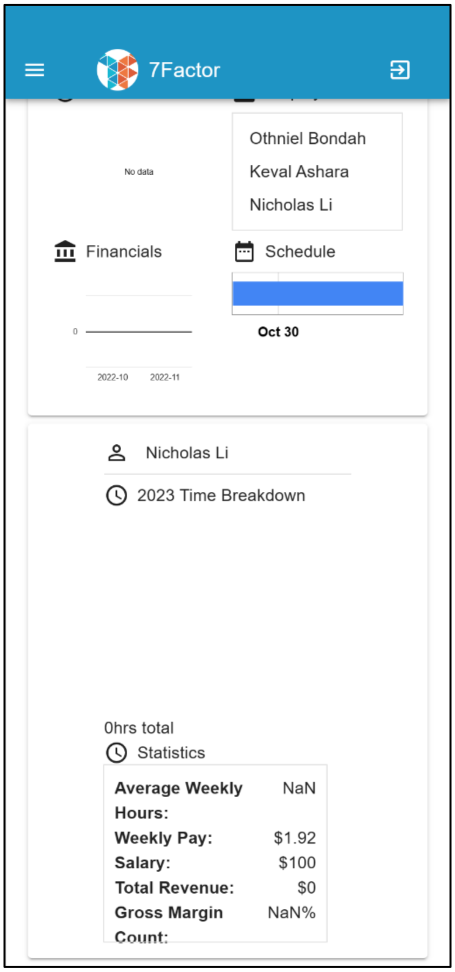
Hours

Employees

Othniel Bondah
Keval Ashara
Nicholas Li

Financials

Schedule



Othniel Bondah
Keval Ashara
Nicholas Li

Financials

Schedule

Nicholas Li

2023 Time Breakdown

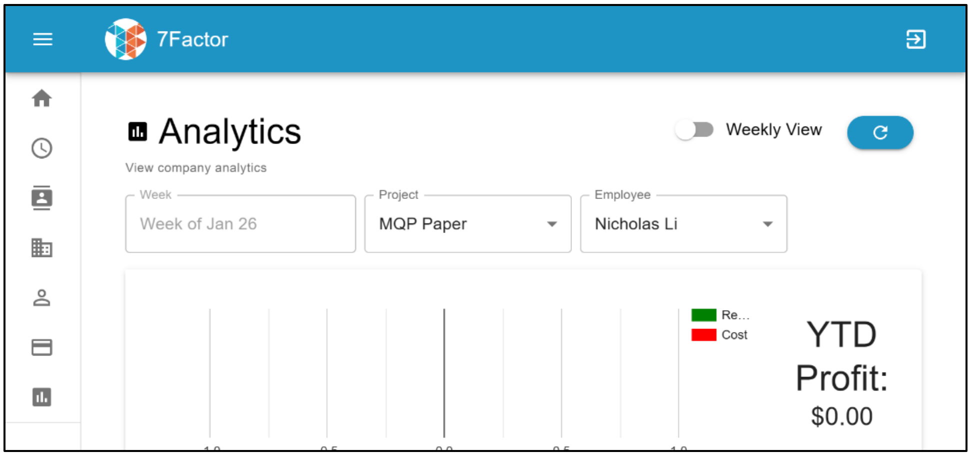
0hrs total

Statistics

Average Weekly Hours:	NaN
Weekly Pay:	$1.92
Salary:	$100
Total Revenue:	$0
Gross Margin	NaN%
Count:	

Figure 44: Analytics Page (Mobile After)

Figure 45: Analytics Page (Mobile After)



Analytics

View company analytics

Weekly View

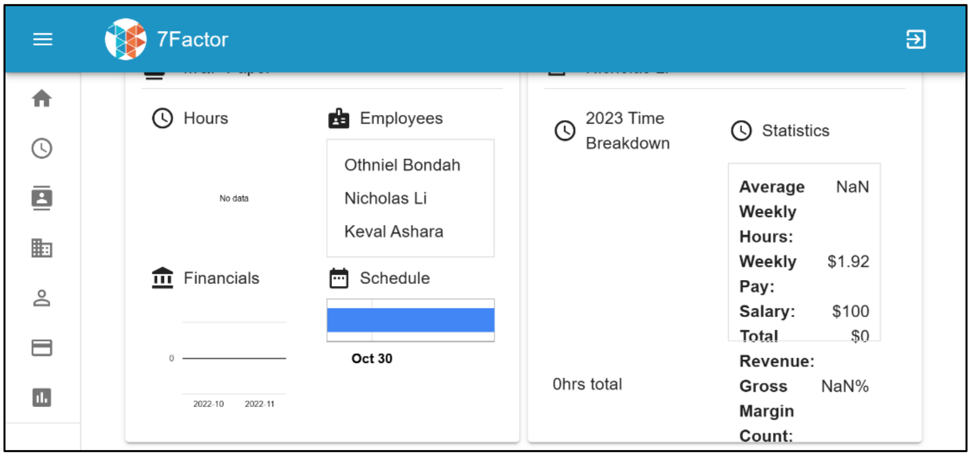
Week: Week of Jan 26

Project: MQP Paper

Employee: Nicholas Li

YTD Profit: $0.00

Figure 46: Analytics Page (Mobile Rotated After)



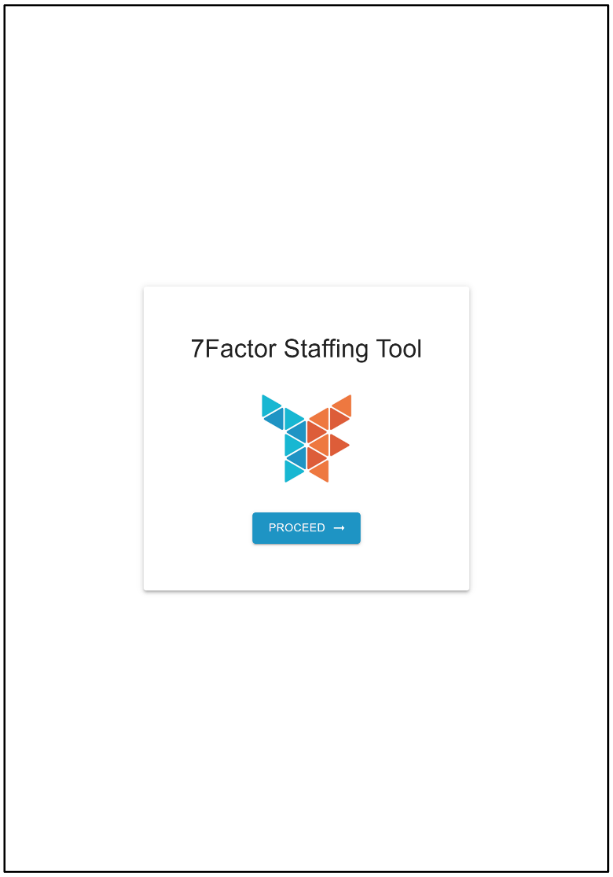
Employees:
Othniel Bondah
Nicholas Li
Keval Ashara

0hrs total

Average Weekly Hours:	NaN
Weekly Pay:	$1.92
Salary:	$100
Total Revenue:	$0
Gross Margin Count:	NaN%

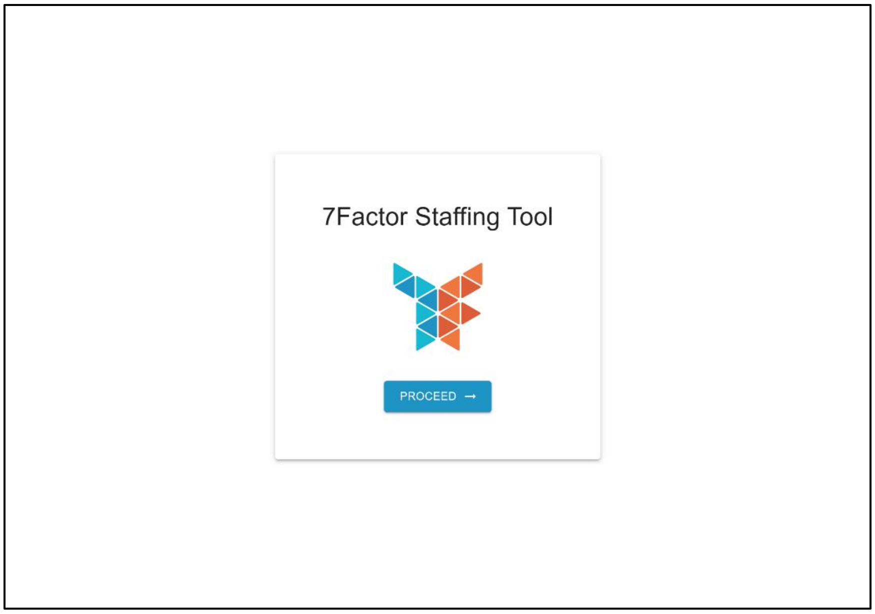
Figure 47: Analytics Page (Mobile Rotated After)

User Interface Additions (Tablet Mode)



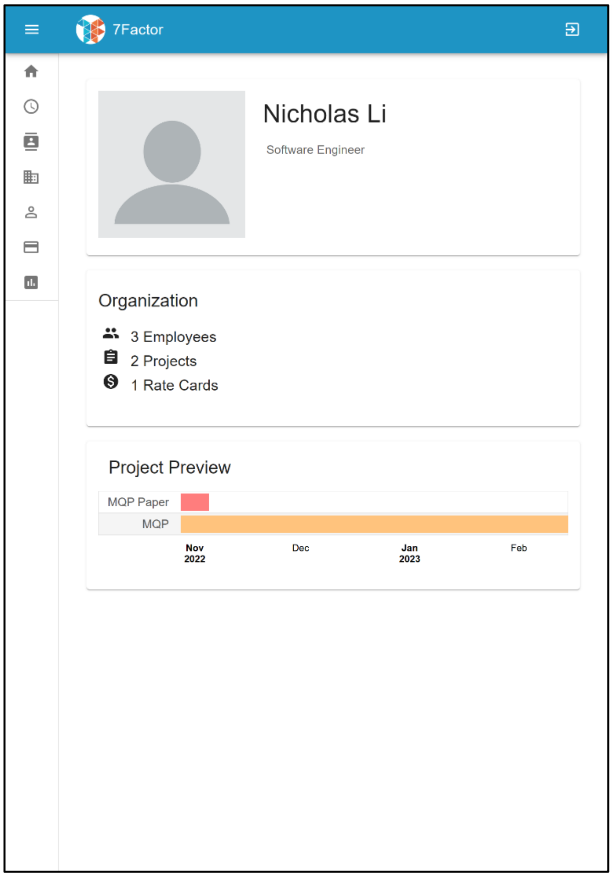
7Factor Staffing Tool

Figure 48: Login Page (Tablet Vertical After)



7Factor Staffing Tool

Figure 49: Login Page (Tablet Horizontal After)



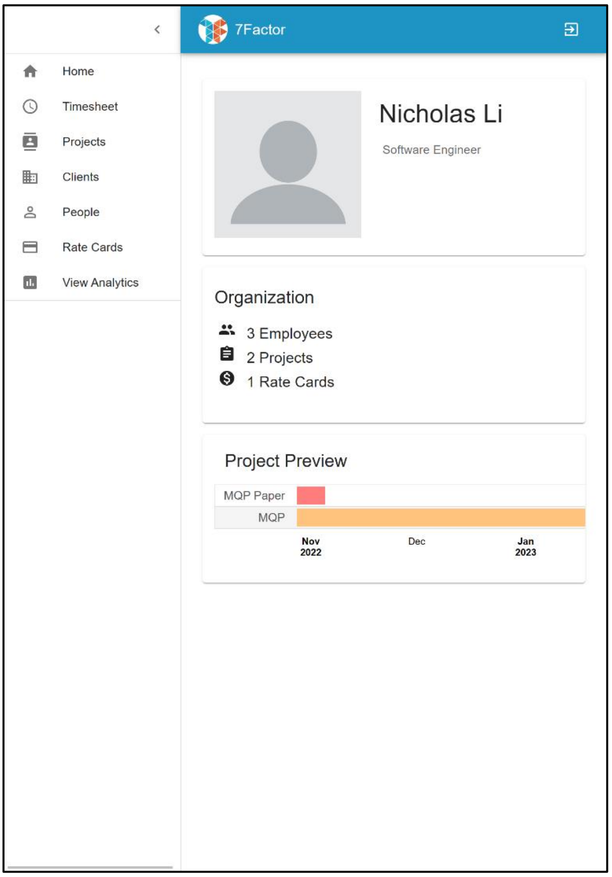


Figure 50 (Left): Home Page (Tablet Vertical After)

Figure 51 (Right): Home Page Hamburger Expanded (Tablet Vertical After)

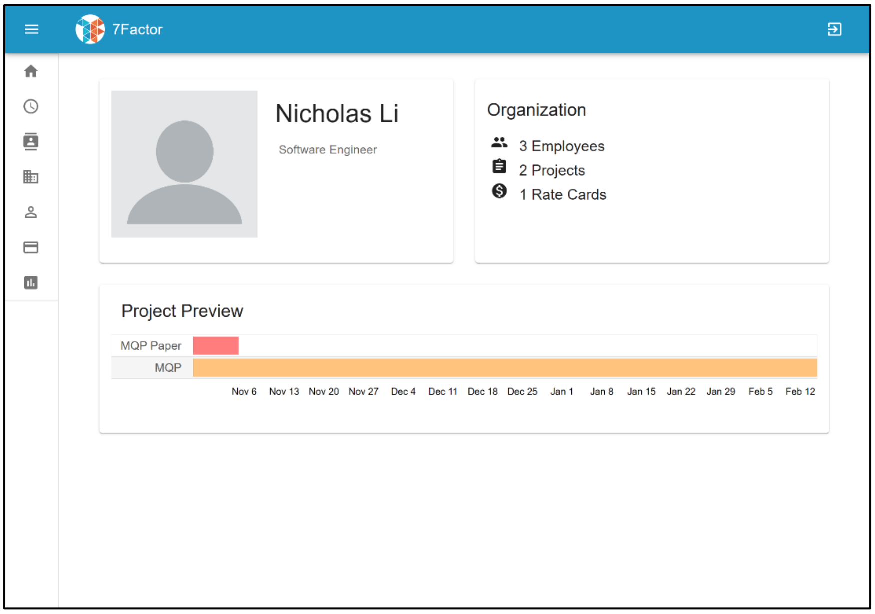


Figure 52: Home Page (Tablet Horizontal After)

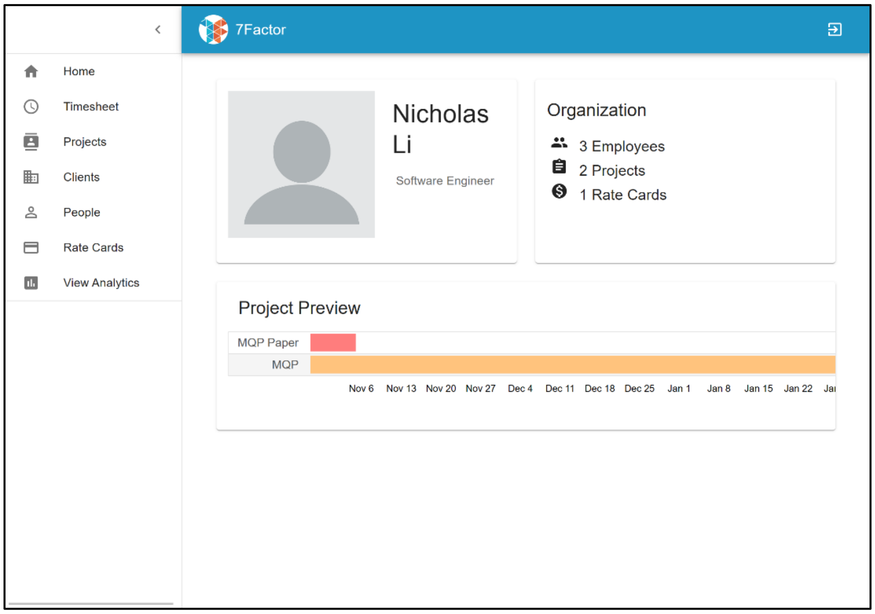
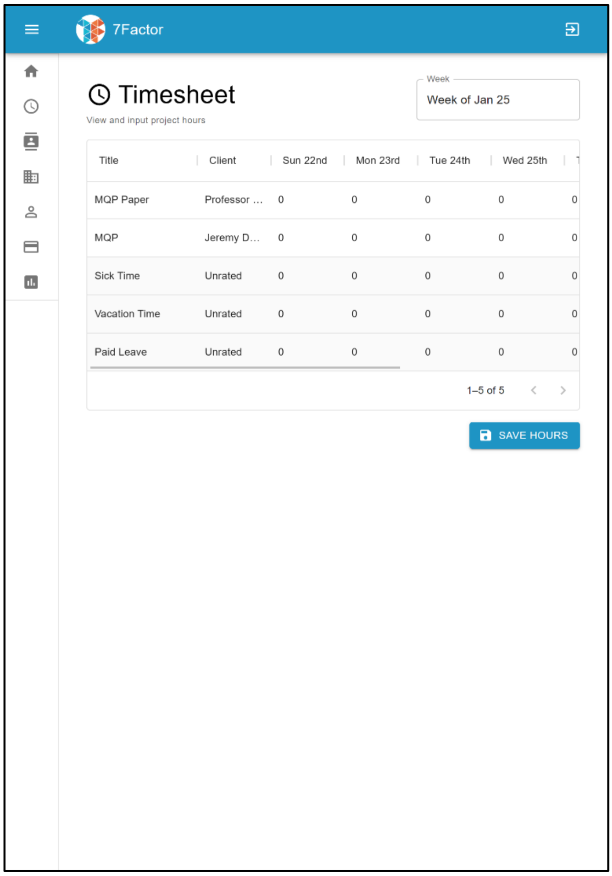


Figure 53: Home Page Hamburger Expanded (Tablet Horizontal After)



Timesheet

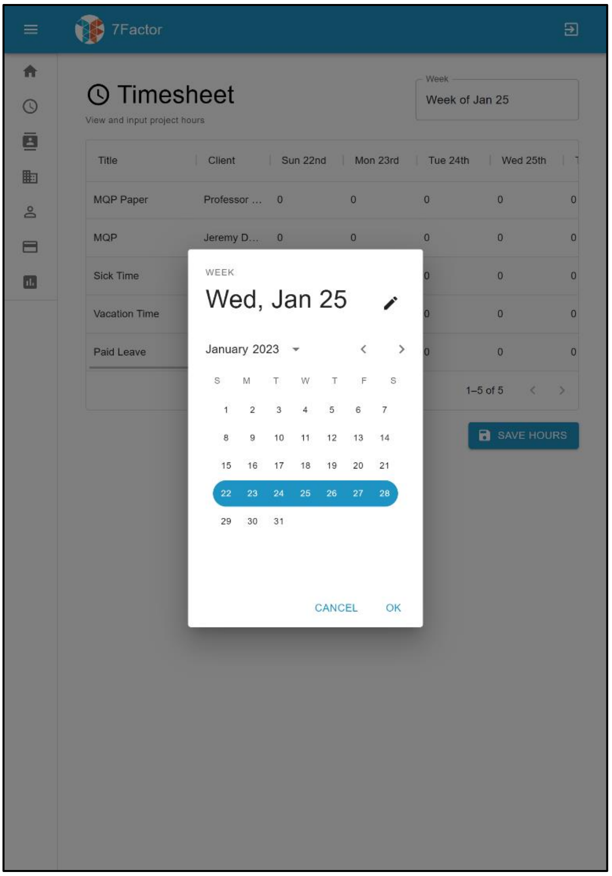
View and input project hours

Week

Week of Jan 25

Title	Client	Sun 22nd	Mon 23rd	Tue 24th	Wed 25th
MQP Paper	Professor ...	0	0	0	0
MQP	Jeremy D...	0	0	0	0
Sick Time	Unrated	0	0	0	0
Vacation Time	Unrated	0	0	0	0
Paid Leave	Unrated	0	0	0	0

1–5 of 5



WEEK

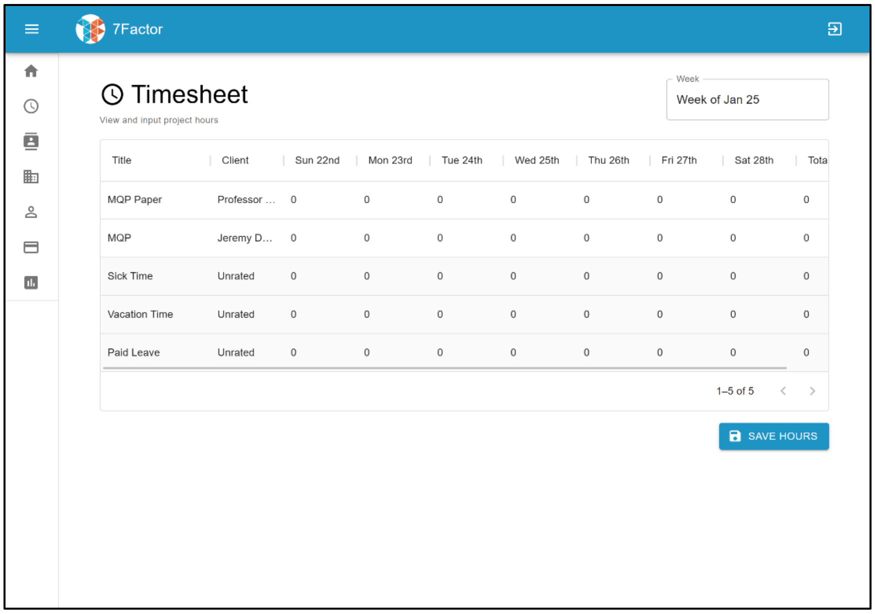
Wed, Jan 25

January 2023

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Figure 54 (Left): Timesheet Page (Tablet Vertical After)

Figure 55 (Right): Timesheet Page Calendar (Tablet Vertical After)



Timesheet

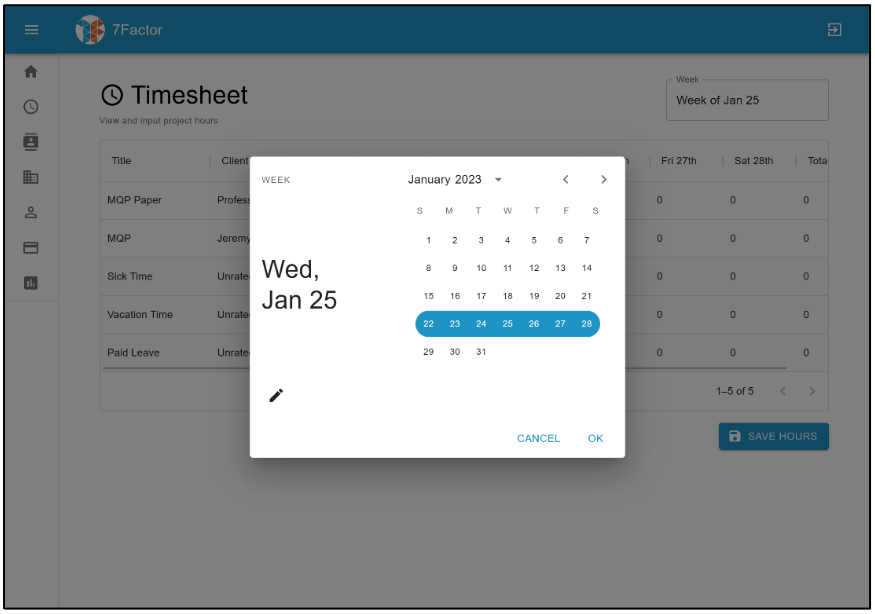
View and input project hours

Week: Week of Jan 25

Title	Client	Sun 22nd	Mon 23rd	Tue 24th	Wed 25th	Thu 26th	Fri 27th	Sat 28th	Tota
MQP Paper	Professor …	0	0	0	0	0	0	0	0
MQP	Jeremy D…	0	0	0	0	0	0	0	0
Sick Time	Unrated	0	0	0	0	0	0	0	0
Vacation Time	Unrated	0	0	0	0	0	0	0	0
Paid Leave	Unrated	0	0	0	0	0	0	0	0

1–5 of 5

Figure 56: Timesheet Page (Tablet Horizontal After)



Timesheet

View and input project hours

Week: Week of Jan 25

Title	Client		Fri 27th	Sat 28th	Tota
MQP Paper	Profes		0	0	0
MQP	Jeremy		0	0	0
Sick Time	Unrate		0	0	0
Vacation Time	Unrate		0	0	0
Paid Leave	Unrate		0	0	0

1–5 of 5

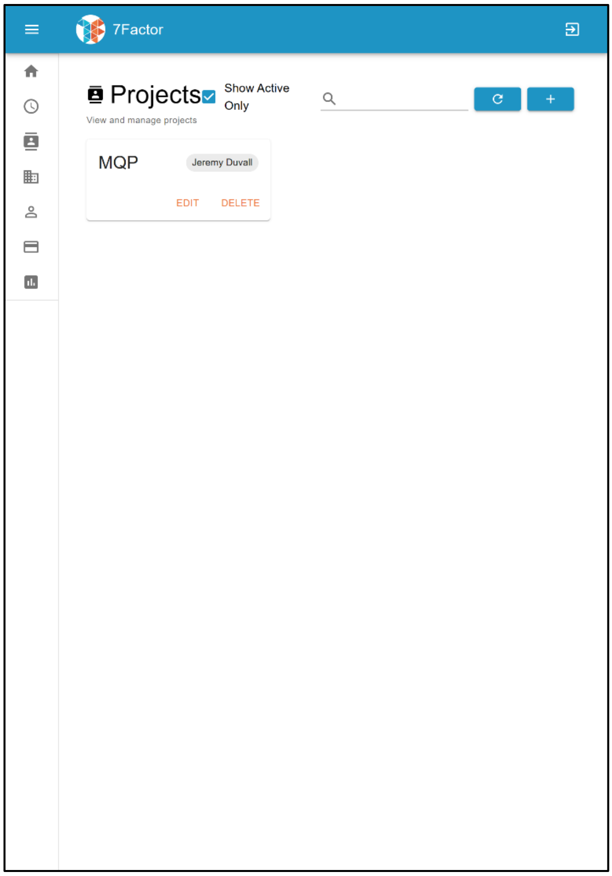
WEEK

Wed, Jan 25

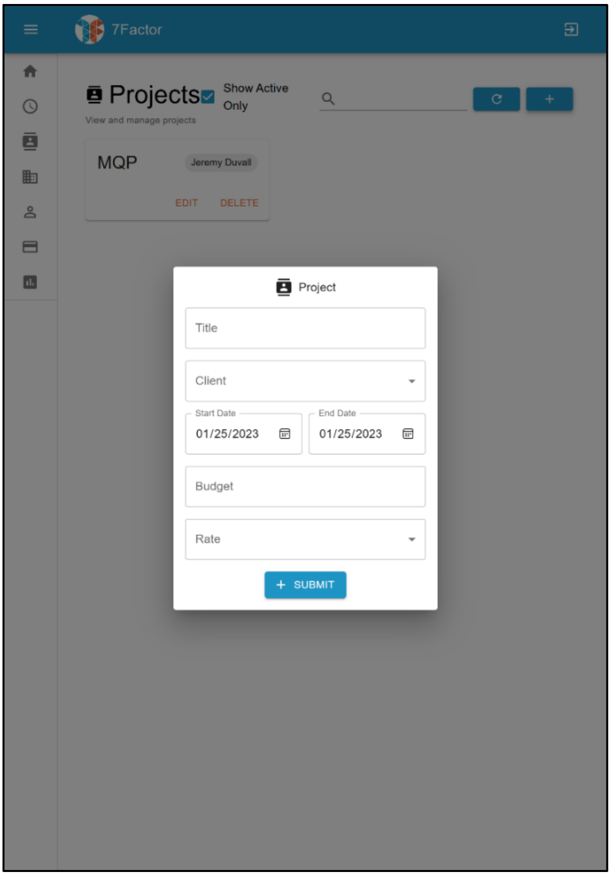
January 2023

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Figure 57: Timesheet Page Calendar (Tablet Horizontal After)



View and manage projects



View and manage projects

Start Date 01/25/2023

End Date 01/25/2023

Figure 58 (Left): Projects Page (Tablet Vertical After)

Figure 59 (Right): Projects Page Add Project (Tablet Vertical After)

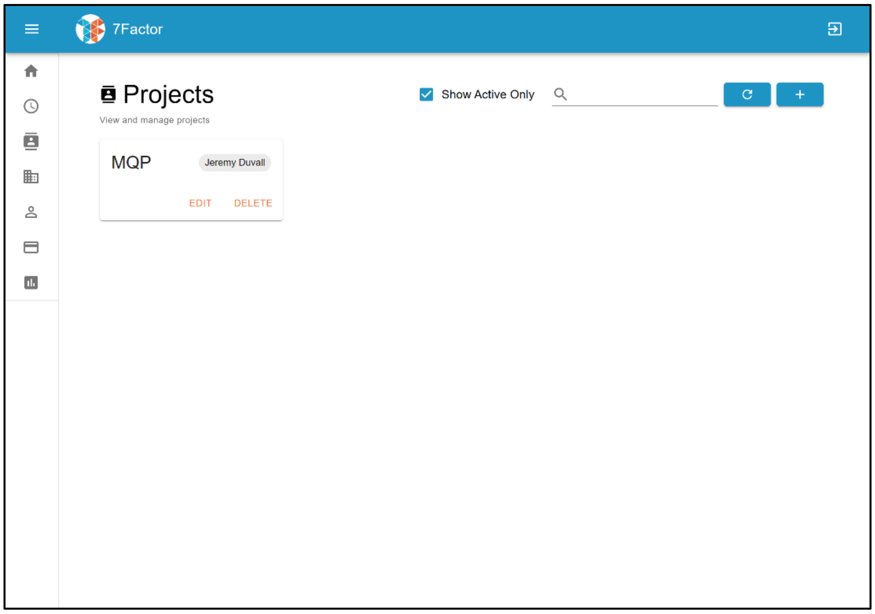


Figure 60: Projects Page (Tablet Horizontal After)

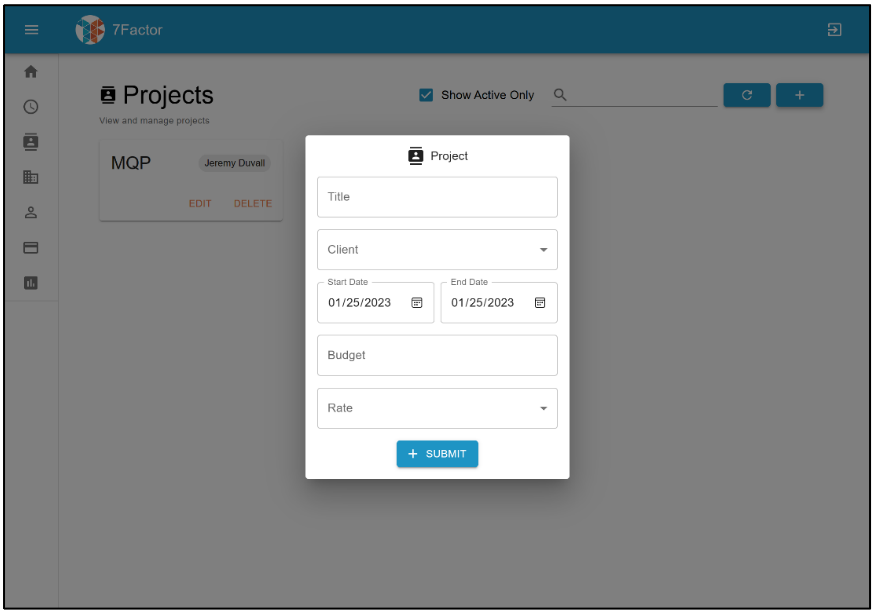
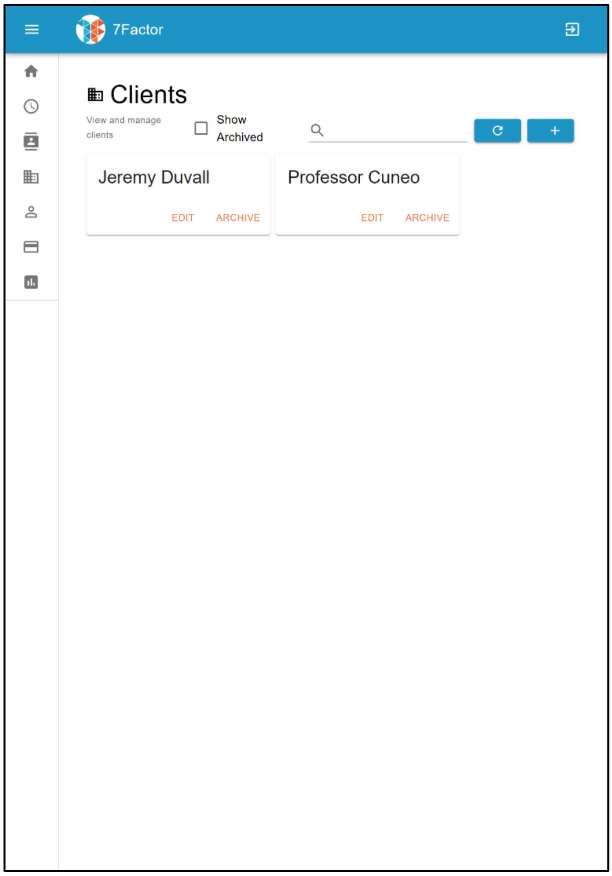


Figure 61: Projects Page Add Project (Tablet Horizontal After)



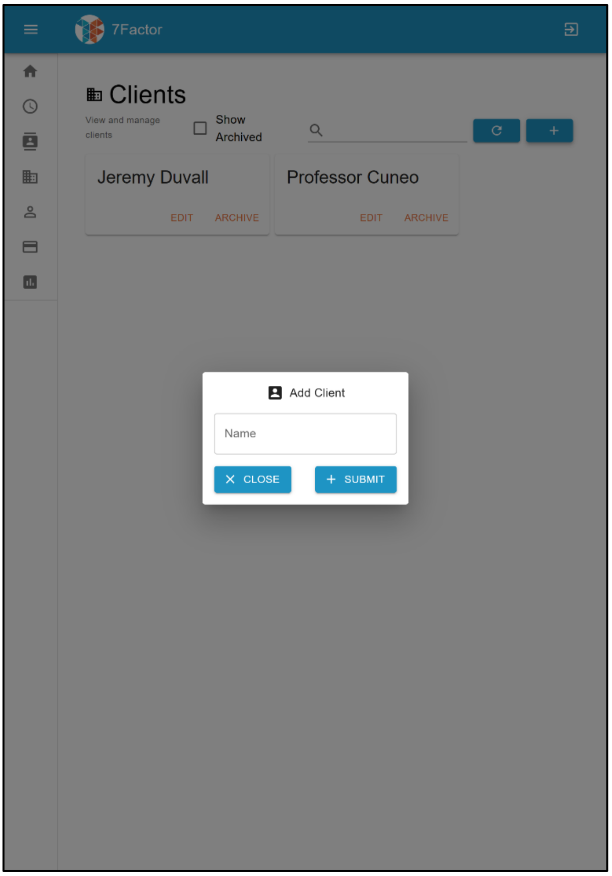


Figure 62 (Left): Clients Page (Tablet Vertical After)

Figure 63 (Right): Clients Page Add Client (Tablet Vertical After)

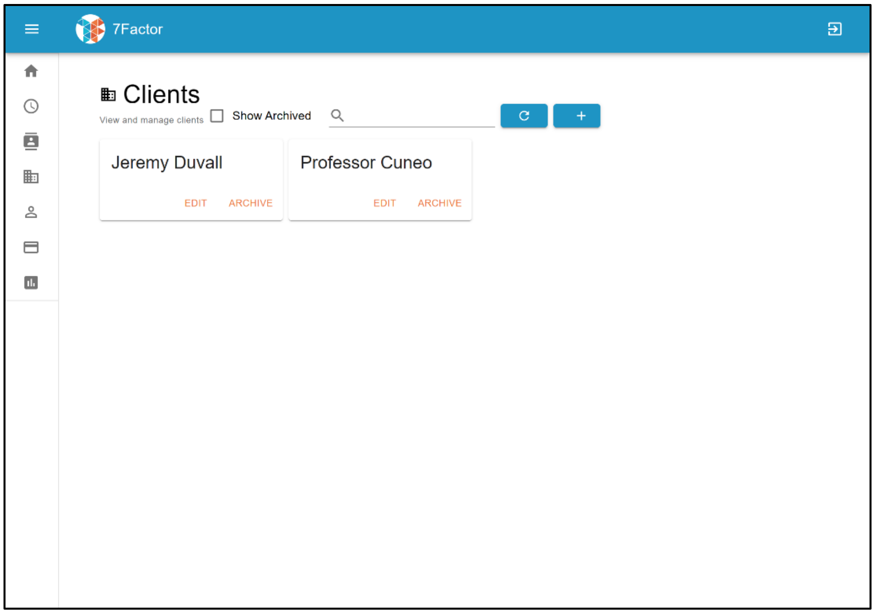


Figure 64: Clients Page (Tablet Horizontal After)

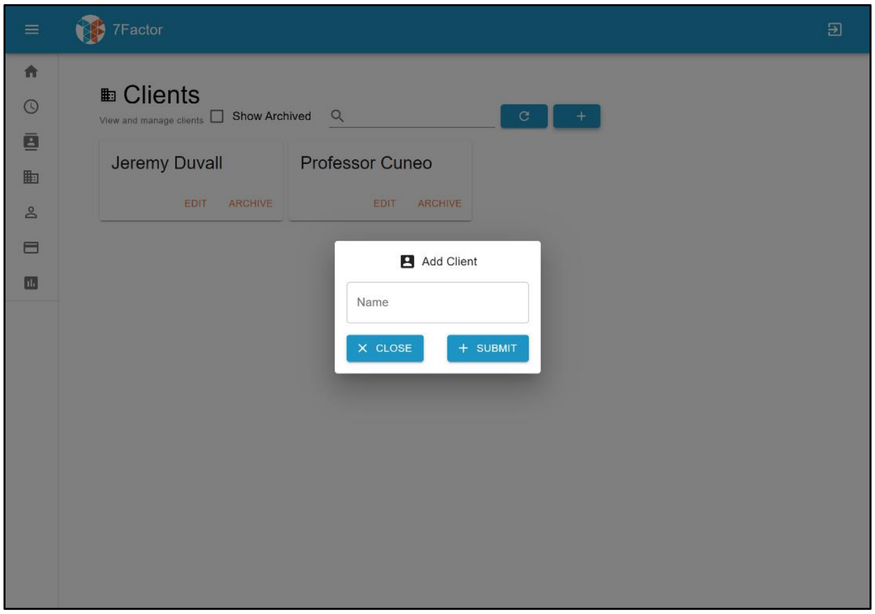
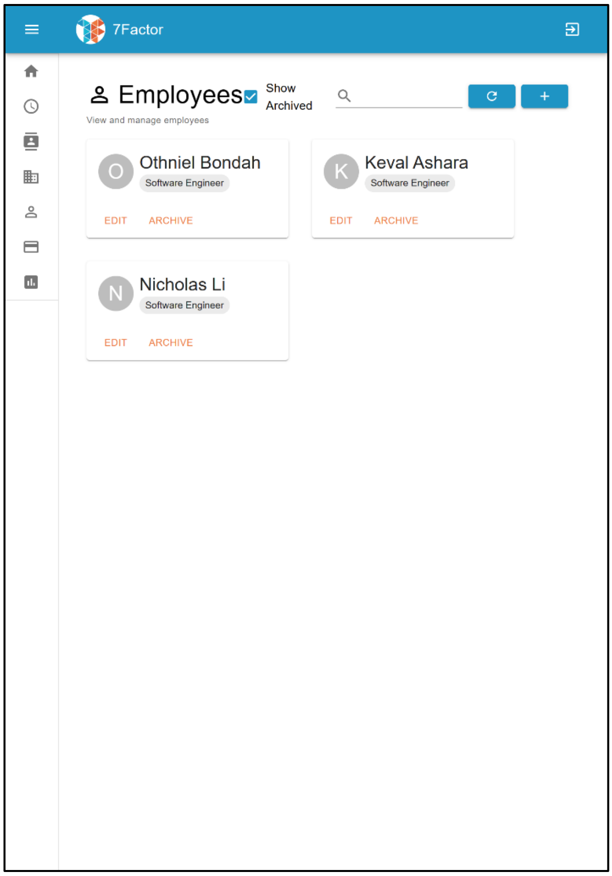


Figure 65: Clients Page Add Client (Tablet Horizontal After)



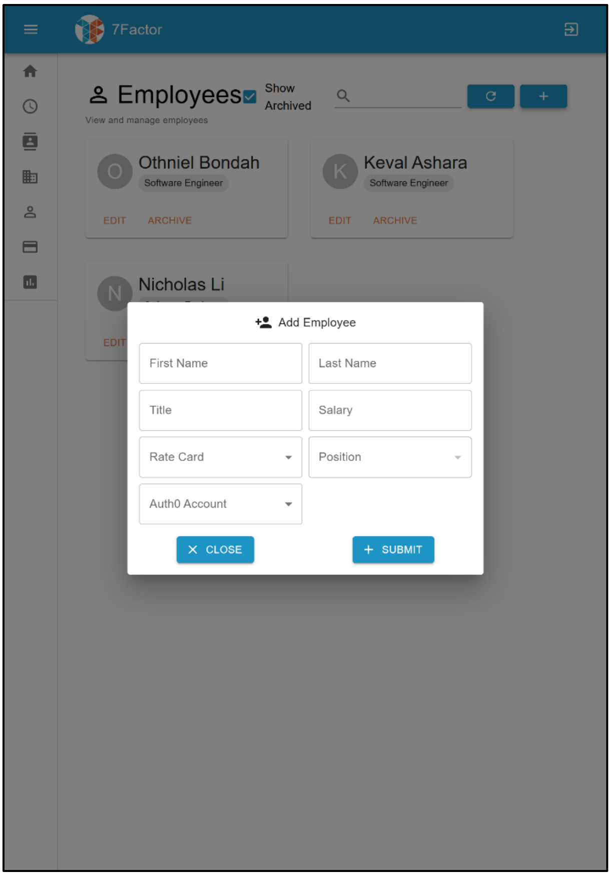
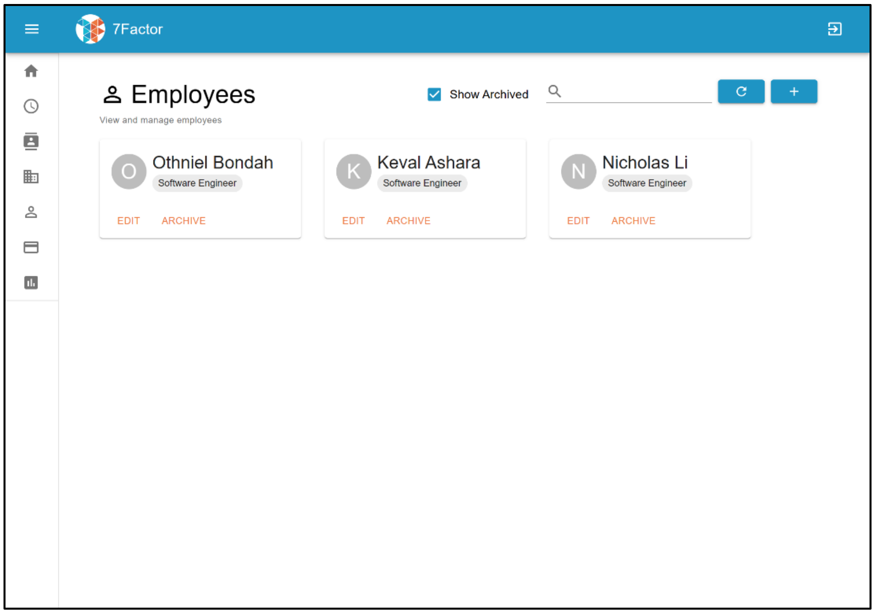


Figure 66 (Left): Employees Page (Tablet Vertical After)

Figure 67 (Right): Employees Page Add Employee (Tablet Vertical After)



7Factor

Employees

☑ Show Archived

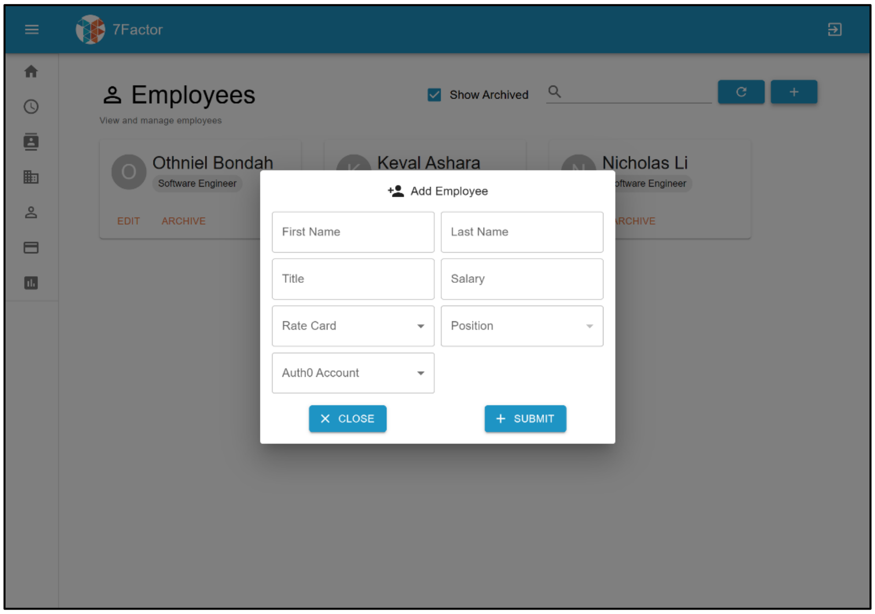
View and manage employees

Othniel Bondah
Software Engineer
EDIT ARCHIVE

Keval Ashara
Software Engineer
EDIT ARCHIVE

Nicholas Li
Software Engineer
EDIT ARCHIVE

Figure 68: Employees Page (Tablet Horizontal After)



7Factor

Employees

☑ Show Archived

View and manage employees

Add Employee

First Name

Last Name

Title

Salary

Rate Card

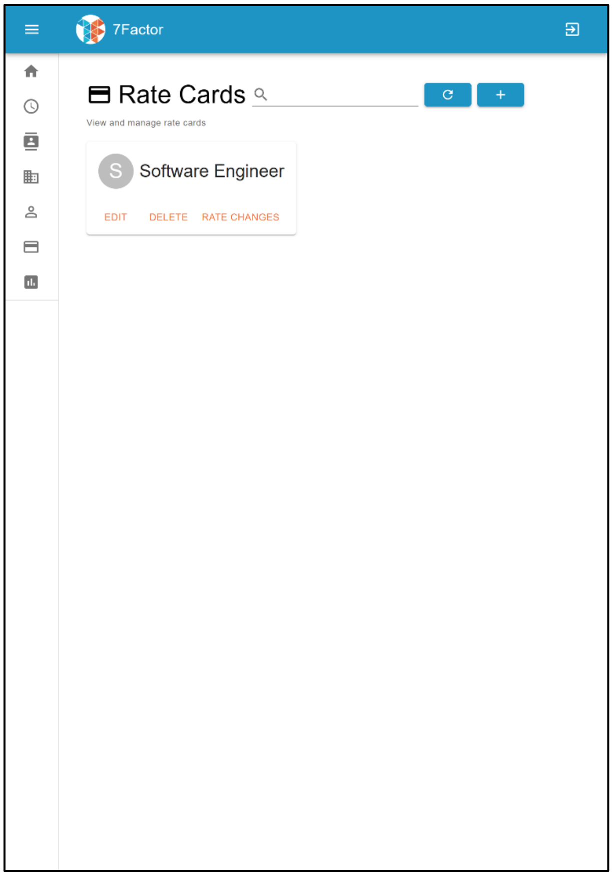
Position

Auth0 Account

CLOSE

SUBMIT

Figure 69: Employees Page Add Employee (Tablet Horizontal After)



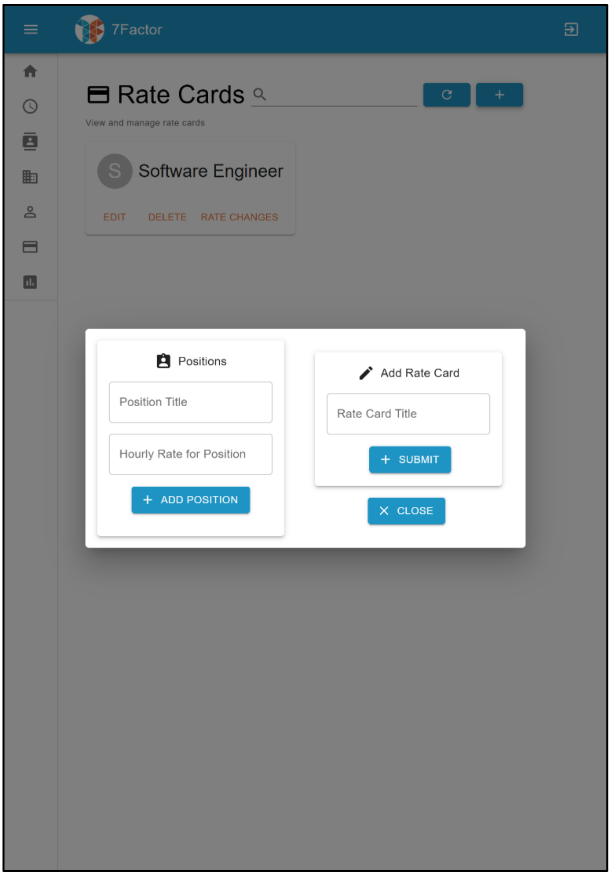


Figure 70 (Left): Rate Cards Page (Tablet Vertical After)

Figure 71 (Right): Rate Cards Page Add Rate Card (Tablet Vertical After)

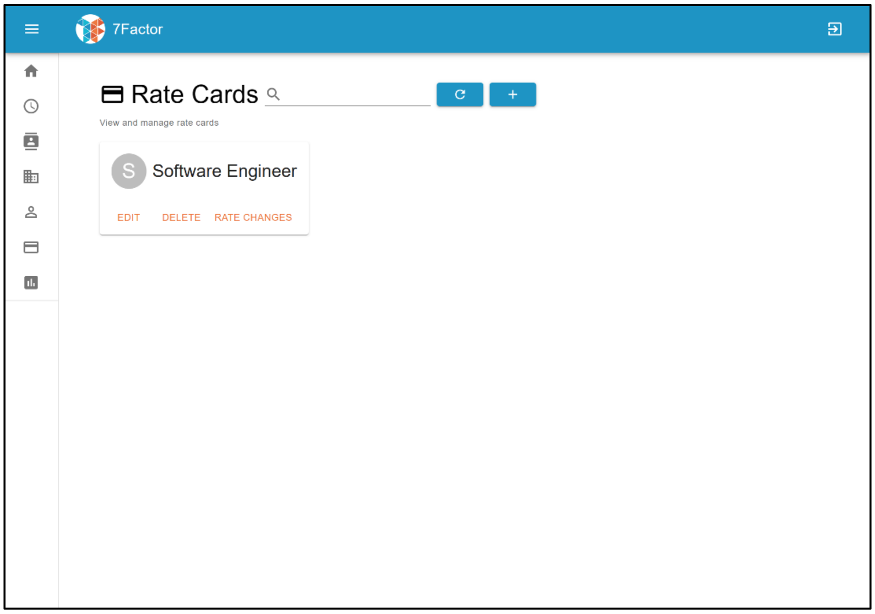


Figure 72: Rate Cards Page (Tablet Horizontal After)

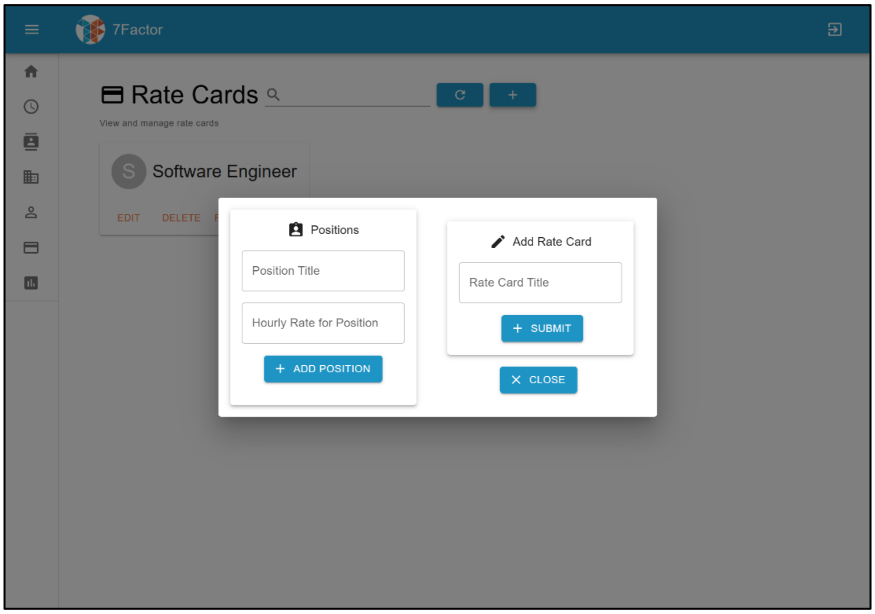
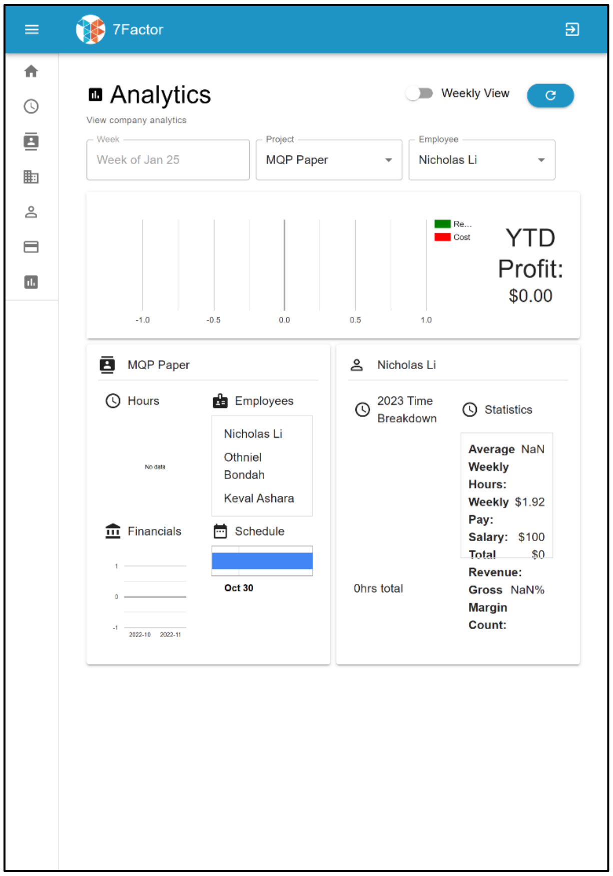


Figure 73: Rate Cards Page Add Rate Card (Tablet Horizontal After)


7Factor

Analytics

Weekly View

View company analytics

Week
Week of Jan 25

Project
MQP Paper

Employee
Nicholas Li

YTD Profit:
$0.00

MQP Paper

Hours

No data

Employees

Nicholas Li

Othniel Bondah

Keval Ashara

Financials

Schedule

Oct 30

Nicholas Li

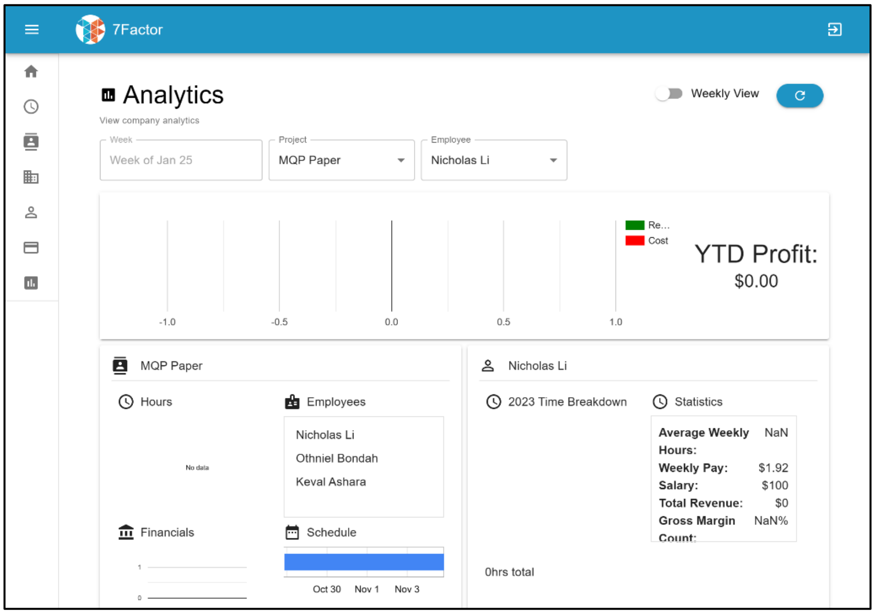
2023 Time Breakdown

0hrs total

Statistics

Average Weekly Hours:	NaN
Weekly Pay:	$1.92
Salary:	$100
Total Revenue:	$0
Gross Margin Count:	NaN%

Figure 74: Analytics Page (Tablet Vertical After)


7Factor

Analytics

Weekly View

View company analytics

Week
Week of Jan 25

Project
MQP Paper

Employee
Nicholas Li

YTD Profit:
$0.00

MQP Paper

Hours

No data

Employees

Nicholas Li

Othniel Bondah

Keval Ashara

Financials

Schedule

Nicholas Li

2023 Time Breakdown

0hrs total

Statistics

Average Weekly Hours:	NaN
Weekly Pay:	$1.92
Salary:	$100
Total Revenue:	$0
Gross Margin Count:	NaN%

Figure 75: Analytics Page (Tablet Horizontal After)

Recommendations and Future Work

The previous group had left us with three suggestions for future advancements on this project. The first is to further implement and secure the server authentication using Auth0 to validate requests on the server side. The second is to redesign and implement Data-Transfer Objects to reduce the load of data transferred from the backend to the frontend and vice versa. The last suggestion was to work on the responsive design of the platform. We have successfully finished the responsive design aspect of this project. We made sure that this Staffing Tool platform is fully functional as well as visually pleasing for all devices and not just for desktop users.

However, the area we believe would be the best to focus on for future groups and the most important would be the authentication system's security. The platform currently holds a secure-built authentication system with the usage of Auth0, but it does not support much server-side request validation. All requests sent to the backend server contain a token generated and checked by Auth0. However, this token does not consider the role of the user, which is usually assigned to a user based on their position in the corporation. This means that hackers or other intentional users can sneak into parts of the application that should have been locked in users with specific roles or privileges.

The next area of improvement is to redesign the way that data is being sent from the backend to the frontend and the other way around. However, this can be a challenging task since the initial design was created by a couple of groups prior, and many newer features have been built upon this old design. The application currently sends over the entire server-side representation of the object to the frontend with each single API request, regardless of the type of request. That means that even if we just want to get a list of all the employees in the system, the server will still send to the frontend information that describes everything related to employees, even when this information has nothing to do with the user’s request. By implementing Data Transfer Objects, objects can carry only relevant information to reduce the load of information being sent back and forth.

Another feature is the addition of small, interesting animations to the platform. Currently the interface for all devices is functional but can get a little bit boring. We tried to start on that, but most of our time was put into ensuring that the platform would function properly and look correct on all devices despite the size. However, we generated some interesting ideas, including hover animation for the cards, animation when switching between pages, and sidebar and toolbar animations.

Conclusion

Building on the desktop version of the staffing tool app by our predecessors, our team was able to create a responsive design user interface for modern mobile phones and tablet devices while maintaining the functionality of the app, including administrative management of clients, employees, projects, and rate cards. All pages are styled similarly to the desktop version to avoid inconsistency and to keep the application user-friendly.

Bibliography

Atlassian. (n.d.). *What is agile?* Atlassian. Retrieved February 20, 2023, from https://www.atlassian.com/agile

Quality Engineered Custom Software Solutions: Cloud native: 7Factor. 7Factor Software. (2023, February 17). Retrieved February 20, 2023, from https://www.7factor.io/

React – a JavaScript library for building user interfaces. – A JavaScript library for building user interfaces. (n.d.). Retrieved February 20, 2023, from https://reactjs.org/

The Collaborative Interface Design Tool. Figma. (n.d.). Retrieved March 3, 2023, from https://www.figma.com/

The React Component Library You always wanted. MUI. (n.d.). Retrieved February 20, 2023, from https://mui.com/

Appendix

A. Development Environment Setup

You must install all the following tools (these are the versions that was currently being used) before running the Staffing Tool Platform:

- Docker (version 4.12.0)
- Git (version 2.39.2)
- Java (version 8, jdk "1.8.0_341")
- NodeJS (version v16.17.0)
- NPM (version 8.15.0)

If you are running Ubuntu Linux operating system, you can run this command in a terminal to install all the packages at the same time:

```
sudo apt-get install docker git nodejs npm
```

B. Running the Staffing Tool Platform Code

If you run into any difficulties getting the staffing tool to run, please do feel free to email our group at the emails on the Digitial WPI page. Our team and previous teams did run into trouble trying to initially run this code and we are willing to help future teams to get started.

Instruction

To run the code, you must first get access to all three GitHub repositories that contain the source code. These repositories are private repositories so you would first need to request access from 7Factor.

- Frontend: https://github.com/7Factor/mqp-staffing-tool-ui
- Backend: https://github.com/7Factor/mqp-staffing-tool
- Database: https://github.com/7Factor/mqp-staffing-tool-db

For each repository, once you get access to these GitHub repositories from 7Factor, you would then need to clone the repositories by using "*git clone [repository URL]"* command. When you have all 3 repositories cloned, you should first start the database, then the backend API, and finally the frontend.

Steps to Take:

Database

- Open the database repo folder in a terminal (bash works, prompt does not)
- Run the following command
  - `./env/_up.sh`

Backend API

- Open the backend repo folder in a terminal (bash works, prompt does not)
- Run the following command depending on your operating system
  - Windows: `./gradlew.bat bootRun`
  - Other: `./env/_up.sh`

Frontend

- Open the frontend repo folder in a terminal (bash works, prompt does not)
- Run the following command
  - CD into the src folder: `cd src`
  - `npm install`
  - `npm run start`

Once you have all three repositories running and the frontend started, your browser should automatically open to a development build of the platform. Assuming that both the database and backend have been set up and running properly, you should then be able to do everything that the site is meant to do. However, the first time you are trying to login you would need access from Auth0, which you should contact Jeremy about.