Writing 4

Cities are amazing places full of history and human activity. Some have incredible historical sites and lovely neighborhoods, full of places to explore. Locals and visitors must rely on different sources of information to know where to go, how to get there, and what to do on the way. What if there was an application that would combine all of this in one place? Through *Journey*, users will have access to recommendations, personalized routes, and detailed information about different locations. Also, we will promote foot traffic in congested cities by incentivizing walking. We will route a path for our users to take that will lead to an enjoyable and memorable experience. Users want to walk with this app as it allows them to explore and find new places that they can visit in the future.

Our target customer groups are tourists and city residents. Tourists will want to use the app to gain a greater appreciation for the city that they are in. This will come in the form of adding landmarks to the maps and information about different locations in the city. This allows tourists to travel the city and discover new places without the additional expense of a tour guide, and further allows tourists to feel as though they are discovering the area for themselves. The app will also provide value to residents who already know the city. People who live in the city will be able to easily plan walks and visit all forms of recreation. They will expand their knowledge of the city by using the app and become more familiar with areas outside of their usual surroundings. Adding on to the sentiment, we believe our differentiating factor is that we will be generating individualized routes based on user preferences directly at the user's current location. Therefore, unlike other walking apps that simply give shortest-path directions, we will be able to cater to each user's likes and dislikes thus providing a more enjoyable walk. This would involve dynamic features such as shade, foot traffic, street lighting, and green areas.

We aim to provide a simple user interface and in-app experience that will make it easy for the user to enjoy our app, and we want all of our results to appear for the user in a relatively quick response time. With this set of goals in mind, we believe we will take up a new domain in the market for interactive, guided walking apps, and we see a potential for *Journey* to succeed in this area.

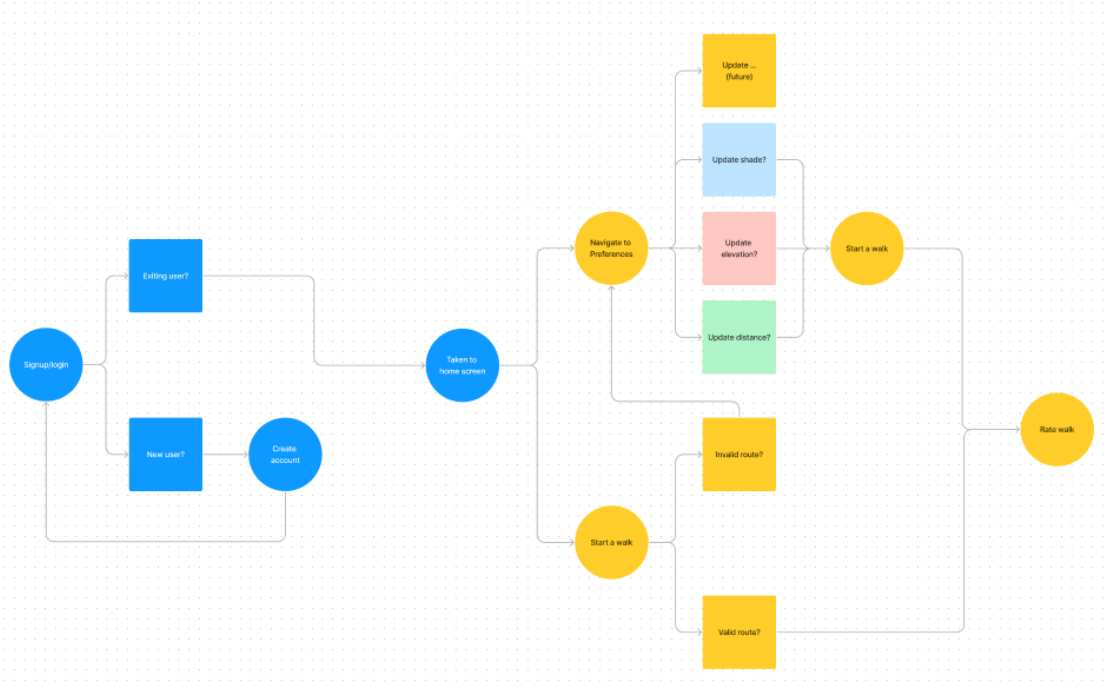
Our project will use Open Street Maps (OSM) to develop our backend maps database. We use the node structure to store our data points and existing walkways. This allows us to simplify our map down to just foot routes and remove other modes of transportation, and also allows us to add values to the nodes with custom tags we can create (for adding shade, foot traffic, and other data points). The technical novelty comes from developing a route in a cycle while collecting the most reward. Generating a

route on other attributes without a goal in mind is the fascinating aspect. Additionally, shade calculation and foot traffic calculation are novel as we explore how to compute these things at a larger scale. For the shading algorithm, we will use an elevation map and SunCalc API which provides solar data based on the date, location, and time. We will retrieve the elevation of a certain point using the map and input it into the SunCalc API to find the shadow length of that point. Then, we compare the distance between the building and the path with the shadow length to check if the building shade reaches the path. We will generate routes with existing path algorithms (the prize collecting traveling salesman) and make appropriate modifications to account for our take on reward/penalty analysis.

For the front end development, we will be using the React Native library and the Google Maps API to display the route. The novel portion of this is the ability that we have to store user preferences in our database and to be able to use those preferences to generate personalized routes for our users.

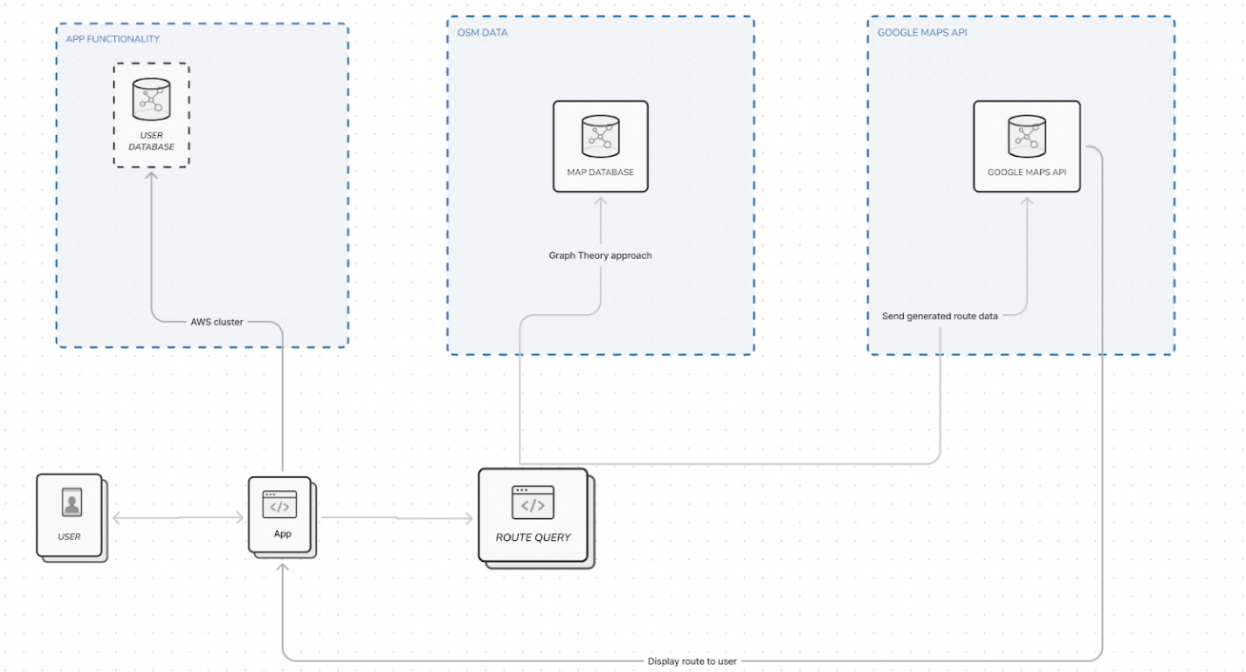
Journey has potential benefits to the communities since custom-made routes can increase business for shops, restaurants, and other venues. This, in turn, produces the virtuous cycle of better business, more employment, and increased prosperity. A product that makes exploring and learning easier can only increase tourism and resident satisfaction of their city.

Flow Diagram:

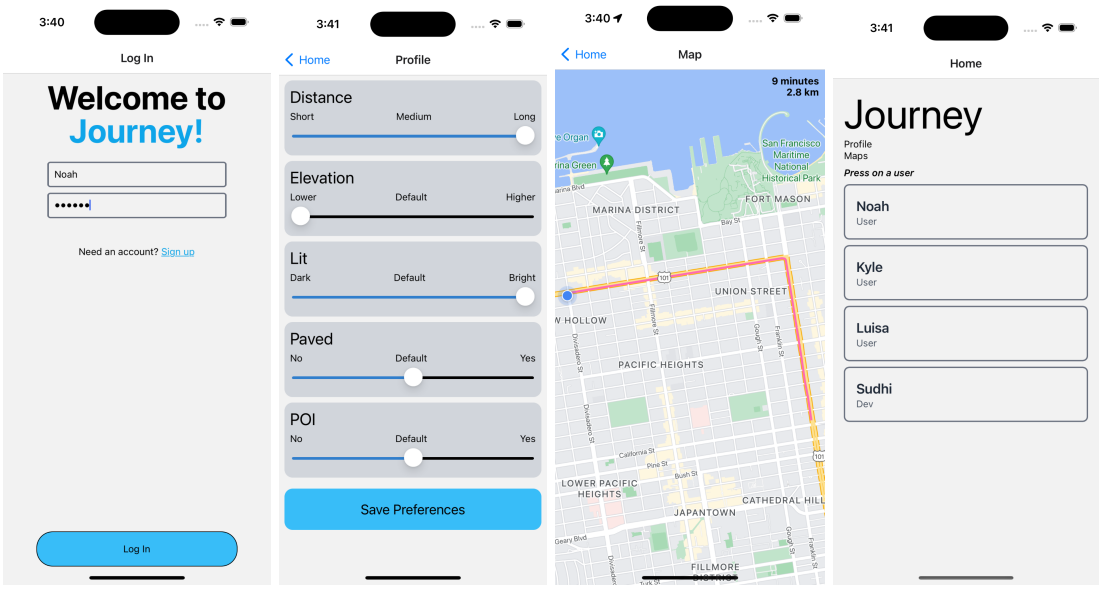


System Architecture:

Here we show an overview of how the individual components interact with each other. The user interface takes the registration information of the user at sign up and adds it to the database. They then navigate to the profile screen where they can select the different options they want for a walk. These options are sent to the backend of our app where, using our routing algorithm to weigh the different features they want, a walk will be generated. This walk will then be returned to the app through the google maps api to showcase the generated route for the user.



Mockups:



*The home screen will not showcase the database information in the final release, this is just for the alpha demo to showcase it is saving data.