****

**BEACONHOUSE NATIONAL UNIVERSITY**

**SaafPakistan**

**PRJ-F23/329**

**Design Document**

**EXTERNAL SUPERVISOR**

**Mr. Abdul Wahab**

**INTERNAL SUPERVISOR  
  
 Ms. Shazia Rizwan**

**GROUP MEMBERS**

**Ali Sher F2020-158**

**Nouman Ali F2020-149**

**Mian Faizan Munawer F2020-148**

**SCHOOL OF COMPUTER & IT**

**September 2024**

**Introduction**

SaafPakistan is a revolutionary mobile app addressing waste management challenges in Pakistan. Key features include easy recycling pickup scheduling, a gamified leaderboard system for individuals and businesses, a friend connection feature, and rewards for recycling efforts. Corporate onboarding allows businesses to showcase environmental initiatives, gaining recognition as green companies. The app also offers educational content on effective recycling. The dashboard provides users with a summary of their achievements, aiming to streamline waste management, promote responsible waste disposal, and highlight the significance of sustainability practices.

**Technologies**

**WebApp:**

* + - React

Udemy Course (https://www.udemy.com/course/the-ultimate-react-course/)

* + - Firebase

Degree Course

**MobileApp:**

* + - Flutter

Degree Course

* + - Firebase

Degree Course

**System Context Diagram**

This is the System Context Diagram of the system. It focuses on people and software systems and only shows the system landscape. There are four actors and two software systems.

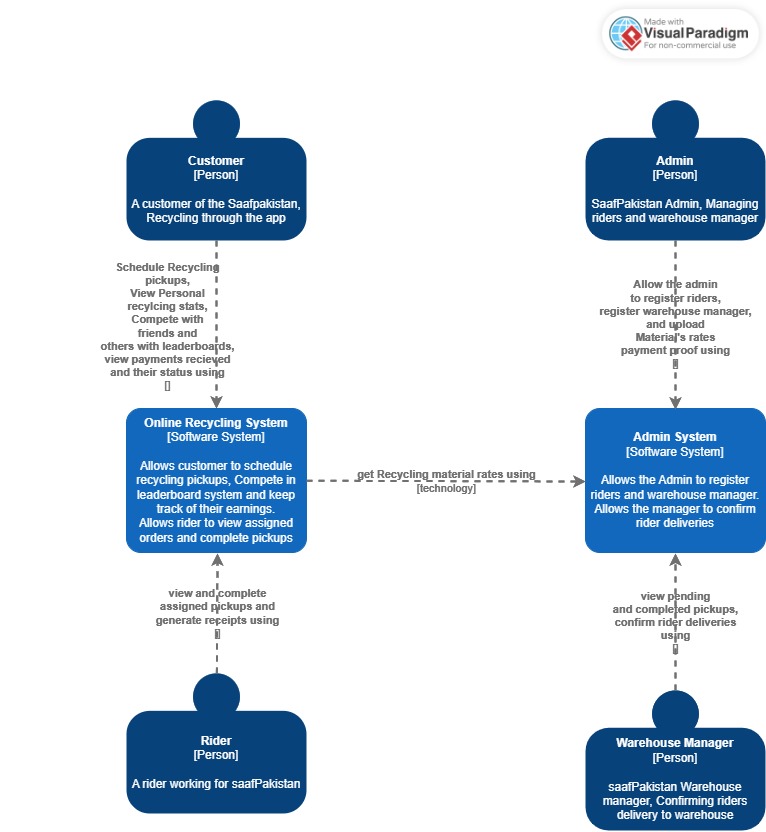
****

Figure 1 System Context Diagram

**High-Level Architecture**

This is the high-level architecture of the system. It shows major technology choices and how the software systems interact with each other. There are four actors and three major components of the system, a mobile app(Flutter), a web app(React) and the database(Firebase Firestore).

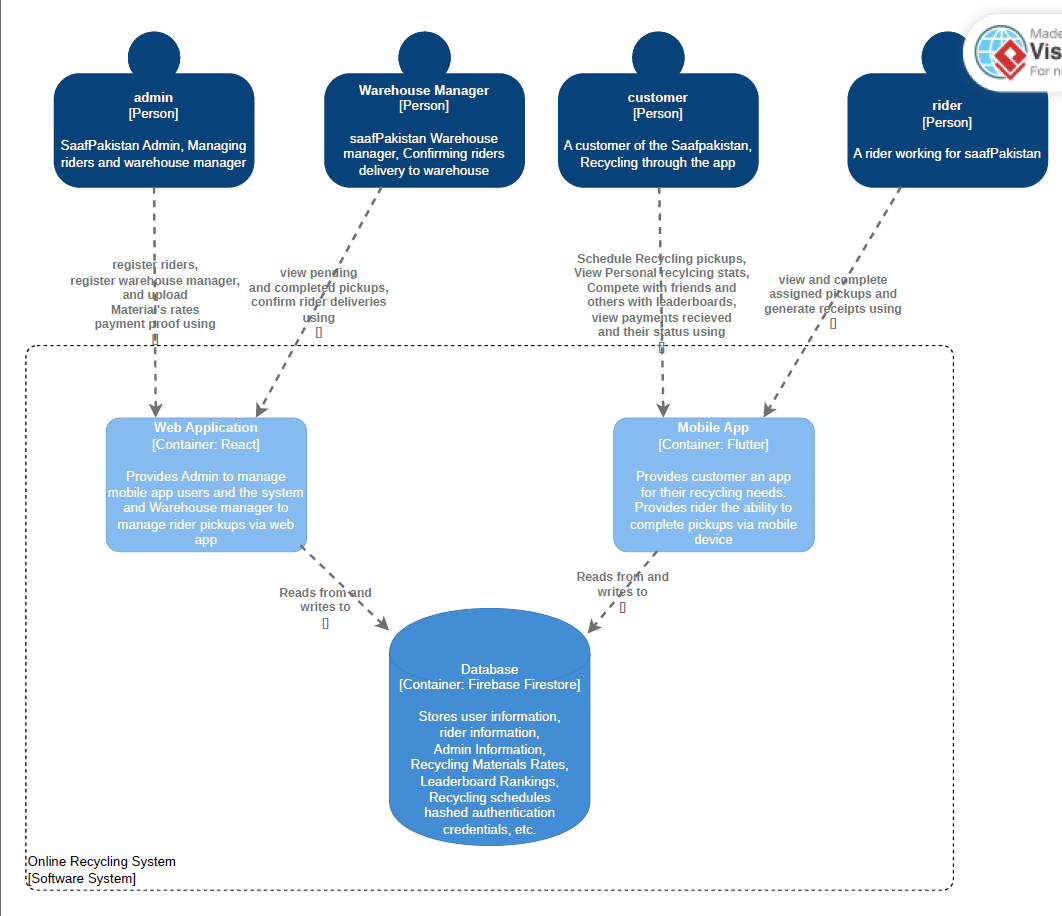
****

Figure 2 High Level Architecture

**Low-level Architecture**

**Mobile App Component Diagram**

This is the component diagram of the SaafPakistan mobile app. It delves into the finer details of the system's low-level architecture. It provides a closer look at the key components within the mobile container, along with the underlying technologies and implementation specifics.

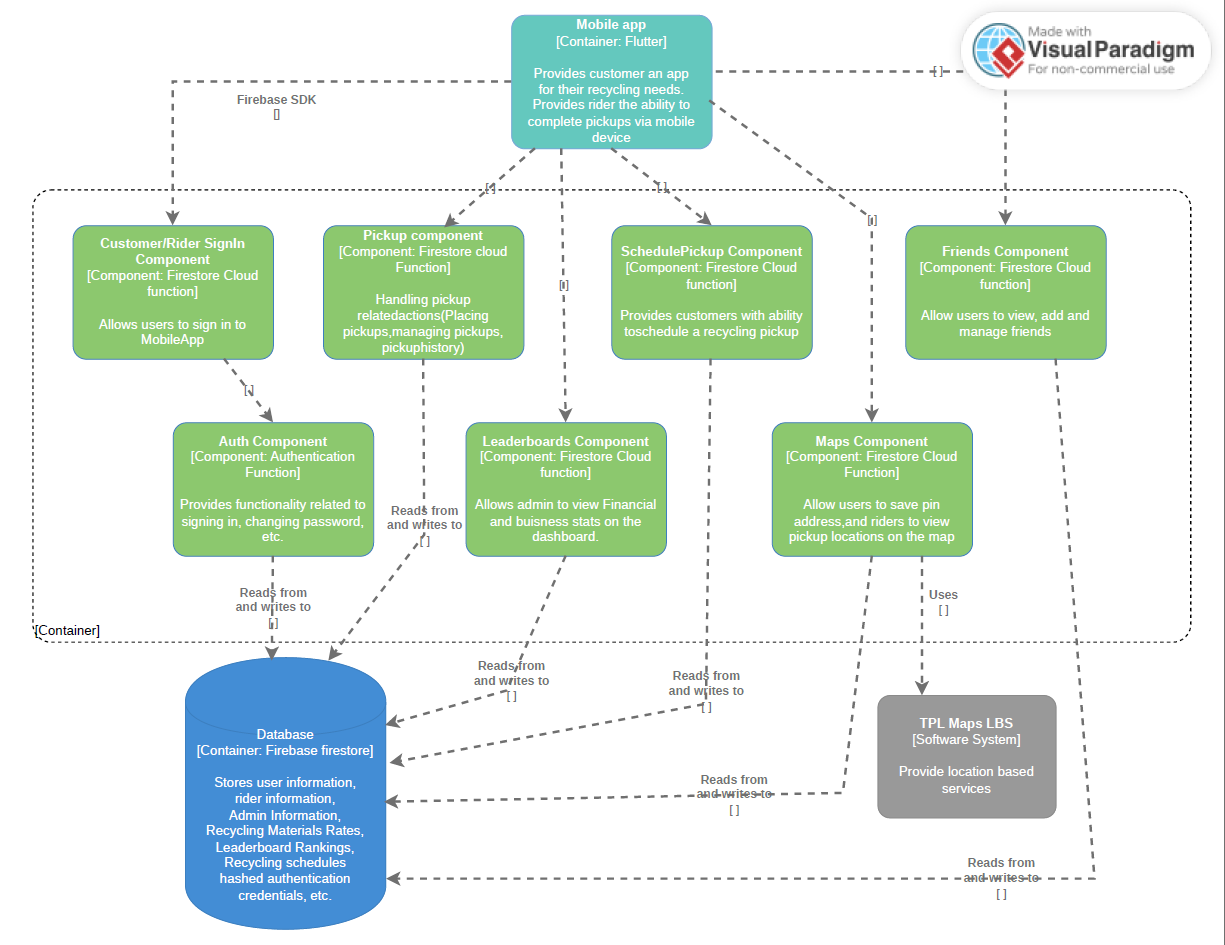


Figure 3 Mobile App Component Diagram

**Web App Component Diagram**

Component diagram of the Web App presents an in-depth exploration of the system's low-level architecture. It outlines the primary components residing within the web container, shedding light on the underlying technologies and implementation intricacies.

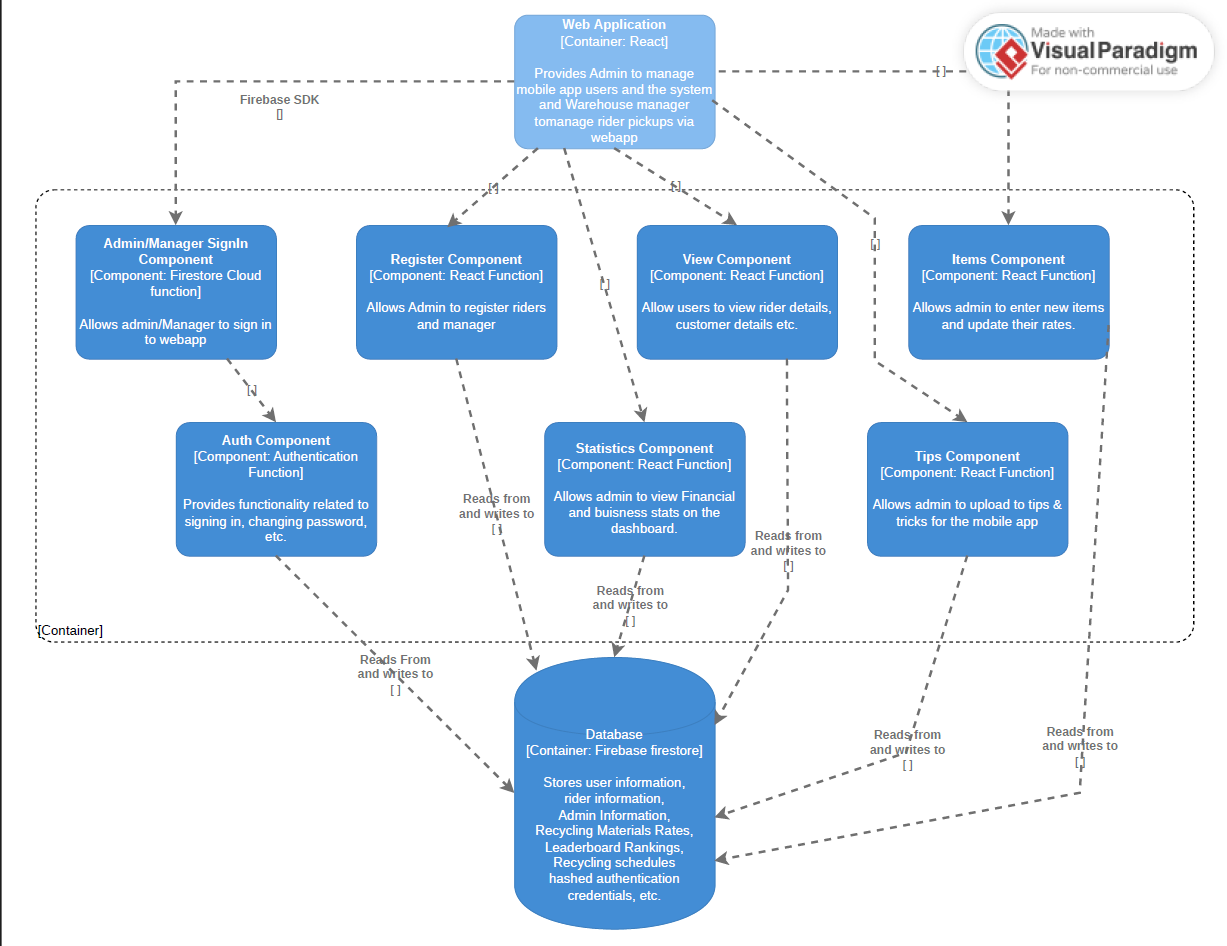


Figure 4 Web App Component Diagram

**Database Schema**

SaafPakistan is developed using Firebase FireStore as the database for the application. Firestore is a NoSQL serverless database with real-time notification capability, and together with the Firebase ecosystem it greatly simplifies common app development challenges while letting the application developer focus primarily on their business logic and user experience.

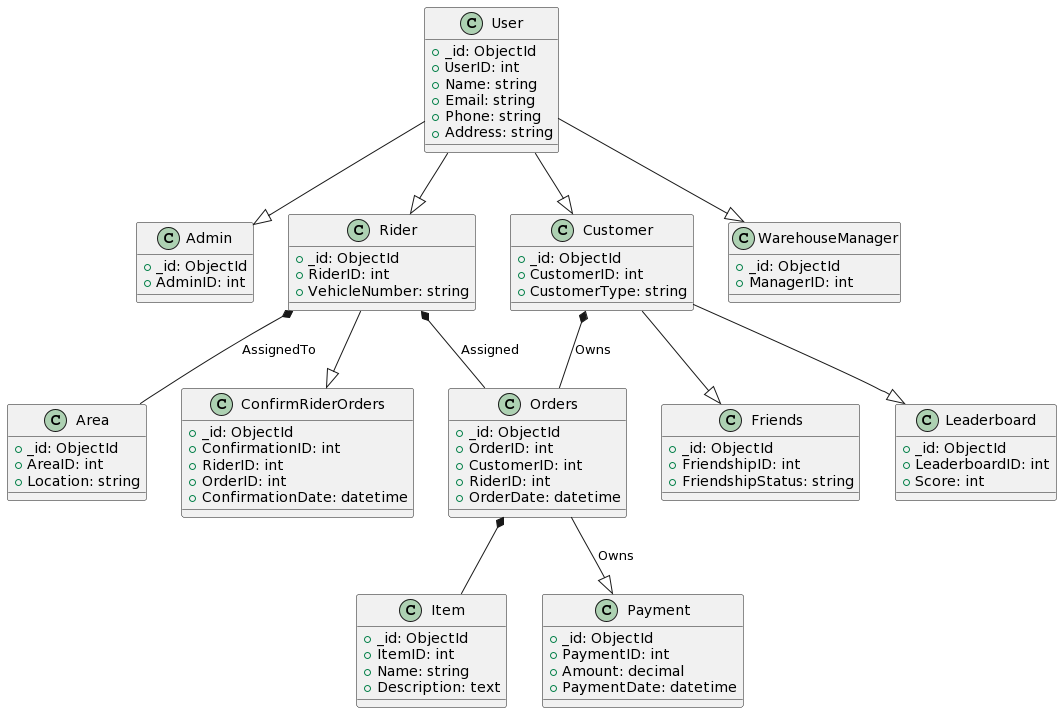


Figure 5 Schema Diagram

**Sequence Diagram**

Our project, which follows a functional programming paradigm, sequence diagrams diverge from the conventional use of objects and instead represent interactions through App components/pages. This approach aligns with the functional nature of our codebase, emphasizing the flow of data and operations within the distinct functional units rather than traditional object-oriented entities. By utilizing App components/pages in sequence diagrams, we tailor the representation to better reflect the functional architecture of our project.   
Following are the sequence diagrams for the highest priority (major) requirements.

**Schedule Pick-Up (FR 1.6)**

This is a sequence diagram of how a customer will schedule a pickup. It highlights how the customer navigates the screens, selects recyclables that he wants to recycle, and confirms the recycling pickup request.

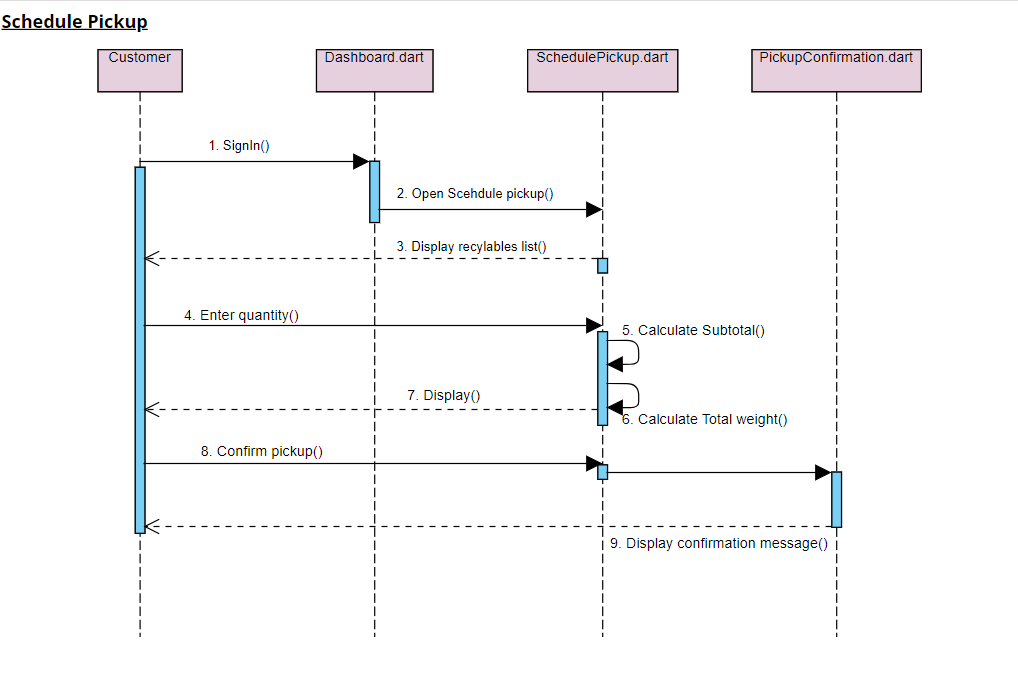
****

Figure 6 Sequence Diagram: Schedule Pickup

**Complete Pick-Up (FR 1.22 - 1.26)**

This is a sequence diagram of how a rider will complete a pickup. It shows how the rider will select an order, complete pickup and generate receipt.

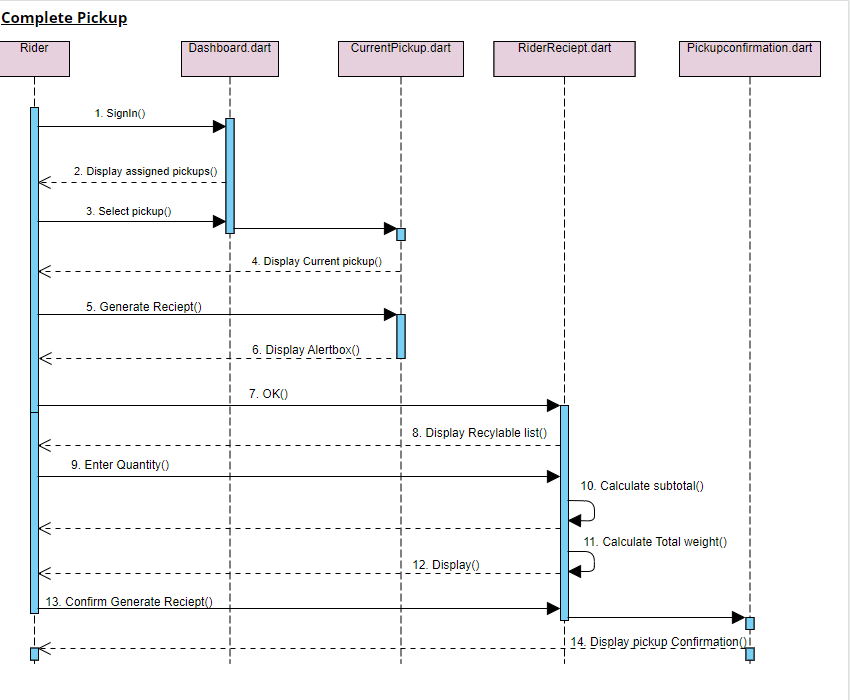


Figure 7 Sequence Diagram: Complete Pickup

**References**

1. <https://firebase.google.com/docs/android/setup>
2. <https://legacy.reactjs.org/docs/getting-started.html>
3. <https://docs.flutter.dev/ui/widgets>