

Project Progress Week 10

Automated School Bus System (ASBS) in Malaysia

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INTRODUCTION

SchoolNow is a system consisting of three mobile applications developed for a school transportation company or operator that provides bus or van services for primary and secondary school students. The system is designed to support centralized management of school transportation operations, including route planning, student monitoring, and monthly transportation fee management. It enables parents to make payments through the application while allowing drivers and administrators to track, manage, and monitor transportation activities digitally.

The first application, SchoolNow, is intended for parents and students. It allows parents to monitor their child's transportation status, view the live location of the assigned driver during active pickup or drop-off sessions (from home to school and from school to home), and manage monthly transportation payments. Students can scan and record their boarding status when boarding or alighting from the bus or van, ensuring accurate attendance and safety tracking throughout each transportation session.

The second application, SchoolNow: Driver, is designed for drivers employed by the transportation company or operator. This application enables drivers to view assigned students, schools, and service areas, as well as to execute daily transportation services. The system assists drivers in generating optimized travel routes based on the operator's starting location, assigned student pickup points, and designated schools. Drivers can monitor student boarding status in real time, provide live location updates to parents during active services, and manage digital records related to transportation operations.

The third application, SchoolNow: Admin, is intended for company administrators or operators. This application allows administrators to centrally manage all core entities within the system, including schools, buses, drivers, parents, and students. Administrators can assign buses and drivers, configure service areas and school coverage, verify drivers, manage system settings such as operator location, and oversee overall transportation and payment data to ensure safe, accurate, and efficient operation of the school transportation service.

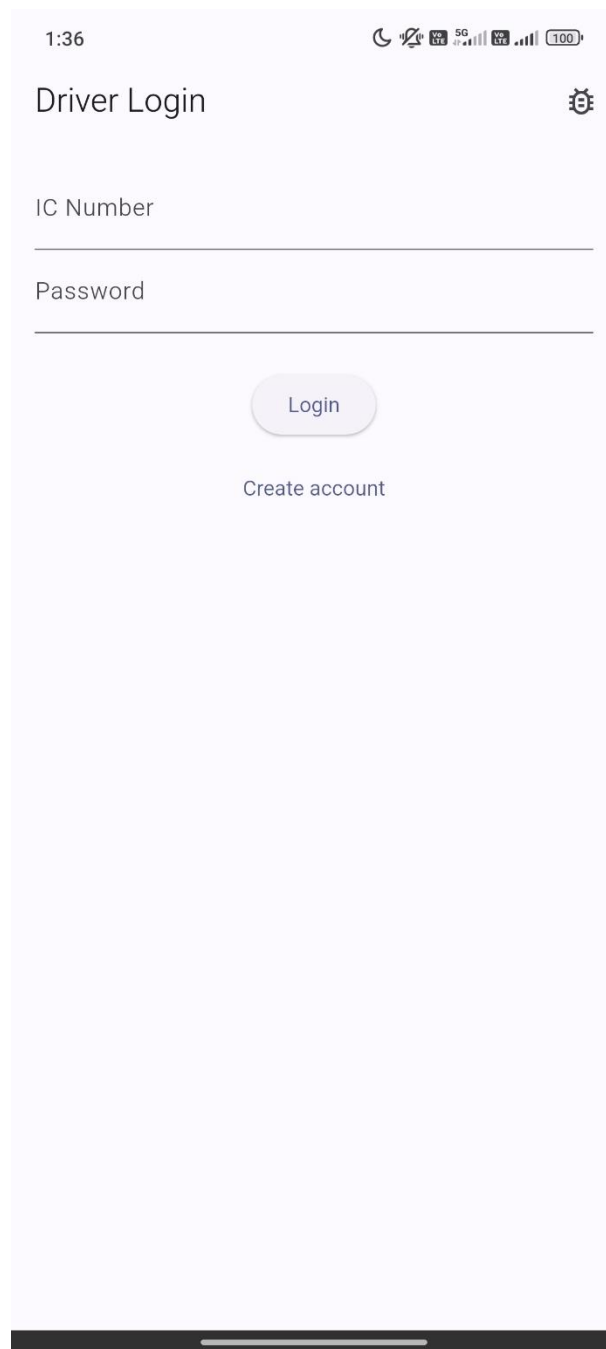
Works Completed and App Screenshot:

Apps Icon



Figure 1 App Icons for SchoolNow and SchoolNow: Driver

School Now: Driver



A screenshot of a mobile application interface for 'School Now: Driver'. The screen has a light purple background. At the top, the status bar shows the time '1:36' and various icons including signal strength, 5G, and battery level at 100%. Below the status bar, the title 'Driver Login' is displayed in a dark font, with a settings gear icon to its right. There are two input fields: 'IC Number' and 'Password', each with a horizontal line below it. Below the 'Password' field is a rounded rectangular button labeled 'Login'. At the bottom of the main content area, there is a link that says 'Create account'. The bottom of the screen shows a dark home indicator bar.

1:36

Driver Login

IC Number


Password

Login

Create account

Figure 2 Login Page of SchoolNow:Driver

1:36



←

Driver Registration


IC Number

Full Name

Email

Contact Number

Home/Operator Address (Starting Point)



Pick home on map (search address)

Registered School Transportation Number

Vehicle Seat Capacity


Monthly Fee

Service Area

School Name

School Lat


School Lng



Pick school on map

Side (North/South/East/West)

North



Radius (km)

Figure 3 Register Page

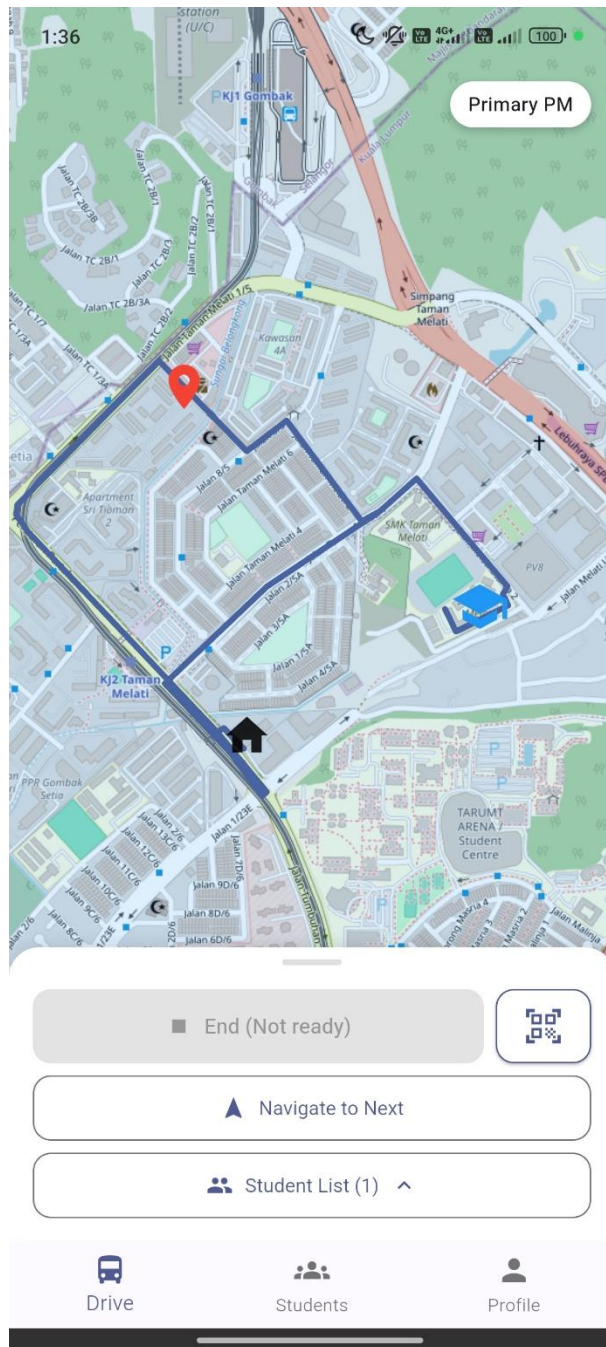


Figure 4 Navigation Page, where the driver knows where to pickup students

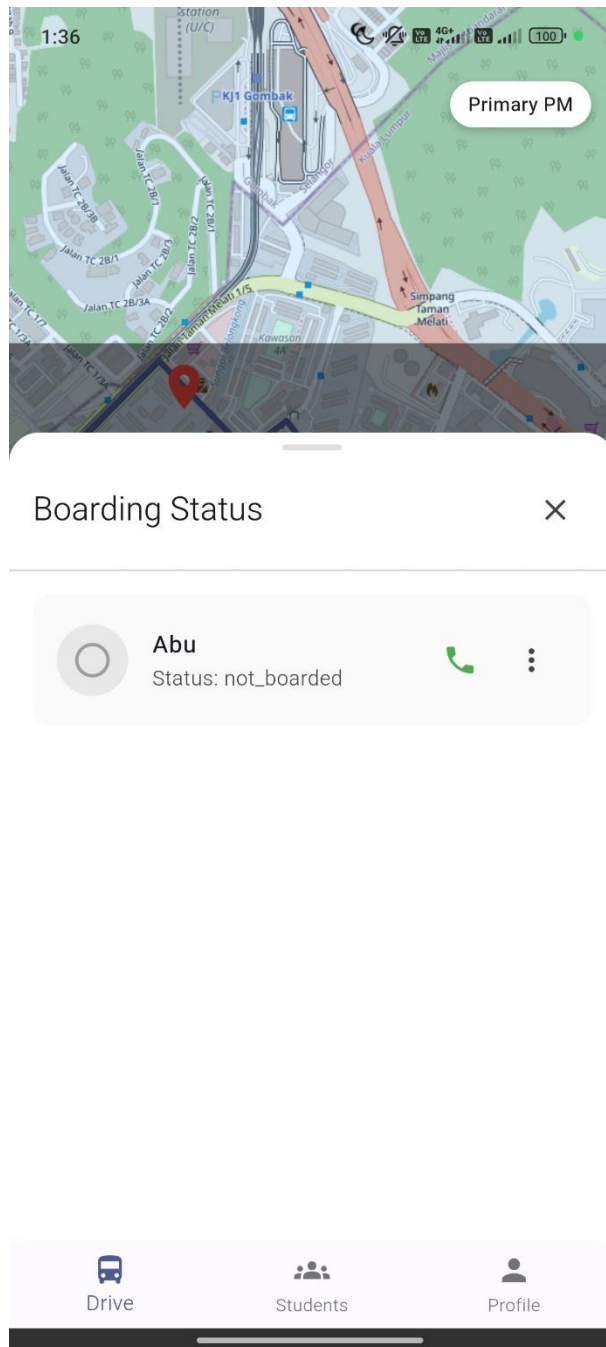


Figure 5 Students' Boarding Status overlay, where the driver know the list of student they need to pickup for this session and their status

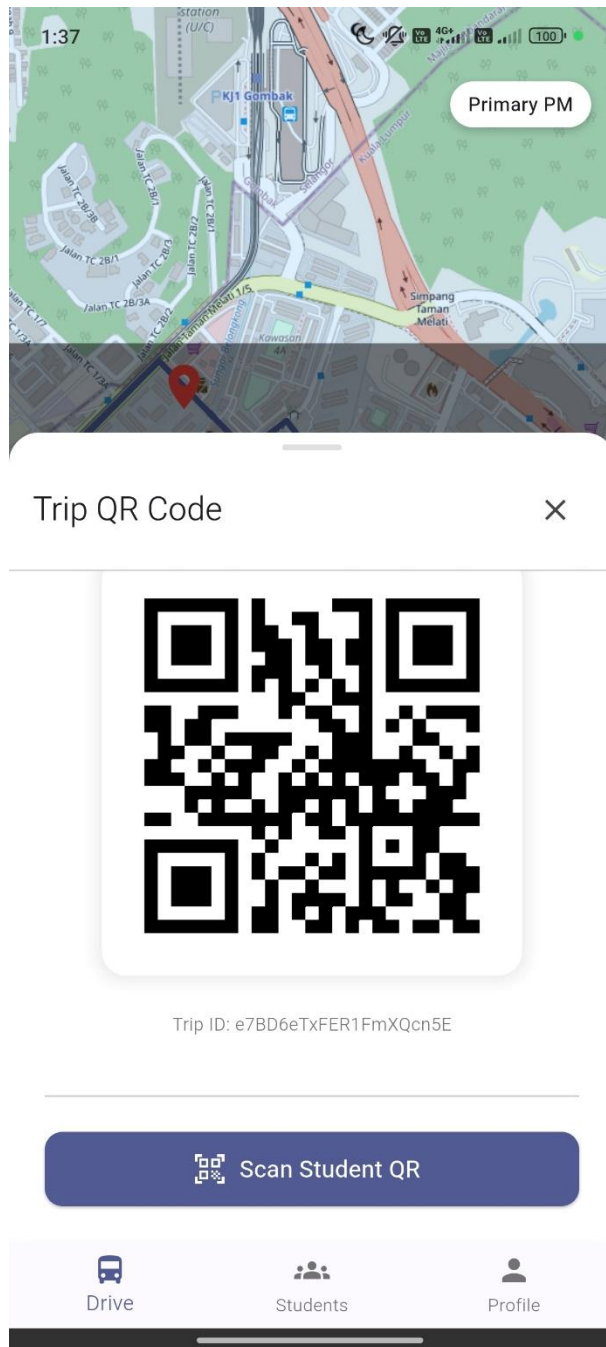


Figure 6 QR Code overlay where Student can scan the QR to update status and Driver can use camera to scan student's QR

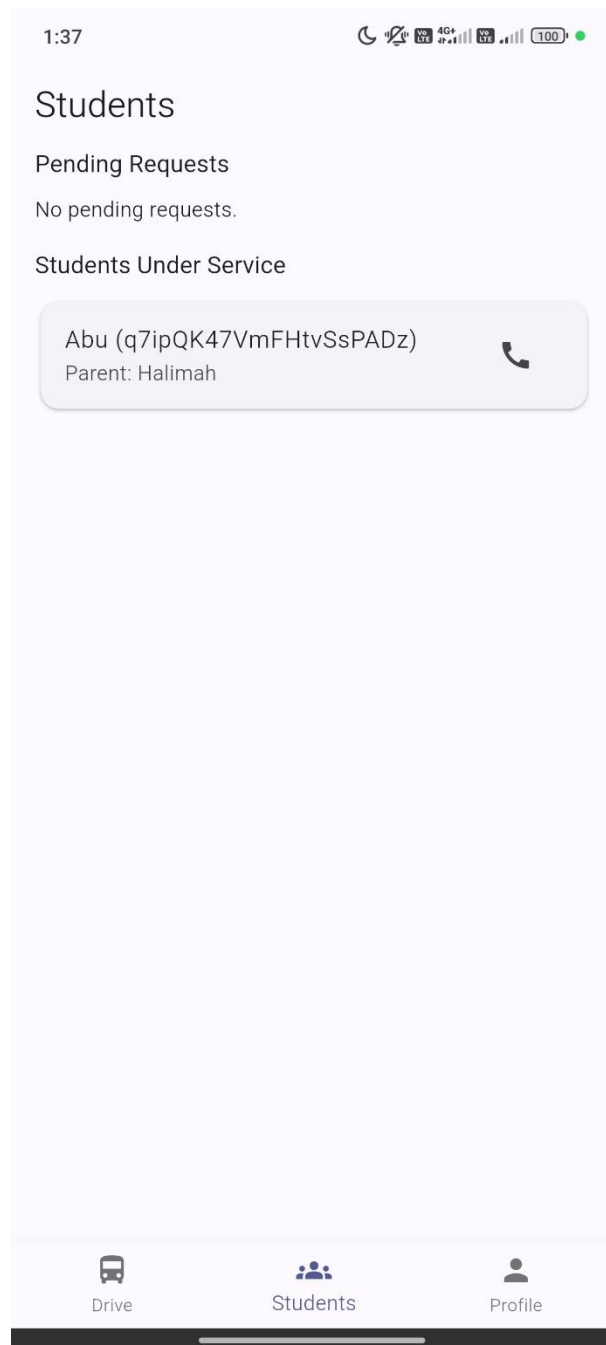


Figure 7 Student's list page

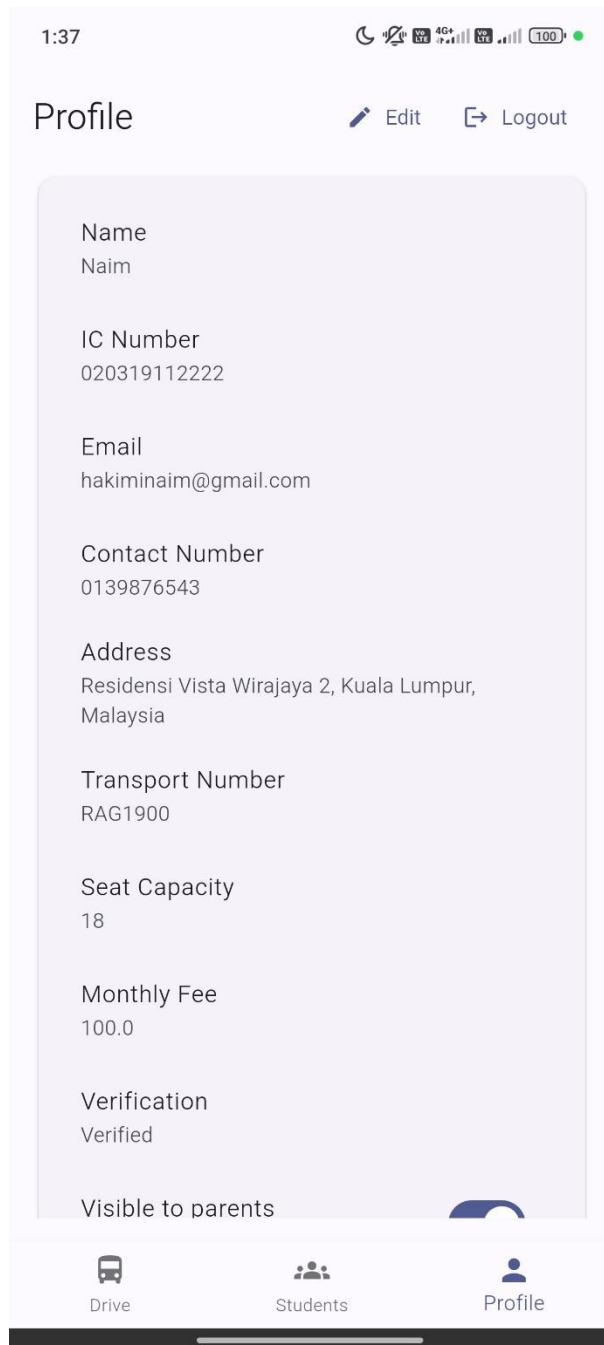
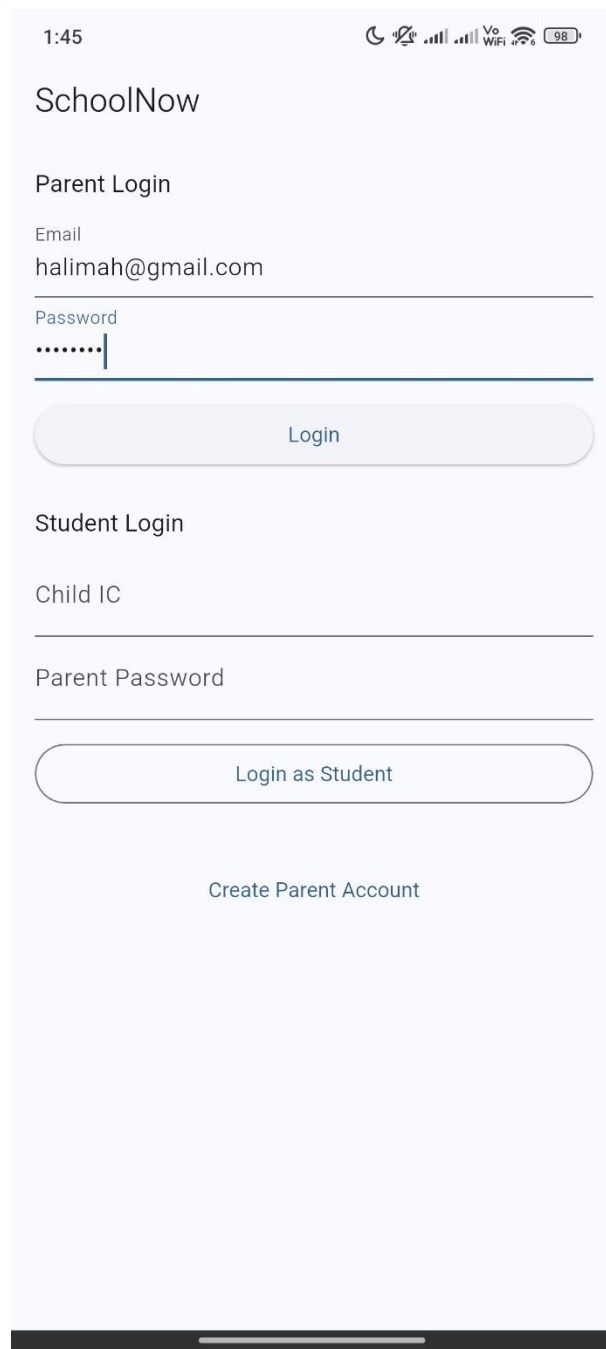


Figure 8 Driver's Profile Page

SchoolNow: Parents and Students

A screenshot of the SchoolNow mobile application login page. The page has a light blue background. At the top, there is a status bar with the time 1:45, signal strength, VoWiFi, and a 98% battery icon. Below the status bar, the app name 'SchoolNow' is displayed in a large, dark font. Underneath, the 'Parent Login' section is visible, featuring an 'Email' field with the text 'halimah@gmail.com' and a 'Password' field with masked characters '.....'. A blue 'Login' button is positioned below these fields. The 'Student Login' section follows, with 'Child IC' and 'Parent Password' fields. A blue 'Login as Student' button is located below these fields. At the bottom of the page, there is a link that says 'Create Parent Account'.

1:45

SchoolNow

Parent Login

Email
halimah@gmail.com

Password
.....

Login

Student Login

Child IC


Parent Password

Login as Student

Create Parent Account

Figure 9 SchoolNow login page

1:45



←

Parent Registration


IC Number

Name

Email

Contact

Home Address (Pickup Point)

 Pick pickup point on map

Password

Confirm Password

Register

Figure 10 Parents registration page

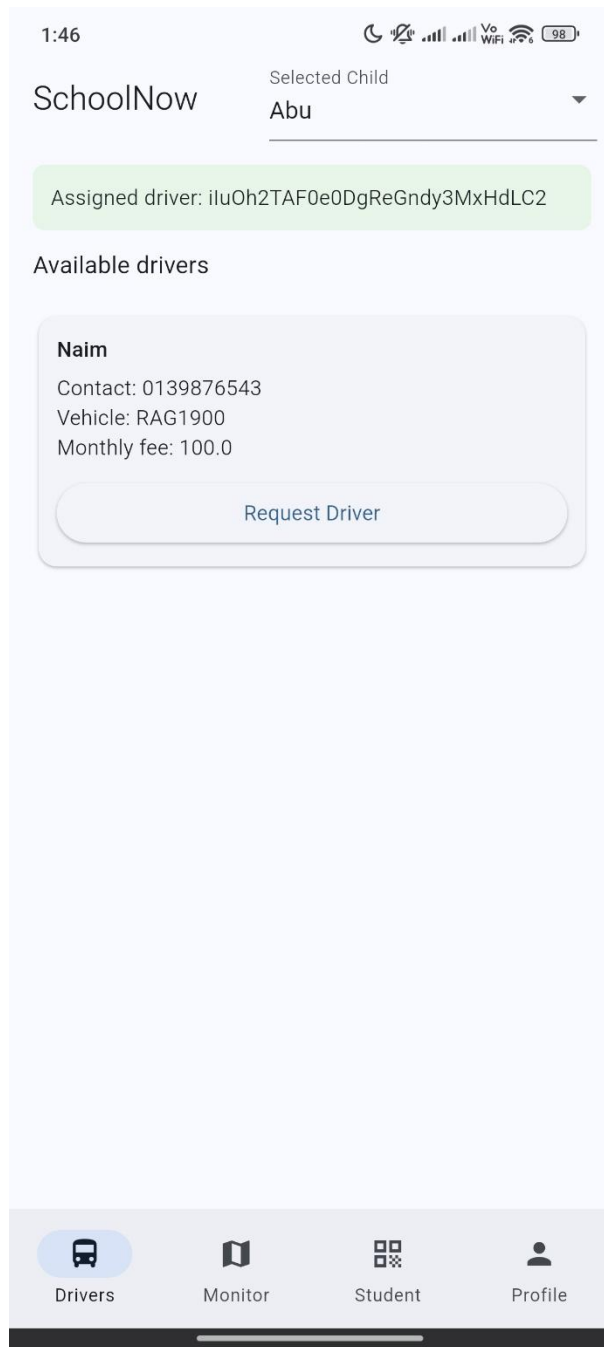


Figure 11 Drivers list page, where Parents can choose which driver to choose for their kids

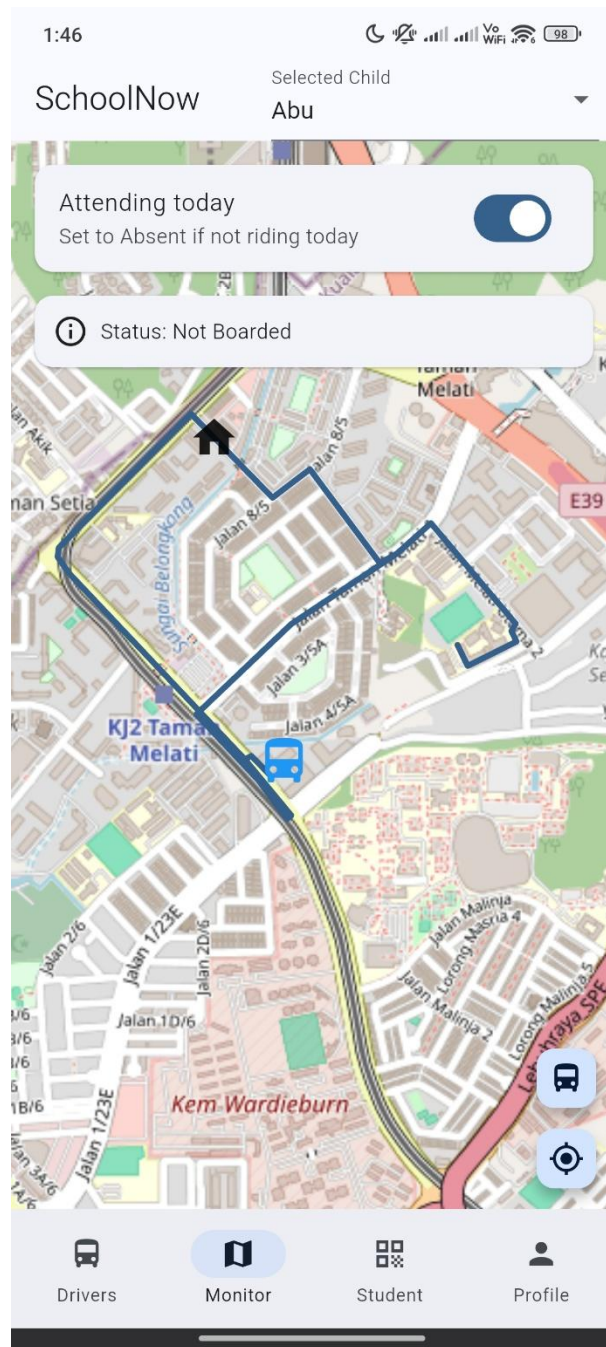


Figure 12 Monitor page, where the parents can monitor driver's live location

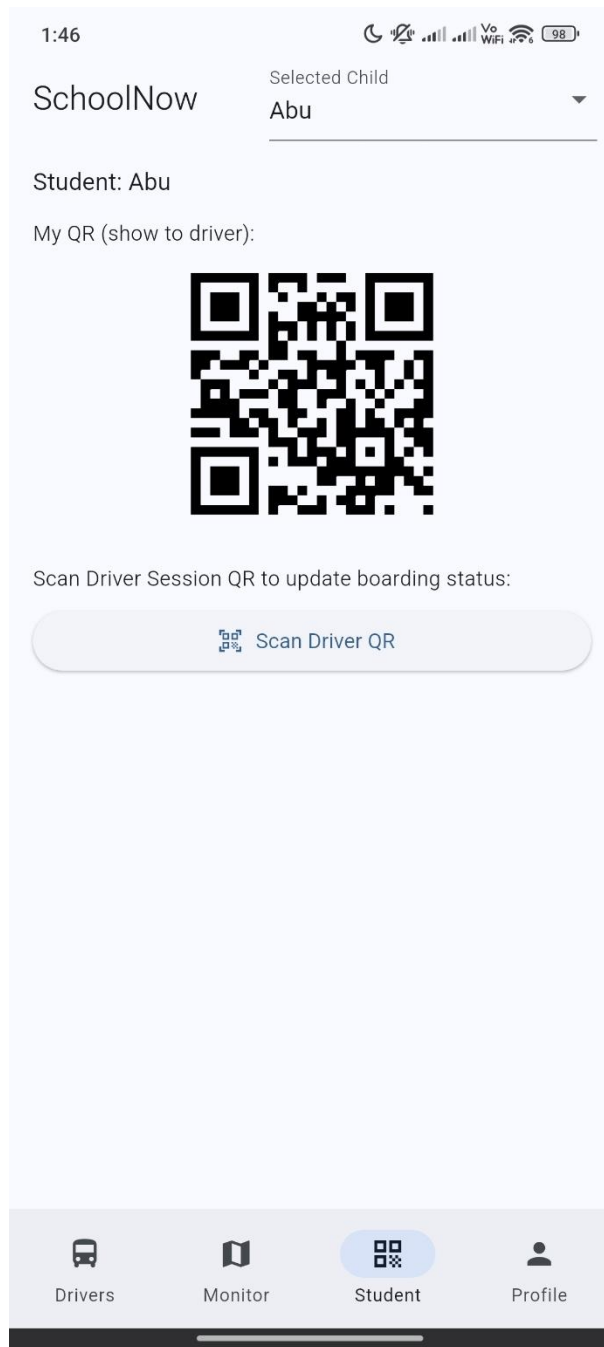


Figure 13 Student's QR that can be screenshot and printed and drivers can scan

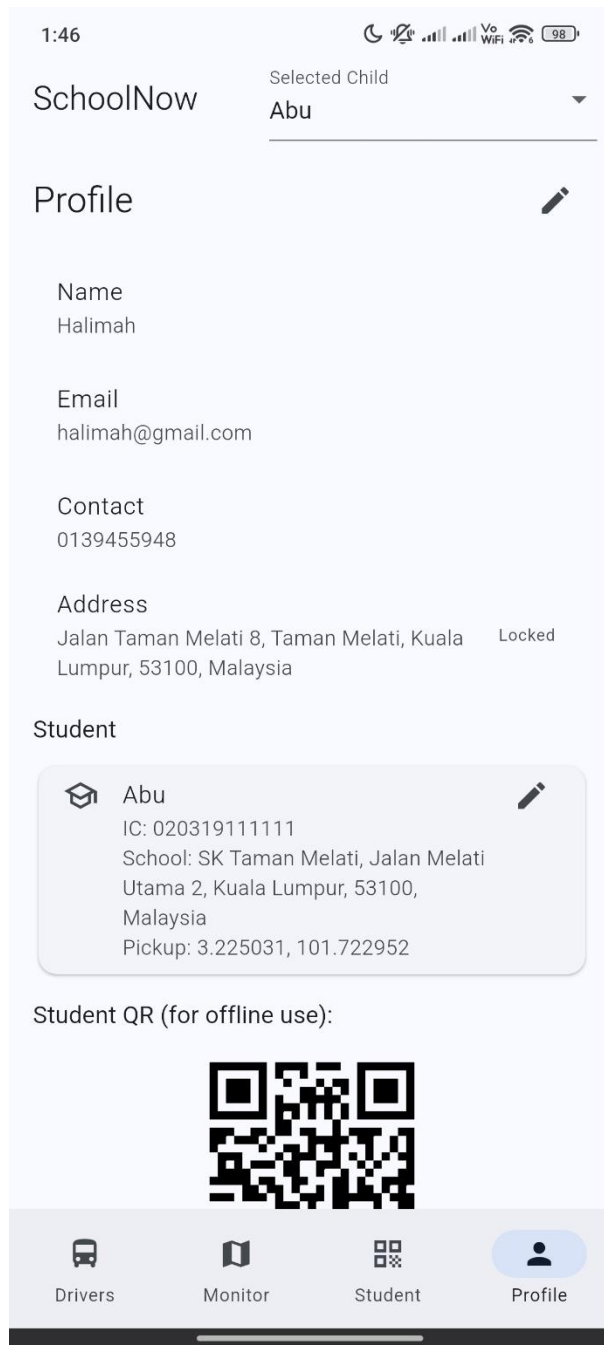


Figure 14 Parent's and student's profile page

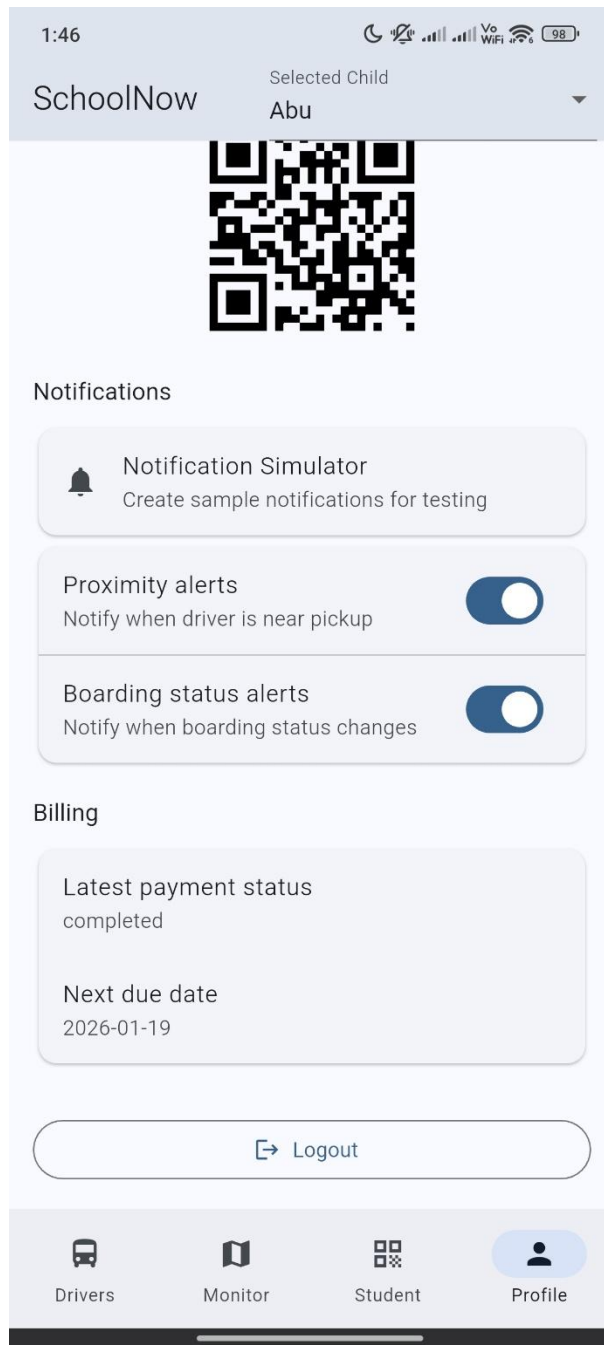
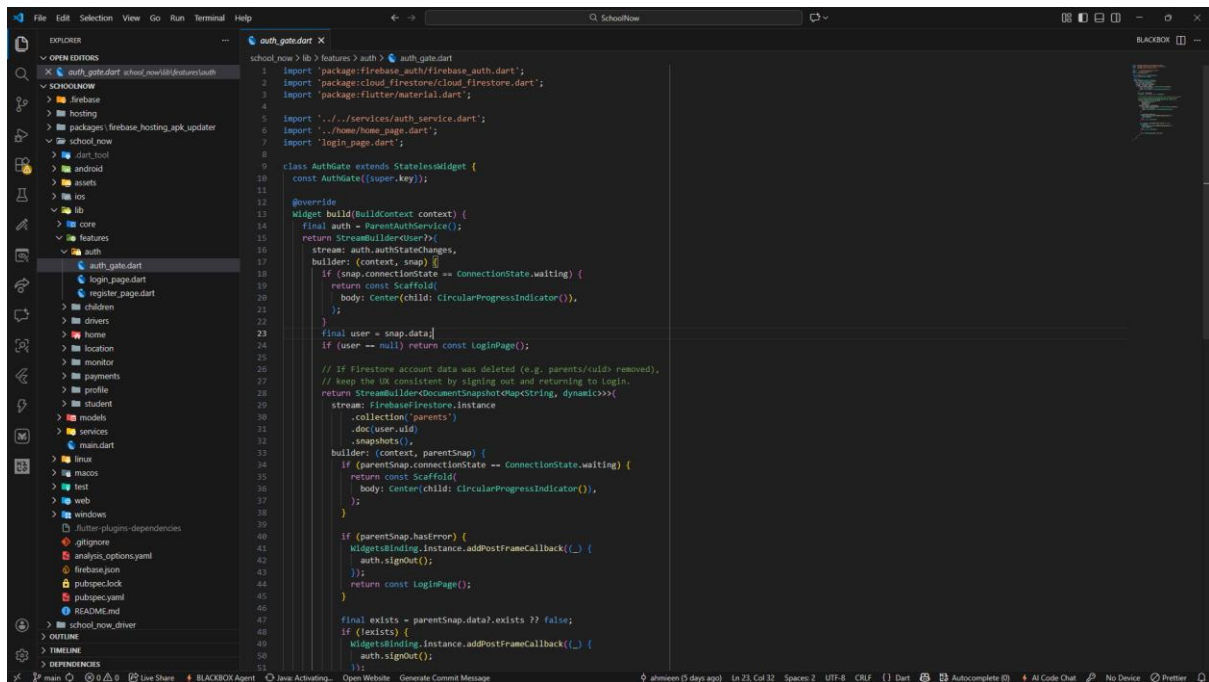


Figure 15 Parents and students' profile page: Billing status

Code Implementation



The screenshot shows the VS Code editor with the 'auth_gate.dart' file open. The code implements an 'AuthGate' widget that manages user authentication state. It uses 'firebase_auth' and 'cloud_firestore' packages. The widget's build method checks the connection state and displays a loading indicator while fetching user data from the database. If the user is null, it navigates to the login page; otherwise, it checks if the user exists in the database and navigates to the login page if not.

```
1 import 'package:firebase_auth/firebase_auth.dart';
2 import 'package:cloud_firestore/cloud_firestore.dart';
3 import 'package:flutter/material.dart';
4
5 import '../services/auth_service.dart';
6 import '../home/home_page.dart';
7 import 'login_page.dart';
8
9 class AuthGate extends StatelessWidget {
10   const AuthGate({super.key});
11
12   @override
13   Widget build(BuildContext context) {
14     final auth = FirebaseAuth.instance;
15     return StreamBuilder<User?>(
16       stream: auth.authStateChanges,
17       builder: (context, snap) {
18         if (snap.connectionState == ConnectionState.waiting) {
19           return const Scaffold(
20             body: Center(child: CircularProgressIndicator()),
21           );
22         }
23         final user = snap.data;
24         if (user == null) return const LoginPage();
25
26         // If Firestore account data was deleted (e.g. parents/child removed),
27         // keep the UI consistent by signing out and returning to login.
28         return StreamBuilder<DocumentSnapshot?>(
29           stream: FirebaseFirestore.instance
30             .collection('parents')
31             .doc(user.uid)
32             .snapshots(),
33           builder: (context, parentSnap) {
34             if (parentSnap.connectionState == ConnectionState.waiting) {
35               return const Scaffold(
36                 body: Center(child: CircularProgressIndicator()),
37               );
38             }
39             if (parentSnap.hasError) {
40               WidgetsBinding.instance.addPostFrameCallback(() {
41                 auth.signOut();
42               });
43             }
44             return const LoginPage();
45           }
46         );
47         final exists = parentSnap.data?.exists ?? false;
48         if (!exists) {
49           WidgetsBinding.instance.addPostFrameCallback(() {
50             auth.signOut();
51           });
52         }
53       }
54     );
55   }
56 }
```

Figure 16 Code on VSCode

Firestore Console

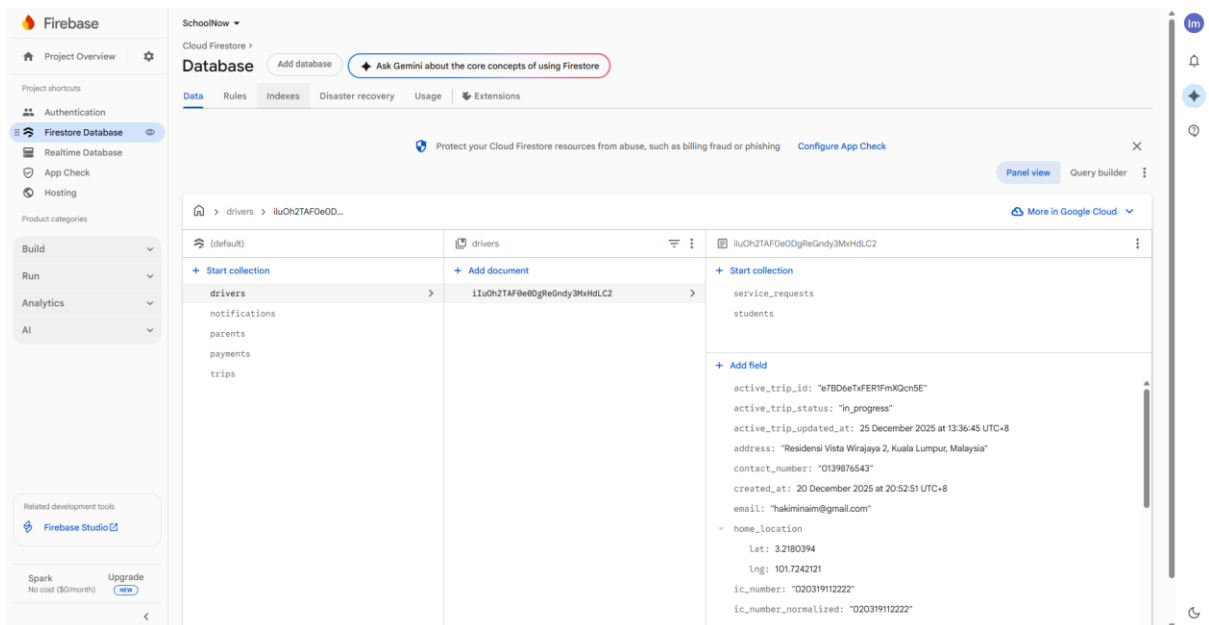


Figure 17 Firestore console

Functional Requirements and Tasks Completed:

BusNow Driver: Driver-side App			
FR ID	Functional Requirements	Status	Person-in-Charge
FR-D1	Driver Registration: Driver is allowed to register an account	Done	Naim
FR-D1.1	Provide a user-friendly interface for the bus driver.	Done	Naim
FR-D1.2	Registered drivers shall be placed under pending verification	Done	Naim
FR-D1.3	The driver shall not be visible to parents until verified by admin	Done	Naim
FR-D2	Driver Login: Driver is allowed to log in	Done	Na'im
FR-D2.1	Driver shall log in using IC number and password	Done	Na'im
FR-D2.2	The system shall authenticate the driver using Firebase	Done	Na'im
FR-D2.3	The system shall display login success or failure message	Done	Na'im
FR-D2.4	Upon successful login, the driver shall access Drive, Students, and Profile tabs	Done	Na'im
FR-D3	The system shall support driver service execution	Done	Na'im
FR-D3.1	The system shall display the driver's service area on the map	Done	Na'im
FR-D3.2	The system shall display students scheduled for pickup	Done	Na'im
FR-D3.3	Drivers may be assigned to multiple schools of the same type	Done	Na'im
FR-D3.4	In morning session (going to school), route shall start from operator address	Done	Na'im
FR-D3.5	Morning session destination shall be the last assigned school	Done	Na'im
FR-D3.6	In return session (back from school), route shall start from the first assigned school	Done	Na'im
FR-D3.7	Return session destination shall be operator address	Done	Na'im
FR-D3.8	The system shall navigate through all student pickup points in sequence	Done	Na'im
FR-D3.9	The system shall allow service start only at 6:00am (morning), 1:30pm (primary), or 3:00pm (secondary)	Done	Na'im
FR-D3.10	Parent shall be able to view live driver location during active service	Done	Na'im
FR-D3.11	The system shall display a QR code for boarding verification	Done	Na'im
FR-D3.12	The system shall update boarding status when QR is scanned	Done	Na'im
FR-D3.13	Once a student boards, their map pin shall be removed	Done	Na'im
FR-D3.14	The driver may mark student as absent and proceed	Done	Na'im
FR-D3.15	Arrival button shall update student status to arrived	Done	Na'im
FR-D3.16	Driver may stop service once all students are dropped	Done	Na'im
FR-D4	Driver is allowed to manage assigned students	Done	Na'im
FR-D4.1	The system shall display a message if no students are assigned	Done	Na'im
FR-D4.2	Driver shall view list of assigned students	Done	Na'im
FR-D4.3	Driver shall view student and parent details	Done	Na'im
FR-D4.4	Driver shall approve or reject new service requests	Done	Na'im
FR-D4.5	Rejected requests shall trigger refund to parent	Done	Na'im
FR-D5	Driver is allowed to manage profile	Done	Na'im
FR-D5.1	Driver shall view profile information	Done	Na'im
FR-D5.2	Driver shall edit profile information	Done	Na'im
FR-D5.3	Driver shall log out from the system	Done	Na'im

BusNow: Parents and Students Side app			
FR ID	Functional Requirements	Status	Person-in-Charge
FR-P1	Parent is allowed to register an account	Done	Amin
FR-P1.1	Parent shall register using IC number, name, email, contact number, home address, and password	Done	Amin
FR-P1.2	Parent shall add one or more children	Done	Amin
FR-P1.3	Child data shall include name and IC number	Done	Amin
FR-P1.4	School selection shall be from existing schools added by admin	Done	Amin
FR-P1.5	Parent shall log in using IC and password	Done	Amin
FR-P1.6	Student shall log in using IC and parent's password	Done	Amin
FR-P2	Parent is allowed to log in	Done	Amin
FR-P2.1	Parent shall log in using IC and password	Done	Amin
FR-P2.2	System shall display login result	Done	Amin
FR-P2.3	Upon success, parent shall access Monitor, Drivers, and Profile tabs	Done	Amin
FR-P3	Parent is allowed to select driver	Done	Amin
FR-P3.1	Parent shall select child	Done	Amin
FR-P3.2	System shall list available verified drivers in service area	Done	Amin
FR-P3.3	Parent shall view driver details including monthly fee	Done	Amin
FR-P3.4	Parent shall proceed to payment	Done	Amin
FR-P3.5	Driver approval is required before service starts	Done	Amin
FR-P3.6	One student shall only have one active driver	Done	Amin
FR-P4	Parent is allowed to monitor service	Done	Amin
FR-P4.1	Parent shall see message if no driver is assigned	Done	Amin
FR-P4.2	Parent shall monitor selected child	Done	Amin
FR-P4.3	Parent shall view live driver location	Done	Amin
FR-P4.4	Parent shall view boarding status	Done	Amin
FR-P5	Parent is allowed to manage profile	Done	Amin
FR-P5.1	Parent shall view profile	Done	Amin
FR-P5.2	Parent shall edit profile except address after service starts	Done	Amin
FR-P5.3	Parent shall manage children information	Done	Amin
FR-P5.4	Parent shall print student QR if needed	Done	Amin
FR-P5.5	Parent shall receive notifications	Done	Amin
FR-P5.6	Parent shall receive fee renewal reminders	Done	Amin
FR-S1	Student is allowed to log in	Done	Amin
FR-S1.1	Student shall log in using IC and parent's password	Done	Amin
FR-S1.2	System shall show login result	Done	Amin
FR-S1.3	Student shall access home page upon success	Done	Amin
FR-S2	Student is allowed to manage boarding	Done	Amin
FR-S2.1	Student shall scan driver QR to update boarding status	Done	Amin

BusNow Driver: Admin			
FR ID	Functional Requirements	Status	Person-in-Charge
FR-A1	Admin is allowed to log in to the system		Hanif
FR-A1.1	The system shall allow admin to log in using a fixed username and password		Hanif
FR-A1.2	Admin authentication credentials shall be stored and authenticated using Firebase		Hanif
FR-A1.3	The system shall display a success or failure message after login		Hanif
FR-A1.4	The system shall allow admin to change the username and password within the Admin app		Hanif
FR-A2	Admin is allowed to manage schools		Hanif
FR-A2.1	The system shall allow admin to create a new school		Hanif
FR-A2.2	Each school shall have an auto-generated unique ID		Hanif
FR-A2.3	School data shall include school name, school type (primary or secondary), and address		Hanif
FR-A2.4	The system shall allow admin to select school location (latitude and longitude) by searching and choosing on a map		Hanif
FR-A2.5	The system shall allow admin to view all schools		Hanif
FR-A2.6	The system shall allow admin to update school information		Hanif
FR-A2.7	The system shall allow admin to delete a school		Hanif
FR-A3	Admin is allowed to manage buses		Hanif
FR-A3.1	The system shall allow admin to create a new bus		Hanif
FR-A3.2	Each bus shall use plate number as a unique identifier		Hanif
FR-A3.3	Bus data shall include plate number and seating capacity		Hanif
FR-A3.4	The system shall allow admin to view bus information		Hanif
FR-A3.5	The system shall allow admin to update bus information		Hanif
FR-A3.6	The system shall allow admin to delete a bus		Hanif
FR-A4	Admin is allowed to manage drivers		Hanif
FR-A4.1	The system shall allow admin to create a new driver		Hanif
FR-A4.2	Driver data shall include IC number, name, email, contact number, password, and monthly fee		Hanif
FR-A4.3	The system shall allow admin to assign a bus to a driver		Hanif
FR-A4.4	The system shall allow admin to assign one or more schools to a driver		Harun
FR-A4.5	Assigned schools shall be of the same school type (primary or secondary only)		Harun
FR-A4.6	The system shall allow admin to define the driver's service area by selecting a map location and service radius		Harun
FR-A4.7	The system shall allow admin to update driver information		Harun
FR-A4.8	The system shall allow admin to delete driver information		Harun
FR-A5	Admin is allowed to verify drivers registered via the Driver app		Harun
FR-A5.1	The system shall display a list of drivers pending verification		Harun
FR-A5.2	The system shall allow admin to review driver registration details including monthly fee		Harun
FR-A5.3	The system shall allow admin to assign a bus to the driver		Harun
FR-A5.4	The system shall allow admin to assign one or more schools of the same type to the driver		Harun
FR-A5.5	The system shall allow admin to define driver service area using map and radius		Harun
FR-A5.6	The system shall allow admin to verify or reject the driver		Harun
FR-A5.7	Only verified drivers shall be visible in the Parent application		Harun
FR-A6	Admin is allowed to manage parents and students		Harun
FR-A6.1	The system shall allow admin to create parent accounts		Harun
FR-A6.2	The system shall allow admin to create student accounts under parents		Harun

FR-A6.3	Student school selection shall only allow existing schools added by admin		Harun
FR-A6.4	The system shall allow admin to view parent and student records		Harun
FR-A6.5	The system shall allow admin to update parent and student information		Harun
FR-A6.6	The system shall allow admin to delete parent or student records		Harun
FR-A7	Admin is allowed to manage system settings		Harun
FR-A7.1	The system shall allow admin to update the operator bus starting address		Harun
FR-A7.2	The system shall allow admin to update operator location by selecting on a map		Harun