



Hi-Fi Prototype and Heuristic Evaluation

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Human Computer Interface - 2025-1 CMPS3141-1

Lecturer: Manuel Medina

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Group members:

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Page	Page 2 of 20

Table of Contents

Table of Contents	2
Problem and Solution Overview	3
Problem and Mission	3
Solution	3
Tasks & Final Interface Scenarios	4
Task 1: Setting your location	4
Task 1 Storyboard	4
Task 2: Quick-booking a ride	4
Task 2 Storyboard	4
Task 3: Scheduling a ride	4
Task 3 Storyboard	4
Design Evolution	5
Initial Sketches	5
Low-Fi Demo	5
Medium-Fi Demo	5
Final Design	5
Major Usability Problems Addressed	6
Prototype Implementation	7
Tools	7
How The Tools Helped	7
How The Tools Didn't Help	7
Wizard of Oz	7
Hard-coded Data	7
What is missing and what might we add in the future?	7
Summary	8

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Page	Page 3 of 20

Problem and Solution Overview

Problem and Mission

For many UB students, commuting to Belmopan has become increasingly frustrating. Overcrowded buses, unreliable schedules, and long travel times make daily travel stressful and inefficient. Meanwhile, many students who drive to campus travel alone, spending large amounts on gas despite having empty seats in their vehicles.

Solution

Our solution, the UB Carpool App, creates a UB-student-only carpooling platform that allows drivers to offer rides and passengers to find available seats. Through verified profiles, built-in chat, and a simple map-based booking system, the app helps students share rides, save on fuel, and reduce the hassle of commuting while promoting safety and community.

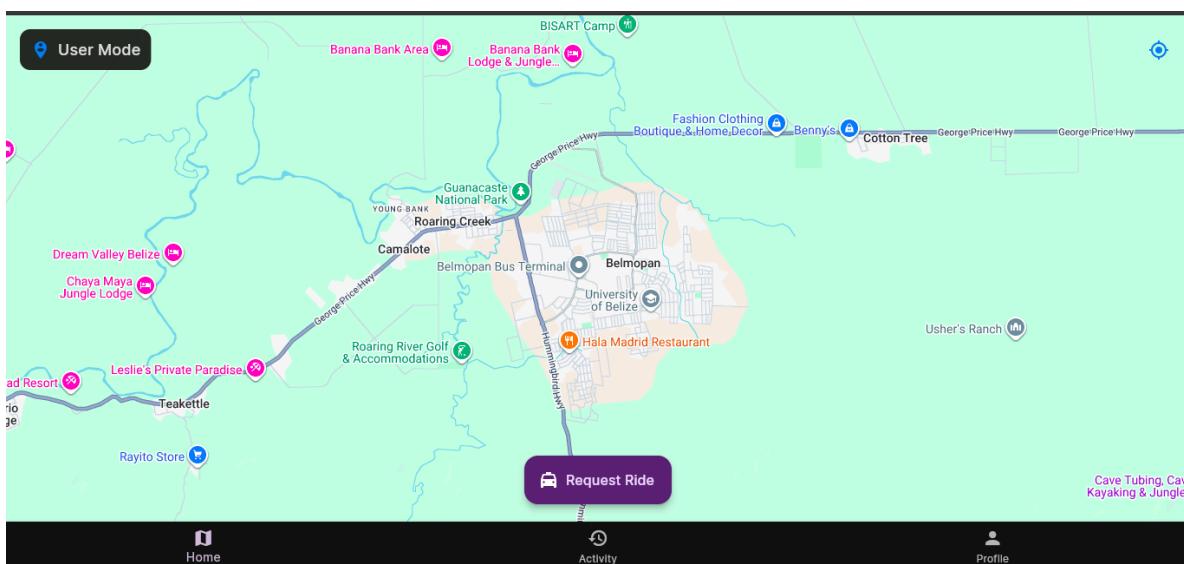


Figure 1: Overview of Design on web PC interface

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Page	Page 4 of 20

Tasks & Final Interface Scenarios

Task 1: Viewing Activity History (Easy Task)

The user can view their ride history by clicking on the activity tab, then clicking on a ride. This displays useful information to the user such as payment, rider information, and where the user was picked up from. This can serve as a handy tool for things such as tracking expenses, or being able to view drivers that the user enjoyed riding with.

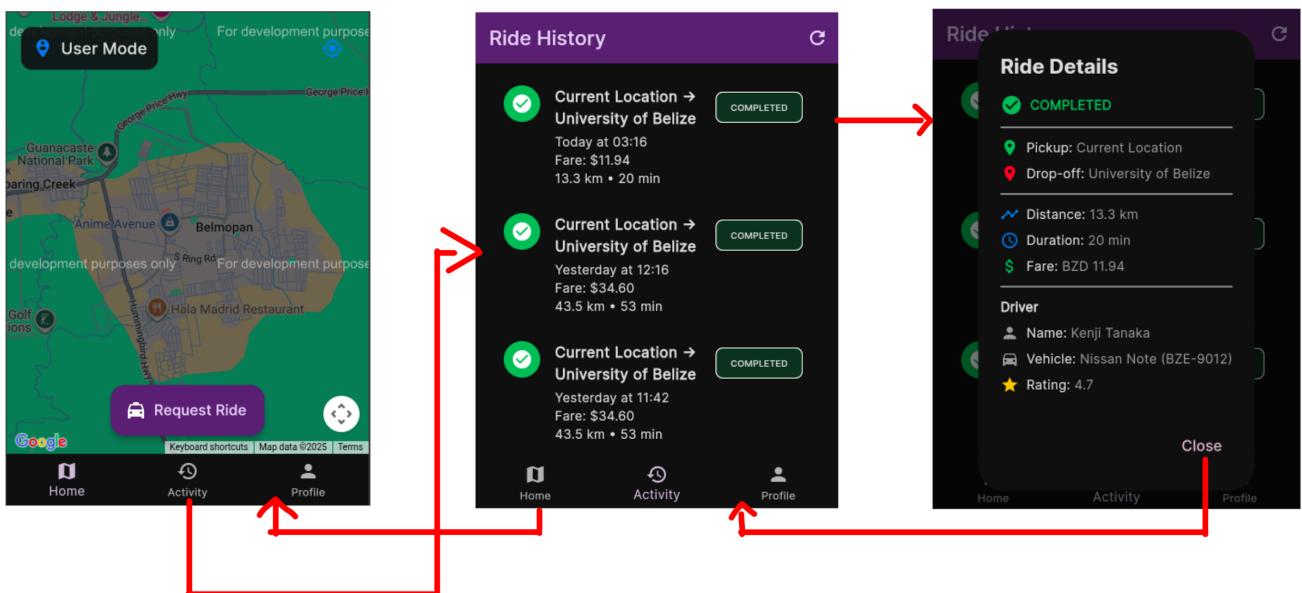


Figure 2: Task 1 Storyboard

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Page	Page 5 of 20

Task 2: Setting your location (medium task)

The rider can set their location in order for the app to show them what riders are compatible with their route. For example, if the rider is in San Ignacio, then a driver in Benque can pass by to pick the rider up and take them to the University of Belize.

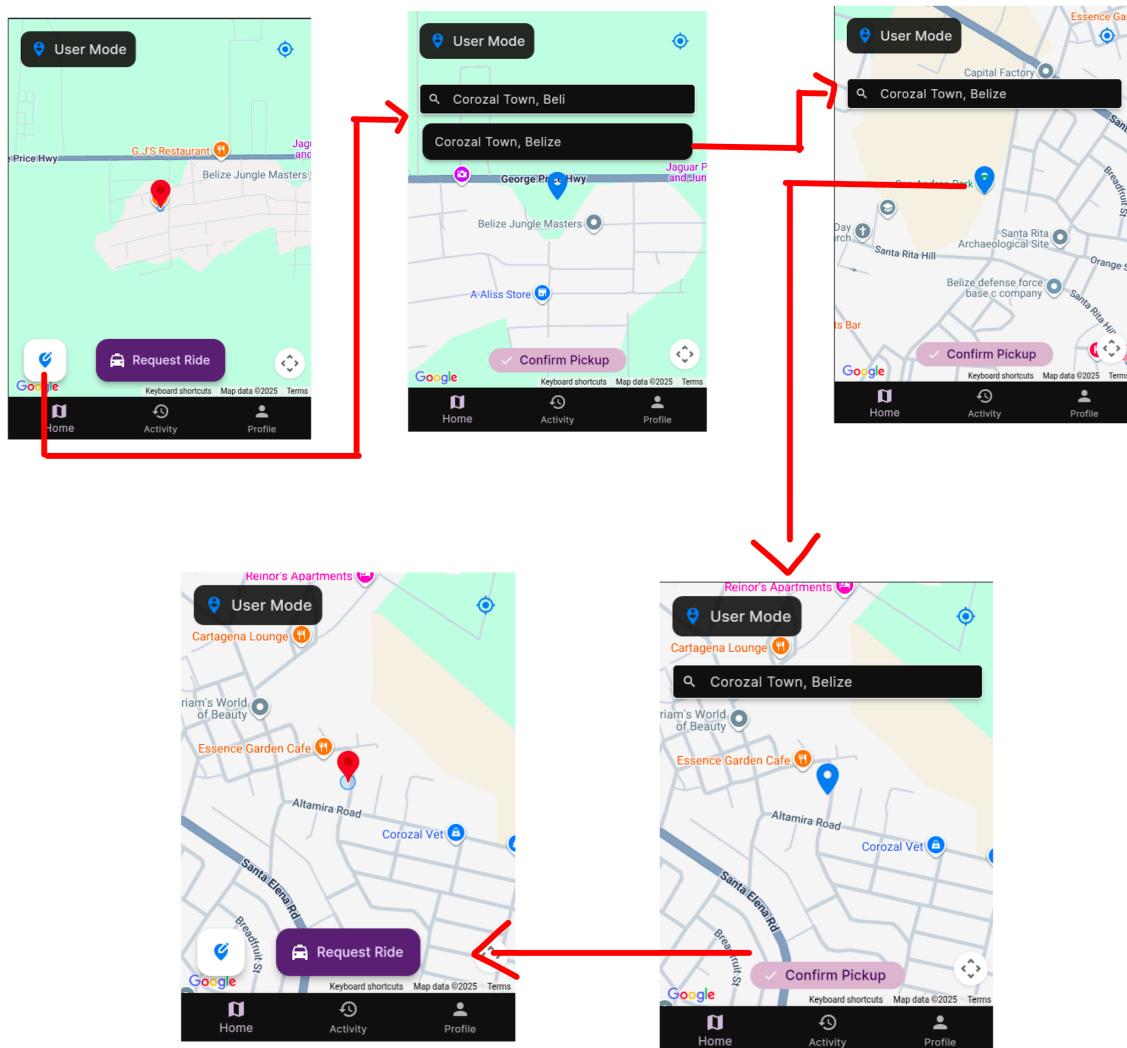


Figure 3: Task 2 storyboard

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Page	Page 6 of 20

Task 3: Scheduling and Requesting a ride (Hard Task)

The interface used by the rider to search for and book a ride based on a list of compatible drivers.

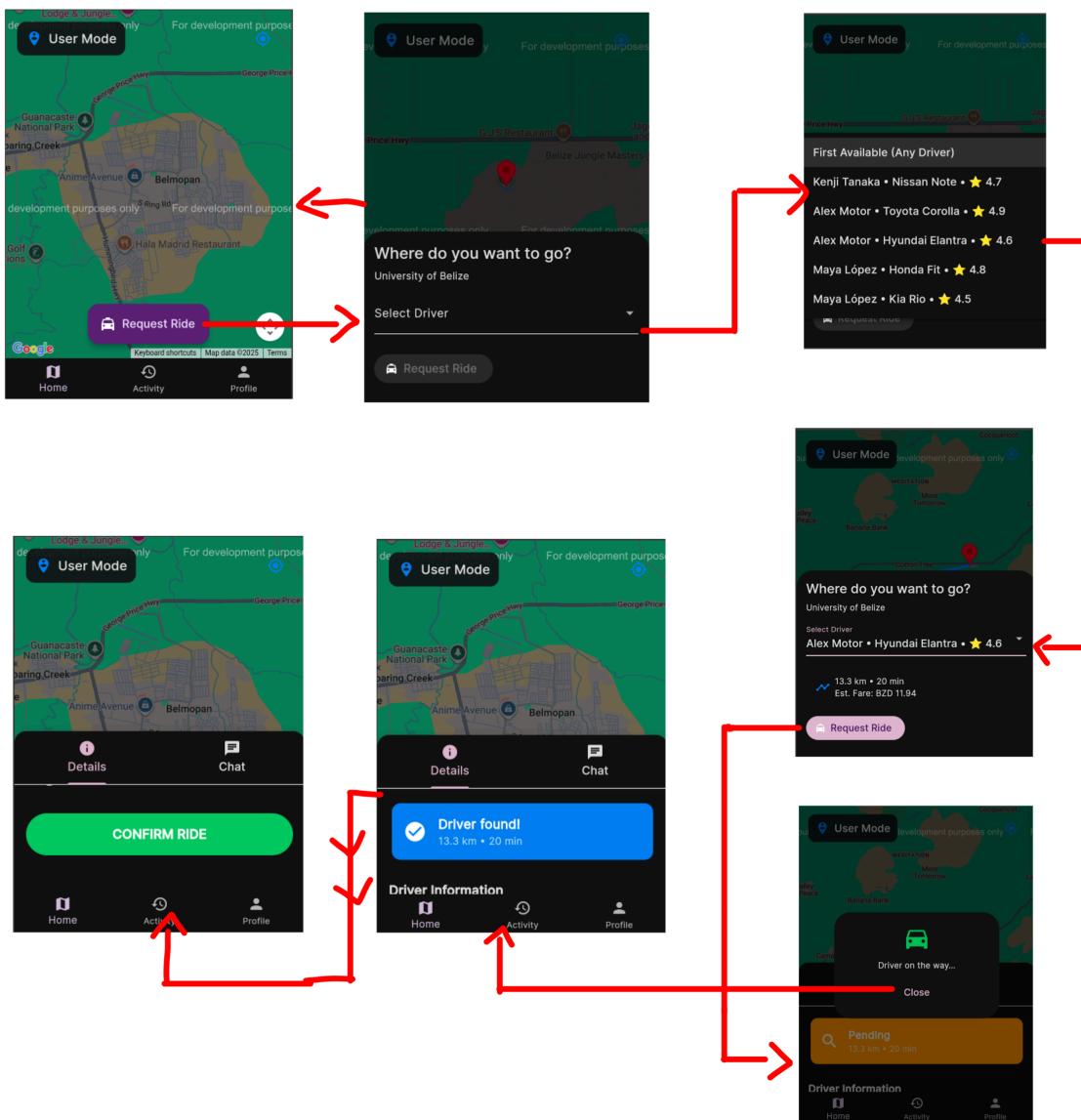


Figure 4: Task 3 Storyboard

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Page	Page 7 of 20

Design Evolution

Initial Sketches

The first initial sketches were concepts that the team came up with (based on the initial needsfinding phase) to figure out what the best design approach going forward would be. Below is the chosen design, a tabbed approach with some hovering elements.

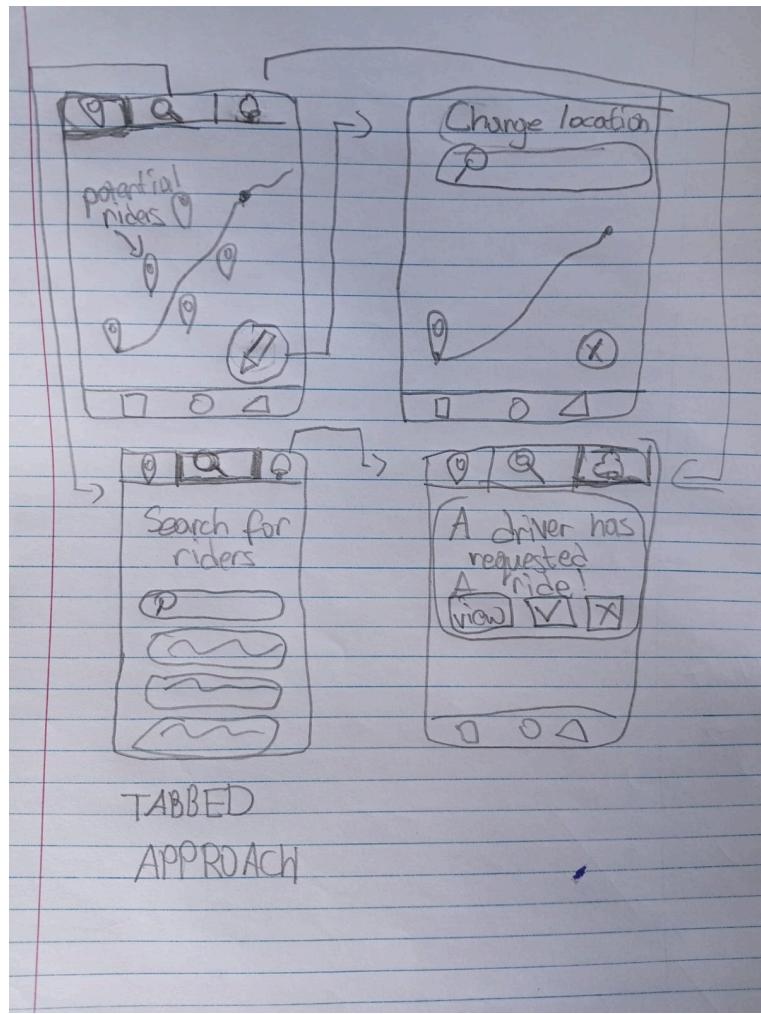


Figure 5: Initial sketch idea

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Page	Page 8 of 20

Low-Fi Demo

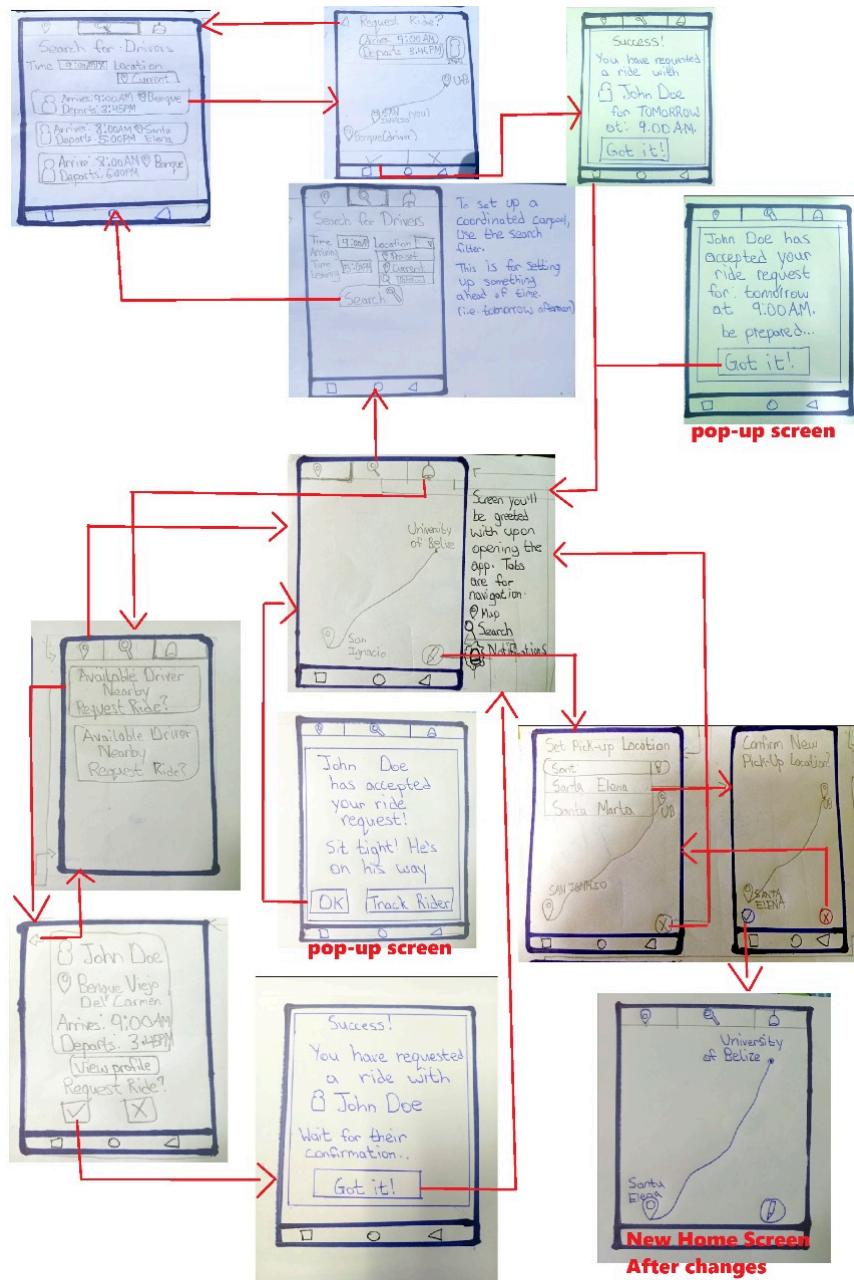


Figure 6: Low-Fi Demo

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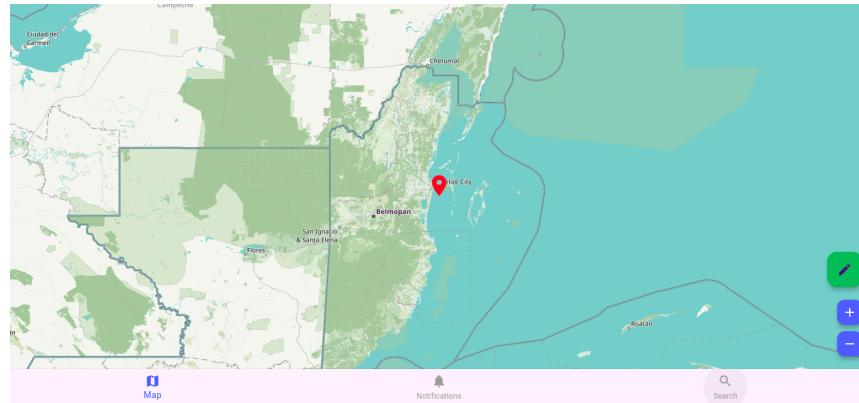


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Page	Page 9 of 20

The sketches above depict the design used to test out the low-fi demo. This design is simply an expansion of the initial sketches with the main difference being higher quality sketches and more detailed task flows. Design issues with the paper prototype were mainly related to unclear visuals, which is an expected limitation of paper prototypes. Another design issue was unclear wording for certain tasks, such as the search feature's option's wording. These issues were addressed in the medium-fi prototype.

Medium-Fi Demo

After gathering feedback from the Low-Fi demo implementation, the team created a new interactable medium-fi prototype. With this, we were able to gain better insight on the design issues than we could for our Low-Fi prototype.



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Page	Page 10 of 20

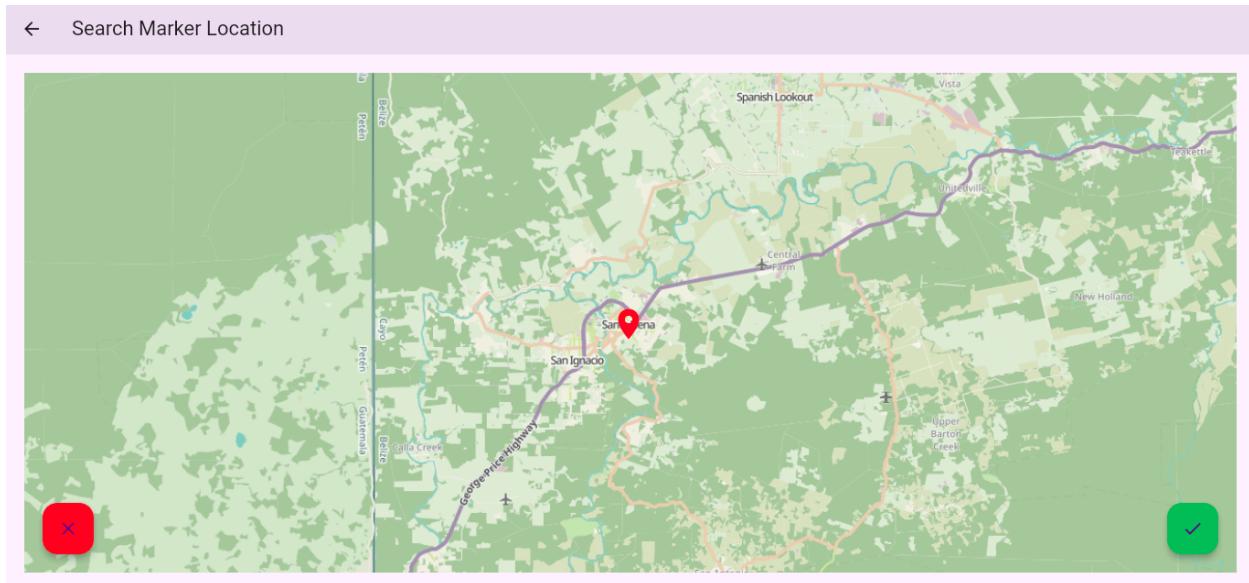


Figure 7: Edit location screens

The main issues faced were users not intuitively understanding how to edit the location (See screenshots above). The green icon may have played a part, as it does sort of blend into the background. The green and purple may have also been a part of the problem, as it's difficult to tell that the icon is meant to be an edit button. It may also help to design the edit button to include more than just a pencil, which we'll see in the Hi-Fi prototype.

The second issue faced was users intuitively wanting you to be able to move the marker around, which is a functionality this prototype did not have. This will be added to the Hi-Fi prototype.

The third major issue was not intuitively understanding the labels (see screenshots below), the "search" and "notification" appear to be label names that don't fully capture what they're supposed to mean. This issue will be fixed in the Hi-Fi prototype.

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Page	Page 11 of 20

Notifications

Driver: Carlos Lopez
From: Belmopan
Departs Home: 08:00 AM
University Departure: 08:45 AM

Driver: Maria Garcia
From: Belize City
Departs Home: 07:00 AM
University Departure: 08:15 AM

Driver: Sofia Hernandez
From: San Ignacio
Departs Home: 01:00 PM
University Departure: 01:45 PM

Maria Garcia has accepted your ride request!

You can now track Maria in the Map tab.

OK Track Rider

 Map  Notifications  Search

Notifications

Driver: Carlos Lopez
From: Belmopan
Departs Home: 08:00 AM
University Departure: 08:45 AM

Driver: Maria Garcia
From: Belize City
Departs Home: 07:00 AM
University Departure: 08:15 AM

Driver: Sofia Hernandez
From: San Ignacio
Departs Home: 01:00 PM
University Departure: 01:45 PM

Request Ride?

Driver: Maria Garcia
From: Belize City
Home Departure: 07:00 AM
University Departure: 08:15 AM

Cancel  Request

 Map  Notifications  Search

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Page	Page 12 of 20

Notifications

Driver: Carlos Lopez
From: Belmopan
Departs Home: 08:00 AM
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From: Belize City
Departs Home: 07:00 AM
University Departure: 08:15 AM

Driver: Sofia Hernandez
From: San Ignacio
Departs Home: 01:00 PM
University Departure: 01:45 PM

Request Sent

You've requested a ride from Belize City with Maria Garcia

[Got it!](#)

[Map](#)
 [Notifications](#)
 [Search](#)

Search Rides

Enter departure town
 X

Home Departure University Departure

🕒 9:30 AM ⏲ 6:08 PM

[Search Rides](#)

Camila Lopez
From: San Ignacio
Home Departure: 09:00 AM
University Departure: 10:15 AM

Andres Vazquez
From: San Ignacio
Home Departure: 12:30 PM
University Departure: 02:00 PM

Sofia Hernandez
From: San Ignacio

[Map](#)
 [Notifications](#)
 [Search](#)

Figure 8: Notification and Search tabs

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Page	Page 13 of 20

Final Design

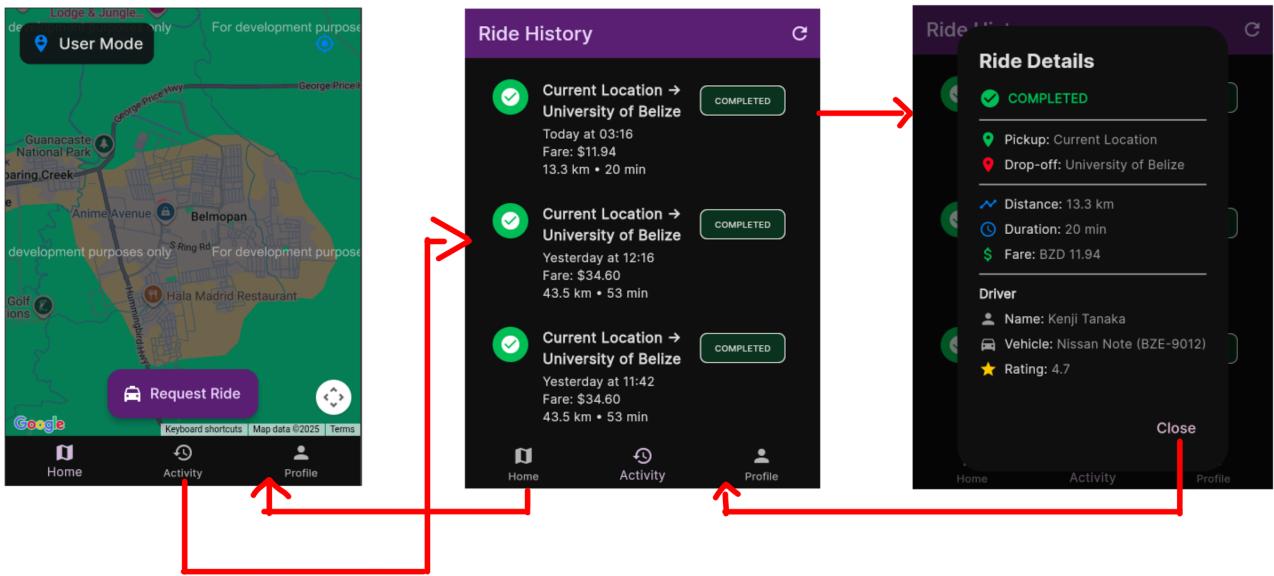


Figure 9: Task 1 Storyboard

The final design has slightly altered the tasks. Changing your location is now considered a “medium task” as we’ve increased the complexity of it a bit, while also adding a new useful simple task, seeing a history of your past rides. This task is simple navigation, pressing a tab to view all your previous rides, and clicking on one allows you to see more details about the ride. This is helpful if you need to keep track of expenses or drivers that you liked interacting with.

The second task (view storyboard below) as mentioned, is the “update location” task, which is now the medium task. This task involves updating your location, which is used to help you find rides. Currently the Hi-Fi only has placeholder drivers. You can use the search feature or drag the marker around, or a combination of the two. So changing your location is now super intuitive.

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Page	Page 14 of 20

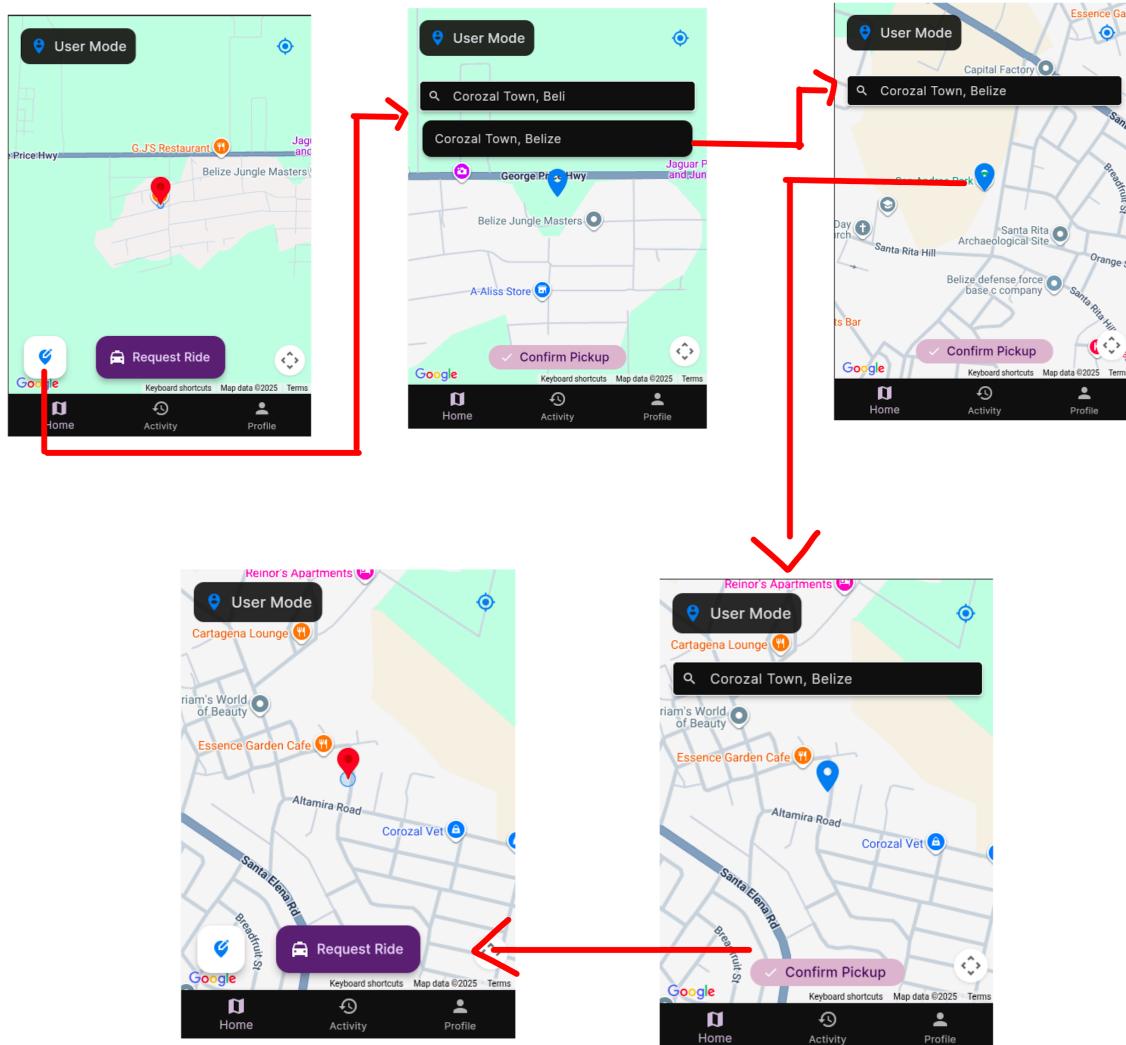


Figure 10: Task 2 Storyboard

The final task is the booking a ride feature. The previous way of splitting it into two ways of booking rides was unintuitive to users so we decided to just have one way of booking a ride for now. This feature depends on your location, as available rides you can book depends on if the driver can come pick you up or not.

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Page	Page 15 of 20

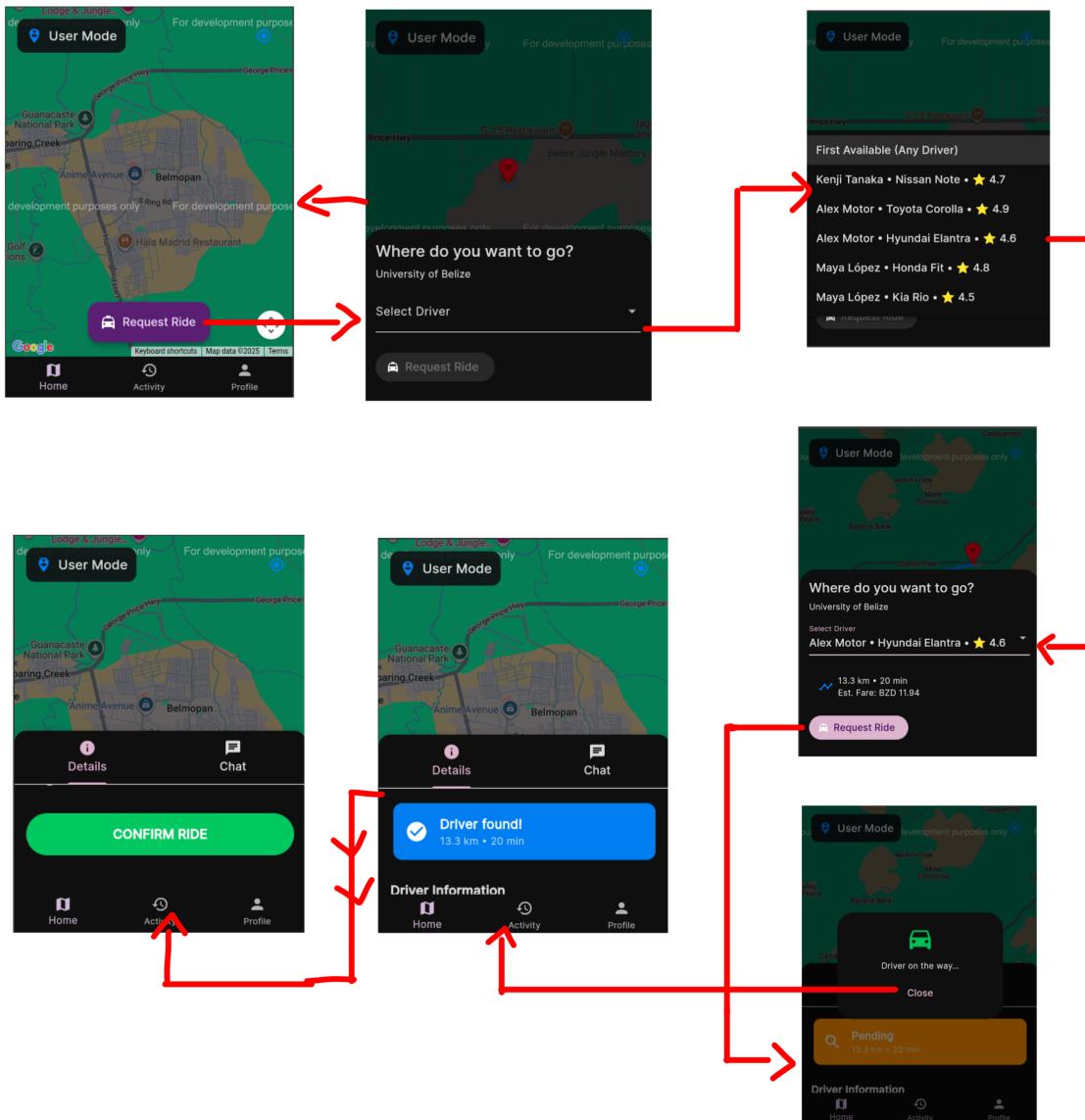


Figure 11: Task 3 Storyboard

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Page	Page 16 of 20

Major Usability Problems Addressed

Pre-Heuristic Evaluation

Before a Heuristic Evaluation, we had to address major issues with the medium-fi prototype

- Merging task 2 and task 3 into one: our original vision appeared to be unintuitive to users and having them both be merged into one task seemed like the best solution to this problem.
- Users having problems with the edit location feature by changing the icon and colour scheme
- Added a more intuitive way of editing your location

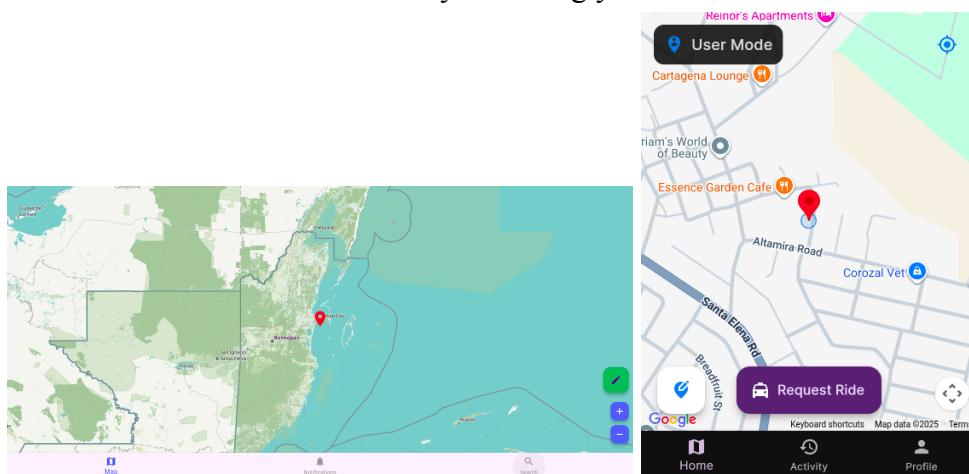


Figure 12: Depicting the edit button change along with the "Request Ride" feature button being moved

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Page	Page 17 of 20

Post-Heuristic Evaluation

After creating our prototype, we had Enrique Garcia perform a Heuristic Evaluation on our prototype and found the following major usability issues:

- Map being interactable when scrolling through tabs due to the map gestures not being turned off when another tab is open. This is a major usability issue and was removed by locking the map whenever there is a tab open.

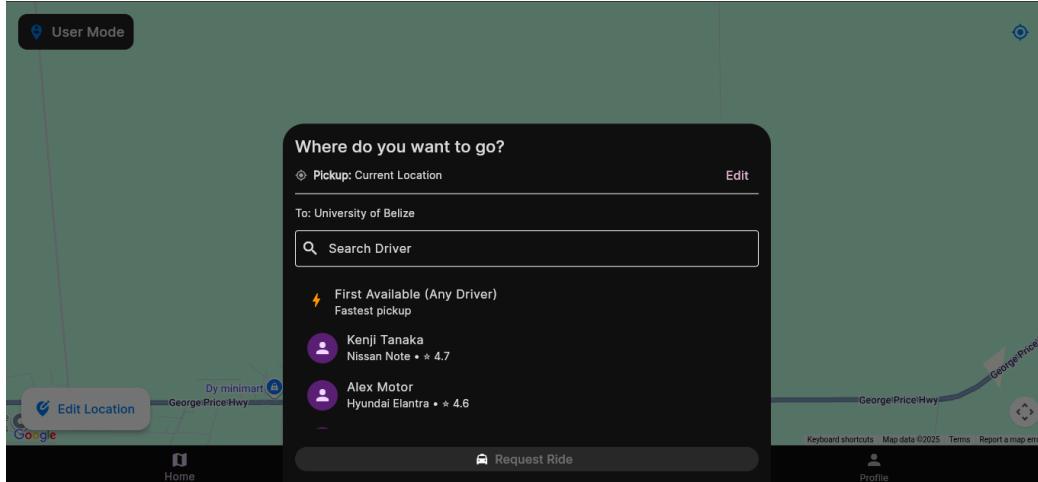


Figure 12: Map in background moving despite tab being open

- Driver updates not updating on client side: Whenever there was a driver update, the driver status did not update. This is a major usability issue as the user needs to be able to see updates. We weren't able to completely fix it, so for demo purposes we'll just use a workaround of reloading the tab if we are unable to find a way to fix the tab not updating.

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Page	Page 18 of 20

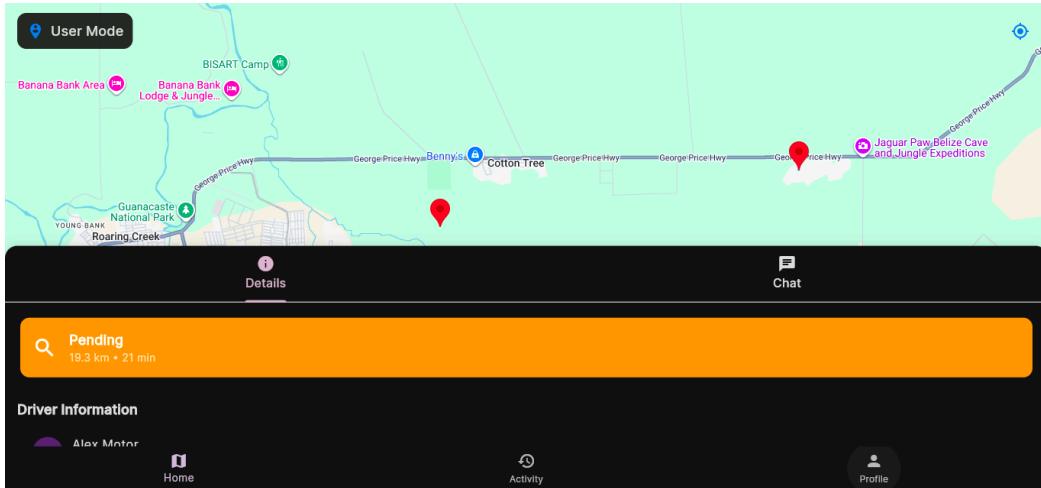


Figure 12: Map in background moving despite tab being open

- The final major usability issue found is the location opening every time a tab is reloaded. Whenever a user performs any action, the map tab is refreshed, and there was a strange bug that caused this to put you into location-changing mode. Which had to be swiftly addressed as this would make the app frustrating for users.

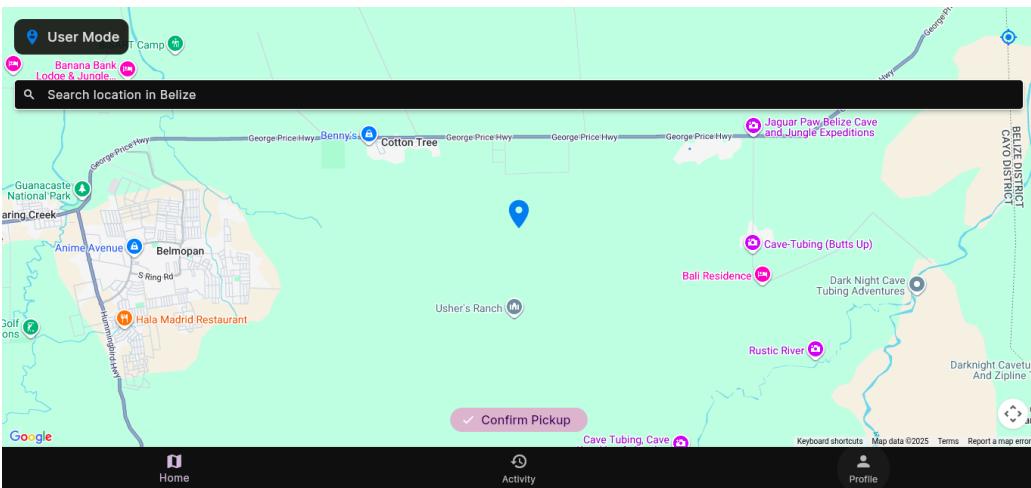


Figure 13: Unsolicited Location Update anytime the user does anything.



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Page	Page 19 of 20

Prototype Implementation

Tools

The tool we used to implement our medium-fi and hi-fi was flutter. Flutter is an open-source UI toolkit created by Google that lets you build cross-platform apps from a single codebase. That means you write your app once, and it'll run on android, iOS, the web, and desktop. The flutter framework uses dart and a bunch of widgets.

How The Tools Helped

- Cross platform allowed us to test it on a variety of interfaces.
- A ton of widget libraries that we can lookup
- Built in icons so we don't have to worry much about graphic design
- Being backed up by google means it has a large environment

How The Tools Didn't Help

- It's too heavy for these kinds of tasks
- Flutter is prone to "nested hell" due to how widgets work, spaghetti code
- It's hard to make changes, making it hard to explore a lot of "what-if" scenarios

Hard-coded Data

- Drivers and rider accounts are hardcoded through the Supabase database
- Location is based on current location, but can be updated by the user
- The driver simply marks that they have arrived at their destination rather than this being automatic
- Routes are simply created by google maps
- Activity history is hardcoded on all accounts



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Page	Page 20 of 20

What is missing and what might we add in the future?

- Real-time driver location updates: currently the driver is the one that controls when they're displayed as "arrived"
- Expand on the driver side interface
- User authentication
- Payment system
- Notification system
- Security system
- Better error handling
- Better in-system updates

Summary

Throughout this project, we found that we didn't go with the original vision of the design. As needs were changing, so did the UI. If we continued making updates, we're certain that the final UI would look nothing like it does now.

Using Flutter as a prototype proved to be challenging. Although it allowed for easier UI design implementations due to the numerous tools at our disposal, it was difficult to use due to the amount of code needed to get the app's functionality up and running. Due to the difficulty of flutter, not all issues we encountered were able to be resolved, and although this app could be directly expanded upon to be fully functioning in the future, that's not the goal of a prototype. A prototype is meant to be thrown away once it's done with. If it weren't for the assistance of AI, it would've been impossible for us to get this prototype presentation-ready before the deadline.