

CHAPTER 1: INTRODUCTION

1. Introduction

1.1 Background

Catch The Bus application will allow users to book their tickets online on their android smart phones for their desired destinations. It will allow the users to purchase their tickets online and they can also cancel their bookings in one click. This android application is the replacement of manual ticket booking and buying process and caters for maximum audience response. It integrates planning, booking, online payments and cancellation of tickets under one umbrella in just one click and ensures optimum responses. This product will help users to get rid of the cumbersome job of booking and buying of tickets. CTB provides a group of works with interface environments. Also there will be a database which will keep all the records that done by user while using this application.

1.2 Problem Statement

Due to the hike in fares, bleak condition of Aircrafts and trains, the upper middle and middle class of Pakistan is inclined to use bus service as replacement to these services. Due to the heavy demand of bus services the workload of the bus service providers has also exceptionally increased.

On our travels in rural and semi-urban areas, we've often encountered situations where tracking the bus schedules is either nearly impossible or laborious in case

you decide calling every bus service. Adding to our misery even if we are lucky enough to get our seat reserved either we have to physically go to the bus station to purchase our tickets or rely on eleventh hour surprises. Unless we are armed with an app and a phone which constantly keep us updated on our nearest bus stations and their schedules with an added functionality of getting our seats reserved by a mere click. The app lets you pay for your tickets through credit cards, debit cards, net banking and cash on delivery..

1.3 Scope

Catch The Bus Application is designed to facilitate the users in online booking and cancellation of tickets to their desired destinations. The application will provide:-

- Online booking of tickets from app to android device.
- Cancel bookings straight from the app.
- Purchase your tickets via Credit Card/Debit Card.
- Download the ticket to the android device.
- View the route from original position to the destination on map.
- To check weather details which assist the passengers in packing their traveling stuff accordingly.
- Call bus customer service center via app.
- Web server to upload the bus schedules for administrator of bus service company.

1.4 Objective

To develop a curative Android App for the agony of dangling bus service customers for purchasing their Tickets online.

1.5 Deliverables

1.5.1 1st Progress Report: Including SRS Document

1.5.2 2nd Progress Report: Including System Design

1.5.3 3rd Progress Report: Including Interface Design

1.5.4 4th Progress Report: Including Demonstration

1.5.5 Final Report: Including complete documentation and code.

1.6 Technological Requirements

1.6.1 A Web Server (or PC Configured as such) Windows Based with .Net Framework 4.0-4.5 and Wamp server.

1.6.2 Windows OS (XP/Vista/7/8.0).

1.6.3 Eclipse IDE and JDK 7

1.6.4 My SQL Server 2012.

1.6.5 Android Smart Phone.

CHAPTER 2 : LITERATURE REVIEW

2. Literature Review

2.1 Introduction

Increase use of smart phone has even minimized the use of computers for general purpose internet surfing. Therefore, there is a dire need to automate the ticket booking and buying process in such a way that the smart phone users can be targeted and maximum financial benefits can be obtained. Traveling to a new city is always painful, especially when you have no clue of bus boarding point. Unless you are a seasoned traveler, you end up confirming multiple times where the boarding point is just to ensure that you don't miss your bus. Curing the misery of affected passengers, our app will assist the user in checking the bus timings and schedule from his current location to the desired destination.

This android application is the replacement of manual ticket booking and buying process and caters for maximum audience response. It integrates planning, booking, online payments and cancellation of tickets under one umbrella in just one click and ensures optimum responses. This product will help users to get rid of the cumbersome job of booking and buying of tickets. CTB provides a group of works with interface environments. Also there will be a database which will keep all the records that done by user while using this application.

To understand the functionality and features that the app will provide a number of apps for different bus services have been searched and studied. More over features that are provided by the website of Daewoo Bus Services have also been browsed for the functionalities and feature implementation. Some of the apps and their features are listed below:

2.2 Previous Work Done

2.2.1 Red Bus

The app allows to search and book bus ticket for over 67,000 routes and also chooses from over 1,800 operators. Choose from seater, sleeper, semi-sleeper, A/C, non A/C buses. A passenger can now transact on the redBus.in app using net banking, credit cards, debit cards, Cash on delivery & phone booking options.

Here are some of the helpful features.

- **Live Tracking:** Track the bus live on a map. Know where you are any time during the journey
- **Friends & Family:** Send a tracking link to your near & dear to keep track of your whereabouts & plan pickups
- **Select Boarding points:** Choose your boarding point on a map and get directions
- **One touch Secure Payment:** Save your card details & book tickets with a single tap
- **One touch Cancellations:** Cancel tickets using the application with a single tap
- **Save ticket details:** Download previously booked tickets and save them on the app
- **Call support:** Call our support team directly from the application
- **Find buses & route information:** Use the app to check availability and price of buses & operators in India

- **Ratings:** Get ratings of buses based on fellow customers feedback for each operator
- **Amenities:** Check out amenities available in the bus

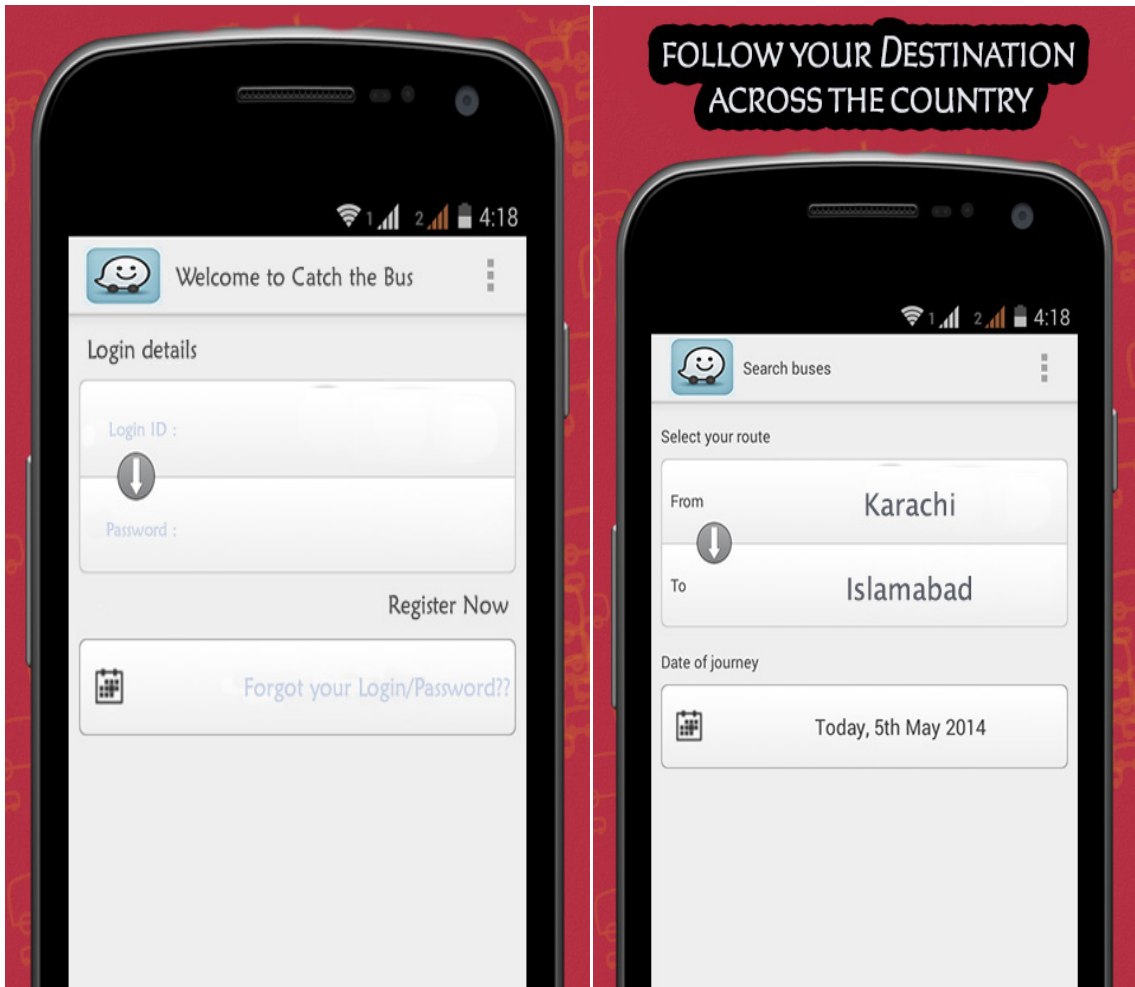


Figure 1: Red Bus Login and Reservation

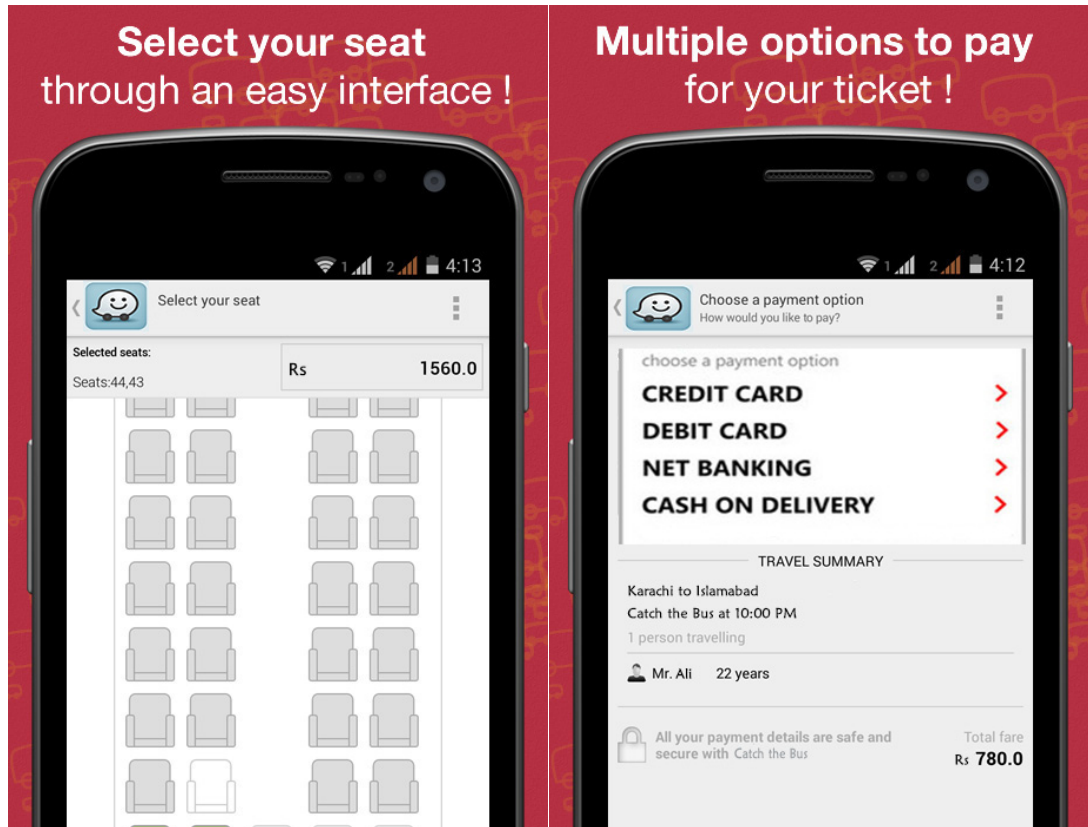


Figure 2: Red Bus Seat Selection and Payment Details

2.2.2 First Bus m-Tickets

The First Bus m-Tickets app allows ticket straight to your phone for when you're out and about using the bus. It allows to buy tickets before you travel, any day, at any time, when you're at home, in the office or out and about, so you have them ready for when you want to travel. There is no need to worry about having the right change, or cash anymore just buy the tickets on your phone with a debit or credit card. With your ticket on your phone, you only need to remember one thing as you leave the house, so losing or forgetting your ticket is a thing of the past.

This App features:

- Buy tickets for Aberdeen, Greater Manchester, Calder dale and Huddersfield, Bradford, Leeds, South Essex and around Hampshire and Worcester, using credit or debit cards.
- Links with the First Bus travel information App for bus times, news and up to date notices affecting First bus services.
- Details on ticket types and fares for travel on First bus networks.
- Contact details for First customer services.



Figure 3: First Bus m-tickets main menu

2.2.3 Arriva Mobile Ticketing Application

It allows buying, receiving and using your bus ticket via your Android Phone. It's available across the UK (except London). A user can now purchase day, Weekly, 4-Weekly or Annual Saver ticket using the mobile phone. It's quick, easy and hassle-free. The features of this app are:

- **Convenient**

Buy your m-ticket when it suits you. You could be sitting on the sofa or at your work desk. There's no need to nip to the cash point just to fund a bus trip.

- **Easy**

Once set up, it's a doddle to buy from your mobile.

- **Fast**

Save time. When others are fumbling for change, you simply show the driver your m-ticket on your mobile screen.

- **Value**

The m-ticket service itself is free - you only pay for your actual m-ticket.

- **Secure**

It's totally secure and uses a highly secure AES 256 bit encryption.

Your card details are not held on your handset or Arriva servers, but use servers that meet PCI-DSS security standards.

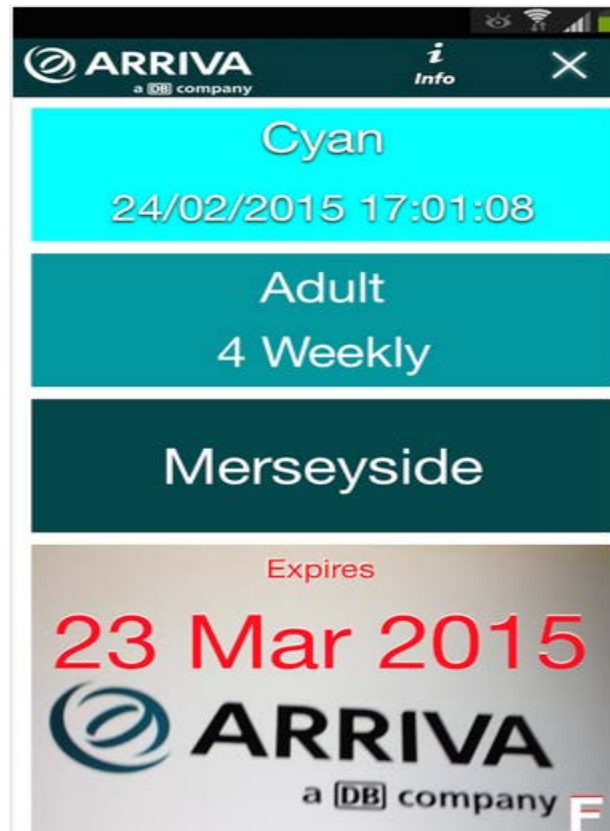


Figure 4: Arriva Mobile Ticketing Interface

2.2.4 Brighton & Hove m-tickets

Travelling across the Brighton & Hove bus network couldn't be easier than with the Brighton & Hove Mobile Ticketing app. It allows to download, signup (using their secure digital wallet), purchase a ticket and hop on the bus. Tickets are sent straight to the user's device or can delegate a ticket to another person. It also allows to pay securely with your credit/debit card or Pingit app.

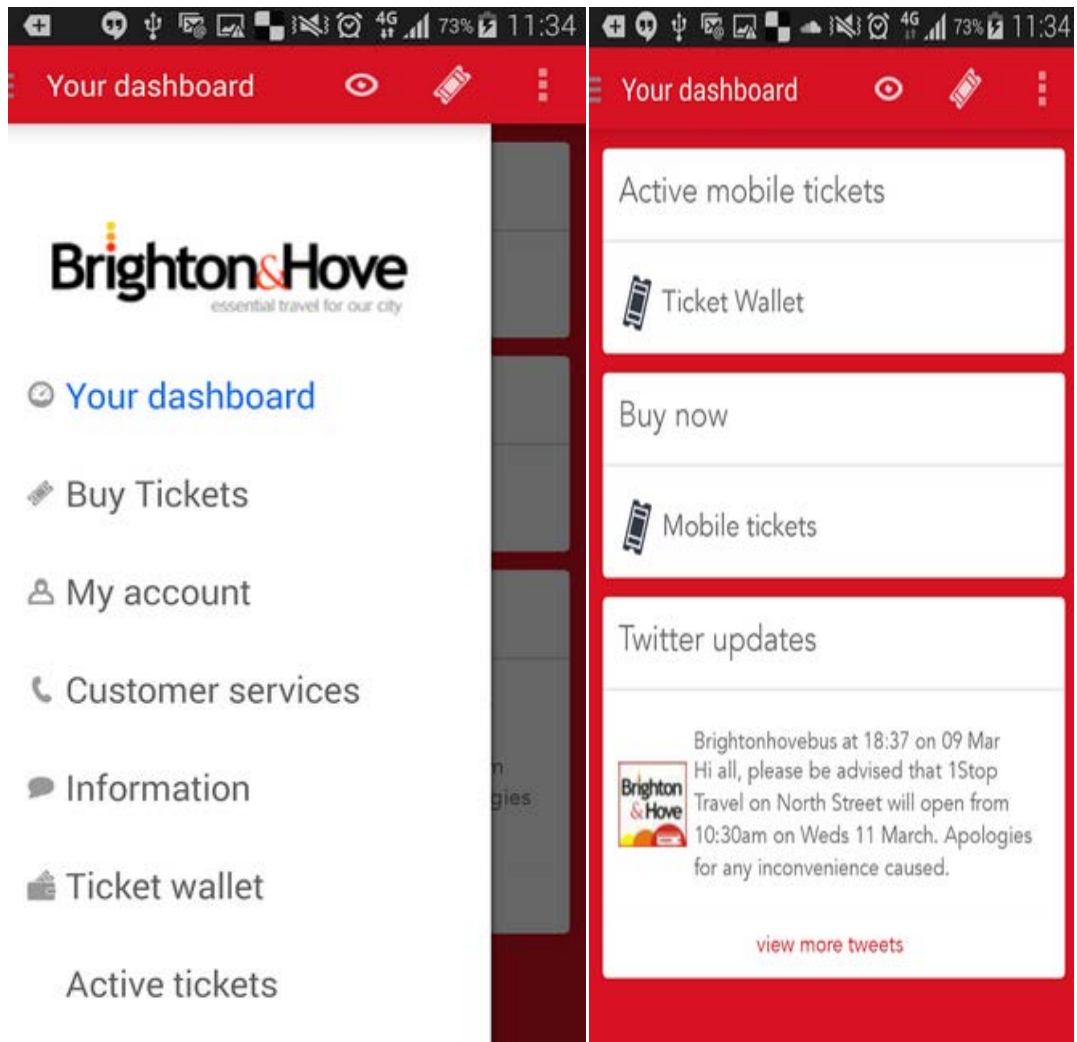


Figure 5: Brighton & Hove m-tickets Interface

2.3 Work Break Down Structure

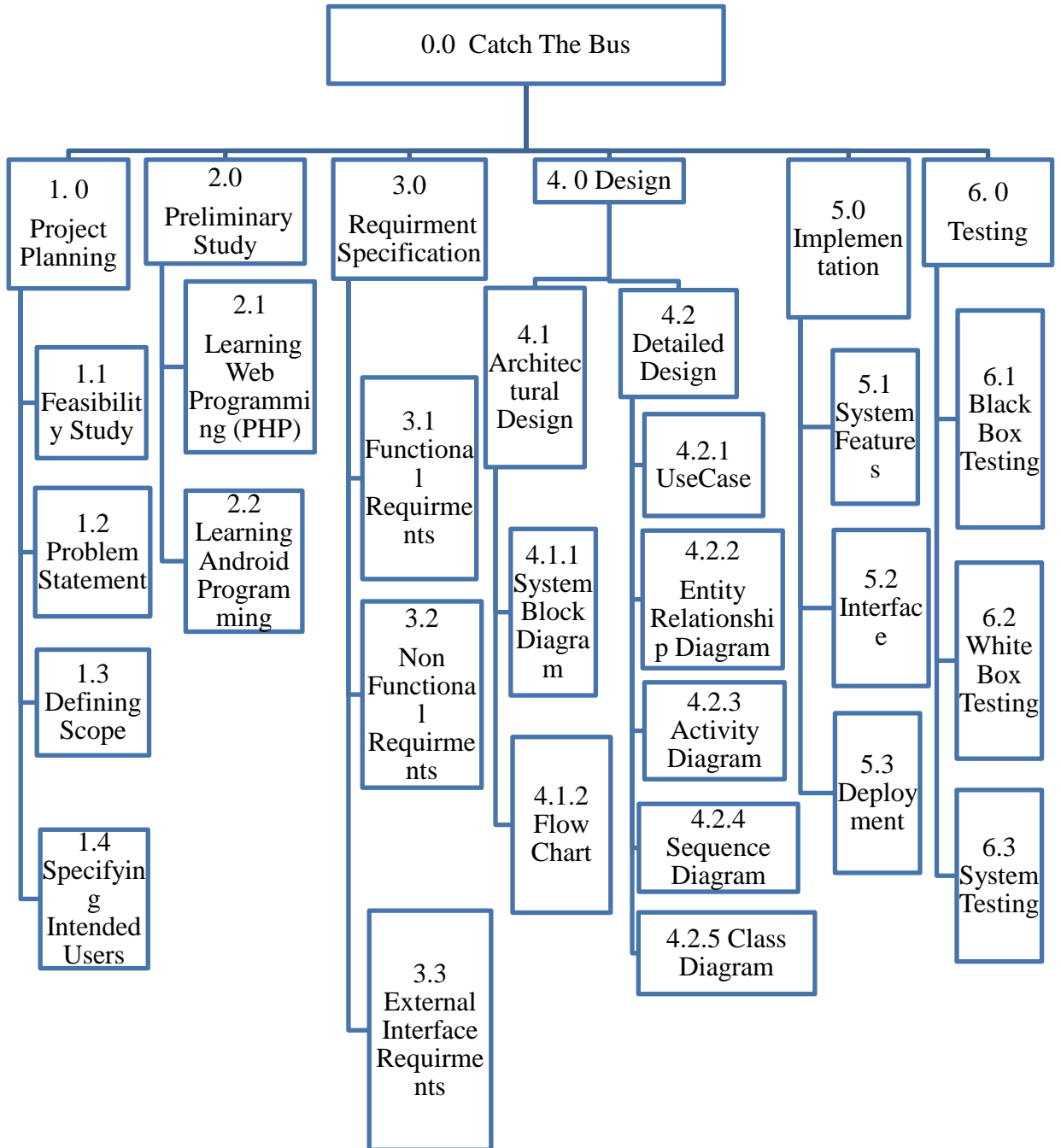


Figure 6: Work Break down Structure

CHAPTER 3: SYSTEM REQUIREMENTS

3.1 Introduction

Catch The Bus application will allow users to book their tickets online on their android smart phones for their desired destinations. It will allow the users to purchase their tickets online and they can also cancel their bookings in one click.

3.1.1 Purpose

The purpose of this document is to present a detail description of “**Catch The Bus Application**”. It will explain the purpose and features of the application, the interfaces of the application, what the application will do, the constraints under which it must operate and how the application will react to external inputs.

3.1.2 Intended Audience and Reading Suggestions

The Software Requirements Specification (**SRS**), is meant for all the stake holders listed below,

- **Client (Supervisor, student):**It will help to gain the client’s agreement. Client will be able to get better understanding of software requirements.
- **Developer:** It will help the developers to develop the product and trace back the functional requirements.
- **Testing Team:** It will help the testers to understand the constraints.
- **Employees:** It will help the employees of bus service provider companies to know about the application features in detail.
- **UG Evaluation Committee:** It will help them to evaluate functional requirements against the project deliverables
- **Customer:** The potential stakeholder of the application who is interested to provide online booking services to their respected passengers.

- **End User:** The users of the application who is interested to purchase online tickets in one click.

3.1.3 Product Scope

Catch The Bus Application is designed to facilitate the users in online booking and cancellation of tickets to their desired destinations. The application will provide:-

- Online booking of tickets from app on android device.
- Cancel bookings straight from the app.
- Purchase the tickets via Credit Card/Debit Card/iNet Banking or Cash on delivery.
- To check weather details which assist the passengers in packing their traveling stuff accordingly.
- Call bus customer service center via app.

3.1.5 Product Vision

For	The bus service provider companies in Pakistan.
What	Provides facility to end users in acquiring their online bus tickets via online payment, cancellation of tickets, viewing the bus schedules and get assistance from call center.
The	Catch The Bus Application (CTB)
Is	An android application for smart phones.
That	Provides quick bus schedules and online booking of tickets. Followed by efficient download of their booked tickets and cancelation of tickets.
Unlike	Existing bus service provider companies don't have the online booking & buying facility. The passengers have to go to the bus stations for buying their tickets which is the cumbersome job for them. This application will automate the reservation of tickets and enquiries about availability of the tickets.
Our product	Our app will assist the user(s) in checking the bus timings and schedule from his current location to the desired destination. The app lets you pay for your tickets through credit cards, debit cards, net banking and cash on delivery. Furthermore, our app will be equally useful for the Bus service provider(s) in transmitting their coincidental delays in schedule timings via automated messages.

Table 1: Product Vision

3.2 Overall Description

Overall Description of CTB is covered as follows:-

3.2.1 Inception

Traveling to a new city is always painful, especially when you have no clue of bus boarding point. Unless you are a seasoned traveler, you end up confirming

multiple times where the boarding point is just to ensure that you don't miss your bus. Curing the misery of affected passengers, our app will assist the user in checking the bus timings and schedule from his current location to the desired destination.

Increasing use of smart phone has even minimized the use of computers for general purpose internet surfing. Therefore, there is a dire need to automate the ticket booking and buying process in such a way that the smart phone users can be targeted and maximum financial benefits can be obtained.

3.2.2 Product Perspective

This android application is the replacement of manual ticket booking and buying process and caters for maximum audience response. It integrates planning, booking, online payments and cancellation of tickets under one umbrella in just one click and ensures optimum responses. This product will help users to get rid of the cumbersome job of booking and buying of tickets. CTB provides a group of works with interface environments. Also there will be a database which will keep all the records that done by user while using this application.

Furthermore this project includes designing an android application which gives a similar user experience to users of smart phones of android operating system.

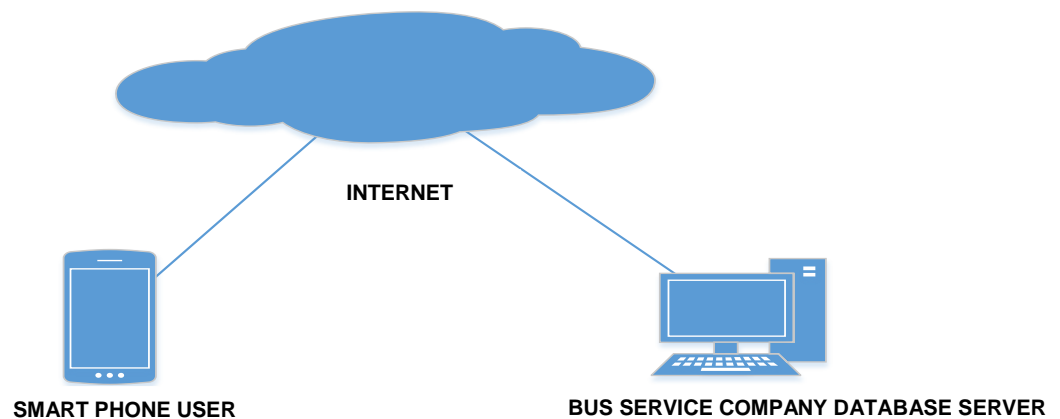


Figure 7: Product Overview

3.2.3 Product Functions

Proposed system provides the following functions:

- 3.2.3.1 Login/Sign-up.** CTB will allow the user to create /log in to their accounts to book their tickets for desired destination, online payments and also the cancelation of the tickets. CTB will restrict the access of booking only to the users of this app..
- 3.2.3.2 Online Booking.** This feature will help users to book their online tickets to the respective destinations.
- 3.2.3.3 Change Password.** CTB will allow its users to change the current passwords of their accounts to ensure the security of their login accounts.
- 3.2.3.4 Online Payments.** This feature will allow its users to pay the fares of their tickets online by giving the facility of payments through credit cards, debit cards, net banking or cash on delivery. It will also facilitate the bus service provider company to get the financial output more consistently and rapidly.
- 3.2.3.5 Online Cancelation.** CTB will help the users to cancel their tickets online prior to the departure of the bus. The cancelation will be done according to the rules of bus service provider company. The amount of the fare of the canceled ticket will be refunded to the users account.
- 3.2.3.6 Download Tickets.**CTB will help the user to download the tickets which they have booked online.
- 3.2.3.7 Weather Bar.** CTB will allow its users to check the weather details of next one week of their desired destination. It will help the users to pack their luggage for the journey in one click.
- 3.2.3.8 Route Chart.** This feature will help the users to see the total number of stops in their desired booked journey. Besides that it will also show the number of minutes the bus will stay in the transit route.
- 3.2.3.9 Update user profile** This feature will help the users to edit and update their profile records which they have entered oa the registration time.

3.2.3.10 Call help center. This feature will help the users to call the support team directly from the application.

3.2.4 User Classes and Characteristics

- **Administrator:** Administrators shall usually do anything in the application. Administrator is responsible for updating and the maintenance of the application content such as adding/removing information about the company, adding/removing links onto the main screen, and adding/removing bus schedules in the content menu, adding/removing/updating links on the event calendar and the menu, changing the logo.
- **Customer:** Customers are people who shall buy the CTB. It will be financial benefit for their bus service companies and also the source of hallmark in the competitive environment.
- **External Users:** External users are people who will use the application to book their tickets online and plan their journey according to their desires.

3.2.5 Operating Environment

3.2.5.1 Software Platform

- Operating System (Server Side): Windows
- Operating System (Client End): Android phones
- CTB should work with SQL database management system

3.2.5.2 Hardware Platform

- Smart Phones
- Internet connection.

3.2.6 Assumptions and Dependencies

Our application shall be assuming and depending upon the following facts:

- Users have sufficient knowledge of Smart Phone's Usage.

- Users know the English language because user interface will be provided in English.
- The users are clear about the objectives of the use of the app.
- The user must have connected to the internet to use the app on their android devices.
- The user's mobile must be android phone or later version platforms.
- The accuracy of the information of users is the responsibility of all users.
- User authentication procedure shall be used to protect data from unauthorized access.
- The project scope is fixed but we may enhance the functionalities of the application according to the available time and the required resources.

3.3 External Interface Requirement

External interface requirements will comprise of user, hardware, software and communication interfaces. These are further elaborated within these listed points below:-

3.3.1 User Interfaces

The CTB shall be designed as an android based that has a main user interface. Format of main screen shall be standard and flexible. The system shall be user friendly designed. Pages shall be connected each other in a consistent way. The design of the pages should allow users to do this.

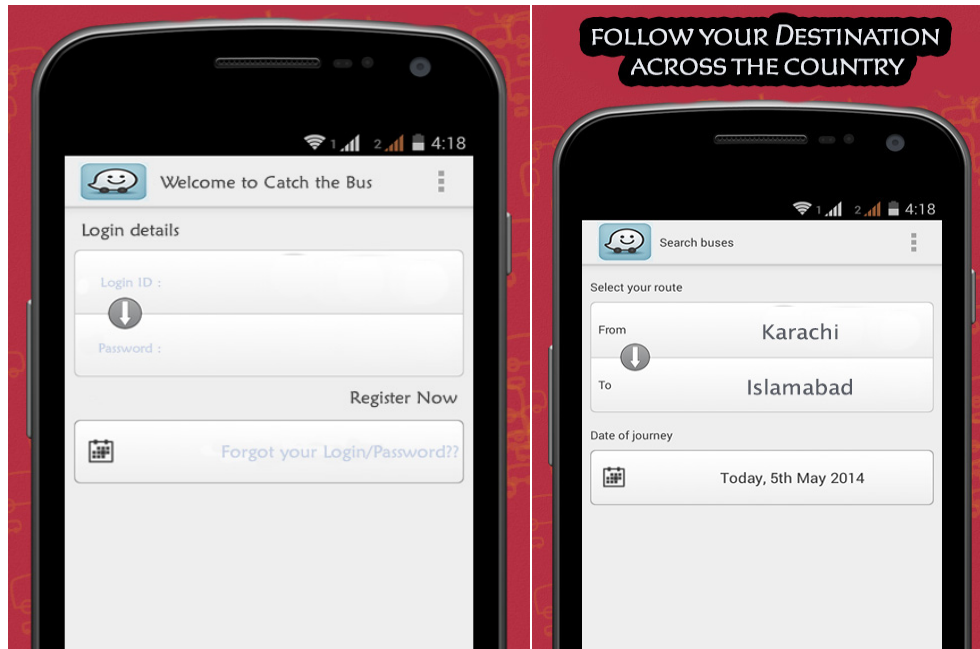


Figure 8: Login Screen

As it can be seen in the figure above, main interface includes a Logo, Background, Username and Password Fields, Login button and 'Register Now' link, If the user click on 'Register Now' link it retrieves the Sign Up Page. If the user click Login Button after he/she enters username and password, the system retrieve Main Page of the user. The user is given the option to select from the above mentioned 4 payment methods. By selecting the credit card option, user will be required to enter the card details to pay and buy the ticket at the same very time. Similar action will be done for debit card.

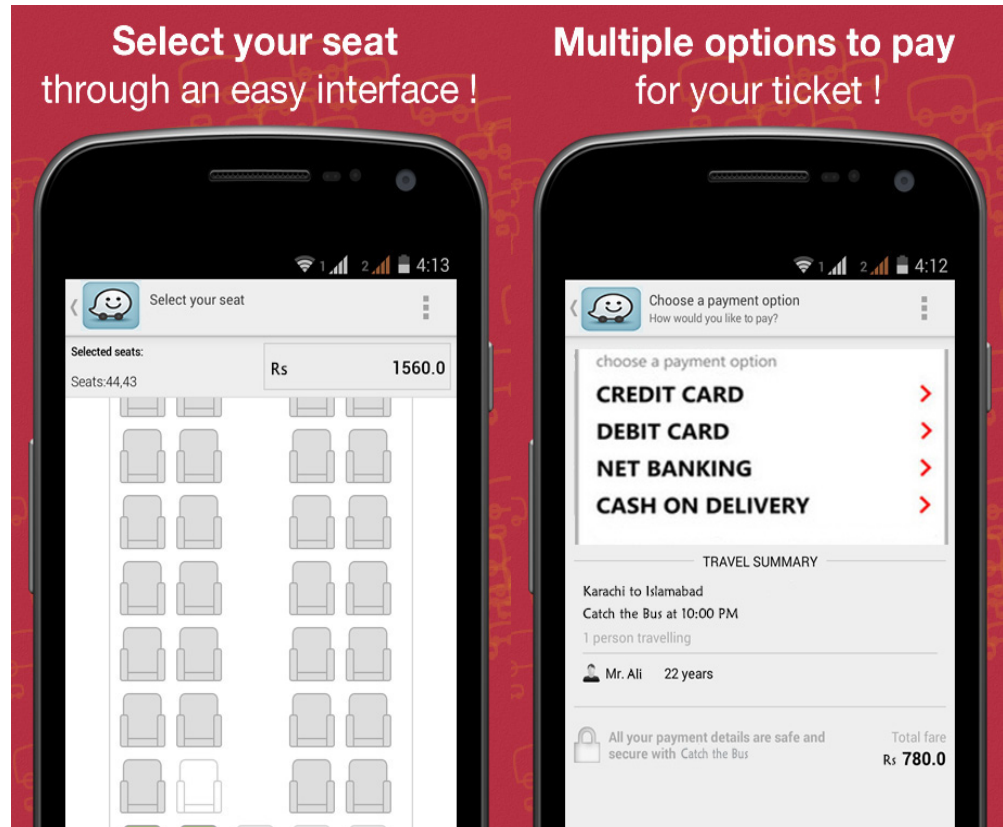


Figure 9: Payment Options

3.3.2 Hardware Interfaces

The hardware interfaces which will interact with the user are explained with their functionalities as follows:

3.3.2.1 Smart-Phones

A Smartphone, or smart phone, is a mobile phone built on a mobile operating system, with more advanced computing capability and connectivity than a feature phone. Many modern smart phones also include high-resolution touch screens and web browsers that display standard web pages as well as mobile-optimized sites. High-speed data access is provided by Wi-Fi.

An android smart phone with min 1 GHz processor and 512 MB RAM will be required to run the application.

3.3.3 Software Interfaces

3.3.3.1 Client Side

- **Scripting language:** JavaScript, JQuery Mobile.
- Android OS SDK v4.1 is required to run this application

3.3.3.2 Server Side

- **OS:** Windows server with Microsoft Framework 4.0
- **Database:** SQL Server 2012
- **Programming Language:** PHP

3.3.3.3 Network System

- Protocols for communication
 - TCP/IP
 - HTTP
 - HTTPS

3.3.3.4 Programming Interfaces

- Eclipse with Android Development Tool (SDK)
- Weather forecast API

3.3.4 Communication Interfaces

- This application requires an internet connection to implement its core functionalities using the default internet settings of Smart Phones, Tablets or Desktop Computers. Communication protocol required is HTTP. If internet is unavailable at any time, the user will be unable to access the application for booking of their tickets.

3.4 System Features Major features of the application are described as under:-

3.4.1 Login/Signup

3.4.1.1 Description and Priority:-This feature shall facilitate the user to Login to use the app CTB or Register with the application by providing the required information.

Priority=Medium.

3.4.1.2 Stimulus/Response Sequences:-Stimulus and response sequence for this feature is stated as below:-

3.4.1.2.1

Input: User will select “Register to Catch The Bus Option”.

Output: System will ask the user to provide required information and will validate the given information to register him.

3.4.1.2.2

Input: User chooses the “Sign-In Option”.

Output: System waits for the user to enter username and password.

3.4.1.2.3

Input: User will enter his username and password.

Output: System will validate the user’s credential and will redirect the user to his home page incase the user is authenticated.

3.4.1.3 Alternate Course

- User entered invalid user name or invalid password.
- System shows an error message and asks the user to login and password.
- User has registered but not confirmed the registration.
- System will generate an error message showing that the user is registered but not activated the account yet.
- System cannot match the record from the data base due to connection problem.
- System prompts an error message.

3.4.1.4 Functional Requirements

- REQ 3.4.1.4.1:** System shall allow new users to register themselves.
- REQ 3.4.1.4.2:** System shall be able to validate user input.
- REQ 3.4.1.4.3:** System shall be able to authenticate users trying to log-in.
- REQ 3.4.1.4.4:** System shall prompt the user to login before using any feature of CTB.
- REQ 3.4.1.4.5** The system shall be able to check if the input data is correct or not.
- REQ 3.4.1.4.6** The system shall prompt an error message for wrong inputs and errors.
- REQ 3.4.1.4.7** The system shall ask the user to enter password and login id again.

3.4.2 Online Booking

3.4.2.1 Description and Priority:-This feature shall facilitate the User to book online tickets to the desired listed destinations.

Priority=High.

3.4.2.2 Stimulus/Response Sequences:-Stimulus and response sequence for this feature is stated as below:-

3.4.2.2.1

Input: User will enter the name of the city in the departure field.

Output: System will store the city name for the user in the database.

3.4.2.2.2

Input: User will enter the name of the city in the arrival field.

Output: System will store the city name for the user in the database.

3.4.2.2.3

Input: User will enter the date of departure in the application.

Output: System will store the date of departure in the database and shows the number of buses available on the route.

3.4.2.2.4

Input: User will select the desired bus route in the application.

Output: System will store the bus route in the database and shows the available seats sketch of the selected bus with male and female display.

3.4.2.2.5

Input: User will select the desired number of seats from the sketch in the application.

Output: System will store the number of seats and their seat numbers in the database.

3.4.2.3 Alternate Course

- The user doesn't select the name of the city in the departure field.
- The user doesn't select the name of the city in the arrival field.
- The user doesn't enter the date of departure in the app.
 - The system prompts with an error message.
 - The user selects the male seat with already booked female seat.
 - The system prompts with an error message.

3.4.2.4 Functional Requirements

REQ 3.4.2.4.1: System shall allow the user to choose the departure city from the list of available cities,

REQ 3.4.2.4.2 System shall allow the user to choose the arrival city from the list of available cities,

REQ 3.4.2.4.3: System shall allow the user to view the calendar with maximum of next four dates.

REQ 3.4.2.4.4: System shall allow the user to choose the date of departure from the calendar.

REQ 3.4.2.4.5: System shall allow the user to view the list of available bus schedules.

REQ 3.4.2.4.6: System shall allow the user to view the bus seats sketch with male and female identification.

REQ 3.4.2.4.7: System shall allow the user to select maximum five seats in the bus seats sketch.

REQ 3.4.2.4.8: System shall prompt with an error message for selection of male seat adjacent to the already reserved female seat.

REQ 3.4.2.4.9: System shall prompt with an error message for not selecting the city from the list of departure cities.

REQ 3.4.2.4.10: System shall prompt with an error message for not selecting the city from the list of arrival cities.

REQ 3.4.2.4.11: System shall prompt with an error message for not selecting the date of departure.

3.4.3 Online Payments

3.4.3.1 Description and Priority:-The feature shall allow the user to pay their tickets online for early and confirmed reservation by providing with different options.

Priority=High.

3.4.3.2 Stimulus/Response Sequences:-Stimulus and response sequence for this feature is stated as below:-

3.4.3.2.1

Input: User selects one of the payment options from the list in the app.

Output: System stores the payment option in the data base.

3.4.3.2.2

Input: User selects the credit card option from the list in the app..

Output: System asks the credit card number from the user.

3.4.3.2.3.

Input: User enters the credit card number in the app..

Output: System stores the number and ask the user to enter the money.

3.4.3.2.4 .

Input: User enters the amount of the fare in rupees in the app..

Output: System stores the amount and verifies the amount of fare.

3.4.3.2.5

Input: User selects the debit card option from the list in the app..

Output: System asks the debit card number from the user.

3.4.3.2.6

Input: User enters the debit card number in the app..

Output: System stores the number and ask the user to enter the money.

3.4.3.2.7

Input: User enters the amount of the fare in rupees in the app..

Output: System stores the amount and verifies the amount of fare.

3.4.3.2.8

Input: User enters the cash on delivery option from the list in the app.

Output: System stores the option selected in the database.

3.4.3.3 Alternate course:

- User enters the wrong credit card number in the system.
- User enters the wrong debit card details in the system.
- User does not select the mode of Payment option in the menu.
- User enters the wrong ticket fare in the system.
- User prompts with an error message of all above errors.

3.4.3.4 Functional Requirements

REQ 3.4.3.4.1: System shall allow the user to choose the credit card option from the list of modes of payments.

REQ 3.4.3.4.2: System shall allow the user to choose the debit card option from the list of modes of payments.

REQ 3.4.3.4.3: System shall allow the user to choose the inet banking option from the list of modes of payments.

REQ 3.4.3.4.4: System shall allow the user to choose the cash on delivery option from the list of modes of payments.

REQ 3.4.3.4.5: System shall allow the user to enter the credit card number in the credit card number field.

REQ 3.4.3.4.6: System shall allow the user to enter the debit card number in the debit card number field.

REQ 3.4.3.4.7: System shall allow the user to enter the fare in rupees in the bus fare field.

REQ 3.4.3.4.8: System shall prompt the user with an error message on entering wrong credit/debit card number.

REQ 3.4.3.4.9: System shall prompt the user with an error message on entering wrong bus fare.

REQ 3.4.3.4.10: System shall prompt the user with an error message for not selecting the modes of payment option in the app.

3.4.4 Cancellation of tickets

3.4.4.1 Description and Priority:-This feature would allow the users to cancel their booking prior to the departure of the desired bus.

Priority=High.

3.4.4.2 Stimulus/Response Sequences:-Stimulus and response sequence for this feature is stated as below:-

3.4.4.2.1

Input: User enters the ticket number of the reserved bus.

Output: System stores the ticket number in the data base.

3.4.4.2.2.

Input: User deletes the reserved ticket in the app.

Output: System saves the changes and cancel the reserved ticket.

3.4.4.3 Alternate course:

- User enters the wrong ticket number in the system.
- User does not select the cancel option in the system for cancellation of their booking.
- System prompts with an error message in case of the above mentioned errors.

3.4.4.4 Functional Requirements

REQ 4.4.4.1: System shall allow its users to cancel their already reserved tickets.

REQ3.4.4.4.2: System shall allow the user to enter ticket number in the ticket number field.

REQ 3.4.4.4.3: System shall allow user to cancel the ticket prior to the departure of the bus.

REQ 3.4.4.4.4: System shall prompt the user with an error message on entering wrong ticket number.

REQ 3.4.4.4.5: System shall verify the entered ticket number in the data base.

REQ 3.4.4.4.6: System shall confirm the user with message that his reservation is successfully cancelled.

3.4.5 Download tickets

3.4.5.1 Description and Priority:- This feature will allow the user to download their reserved tickets from the app.

Priority=High.

3.4.5.2 Stimulus/Response Sequences:- Stimulus and response sequence for this feature is stated as below :-

3.4.5.2.1

Input: User enter the ticket number in the system.

Output: System verifies the ticket number stored it in the database.

3.4.5.2.2

Input: User selects the download option in the app.

Output: System show the ticket details from the database to the user.

3.4.5.2.3

Input: User selects the 'save ticket' option in the app

Output: System saves the ticket details to the user device from the server.

3.4.5.3 Functional Requirements

REQ 3.4.5.3.1: System shall allow the users to download the reserved ticket to their android devices

REQ 3.4.5.3.2: System shall verify the ticket number entered by the user from the database

REQ 3.4.5.3.3: System shall prompt the user with an error message of entering wrong ticket number.

3.4.6 Route chart

3.4.6.1 Description and Priority:- This feature enables the user to view the route chart from the departure city to the desired destination.

Priority=High.

3.4.6.2 Stimulus/Response Sequences:-Stimulus and response sequence for this feature is stated as below :-

3.4.6.2.1

Input: User enters the ticket number in the system.

Output: System verifies the ticket number from the database.

3.4.6.2.2

Input: User selects the 'route chart' option in the app

Output: System displays the route chart on Google map with marked transit points.

3.4.6.3 Functional Requirements

REQ 3.4.6.3.1: System shall allow users to enter the ticket number in the ticket number field in the app.

REQ 3.4.6.3.2: System shall allow users to select the 'route chart' option.

REQ 3.4.6.3.3: System shall allow users to view the route chart on his/her device.

REQ 3.4.6.3.4: System shall display the route chart with marked transit points to the user.

REQ 3.4.6.3.5: System shall display the error message to the user in case the ticket number doesn't match the database.

3.4.7 Call help center

3.4.7.1 Description and Priority:- This feature will allow the user to call the help center of the bus service provider via the app in mere one click

Priority=Medium

3.4.7.2 Stimulus/Response Sequences:- Stimulus and response sequence for this feature is stated as below :-

3.4.7.2.1

Input: User selects the 'Call Help!' option from the main menu in the app

Output: System diverts the call to the server for assistance.

3,4.7.2.2

Input: User selects the 'Call end' option in the app.

Output: System terminates the call of the user from the server.

3.4.7.3 Functional Requirements

REQ 3.4.7.3.1: System shall allow the user to select the 'Call help!' from the main menu in the app.

REQ 3.4.7.3.2: System shall allow the app to copy the helpline number on the user device dialing screen.

REQ 3.4.7.3.3: System shall display the ongoing call details on screen.

REQ 3.4.7.3.4: System shall display the "call end" option as in-call function.

3.4.8 Weather bar

3.4.8.1 Description and Priority:-This feature will allow the users to check the weather details of the cities.

Priority=Medium.

3.4.8.2 Stimulus/Response Sequences:-Stimulus and response sequence for this feature is stated as below :-

3.4.8.2.1

Input: User selects the 'weather bar' in the main menu.

Output: System directs the app to the ACCU weather server.

3.4.8.2.2

Input: User touches the weather tab to toggle between the cities

Output: System will shift the weather details from one city to the desired city.

3.4.8.3 Functional Requirements

REQ 3.4.8.3.1: System shall allow the user to select the 'Weather Bar' button on the main menu.

REQ 3.4.8.3.2: System shall direct the user request to the ACCU weather server.

REQ 3.4.8.3.3: System shall display the weather details of the desired city on the weather bar in the app.

3.4.9 Change Password

3.4.9.1 Description and Priority:- This feature will allow the users to change his/her login password.

Priority=High.

3.4.9.2 Stimulus/Response Sequences:- Stimulus and response sequence for this feature is stated as below:-

3.4.9.2.1

Input: User selects the 'Change Password' option from the main menu in the app.

Output: System asks the user to enter the current password.

3.4.9.2.2

Input: User enters the current password.

Output: System asks the user to enter the new password.

3.4.9.2.3

Input: User enters the new password.

Output: System stores the password in the database.

3.4.9.3 Functional Requirements

REQ 3.4.9.3.1: System shall allow the user to select the “Change Password’ option from the main menu in the app.

REQ 3.4.9.3.2: System shall verify the user current password with the database prior to allowing him to set a new password.

REQ 3.4.9.3.3: System shall allow the user to enter new password.

REQ 3.4.9.3.4: System shall update the password in the database.

3.4.10 Update User Profile

3.4.10.1 Description and Priority:- This feature will allow the users to update their information in the profile

Priority=Low.

3.4.10.2 Stimulus/Response Sequences:-Stimulus and response sequence for this feature is stated as below :-

3.4.10.2.1

Input: User selects the ‘Update profile’ option from the main menu in the app.

Output: System displays the profile details to the user.

3.4.10.2.2

Input: User edits the desired information in the profile.

Output: System saves the information in the database.

3.4.10.3 Functional Requirements

REQ 3.4.10.3.1: System shall allow the user to select the “update Profile’ button on the main menu in the app.

REQ 3.4.10.3.2: System shall display the user profile record to the user

REQ 3.4.10.3.3: System shall allow the user to edit the record in the user profile.

REQ 3.4.10.3.4: System shall save the edited data in the database.

3.5 Other Nonfunctional Requirements

3.5.1 Performance Requirements

- Server shall be able to handle minimum of 500 requests at one time.
- The system shall be able to process 100 payment transactions per second in peak load.

3.5.2 Security Requirements

- After 3 simultaneous login attempts with wrong password, application shall ask for password with a CAPTCHA image.
- Bookings created by a user shall only be accessible to that user for modification, view and online payment.
- Logical Database should be secure and known attacks on databases must be catered for e-g SQL Injection Attacks.
- Lifespan of a password shall be maximum 1 hour.
- Lifespan of a session shall be maximum 30 minutes.

3.5.3 Software Quality Attributes

Software Quality Attributes are listed as follows.

3.5.3.1 Availability

- The system shall not be unavailable more than 1 hour per 1000 hours of operation.
- The system shall meet or exceed 95% uptime.
- Less than 10 minutes shall be needed to restart the system after a failure, 99.90% of the time.

3.5.3.2 Maintainability

- Not more than 15% of the existing functionality shall be affected by adding any new functionality.
- Installation of a new version shall leave all database contents and all personal settings unchanged.

3.5.3.3 Response Time

- It would take less than 10 seconds to completely load a page given a 1mbps internet connection.

3.5.3.4 Reusability

- System shall allow the support for developers to make native applications for different platforms.

3.5.3.5 Portability

- System shall be accessible to different Android tablets, Android Smart Phones (different sizes).
- System shall give the same look and feel being used at different smart phones. Screen resolution and size adjustments should be catered for different screen sizes.
- System must use the display settings of the native device which it is being used.

3.5.3.6 Reliability

- System defect rate shall be less than 2 failures per 1000 requests to servers.
- The system shall rollback to a previous saved state in case of a failure.

3.5.3.7 Usability

- After a 15 minutes training time 8 out of 10 novice users shall be able to use the app in less than 30 minutes.
- For most of the links or buttons, help would be provided to the user for knowing the main functionality of that particular link or button for his better understanding.
- Video Tutorials will be made available (constraint – sufficient time Available).
- Experienced users shall be able to book their tickets in less than 20 minutes.

CHAPTER 4: DESIGN AND DEVELOPMENT

4. Design and Development

4.1 Purpose

This part of document provides a detailed design description of the system. It will explain the purpose and features of the system, major classes, database entities and dataflow in the application. It would also tell that what the system will do, the constraints under which it must operate and how the system will react to external inputs.

4.2 Architecture of CTB

Layered Architecture (3-Tiers) will be used to implement CTB. From a high level perspective, a service-based solution can be seen as being composed of multiple services, each communicating with the others by passing messages. Conceptually, the services can be seen as components of the overall solution. However, internally, each service is made up of software components, just like any other application, and these components can be logically grouped into presentation, business, and data layers. Other applications can make use of the services without being aware of the way they are implemented.

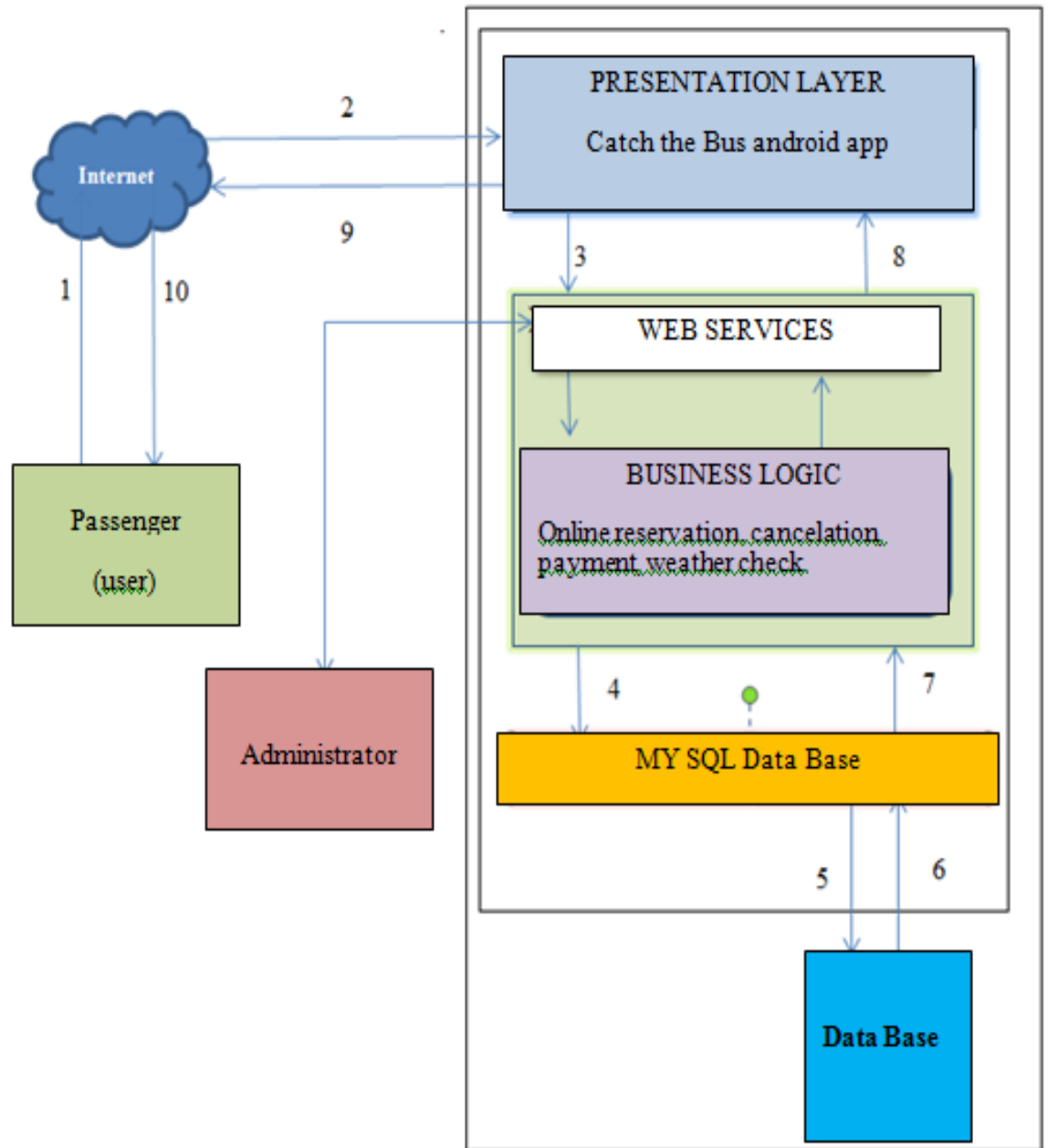


Figure 10: Architecture of CTB

The rationale for selecting Layered architecture is described as under:-

- a. Separation of concerns. Each Layer has to implement independent functionality.
- b. Separating Data Access Layer from application logic layer. Since, a lot of interaction with databases is involved.
- c. To allow for reusability for developers working on different platforms.
- d. Apart from the usual advantages of modular software with well-defined interfaces, the three-tier architecture is intended to allow any of the three tiers to be upgraded or replaced independently in response to changes in requirements or technology.
- e. Dynamic load balancing by use of multiple servers.

4.2.1 Layers Details

4.2.1.1 Presentation Layer Provides the platform for interaction of the user with the system. It displays data to the user and accepts input from the user. This is the part which receives the HTTP request and returns the PHP response. The Presentation layer can only receive requests from, and return responses to, an outside user. The Presentation layer can only send requests to, and receive responses from, the Business layer. It cannot have direct access to either the database or the Data Access layer.

4.2.1.2 Business Logic Layer This layer provides services to the application layer as well as implementing features. It is used to expose the business functionality of the application. This layer accepts the response of the user and transfers it to the data access layer.

4.2.1.3 Data Access Layer This layer receives request from the business logic layer and sends back data after querying it from the database server.

4.3 Detailed Design

4.3.1 Database Diagram



Figure 11: Entity Relationship Diagram CTB

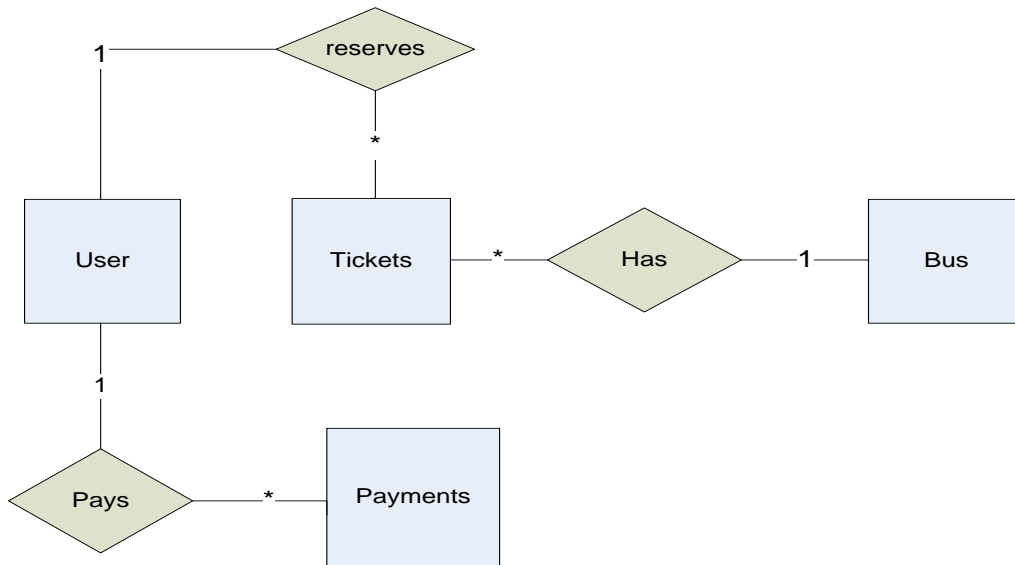


Figure 12: Entity Relationship Diagram CTB

4.3.1.1 ERD Explanation

User	This table contains variables related to the basic informations about administrator, and registered users. This entity has one to many relation with the entity ticket of type reserves and with the entity payments of type pays respectively. The user can reserves many tickets and pays for many tickets.
Ticket	This table contains attributes about the tickets. This entity has many to one relation with the entity user of type reserves and has many to one relation with the entity bus. The user can reserves many tickets and each bus has many tickets.
Payment	This table contains attributes about the payment options. It has many to one relation with the user. The user can reserves many tickets and pays for many tickets.
Bus	This table contains the details about the bus, it has one to many relation with the entity ticket. Each bus has many tickets.

Table 2: ERD Explanation

4.3.2 FlowChart

4.3.2.1 Reservation process

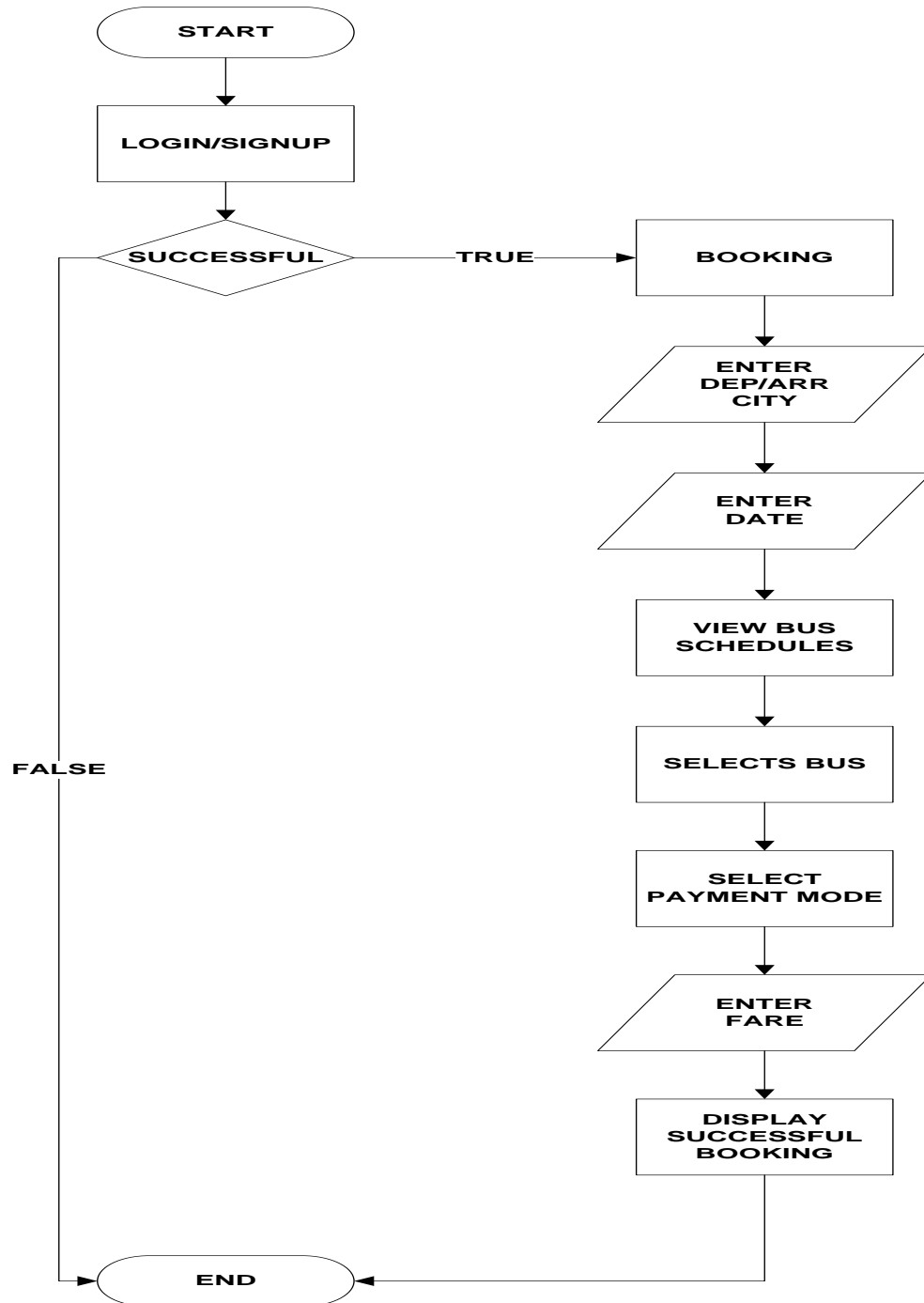


Figure 13: Flow Chart Reservation Process

4.3.2.2 Cancelation process

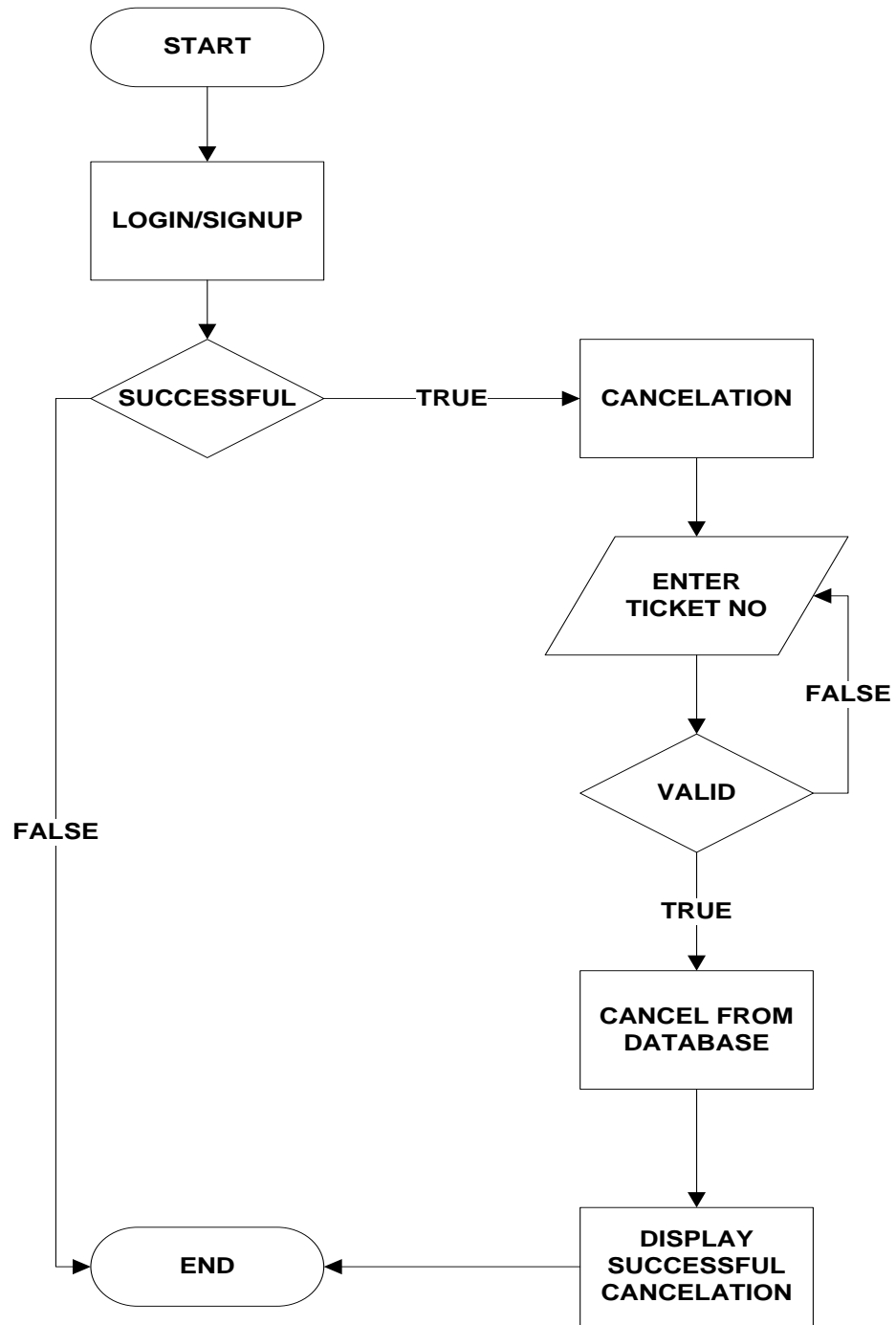


Figure 14: Flow Chart Cancelation process

4.3.2.3 Change Password

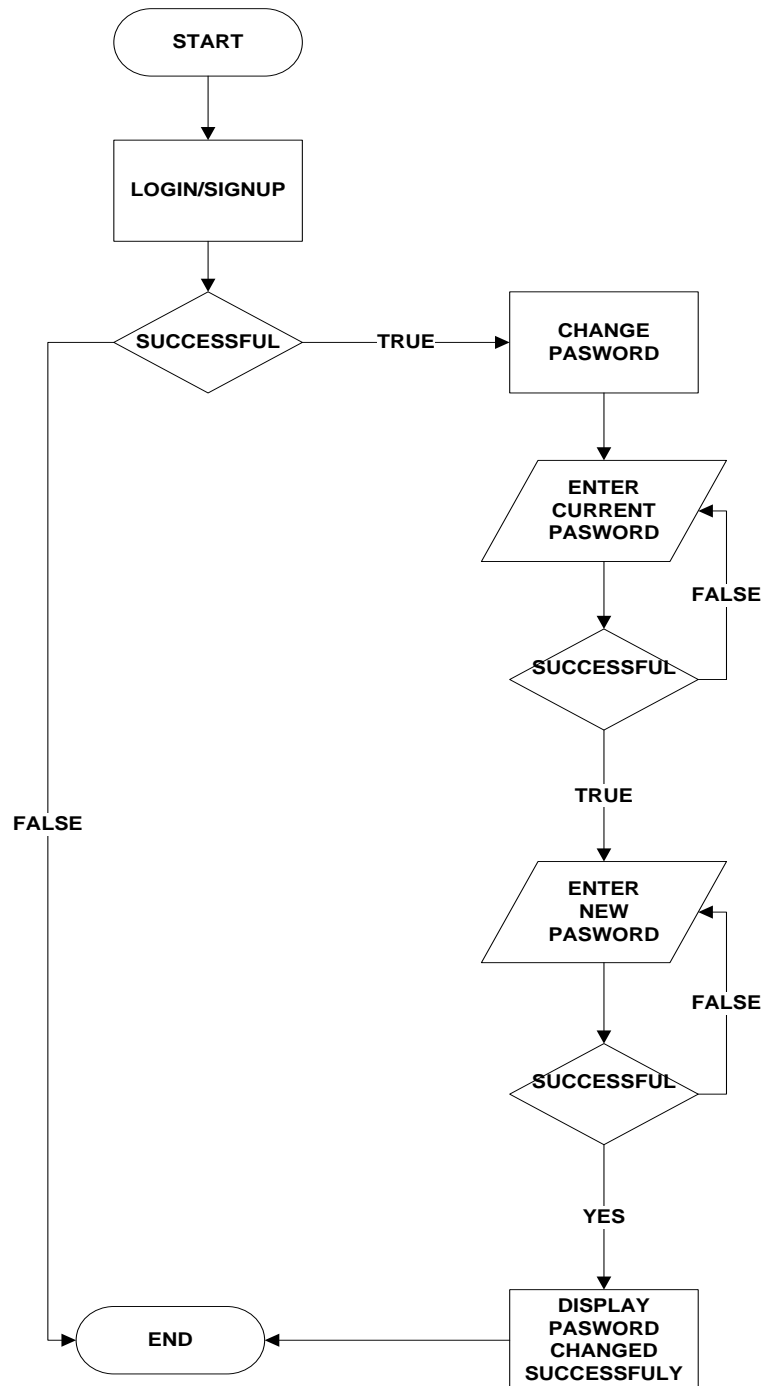


Figure 15: Flow Chart Change Password process

4.3.3 UML Diagram

4.3.3.1 Use case Diagram

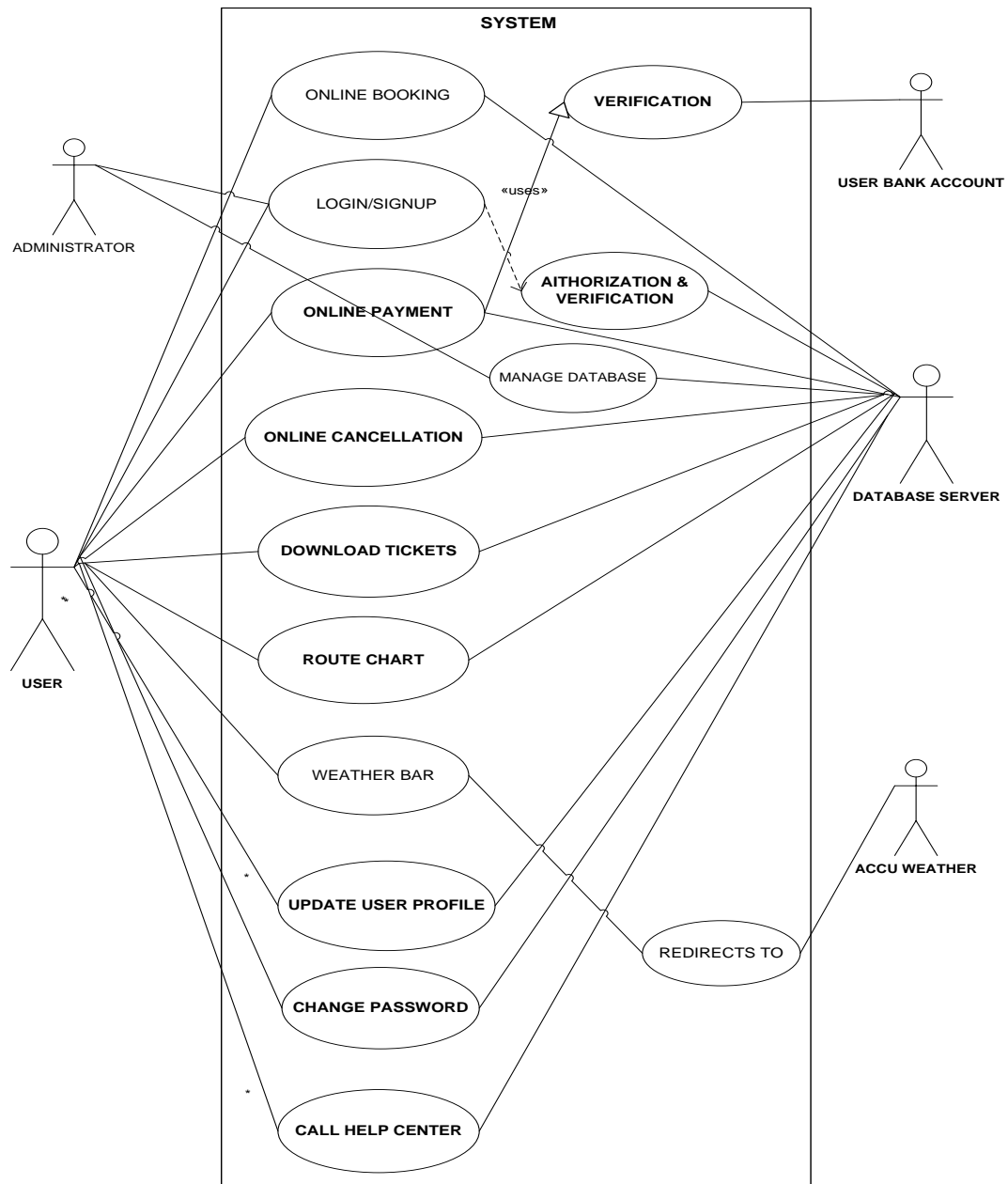


Figure 16: Use Case Diagram CTB

4.3.3.2 Use Cases

4.3.3.2.1 Login/Signup

Use Case ID:	1		
Use Case Name:	Login/Signup		
Actors:	Admin, User		
Created By:	Waqas Ajmal	Last Updated By:	Amir Munir
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This use-case will describe the behavioral requirements to successfully complete the registration process.		
Preconditions:	User has access to CTB app		
Post conditions:	User's account is created successfully. User is added to the database.		
Normal Flow (primary scenario):	<ol style="list-style-type: none">1. System shall allow new users to register themselves.2. System shall be able to validate user input.3. System shall be able to authenticate users trying to log-in.4. System shall prompt the user to login before using any feature of CTB.5. The system shall be able to check if the input data is correct or not.6. The system shall prompt an error message for wrong inputs and errors.7. The system shall ask the user to enter password and login id again.		
Alternative Flows:	<u>User</u> <ol style="list-style-type: none">1. User entered invalid user name or invalid password.2. System shows an error message and asks the user to login and password.3. User has registered but not confirmed the registration.4. System will generate an error message showing that the user		

	<p>is registered but not activated the account yet.</p> <p>5. System cannot match the record from the data base due to connection problem.</p> <p>6. System prompts an error message.</p>
--	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 3: login

4.3.3.2.2 Online Booking

Use Case ID:	2		
Use Case Name:	Online Booking		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Amir Munir
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This feature shall facilitate the User to book online tickets to the desired listed destinations.		
Preconditions:	User has logged in to CTB app		
Post conditions:	User has successfully reserved the ticket.		
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow the user to choose the departure city from the list of available cities, 2. System shall allow the user to choose the arrival city from the list of available cities, 3. System shall allow the user to view the calendar with maximum of next four dates. 4. System shall allow the user to choose the date of departure from the calendar. 5. System shall allow the user to view the list of available bus schedules. 6. System shall allow the user to view the bus seats sketch with male and female identification. 		

	<ol style="list-style-type: none"> 7. System shall allow the user to select maximum five seats in the bus seats sketch. 8. System shall prompt with an error message for selection of male seat adjacent to the already reserved female seat. 9. System shall prompt with an error message for not selecting the city from the list of departure cities. 10. System shall prompt with an error message for not selecting the city from the list of arrival cities. 11. System shall prompt with an error message for not selecting the date of departure.
Alternative Flows:	<ol style="list-style-type: none"> 1. The user doesn't select the name of the city in the departure field. 2. The user doesn't select the name of the city in the arrival field. 3. The user doesn't enter the date of departure in the app. 4. The system prompts with an error message. 5. The user selects the male seat with already booked female seat. 6. The user selects the female seat with already booked male seat. 7. The system prompts with an error message.

Table 4: online booking

4.3.3.2.3 Online Payments

Use Case ID:	3		
Use Case Name:	Online Payments		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Amir Munir

Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This use Case shall allow the user to pay their tickets online for early and confirmed reservation by providing with different options.		
Preconditions:	User is logged in to his account and has reserved the ticket.		
Post conditions:	<p><u>Success</u></p> <p>User has successfully paid the amount of fare while using his debit/credit card or cash on delivery option.</p>		
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow the user to choose the credit card option from the list of modes of payments. 2. System shall allow the user to choose the debit card option from the list of modes of payments. 3. System shall allow the user to choose the inet banking option from the list of modes of payments. 4. System shall allow the user to choose the cash on delivery option from the list of modes of payments. 5. System shall allow the user to enter the credit card number in the credit card number field. 6. System shall allow the user to enter the debit card number in the debit card number field. 7. System shall allow the user to enter the fare in rupees in the bus fare field. 8. System shall prompt the user with an error message on entering wrong credit/debit card number. 9. System shall prompt the user with an error message on entering wrong bus fare. 10. System shall prompt the user with an error message for not selecting the modes of payment option in the app. 		
Alternative Flows:	<ol style="list-style-type: none"> 1. User enters the wrong credit card number in the system. 2. User enters the wrong debit card details in the system. 3. User does not select the mode of Payment option in the 		

	<p>menu.</p> <ol style="list-style-type: none"> 4. User enters the wrong ticket fare in the system. 5. User prompts with an error message of all above errors.
--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Table 5: Online Payment

4.3.3.2.4 Cancellation of tickets

Use Case ID:	4		
Use Case Name:	Cancellation of tickets		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Amir Munir
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This use-case would allow the users to cancel their booking prior to the departure of the desired bus.		
Preconditions:	<p>User is logged in to his account.</p> <p>User has reserved and paid for the ticket.</p>		
Post conditions:	The passenger has successfully cancelled the ticket.		
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow its users to cancel their already reserved tickets. 2. System shall allow the user to enter ticket number in the ticket number field. 3. System shall allow user to cancel the ticket prior to the departure of the bus. 4. System shall prompt the user with an error message on entering wrong ticket number. 5. System shall verify the entered ticket number in the data base. 6. System shall confirm the user with message that his 		

	reservation is successfully cancelled.
Alternative Flows:	<ol style="list-style-type: none"> 1. User enters the wrong ticket number in the system. 2. User does not select the cancel option in the system for cancellation of their booking. 3. System prompts with an error message in case of the above mentioned errors.

Table 6: Cancellation of tickets

4.3.3.2.5 Download tickets

Use Case ID:	5		
Use Case Name:	Download tickets		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Amir Munir
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This use-case will allow the user to download their reserved tickets from the app.		
Preconditions:	<p>User is logged in to his account.</p> <p>User has reserved and paid for the ticket.</p>		
Post conditions:	User has successfully downloaded the ticket.		
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow the users to download the reserved ticket to their android devices 2. System shall verify the ticket number entered by the user from the database 3. System shall prompt the user with an error message of entering wrong ticket number. 		

Alternative Flows:	<ol style="list-style-type: none"> 1. User selects the download ticket option without reserving the ticket. 2. The system prompts with an error message.
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Table 7: ticket download

4.3.3.2.6 Route chart

Use Case ID:	6		
Use Case Name:	Route chart		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Ali Zuhair
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This use Case enables the user to view the route chart from the departure city to the desired destination.		
Preconditions:	<p>User is logged in to his account.</p> <p>User has reserved and paid for the ticket.</p>		
Post conditions:	User has successfully view the route chart from the departure city to the desired destination.		
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow users to enter the ticket number in the ticket number field in the app. 2. System shall allow users to select the 'route chart' option. 3. System shall allow users to view the route chart on his/her device. 4. System shall display the route chart with marked transit points to the user. 5. System shall display the error message to the user in case the ticket number doesn't match the database. 		
Alternative Flows:	<ol style="list-style-type: none"> 1. User selects the view Route chart option without reserving the ticket. 2. The system prompts with an error message. 		

Table 8: Route Chart

4.3.3.2.7 Call help center

Use Case ID:	7		
Use Case Name:	Call help center		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Ali Zuhair
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This feature will allow the user to call the help center of the bus service provider via the app in mere one click		
Preconditions:	User is logged in to his account.		
Post conditions:	User has successfully called the help center.		
Normal Flow	<ol style="list-style-type: none">1. System shall allow the user to select the 'Call help!' from the main menu in the app.2. System shall allow the app to copy the helpline number on the user device dialing screen.3. System shall display the ongoing call details on screen.4. System shall display the "call end" option as in-call function.		

Table 9: Call Help Center

4.3.3.2.8 Weather bar

Use Case ID:	8		
Use Case Name:	Weather bar		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Ali Zuhair
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This feature will allow the users to check the weather details of the cities.		
Preconditions:	User is logged in to his account.		

Post conditions:	User has successfully viewed the weather details of his desired location.
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow the user to select the 'Weather Bar' button on the main menu. 2. System shall direct the user request to the ACCU weather server. 3. System shall display the weather details of the desired city on the weather bar in the app.
Alternative Flows:	<ol style="list-style-type: none"> 1. User does not enter the city name in the field. 2. The system prompts with an error message for entering the city name.

Table 10: Weather Check

4.3.3.2.9 Change Password

Use Case ID:	9		
Use Case Name:	Change Password		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Ali Zuhair
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This feature will allow the users to change his/her login password.		
Preconditions:	User is logged in to his account.		
Post conditions:	User has successfully changed his password.		
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow the user to select the "Change Password" option from the main menu in the app. 2. System shall verify the user current password with the database prior to allowing him to set a new password. 3. System shall allow the user to enter new password. 4. System shall update the password in the database. 		

Table 11: change password

4.3.3.2.10 Update User Profile

Use Case ID:	10		
Use Case Name:	Update User Profile		
Actors:	User		
Created By:	Waqas Ajmal	Last Updated By:	Ali Zuhair
Date Created:	10/11/2014	Date Last Updated:	10/11/2014
Description:	This feature will allow the users to update their information in the profile.		
Preconditions:	User is logged in to his account.		
Post conditions:	Users have successfully updated their information in the profile..		
Normal Flow (primary scenario):	<ol style="list-style-type: none"> 1. System shall allow the user to select the “update Profile’ button on the main menu in the app. 2. System shall display the user profile record to the user 3. System shall allow the user to edit the record in the user profile. 4. System shall save the edited data in the database. 		
Alternative	<ol style="list-style-type: none"> 1. 2.a User does not selects the save button after editin his profile. 2. 2.a System does not saves the changes in the database. 		

Table 12: Update user profile

4.3.4 Sequence Diagrams

Sequence diagrams of important use cases are given as under:

4.3.4.1 Login Sequence Diagram.

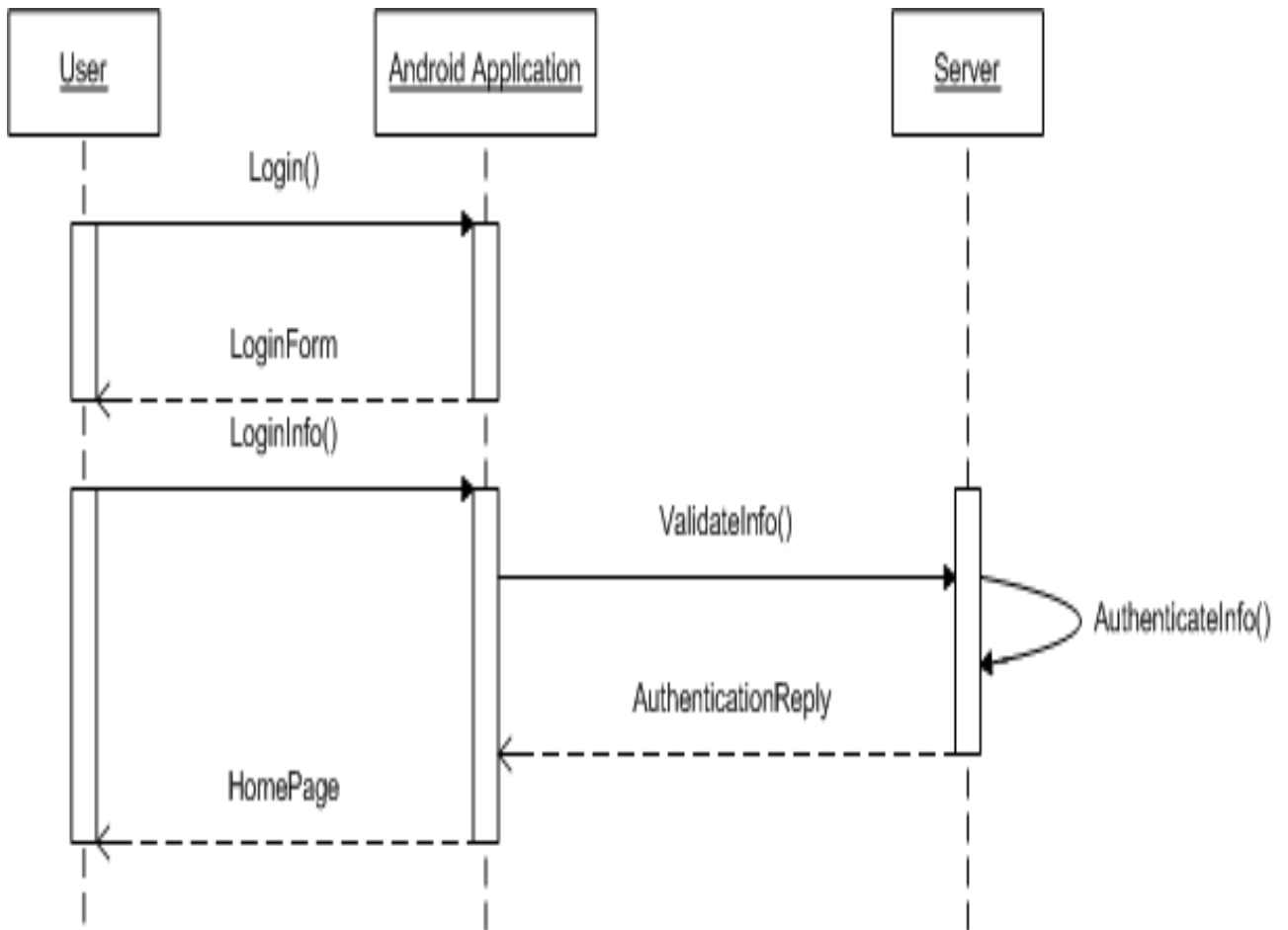


Figure 17: Login Sequence Diagram

4.3.4.2 Reservation

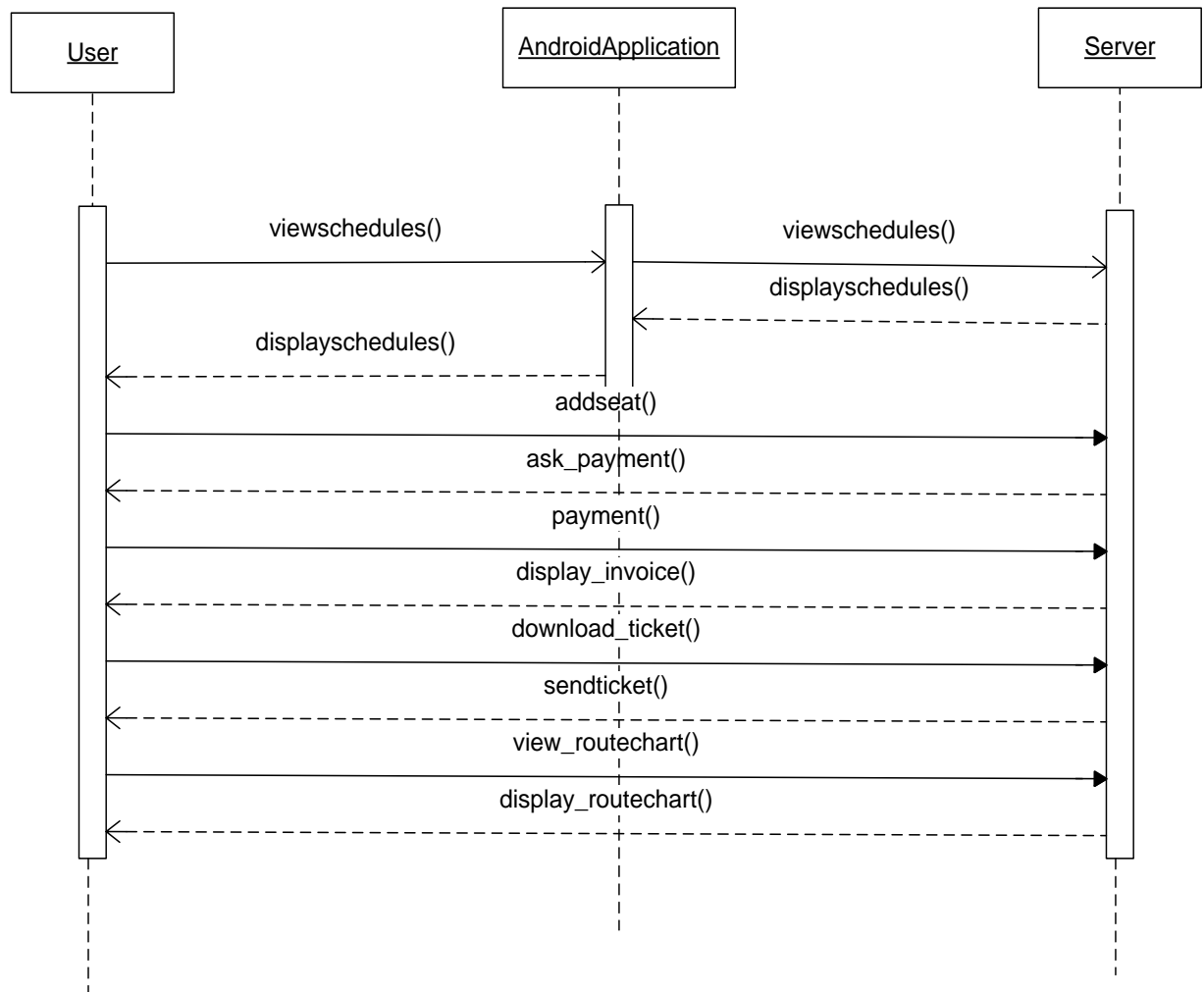


Figure 18: Sequence Diagram reservation process

4.3.4.3 Update user profile / change password

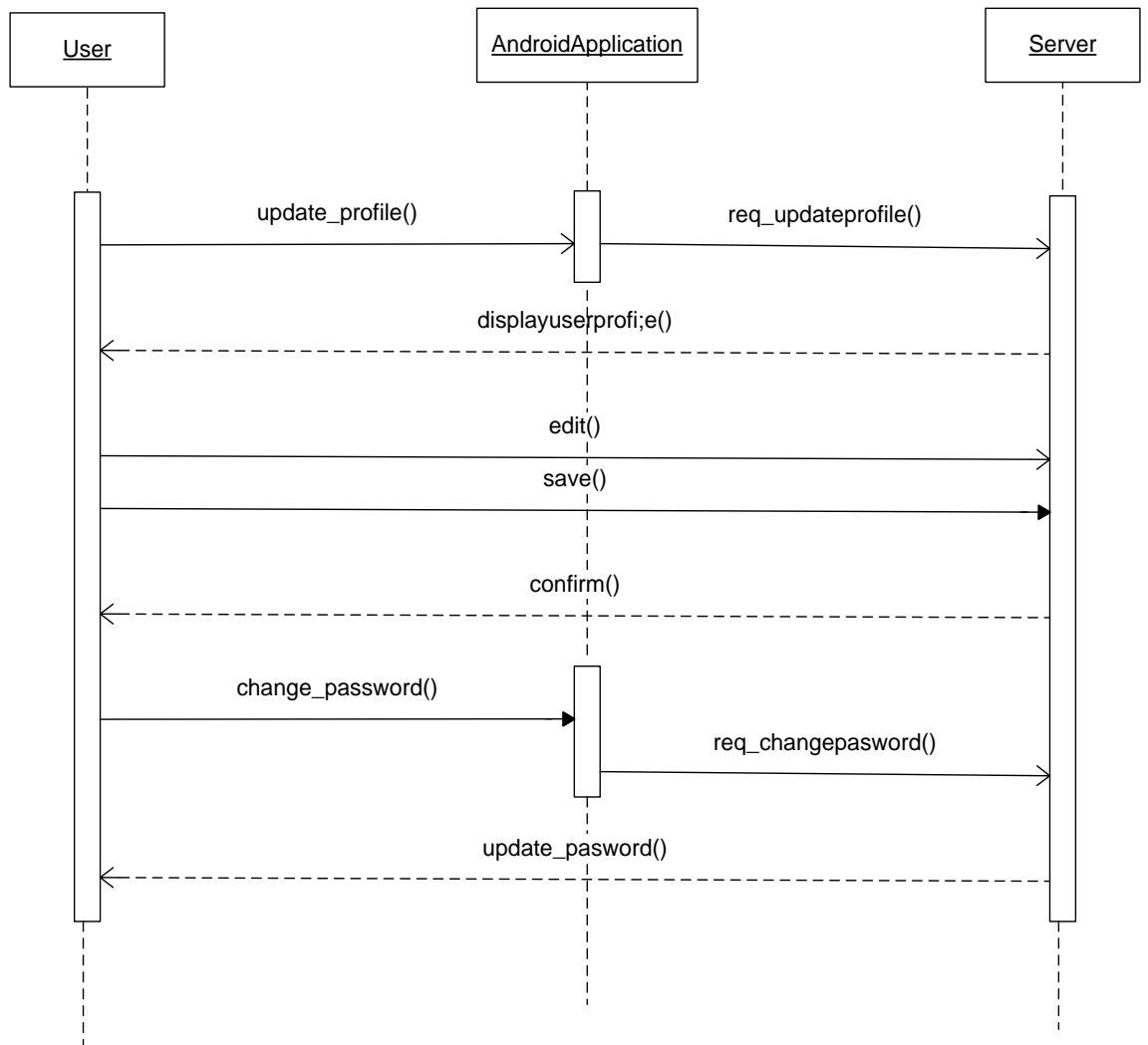


Figure 19: Sequence Diagram Update user profile / change password

4.3.4.4 Check Weather

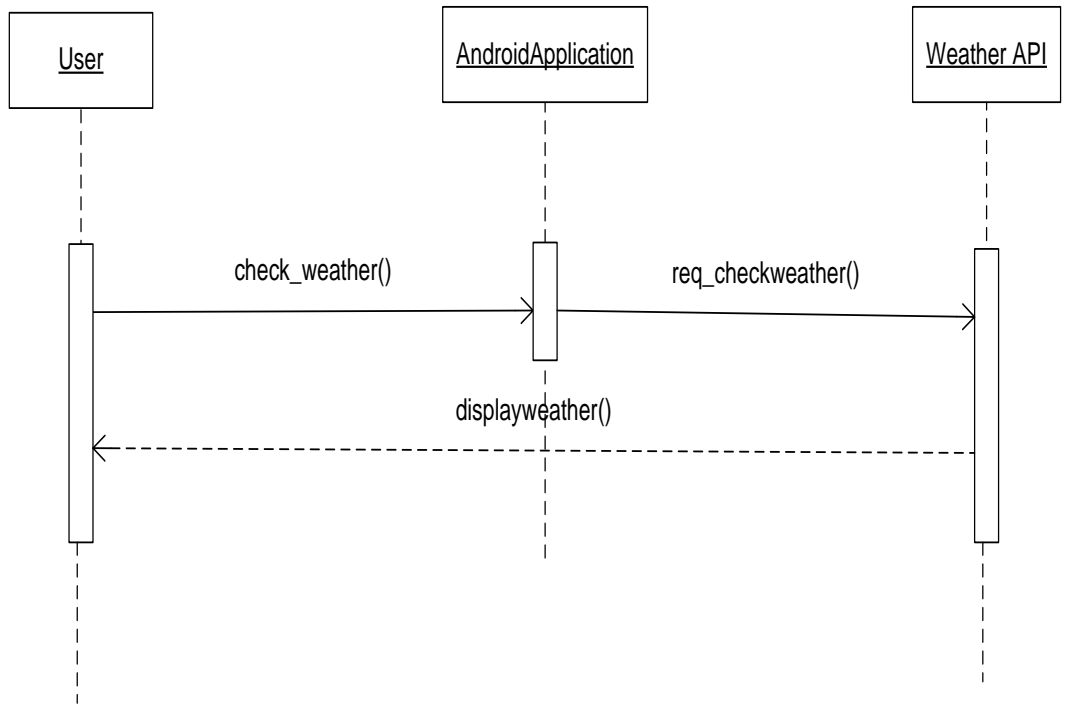


Figure 20: Check Weather

4.3.5 Activity Diagram

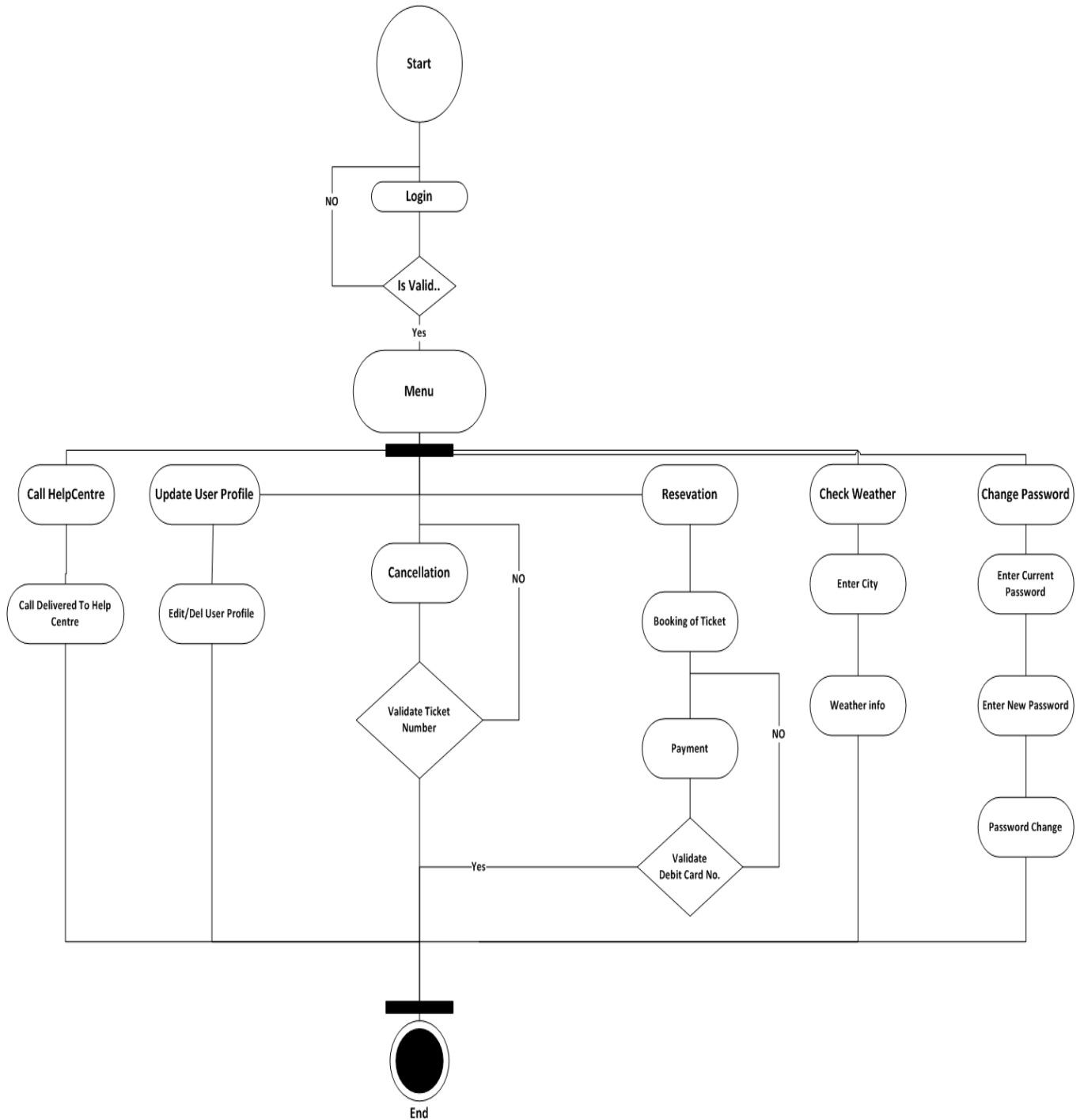


Figure 21: Activity Diagram of CTB

4.3.6. Class Diagram

The application comprises of the following classes:

- Login
- User
- Administrator
- Reservation
- Data base server
- Payments
- Call help center
- Weather information

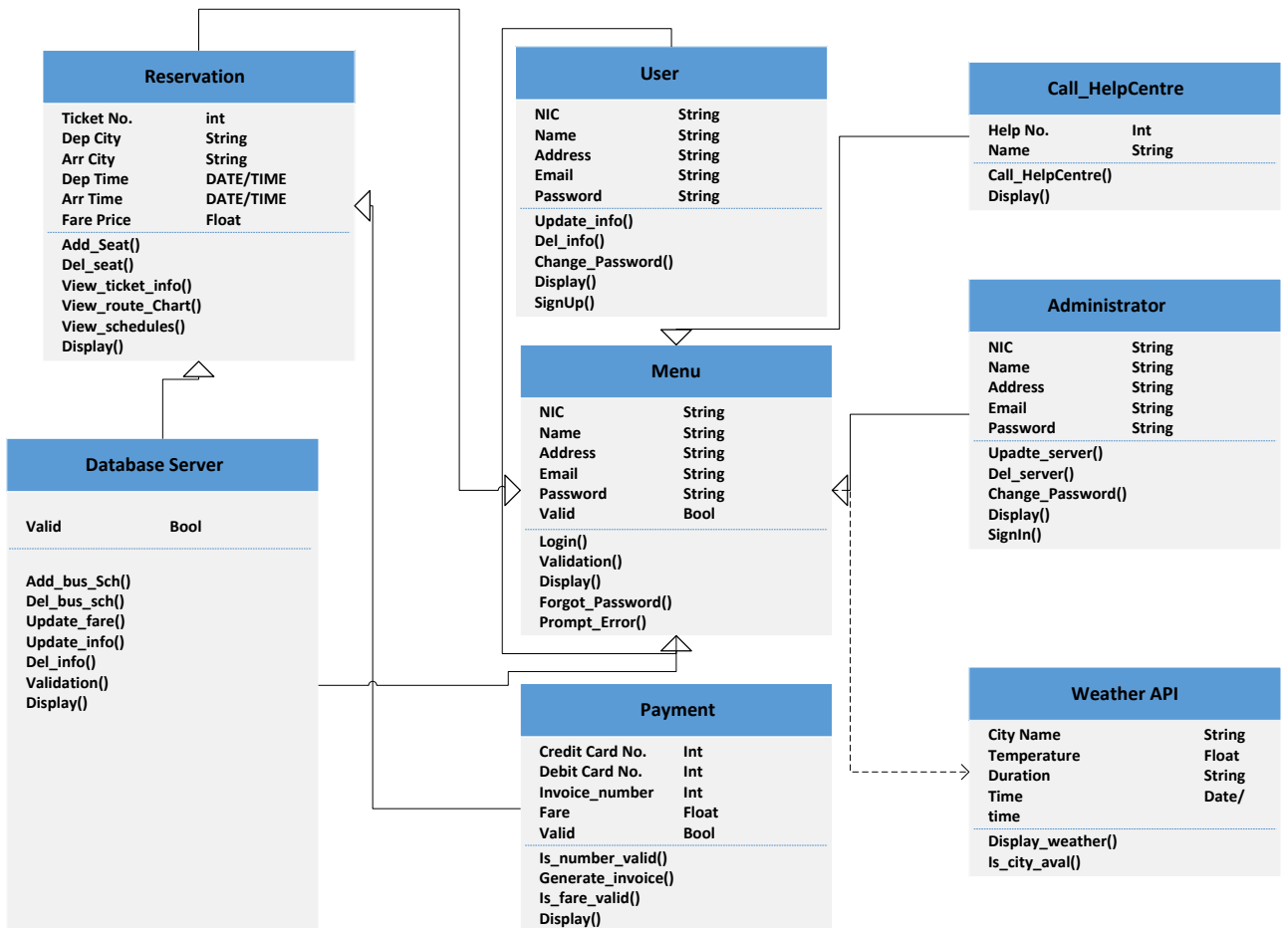


Figure 22: Class Diagram - CTB

4.3.6.1 Explanation of Classes

Name	Description/
Menu	This class contains variables related to the basic informations about administrator and the user. It has the function of validation() for validating the accounts of registered users with the database. It also the function name forgot_password() to entertain the users in case if they forgot their passwords.
User	This class contains functions related to user's registration in the database, updating their accounts information and changing their passwords..
Administrator	This class contains functions related to updating the bus schedules on the server side, editing in the database server, registration and sign in to his account.
Data base server	This class contains functions related to validating the user's request of seat with the availability of seats in the database. It is the child class of reservation. It also stores the information given by the user and administrator into the database.
Reservation	This class has the functions which allows the user to reserve and cancel their seats, to view their reserved tickets, view the route charts and can download their tickets.
Payments	It is the child class of the reservation. It allows the user to pay their tickets through credit or debit cards. It also prints the invoice for cash on delivery purpose. It also validates the user credit/debit card numbers.
Call help center	This class has the function to copy the help center number on the dialing screen of the user's mobile and assist him to call in one click.
Weather API	This class contains the function to link the app with the weather API. It takes the information from the user and redirects it to the weather API.

Table 13: Explanation of classes

CHAPTER 5 : IMPLEMENTATION TOOLS AND TECHNOLOGIES

5.1 Implementation Tools

5.1.1 Eclipse

Eclipse is an open source IDE (integrated development environment) for Java projects (and more). Basically, the place where application software is crafted, supported through various stages of its lifecycle. Google officially supports it, and has created the Android Development Tools plugin for Eclipse and integrated its AVD Manager virtual device management into the tool as well.

In other words, you can not only build vanilla Java programs but quickly create Android-oriented code, and its testing is supported by emulators (the virtual devices) that show you how your code would run in standardized versions of particular Android devices.

5.1.2 Java

Java is the foundation for virtually every type of networked application and is the global standard for developing and delivering embedded and mobile applications, games, Web-based content, and enterprise software. With more than 9 million developers worldwide, Java enables you to efficiently develop, deploy and use exciting applications and services. From laptops to datacenters, game consoles to scientific supercomputers, cell phones to the Internet, Java is everywhere.

5.1.3 PHP

PHP (recursive acronym for PHP: Hypertext Preprocessor) is a widely-used open source general-purpose scripting language that is especially suited for web

development and can be embedded into HTML. What distinguishes PHP from something like client-side JavaScript is that the code is executed on the server, generating HTML which is then sent to the client. The client would receive the results of running that script, but would not know what the underlying code was. You can even configure your web server to process all your HTML files with PHP, and then there's really no way that users can tell what you have up your sleeve. The best things in using PHP are that it is extremely simple for a newcomer, but offers many advanced features for a professional programmer.

5.1.4 Wamp Server

Wamp Server is a Windows web development environment. It allows you to create web applications with Apache2, PHP and My SQL database. Alongside, PhpMyAdmin allows you to manage easily your databases.

5.1.5 Java Development Kit (JDK)

A Java Development Kit (JDK) is a program development environment for writing Java applets and applications. It consists of a runtime environment that "sits on top" of the operating system layer as well as the tools and programming that developers need to compile, debug, and run applets and applications written in the Java language.

5.1.6 Android Development Tools (ADT)

Android Development Tools (ADT) is a plugin for the Eclipse IDE that extends the capabilities of Eclipse to let you quickly set up new Android projects, create an application UI, add packages based on the Android Framework API, debug your applications using the Android SDK tools, and even export signed (or unsigned) .apk files in order to distribute your application

5.1.7 Application Implementation

The software has been using concepts of OOPs with Layered-Architecture (3-Tiers). All the functionality is implemented in separate layers. Separation of concerns has been ensured between the layers. Intercommunication between the layers is performed by adding references to the compiled DLLs and passing variables to appropriate functions and return values. WCF Web-Service exposes the related functionality to the outer world for further usage.

5.2 CTB Implementation

5.2.1 PHP MyAdmin files for Web Server











 add-route.php	PHP script	3207	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 add-user.php	Download the file add-route.php	2757	15692868	15692868	rw-r--r--	Apr 20 06:13	View	Edit	Open
 approve-bookings.php	PHP script	1051	15692868	15692868	rw-r--r--	Apr 21 17:10	View	Edit	Open
 booking-detail.php	PHP script	1658	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 cancel-booking.php	PHP script	316	15692868	15692868	rw-r--r--	Mar 10 12:00	View	Edit	Open
 changepassword.php	PHP script	1525	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 config.php	PHP script	46	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 ctb.sql	SQL File	2709	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 del-route.php	PHP script	290	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 del-user.php	PHP script	290	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 demo.php	PHP script	282	15692868	15692868	rw-r--r--	Dec 27 19:54	View	Edit	Open
 edit-route.php	PHP script	3602	15692868	15692868	rw-r--r--	Feb 15 03:36	View	Edit	Open
 edit-user.php	PHP script	3138	15692868	15692868	rw-r--r--	Apr 20 06:30	View	Edit	Open
 files for your website should be uploaded here!	FILES FOR YOUR WEBSITE SHOULD BE UPLOADED HERE! File	0	0	2	rw-r--r--	Dec 26 21:59	View	Edit	Open

Figure 23: PHP MyAdmin files

5.2.2 Core Activities in Eclipse

Module Name	Activities
Sign up	<ul style="list-style-type: none">• sign up.java
Login	<ul style="list-style-type: none">• user.java• mainactivity.java
Main menu	<ul style="list-style-type: none">• mainmenu.java• imageadapter.java
User Profile	<ul style="list-style-type: none">• profileactivity.java• editprofile.java
New Bookings	<ul style="list-style-type: none">• bookings.java• routeactivity.java• setseatactivity.java
My Bookings	<ul style="list-style-type: none">• mybookingactivity.java• bookingdetailsactivity.java
Payment	<ul style="list-style-type: none">• billingactivity.java
Weather	<ul style="list-style-type: none">• weatheractivity.java• weatherfragment.java• remotefetch.java• citypreference.java
Data entry	<ul style="list-style-type: none">• Booking.java• Route.java

Table 14: Core Activities

CHAPTER 6: TEST AND EVALUATION

6.1 Test cases

Test Case 1

Test Case ID	01
Test Case name	Install .apk file of CTB on android smart phone.
Input(s)	Executable ,apk file CTB.
Output	The app gets installed and app icon appears on phone menu screen. By tapping the icon the login screen will appear.
Sequence of Action(s)	<ul style="list-style-type: none">• Tap the .apk file and wait for the installation.• The app icon appears on the screen.• Tap the icon and login screen appears.
Result	Success

Table 15: Test Case 1

Execution of Test Case

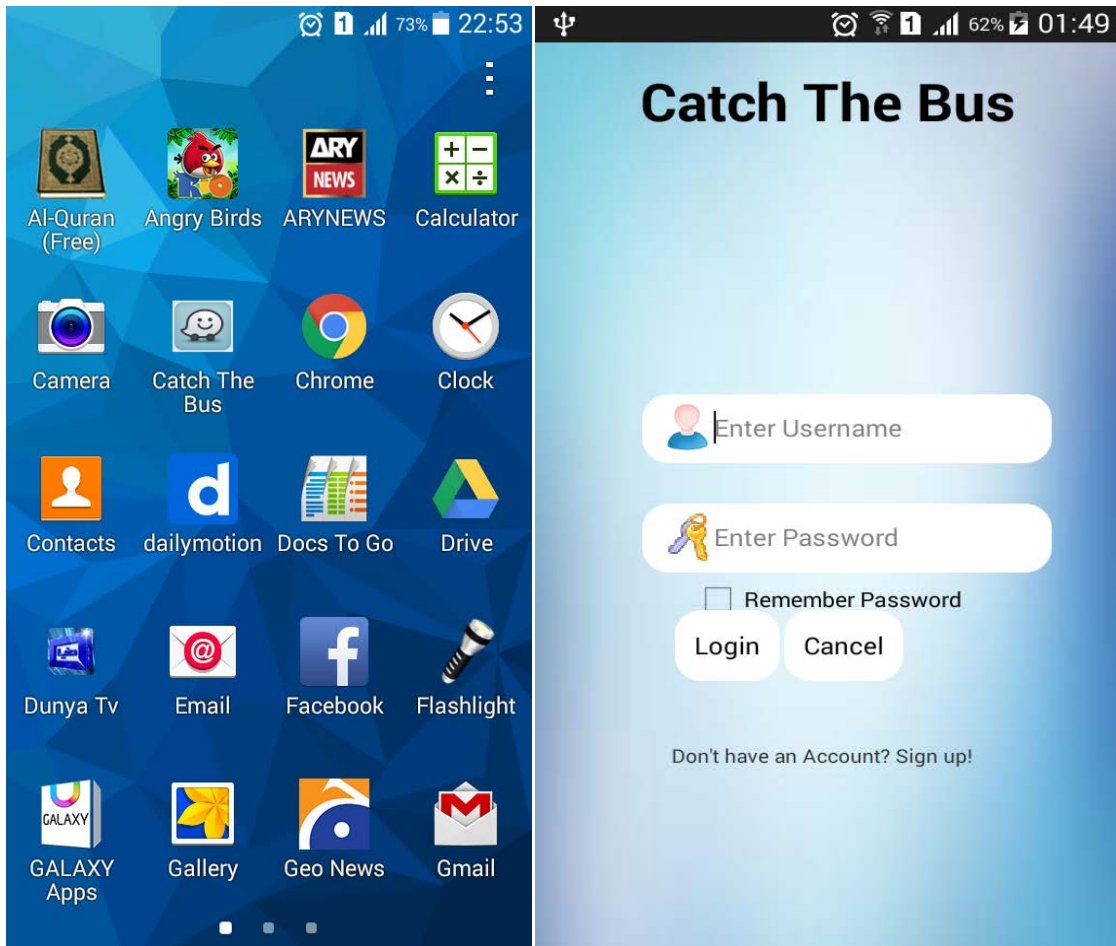


Figure 24: installed App And Login Screen

Test Case 2

Test Case ID	02
Test Case name	Sign up and registration.
Input(s)	Username, 8-digit password and email address.
Output	Successful registration message will

	appear.
Sequence of Action(s)	<ul style="list-style-type: none"> • Enter the username. • Enter 8-digit password and then confirm password. • Enter email address.
Result	Success

Table 16: Test Case 2

Execution of Test Case

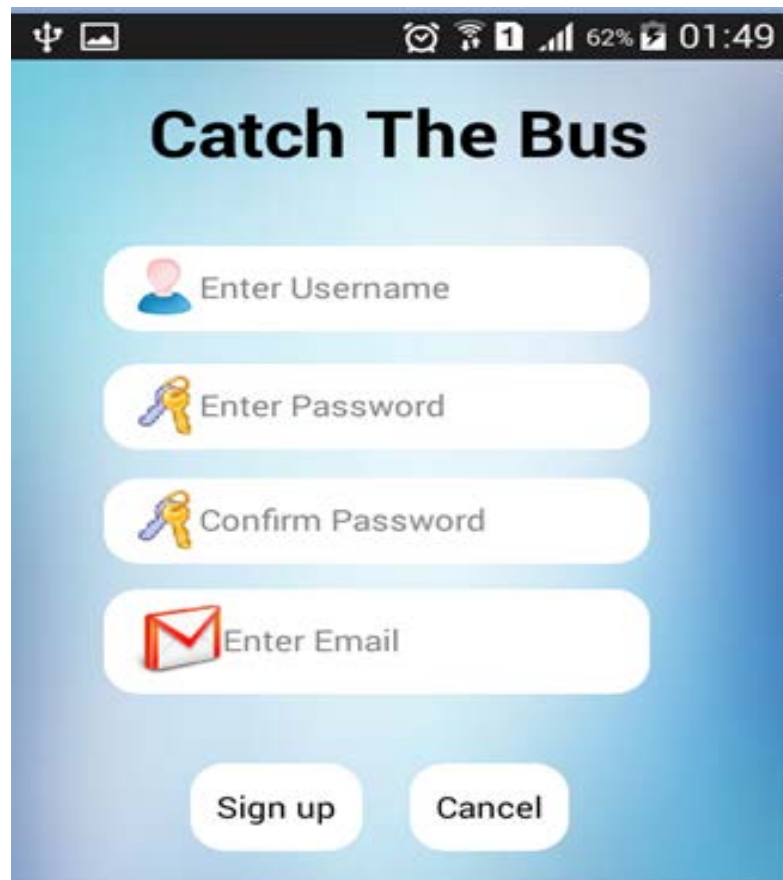


Figure 25: Sign up screen

Test case 3

Test Case ID	03
Test Case name	Login to the app.
Input(s)	Username, 8-digit password
Output	Successful login and main menu appears.
Sequence of Action(s)	<ul style="list-style-type: none">• Enter the username• Enter 8-digit password
Result	Success

Table 17: Test Case 3

Execution of test case

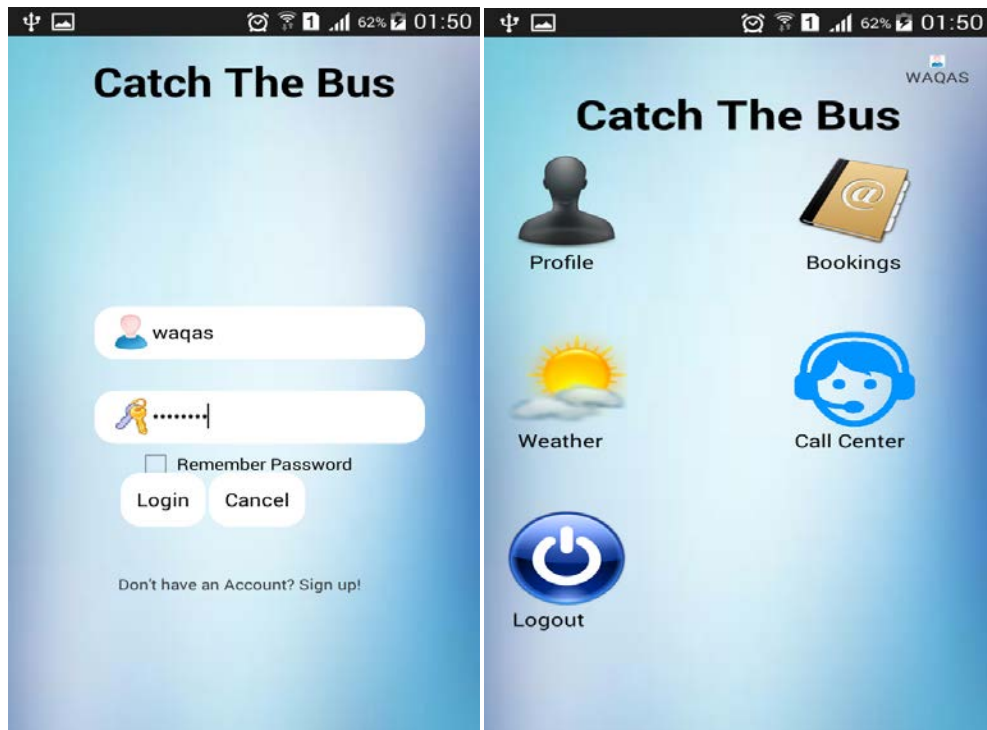


Figure 26: Successful Login and Main Menu

Test Case 4

Test Case ID	04
Test Case name	Edit user profile and password.
Input(s)	Name, Age, Email, Cell no, Password.
Output	The desired fields updated.
Sequence of Action(s)	<ul style="list-style-type: none">• Edit name• Edit email• Enter cell no• Edit password.
Result	Success

Table 18: Test Case 4

Execution of test case



Figure 27: Successful Profile Editing

Test Case 5

Test Case ID	05
Test Case name	Weather test.
Input(s)	City name.
Output	Temperature details will appear on screen.
Sequence of Action(s)	<ul style="list-style-type: none">• Tap the weather icon.• Enter city name.
Result	Success

Table 19: Test Case 5

Execution of test case

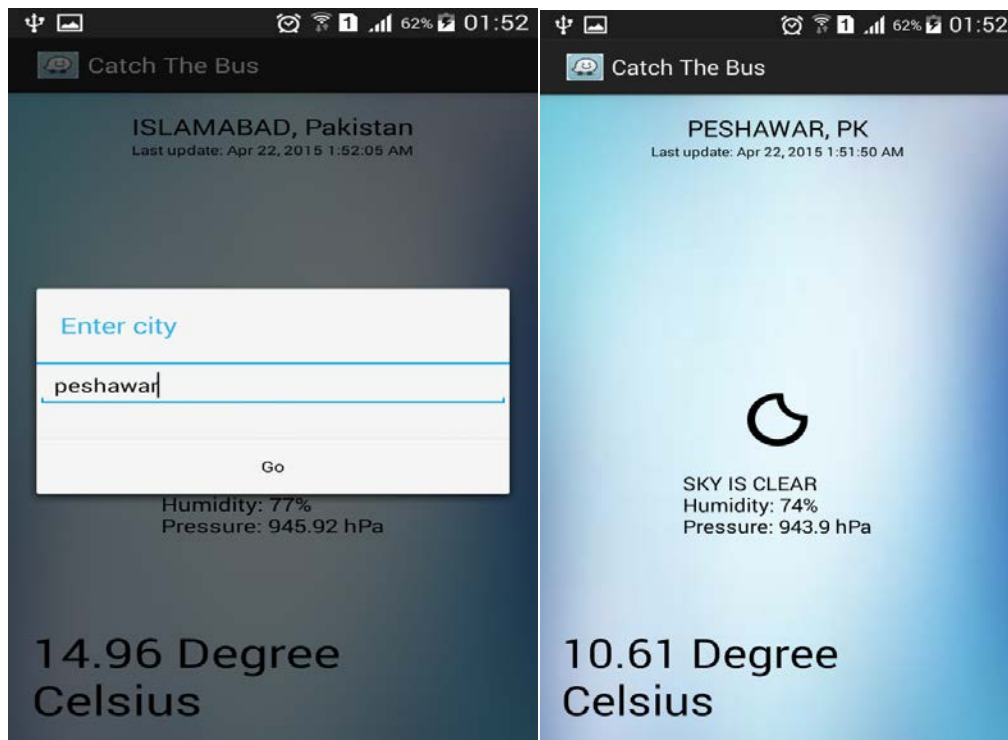


Figure 28: Weather Interface

Test Case 6

Test Case ID	06
Test Case name	Booking icon test.
Input(s)	Tap the booking icon on main menu.
Output	Booking screen will appear.
Sequence of Action(s)	<ul style="list-style-type: none">• Tap the booking icon on main menu.• Booking screen will appear.
Result	Success

Table 20: Test Case 6

Execution of test case

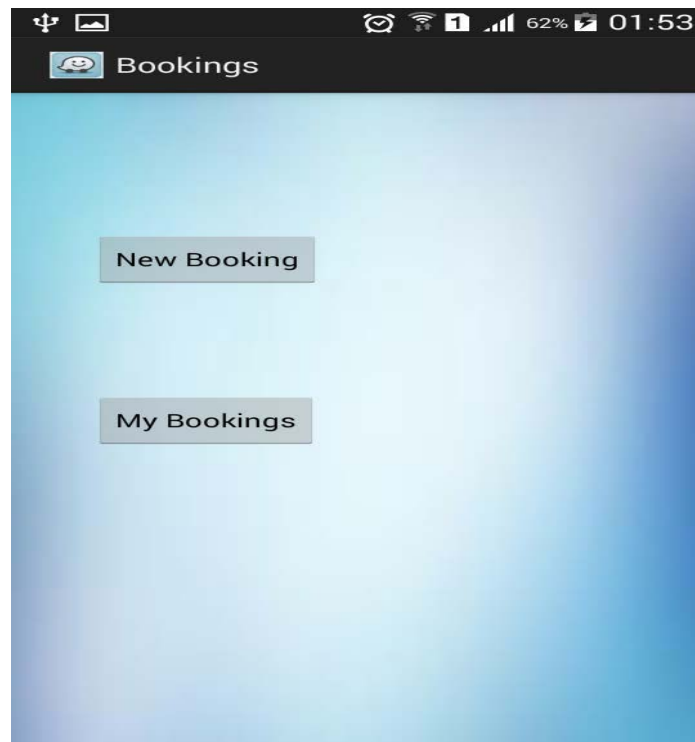


Figure 29: Booking Screen

Test Case 7

Test Case ID	07
Test Case name	New booking test.
Input(s)	From city, To city, Date of departure and Time
Output	Seat selection screen will appear.
Sequence of Action(s)	<ul style="list-style-type: none"> • Enter departure city name. • Enter arrival city name. • Enter date of departure. • Enter time of departure.
Result	Success

Table 21: Test Case 7

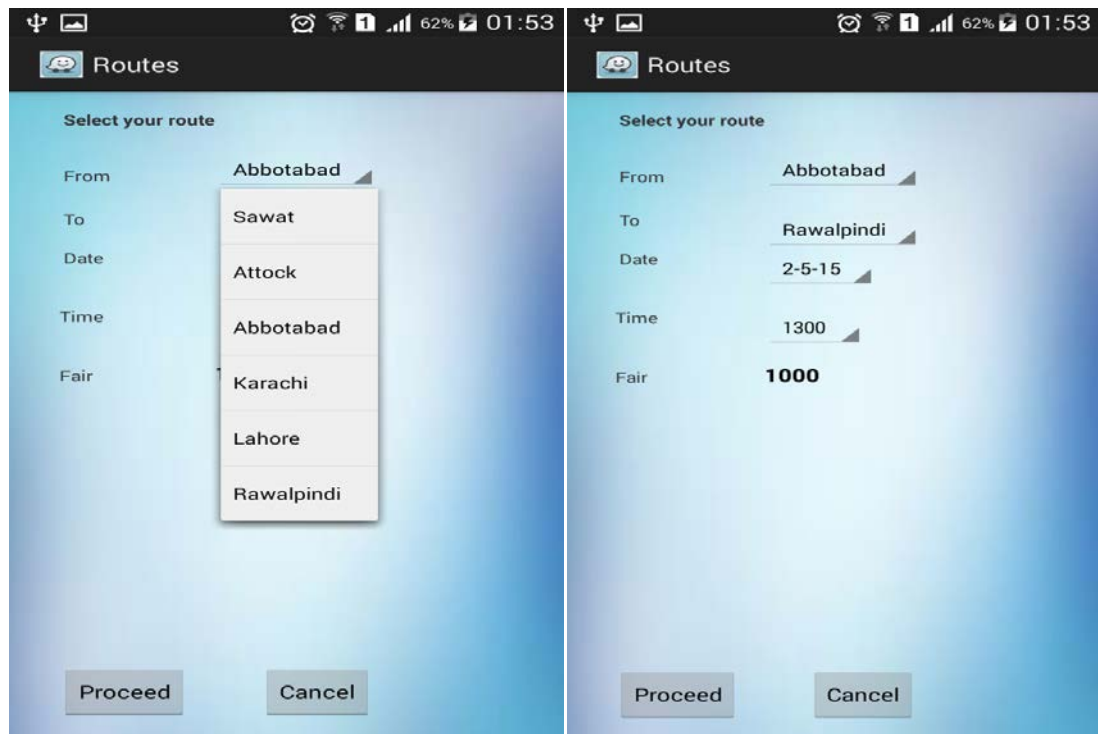


Figure 30: New Booking Screens

Test Case 8

Test Case ID	08
Test Case name	Select seat activity test.
Input(s)	Male/female from gender and seat no.
Output	The seat selected on the screen.
Sequence of Action(s)	<ul style="list-style-type: none"> Select male/female from gender. Select seat no. 8
Result	Success

Table 22: Test Case 8

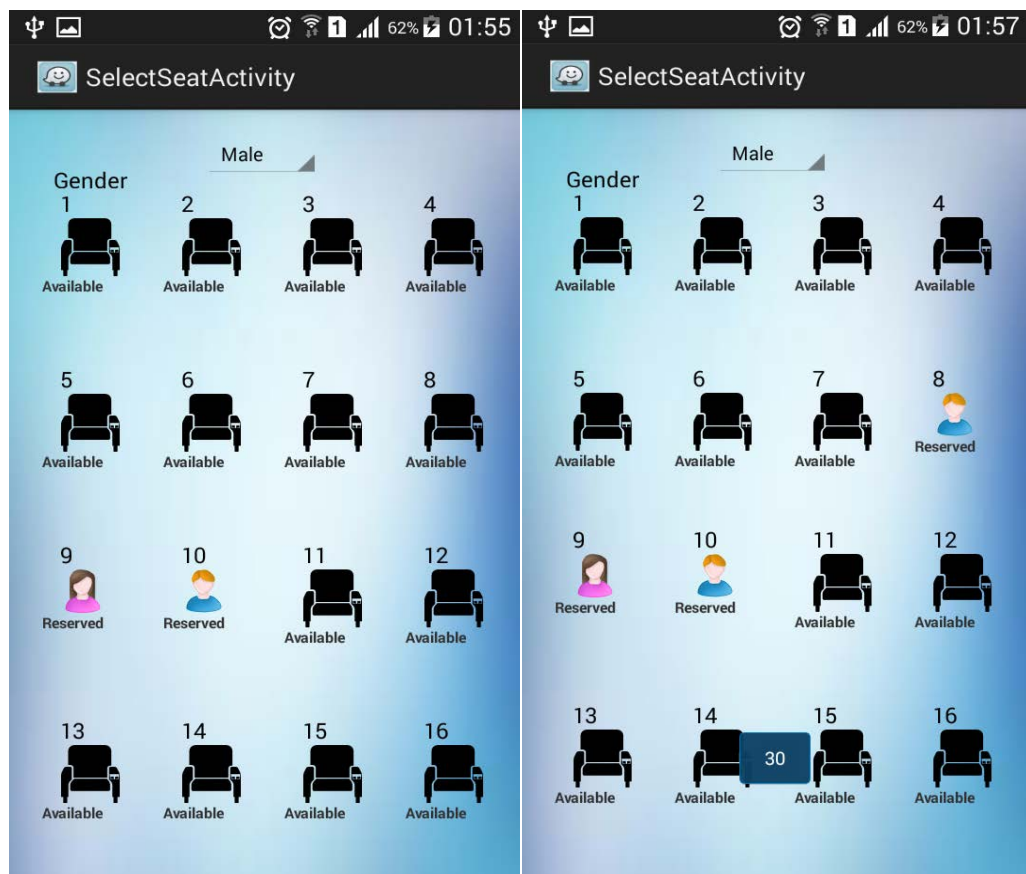


Figure 31: Select Seat Screen

Test Case 9

Test Case ID	09
Test Case name	Prepaid card payment.
Input(s)	Enter 16 digit prepaid card number.
Output	The booking gets confirmed.
Sequence of Action(s)	<ul style="list-style-type: none">• Enter 16 digit prepaid card number.• Press the confirm button.
Result	Success

Table 23: Test Case 9

Execution of test case

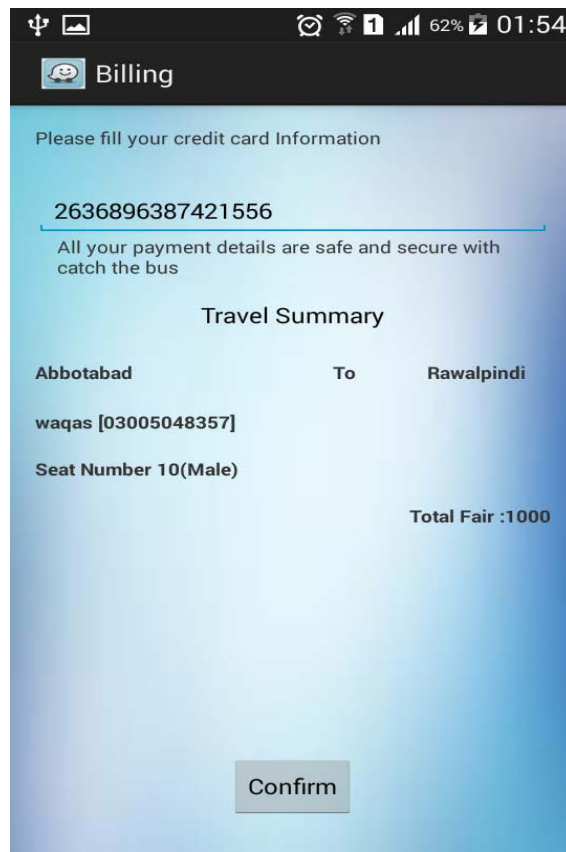


Figure 32: Billing Activity Screen

Test Case 10

Test Case ID	10
Test Case name	My booking test.
Input(s)	Press the desired booking.
Output	The booking details will appear.
Sequence of Action(s)	Press My Bookings from booking menu. Press the desired booking.
Result	Success

Table 24: Test Case 10

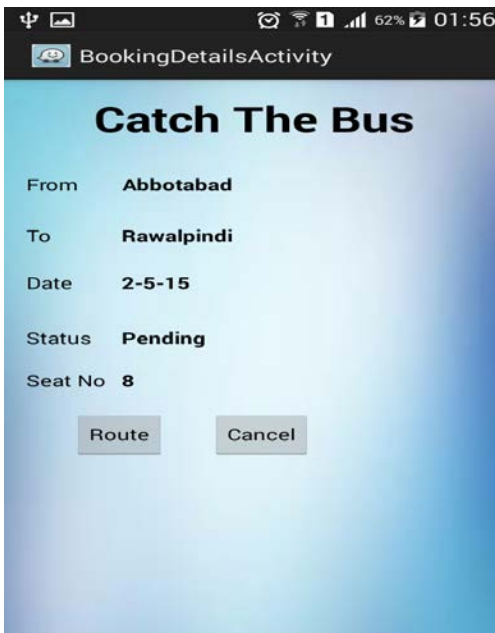


Figure 33: Booking Details

Test Case 11

Test Case ID	11
Test Case name	Route mark test
Input(s)	The departure and arrival city.
Output	Route marked on map.
Sequence of Action(s)	Press the route button on booking details screen in My Bookings.
Result	Success

Table 25: Test Case 11

Execution of test case

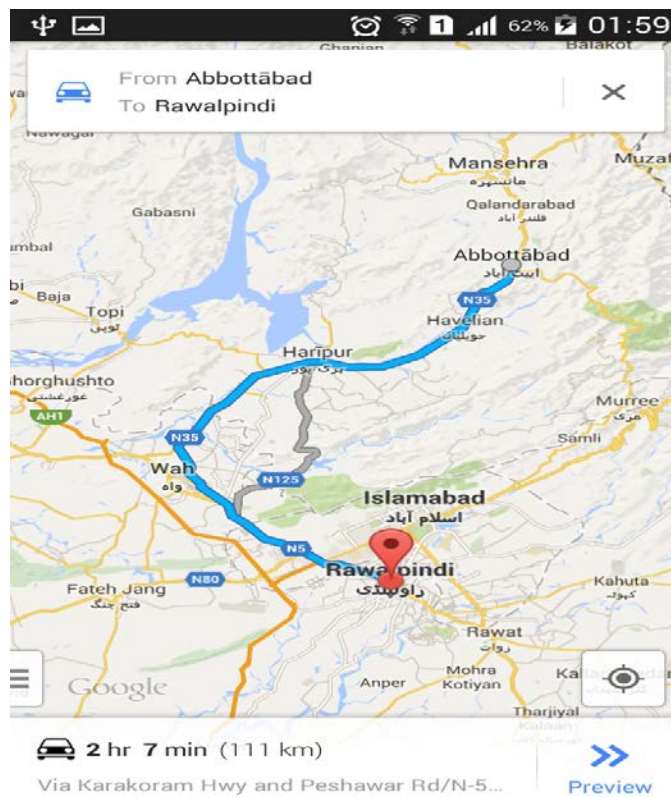


Figure 34: Reserved Route Marked On Map

Test Case 12

Test Case ID	12
Test Case name	Ticket Download
Input(s)	The booking gets confirmed by the administrator.
Output	Ticket is downloaded in the phone images.
Result	Success

Table 26: Test Case 12

BUS TICKET	Catch The Bus [Ticket]					
	PASSENGER INFORMATION					
	Name: waqas					Route ID
	Mobile: 03005048357					30
	BOOKING/TRAP DETAIL					
		Seat	From	To	Time	Total Fare
	CTB	8	Abbotabad	Rawalpindi	1300	1000
	Catch the bus on : 2-5-15					Contact Us in case of Emergency
	<i>This is a Computer Generated Bus Ticket.</i>					0900-78601
	TICKET BOOKING IN:- Catchthebus.byethost4.com					

Figure 35: Downloaded Ticket

Test Case 13

Test Case ID	13
Test Case name	SMS Alert
Input(s)	The administrator approves the booking on web server.
Output	SMS sent to the customer's cell number.
Result	Success

Table 27: Test Case 13

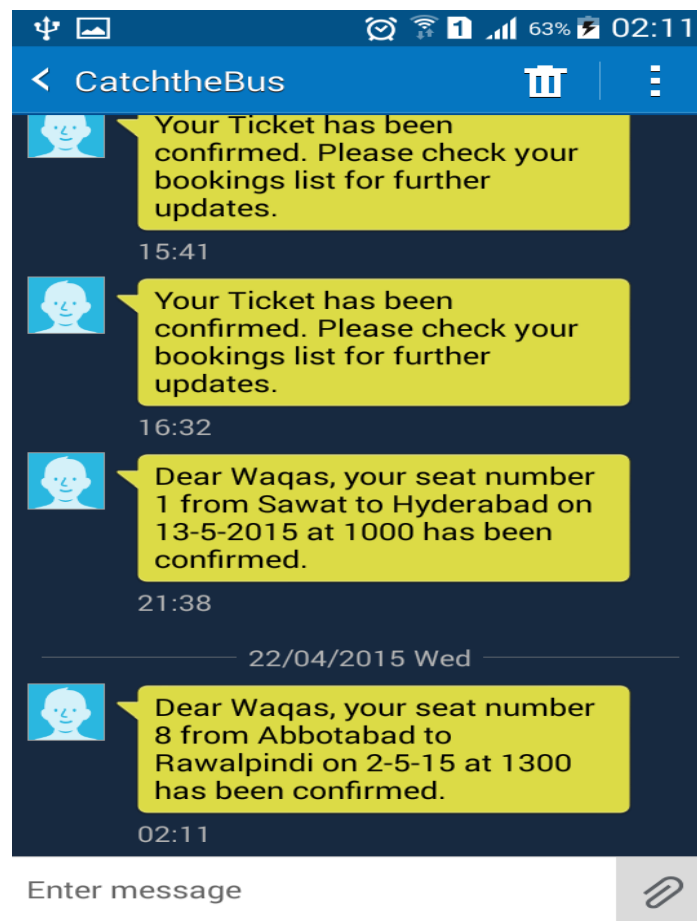


Figure 36: SMS Alert Screen

Test Case 14

Test Case ID	14
Test Case name	Uploading Bus Schedules
Input(s)	Route ID, departure and arrival city name, time and date of departure, fare in rupees.
Output	The route is submitted and uploaded.
Result	Success

Table 28: Test Case 14

← → ↻ catchthebus.byethost4.com/add-route.php

CATCH THE BUS

MAIN

- Dashboard
- Manage Users
- Manage Routes
- Approve Bookings
- Call Center Number

Add New Route List All Routes

Route ID	Route ID
Destination City	Destination
Departure City	Departure
Departure Date	Departure Date
Departure Time	Departure Time
Journey Time	Journey Time
Fair per Seat	Fair Per Seat

Submit

Figure 37: Route Submission Form

Route ID	From	To	Departure Date	Departure Time	Journey Time	Fair Per Seat	
60	Sawat	Hyderabad	13-5-2015	1000	24	5000	Edit Delete
40	Attock	Faisalabad	30-4-2015	1100	7	2000	Edit Delete
30	Abbotabad	Rawalpindi	2-5-15	1300	4	1000	Edit Delete
22	Karachi	Rawalpindi	1-5-2015	0800	24	4500	Edit Delete
21	Lahore	Rawalpindi	2-5-15	1400	5	1200	Edit Delete
12	Rawalpindi	Lahore	22-4-15	2100	5	1200	Edit Delete
11	Rawalpindi	Lahore	22-4-15	1500	5	1000	Edit Delete

Figure 38: Uploaded Bus Schedules

Test Case 15

Test Case ID	15
Test Case name	Approve bookings
Input(s)	The administrator press the approve button.
Output	SMS sent to the customer's cell number and booking gets approved.
Result	Success

Table 29: Test Case 15

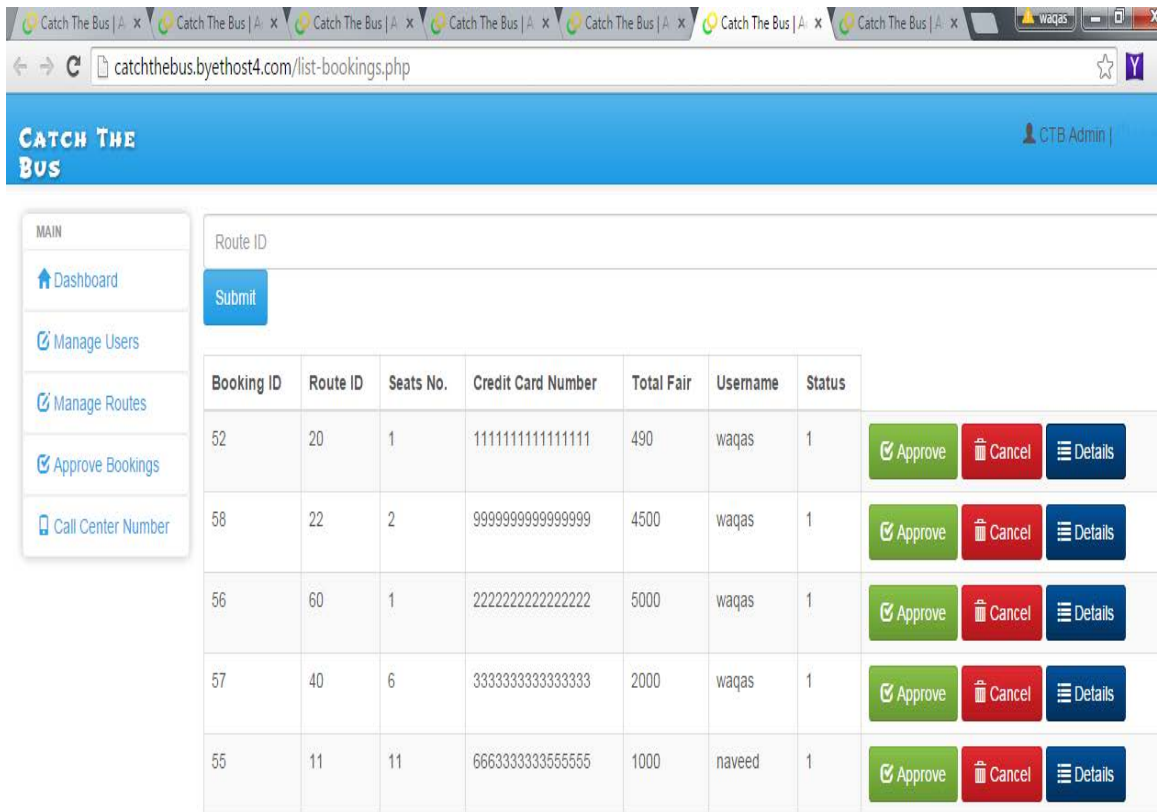


Figure 39: Approve Booking Screen

6.2 Results

Test cases were executed on the basis of different parameters, considering different scenarios, used for testing application; results analyzed, and evaluated to improve the quality and reliability of CTB.

6.3 Conclusion and Future Work

Catch The Bus App can benefit the business of bus service companies by increasing their visibility to customer, promotion, customer engagements and above all customer satisfaction. Apps serving the purpose has been built and

deployed in various progressive countries of the world but presently no such app is developed or used in Pakistan. Our app will fill this gap by linking the database of bus service companies with the smart phones of the passengers.

In future following functionalities will be incorporated in the app.

- **Live Tracking:** Track the bus live on a map.
- **Friends & Family:** Sending a tracking link to near & dear to keep track of your whereabouts & plan pickups.
- **Select Boarding points:** Choose the boarding point on a map and get directions.
- **Find buses & route information:** Use the app to check availability and price of buses & operators in Pakistan.
- **Ratings:** Get ratings of buses based on fellow customers feedback for each operator.
- **Amenities:** Checking out amenities available in the bus.
- **Cargo services:** The users can use the bus company cargo services to dispatch or receive the luggage at one click.

Appendix A: Glossary

Definitions:

Constraint	A limitation or restriction imposed on a function.
Android device	An Android device is a mobile phone built on a mobile computing platform, with more advanced computing ability and connectivity than a feature phone.
Web Link	URL of web page.
Scramble options	Permute answer options

Abbreviations and Acronyms

CTB	Catch The Bus
FAQ	Frequently Asked Question
GUI	Graphical User Interface
HTTP	Hyper Text Transfer Protocol
URL	Uniform Resource Locater
SQL	Structured Query Language.
SMS	Short Message Service
SRS	Software Requirements Specification

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