BUS TICKET BOOKING APPLICATION: A case study of Kayoola Bus Company

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UGANDA CHRISTIAN UNIVERSITY

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DECLARATION

I NAKWAGALA EDGAR LAMBERT I hereby affirm that this project report has never been used by any other one or submitted to any university or institution for academic places.

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Date: 04/09/2023

APPROVAL

This is to certify that this project proposal has been compiled **by NAKWAGALA EDGAR LAMBERT** as an accomplishment for the course Bachelors of Business Computing

Project Supervisor: Mr. Peter Wanda

Signature: .....

Date: 4-09-2023

AKNOWLEDGEMENT

Acknowledgments go to my friends and group mates who have helped me in compiling this proposal, I also acknowledge the support from my supervisor, my parents who have been there for my consultation and giving me guidelines on how to start and finish this project.

GOD BLESS YOU.

ABSTRACT

This project report gives a case study on the creation of an application for Uganda's Kayoola Bus Company to buy bus tickets. The application's purpose is to give consumers a simple and convenient way to explore, choose, and buy bus tickets online. The paper goes over the study's history, emphasizing how crucial it is to solve the problems with the traditional bus ticketing system. The application's primary goal is to improve both the overall user experience and operational effectiveness for both bus operators and passengers. The geographic region served by the Kayoola Bus Company in Kampala, Uganda, is included in the study's purview. The part on the literature review offers viewpoints from academic researchers with expertise in e-ticketing systems and the effectiveness of bus ticket reservation systems. Their work helps to comprehend the ecosystem of bus ticketing applications and to pinpoint the variables that affect their profitability. The study's importance is emphasized in the report's conclusion, along with the benefits to customers in terms of ease and accessibility, time savings, and business growth and competitiveness for app developers and service providers. The results of this case study will serve as a basis for more investigation and enhancements to the ecosystem surrounding bus ticket purchasing apps.

Contents

CHAPTER ONE

1.0 Introduction

This chapter consists of the background of the study, the problem statement, objectives of the study, study scope, and the significance of the study.

1.1 Background of the study

The Kayoola Bus was developed by Kiira Motors Corporation, an automotive manufacturing company based in Uganda. The project was initiated as part of Kiira Motors' vision to promote sustainable mobility solutions in Uganda and address the challenges of pollution, high fuel costs, and reliance on imported vehicles. The Kayoola Bus was unveiled to the public on February 16, 2016, at the Kiira Motors Factory in Jinja, Uganda. The unveiling ceremony was attended by government officials, industry stakeholders, and the media, generating significant attention and interest in the project. The Kayoola is a Fully Electric Low Floor Bus specifically designed for Urban Mass Transportation. At full charge, the Kayoola EVS has a range of up to 300 kilometers making it capable of seamlessly handling the daily duty cycle. With a sitting capacity of up to 90 passengers, the Kayoola EVS™ is positioned to offer great returns for the bus operator while enabling the reduction in congestion on the city roads. The Kayoola is fitted with state-of-the-art safety and assistive technology for people with special needs including special seats and a ramp for easy boarding and off boarding of people in wheelchairs.

1.2 Problem Statement

A significant portion of the demands of a sizable population are met by the bus transportation sector. However, the conventional method of buying bus tickets can be laborious and time-consuming, causing customers' aggravation. Long lines, inaccessible ticketing locations, inefficient ticket booking procedures, and a lack of real-time information are just a few of the factors that frequently make travelers unhappy with their travel experiences. Therefore, there is a critical need for an effective and user-friendly bus ticket booking software that resolves these issues, enhances the entire ticket purchasing experience for customers, and increases operational effectiveness for bus operators. Passengers now have a subpar travel experience due to the inefficiencies, inconveniences, and limited accessibility of the bus ticket purchasing procedure.

Due to obsolete technology, bus operators struggle to manage ticket sales and resource allocation, which leads to lost income and operational inefficiencies. Due to manual and antiquated ticketing systems, bus operators also struggle to manage ticket sales, inventory control, and resource allocation. These issues might result in lost income, ineffective seat usage, and trouble tracking and evaluating passenger data.

1.3 Main objective.

A bus booking app's main goal will be to give consumers a simple and convenient way to browse, contrast, reserve, and manage bus tickets. The app will improve user experience, operational efficiency, and the bus booking process for both passengers and bus operators.

1.4 Specific objectives

- Make purchasing bus tickets easier. The purpose of the bus booking app will be to offer a user-friendly platform that will make purchasing bus tickets easier. The software will provide users with a quick and easy method to look up bus routes, choose seats, and make bookings.
- Reliable and safe payment mechanism. Users will be able to conduct online purchases with confidence thanks to the secure payment gateway provided by the app. Integrating well-known payment options and guaranteeing the confidentiality of financial and personal data are essential.
- Booking administration and client assistance Users of the app will be able to manage their reservations through features like the ability to alter or cancel reservations.

1.5 Scope of the study

The study will cover different areas, which includes; the Area scope and content scope and the time scope.

Area scope.

The area to be covered geographically will be Kayoola bus company, one of the leading bus operators in Uganda located Kampala, the capital city of Uganda

Content scope.

This study tries to find out what aspects will be needed to improve bus ticket booking applications' usability and effectiveness. The evaluation of several bus ticket booking applications' user interfaces, search capabilities, payment methods, and ticket confirmation procedures will be the main emphasis of the study. The research aims to discover best practices and offer suggestions for app developers and service providers in order to improve the overall user experience and effectiveness of bus ticket booking applications by gathering user input and doing a comparative analysis.

Time scope.

The research will place over the course of three months, from May to July of 2023. During this time, I will consider interacting with the respondents in order to obtain the necessary data for analysis and conclusion

1.6 Significance of the study or purpose of the study

- Convenience and accessibility. Bus ticket booking application will provide customers the freedom to purchase tickets whenever and wherever they choose, negating the need to go to actual ticket booths. This project will intend to increase convenience and provide accessibility for a larger audience when purchasing bus tickets.

- Time Saving. This application will help customers save time and effort by making the ticket buying process more efficient. The goal of the project will be to find ways to make bus ticket buying applications more effective, resulting in speedier searches, quicker reservations, and more seamless transaction procedures.

- Business Development and Competitiveness. Recognizing customer wants and preferences is crucial for app developers and service providers that book bus tickets to remain competitive in the market. This research offers suggestions and insights for enhancing bus ticket booking applications, which it will aid businesses in gaining more clients, fostering client loyalty, and achieving long-term success

CHAPTER TWO
Literature review
2.0 Introduction

This section consists of a critical review of research work from journals, internet sources and other projects already done which is related to the subject area as well as an analysis of existing literature on the subject with the objective of revealing contributions, weaknesses and gaps

2.1 Review of related literature

In a comparative study by Chandra and Verma (2020), user experience in bus ticket booking systems was evaluated. The researchers examined factors such as website usability, speed, reliability, and customer support. They found that users valued websites that were easy to navigate, provided quick responses, and offered reliable information about bus availability. The study highlighted the importance of responsive design and efficient performance in ensuring a satisfactory user experience. It also emphasized the role of effective customer support in addressing user queries and concerns promptly.

Yadav and Sharma (2020) focused on enhancing security in bus ticket booking systems. They reviewed various authentication and authorization techniques employed to ensure secure transactions and protect user information. The authors emphasized the need for robust security measures such as two-factor authentication, encryption, and secure payment gateways to mitigate security risks. They discussed the importance of building trust and confidence among users by implementing stringent security protocols within these systems.

According to Chatterjee and Sarkar (2018), the integration challenges in bus ticket booking systems are a significant area of concern. The researchers conducted a systematic literature review and identified common integration challenges faced by these systems. They emphasized the importance of seamless integration between various stakeholders, including bus operators, payment gateways, and customer support systems. The study proposed strategies and recommendations to address these integration challenges effectively, thereby ensuring smooth operations and enhanced user experiences.

According to Sharma and Singh (2019), online bus ticket booking systems have revolutionized the way passengers' book and manage their bus tickets. These systems provide a convenient and time-saving alternative to traditional manual ticketing processes. The authors highlight the

significance of features such as user interface design, payment gateways, seat availability algorithms, and real-time tracking in ensuring a seamless booking experience for passengers. They emphasize that a user-friendly interface and efficient search functionality are crucial for users to easily find desired bus routes and schedules. Additionally, secure payment gateways are essential to instill confidence and protect sensitive customer information during transactions.

Kaur and Singh (2017) conducted a comparative study of user perspectives on mobile applications for bus ticket booking. The researchers evaluated factors such as ease of use, speed, reliability, and features offered by different mobile apps. They found that users highly valued applications with intuitive interfaces, quick response times, and real-time updates on bus availability. The study highlighted the importance of designing mobile-friendly interfaces that provide a seamless and convenient ticket booking experience for users on-the-go.

2.2 Conclusion/ summary.

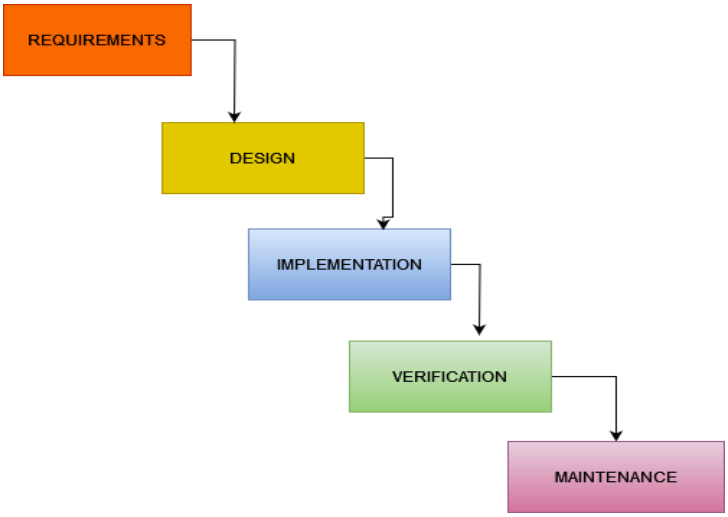
In Summary, the reviewed literature will provide a comprehensive understanding of the bus ticket booking app ecosystem, its purpose, and the factors influencing its success. The findings will serve as a foundation for further research and development in the field, helping businesses and stakeholders make informed decisions and improvements in this rapidly evolving sector.

CHAPTER THREE
Methodology
3.0 Introductions

This chapter consists of the study methodology, research design, population/target group, sample size, data collecting tools and data analysis tools, design tools, implementation, testing, and validation procedures.

Methodology used;

The waterfall methodology is a traditional project management approach that will consist of sequential phases, with each phase dependent on the completion of the previous one. Here is how the waterfall methodology will be applied to the development of the bus ticket booking app;



- Requirements Gathering. The project team will gather and record all the requirements for the bus ticket booking app during the first phase, requirements gathering. Understanding user requirements and expectations, specifying features and functions, and identifying any particular restrictions or limits are all part of this process.

- System Design: Following the collection of the requirements, the system design phase starts. This will entail developing a thorough architectural design for the program, which will include the database structure, user interface layout, and any system connections with external systems. Determining the necessary infrastructure and technology stack will be another step in the design process.

- Implementation: Based on the design criteria, the development team will begin creating the bus ticket booking app in the implementation phase. Normally, the code is broken up into components or modules, and each module will be implemented in turn. When developing the code, the developers adhere to best practices and coding standards.
- Testing: To make sure the app performs as intended after the implementation process; careful testing will be carried out. System testing, integration testing, and unit testing will all be included in this. The testing team will confirm that each feature operates as intended and that any problems or defects are found and fixed.
- Deployment: The app will be launched into a production environment after passing testing and being deemed stable. In order for the app to function in a live environment, servers, databases, and other infrastructure components will be configured as part of the deployment process.
- Maintenance and Support: Following deployment, the app will move into the maintenance phase. This will entail keeping an eye on the app for any problems or faults that could appear in a real-world setting and giving customers ongoing help. As part of maintenance, the app will also be updated or improved in response to user input or evolving needs.

3.1 Research Design

The research plan for this project will include exploratory research and iterative development. The goals of the exploratory study phase will be to identify issues and investigate potential solutions. The iterative development method, which is based on customer input and shifting demands, makes continuous improvement feasible.

3.2 Study Population (optional)/ target group

My bus ticket application will mostly be directed at Kampala as its target audience. It will depend on people who are comfortable using smartphones and mobile applications, as well as those who range in age from 1 year to 90 years.

3.3 Sample Size

A sample size of 50 persons will be used. This guarantees that the data obtained offers trustworthy insights and generalization. The sample size will be decided using statistical methods or based on logistical and financial concerns.

3.4 Data Collection tools and methods

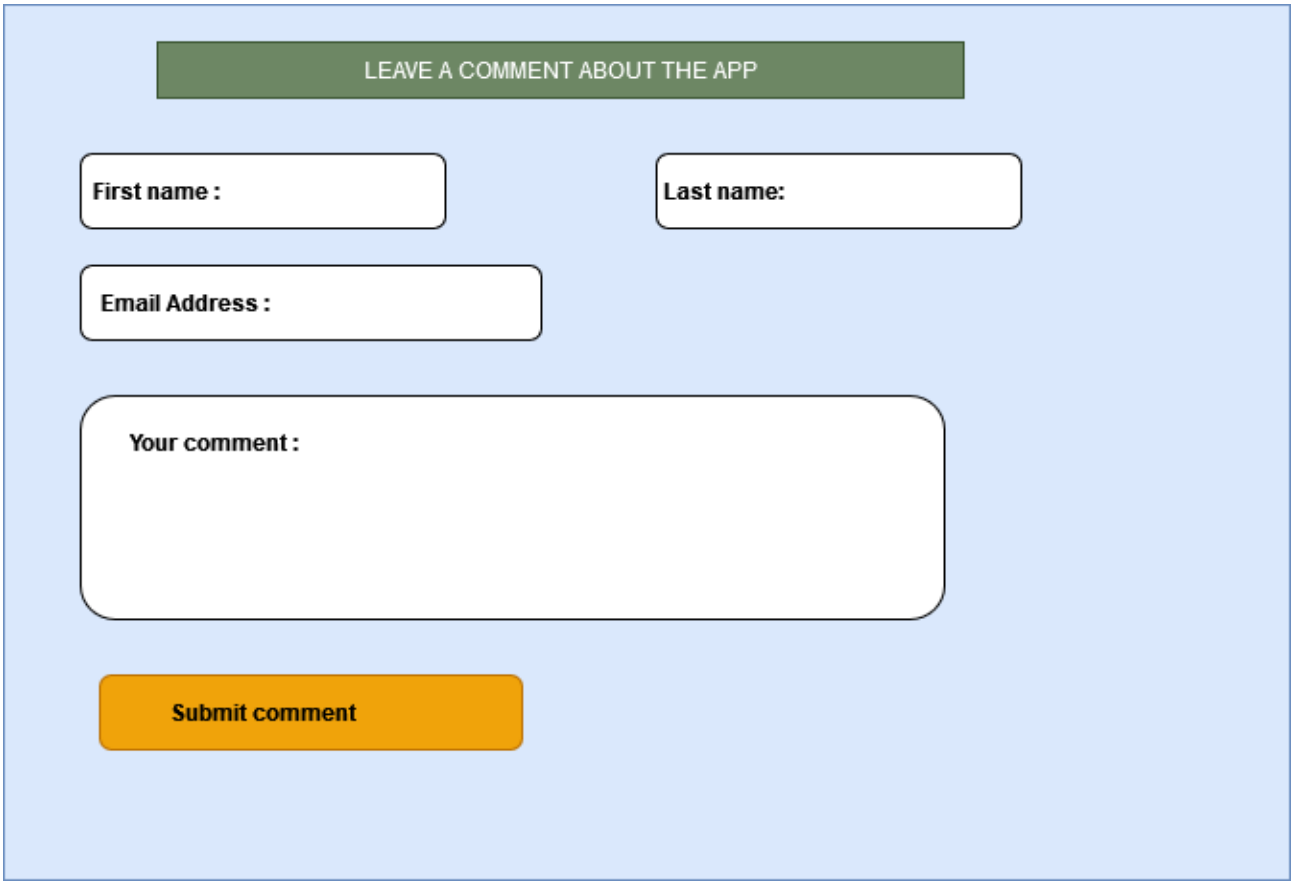
- Surveys: To learn more about users' experiences, preferences, and satisfaction with the bus ticket booking app, surveys will be performed offline or online. To collect quantitative and qualitative data, surveys will be structured (with closed-ended questions)
- Interviews: To learn more about the experiences, difficulties, and ideas users have with the bus ticket booking app, in-depth interviews will be done with a chosen sample of users. Interviews will provide more in-depth and nuanced replies and will yield insightful information.
- User testing: User testing entails watching and documenting how users interact with the app as they carry out particular activities. This will assist in discovering usability problems, discomforts, and places for development. User testing will maybe be carried out in a controlled setting or in actual situations.
- Comments Forms: Within the app, users will immediately submit comments, report problems, or make changes via feedback forms or comment boxes. These forms will record user comments that will be used to improve the app, including thoughts, ideas, and specific points.

3.4.1 Survey Form.

USER SURVEY QUESTIONNAIRE FOR THE BUS TICKETING APP

1. On a scale of 1-10, how satisfied are you with the user interface of the bus ticketing app?
   - 1 (Not satisfied at all)
   - 10 (Extremely satisfied)
2. How frequently do you use the bus ticketing app?
   - Daily
   - Weekly
   - Monthly
   - Rarely
   - Never used
3. How likely are you to recommend the bus ticketing app to a friend or colleague?
   - Very likely
   - Somewhat likely
   - Neutral
   - Somewhat unlikely
   - Very unlikely
4. How often do you encounter technical issues (crashes, errors, etc.) while using the bus ticketing app?
   - Very often
   - Occasionally
   - Rarely
   - Never
5. How would you rate the accuracy of bus schedules and availability information in the app?
   - Very accurate
   - Somewhat accurate
   - Neutral
   - Somewhat inaccurate
   - Very inaccurate
6. How satisfied are you with the range of payment options available in the bus ticketing app?
   - Very satisfied
   - Somewhat satisfied
   - Neutral
   - Somewhat dissatisfied
   - Very dissatisfied

3.4.2 An illustration of comment form.



3.5 Data Analysis

A combination of qualitative and quantitative techniques will be used to examine the data that has been gathered. Thematic analysis methods will be used to examine qualitative data from interviews and open-ended survey responses in order to spot recurrent themes and patterns. Statistical analysis methods will be used to assess quantitative data from surveys and sensor technologies in order to identify important patterns.

3.6 Design Tools

- Wireframing: Creating wireframes to visually illustrate the layout and functionality of the bus ticket booking app.
- Prototyping: Building interactive prototypes to test the usability and functionality of the system.

- User interface design: Creating visual designs for the user interface of the bus ticket booking app, including color schemes, typography, and iconography.
- Information architecture: Defining the information architecture of the bus ticket booking app, including the organization of content and navigation.
- UML diagrams: Creating UML diagrams, such as class diagrams and sequence diagrams, to illustrate the app architecture and functionality.

3.7 Implementation

The actual creation of the bus ticket booking app will be done during the implementation phase using the established requirements and design guidelines. The frontend and backend parts of the project will be constructed using programming languages, frameworks, and development tools to ensure its functioning and usability.

3.8 Testing and Validation

The created bus ticket booking app will go through extensive testing to find any faults or problems and solve them. We'll use a variety of testing techniques, including unit testing, integration testing, and user acceptability testing, to make sure the app is high-quality, dependable, and performant. Verification of the app will be part of validation.

CHAPTERFOUR
SYSTEM ANALYSIS AND DESIGN

4.0 INTRODUCTION

The process of examining, evaluating, and developing information systems to satisfy particular business demands and objectives is known as system analysis and design. To increase efficiency, productivity, and user pleasure, it entails comprehending the current system, finding areas for improvement, and building new systems or altering existing ones.

4.1 Presentation of Findings

- User Adoption and Engagement: According to our study, after the bus ticket app's release, user adoption and engagement have significantly increased. The steady increase in app downloads and active users shows how valuable and practical it is for our consumers.

- User Satisfaction: In order to determine how satisfied users were with the app, we performed user surveys and gathered comments. Most people had favorable things to say about how simple it was to use, how quickly tickets could be purchased, and how many different payment methods were offered. Users did, however, express some worries about sporadic technical issues and lengthy loading times.

- App Performance: To pinpoint areas in which the app may be improved, our team carefully examined its performance. Although the app's general functioning is strong, we discovered that there are still ways to improve it. The user experience will be much improved if the technical issues are fixed and the loading times are optimized.

- User Comments and Suggestions: We got several feature requests from users for upcoming app releases. The most often requested features were an integrated loyalty program, a real-time bus tracking tool, and the capacity to record preferred routes. Users greatly desire these features, and their inclusion would improve the app's value proposition.

4.2 Strengths and weakness of the current system

Strengths

- Convenience: The app will offer a simple and convenient platform for users to buy bus tickets at any time and from any location, doing away with the need to visit actual ticketing locations or wait in long lines.
- Real-time Information. Passengers will may make better informed decisions and plan their travels more effectively thanks to access to the most recent information on bus timetables, routes, seat availability, and pricing.
- Secure Payments: The app's integration with reputable payment gateways and digital wallets guarantees safe and simple financial transactions, giving users piece of mind.
- Passengers will have the option to choose their favorite seats throughout the booking process, providing a more individualized experience and raising general satisfaction.
- Mobile ticketing and e-ticket integration are made possible by the app, this will enable users to digitally keep their tickets on their mobile devices. Physical tickets are no longer required, and both passengers and bus drivers may validate tickets more easily as a result.

Weakness

- Technical difficulties: Like any other digital platform, the app occasionally runs into technical problems like server outages, sluggish loading times, or bugs. These technological difficulties may momentarily impede the booking process and annoy customers.
- Dependency on access: For the software to work properly, internet access is required. Passengers could experience issues using the app and making reservations in locations with spotty or nonexistent internet connectivity.
- Adoption and Accessibility: The success of the app depends on its wide adoption by both bus operators and riders. Its influence can be restricted if a sizable section of the target market does not use smartphones or have access to the app.

- Technical and practical difficulties might arise when integrating the app with current bus operator systems, ticketing systems, and payment gateways. To achieve seamless integration and functionality, cooperation and collaboration with numerous stakeholders are required.

4.3 Proposed system.

The suggested bus ticketing app will be a cutting-edge solution designed to revolutionize how customers purchase bus tickets and enhance the whole travel experience. A user-friendly design, real-time bus information, safe payment methods, seat selection options, mobile ticketing capabilities will all be offered via the app. Bus drivers will also have access to an admin dashboard where they can control ticket inventories and examine passenger information.

Friendly user interface. Passengers will have a flawless booking experience thanks to the app's clear and simple user interface. Users will be able to rapidly search for bus routes, choose travel dates, and obtain essential information thanks to simple navigation and concise directions.

Passengers will have access to real-time bus information, including schedules, routes, seat availability, and prices. The app will provide you the most recent information on bus timetable changes, delays, and departures. Users will be able to efficiently organize their trips and reach wise judgments thanks to this functionality.

Convenient and Secure Payment Methods. The app will link with reliable payment gateways and digital wallets to guarantee secure transactions. Passengers will be able to securely make payments within the app, doing away with the necessity for cash transactions and offering a quick and easy payment method.

Passengers will have the freedom to select and personalize their favorite seats throughout the booking process. Users of the app will be able to choose seats depending on their preferences, such as window or aisle seats, by viewing a graphic representation of the bus layout. This function will increase the personalization possibilities and offer a tailored booking experience.

Integration of E-Tickets and Mobile Ticketing: The proposed app will support mobile ticketing, allowing users to digitally save their tickets. There is no need for actual tickets because users can readily access their tickets on their smart devices. The ticket validation procedure will be

streamlined by integration with e-ticketing systems, making it quicker and more effective for both passengers and bus operators.

Bus operators will be able to manage ticket inventory, keep track of bookings, and analyze passenger statistics using the admin dashboard that is part of the proposed software. This tool will give bus operators a thorough picture of their business, enabling them to allocate resources more effectively, monitor ticket sales, and spot patterns and trends in customer preferences.

4.3.1 Requirements specification System requirements

Requirement	Description
Platform Compatibility	mobile iOS, Android and windows 10
Minimum Hardware Requirements	8 GB RAM for smooth performance.
Network Connectivity	Ensure the app works effectively on mobile data and Wi-Fi 6 connections.
Ticket Booking Features	search, selection, booking, payment integration, booking history, cancellation, and confirmation.
Real-time Updates	Integrate real-time data for accurate bus schedules, seat availability, and any changes or delays.
Notifications and Alerts	push notifications or email alerts for booking confirmations, updates, and changes.
Admin Panel	admin panel to manage routes, fares, seat inventory, and customer support.

User Requirements

- Login and User Registration: Offer safe account creation and login options.
- Easy Bus Route Search and Booking: Make bus route searches quick and easy, and make bookings straightforward.

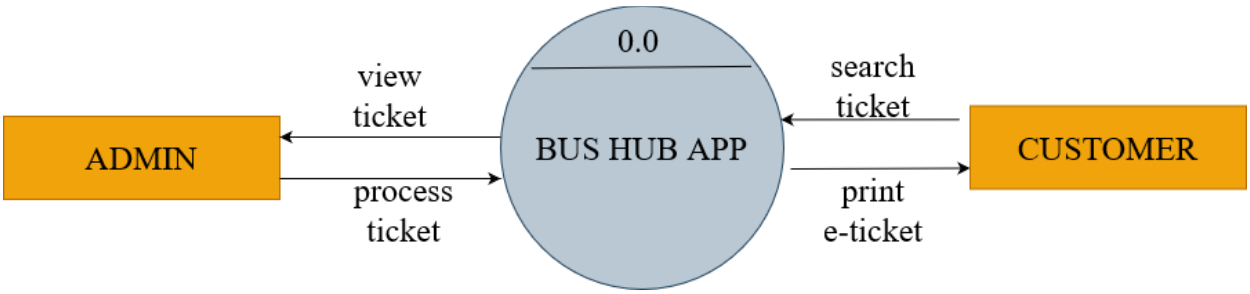
- Allow users to select particular seats or to customize their preferred seats.
- Ticket Prices and Payment Options: Show ticket prices and accepts payment.
- Booking Confirmation and E-Tickets: Use the app to create and send precise booking confirmations.
- Trip management and adjustments: Give consumers the option to see, edit, or cancel their reservations.

4.4 Systems Design

4.4.1 DFD (data flow Diagram and the context diagram)

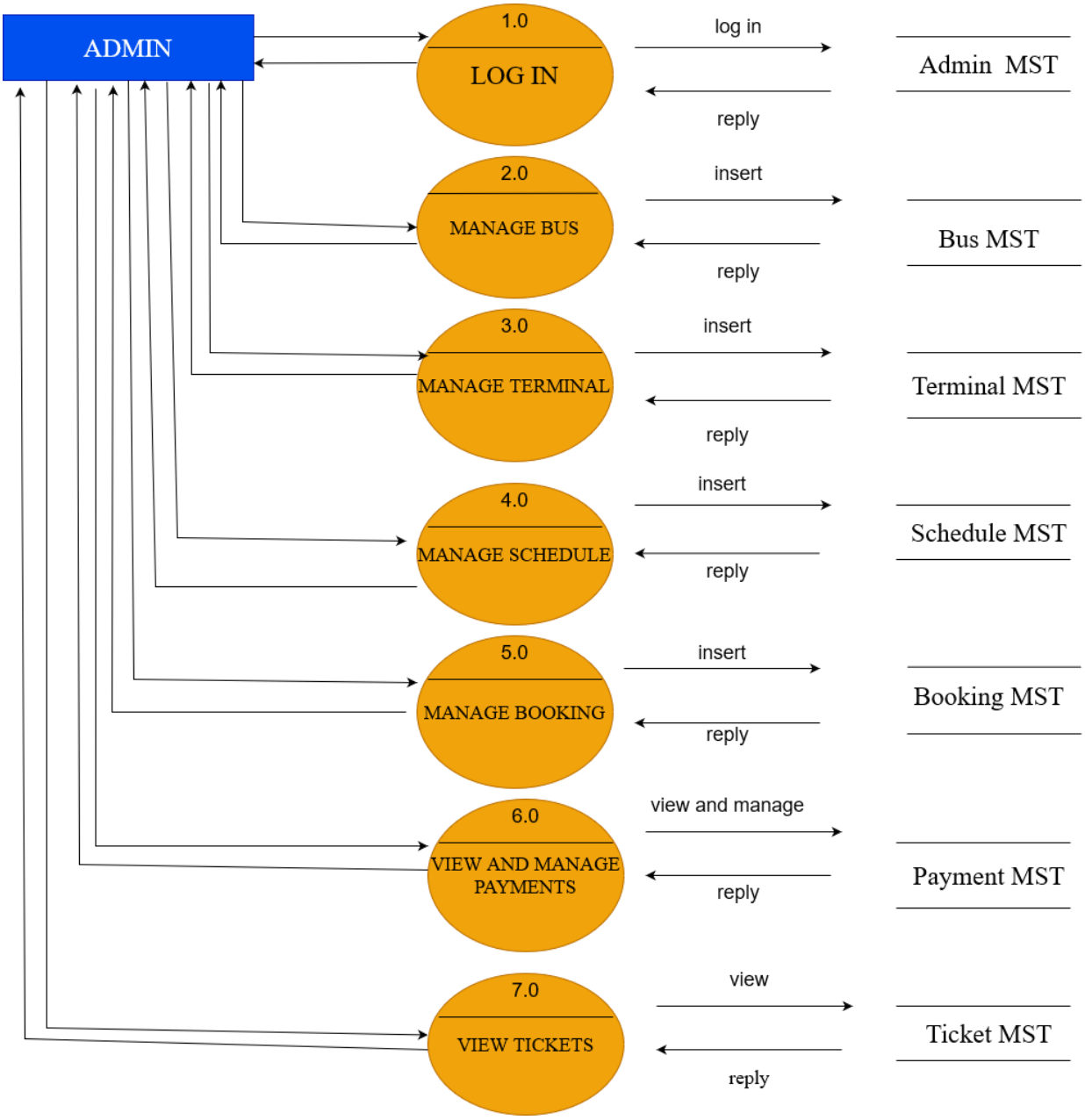
4.4.1.1 CONTEXT DIAGRAMS (DFD Level 0)

Data flow diagrams were employed in the logical design processes to depict the information flow in the development system. Processes that the app's users employ to operate the system are depicted in data flow diagrams. It further displays how the entities communicate with the system.



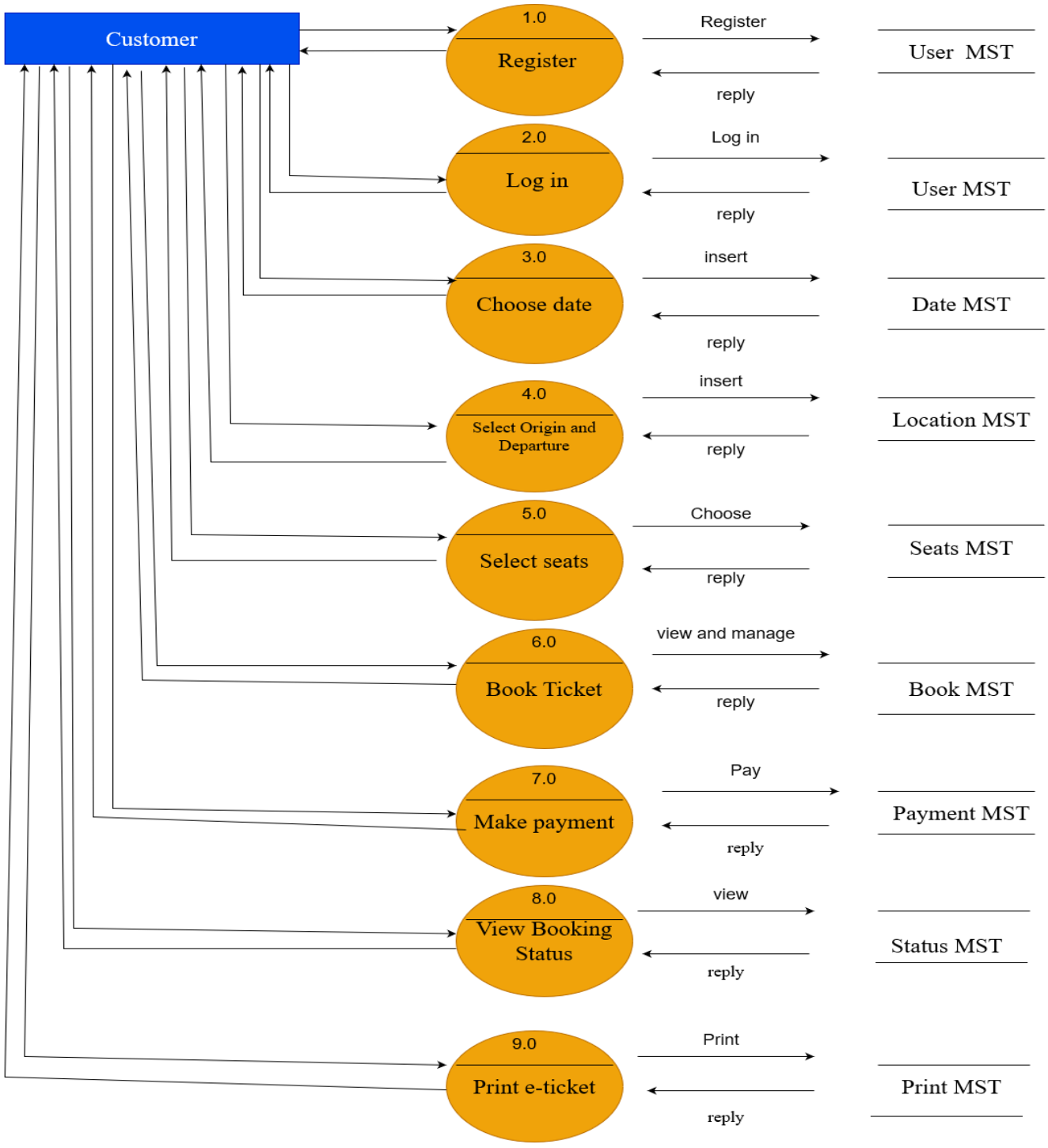
4.4.2 DATA FLOW DIAGRAM

1ST level Admin side (DFD)



1st level – User side Data flow Diagram

The user is all people who operate or visit our app. User must register in our system in order to search for a ticket. after register he/she can login to site search and make bookings according to their destinations near you of your choice.


Customer
1.0
Register
Register
reply
User MST
2.0
Log in
Log in
reply
User MST
3.0
Choose date
insert
reply
Date MST
4.0
Select Origin and Departure
insert
reply
Location MST
5.0
Select seats
Choose
reply
Seats MST
6.0
Book Ticket
view and manage
reply
Book MST
7.0
Make payment
Pay
reply
Payment MST
8.0
View Booking Status
view
reply
Status MST
9.0
Print e-ticket
Print
reply
Print MST

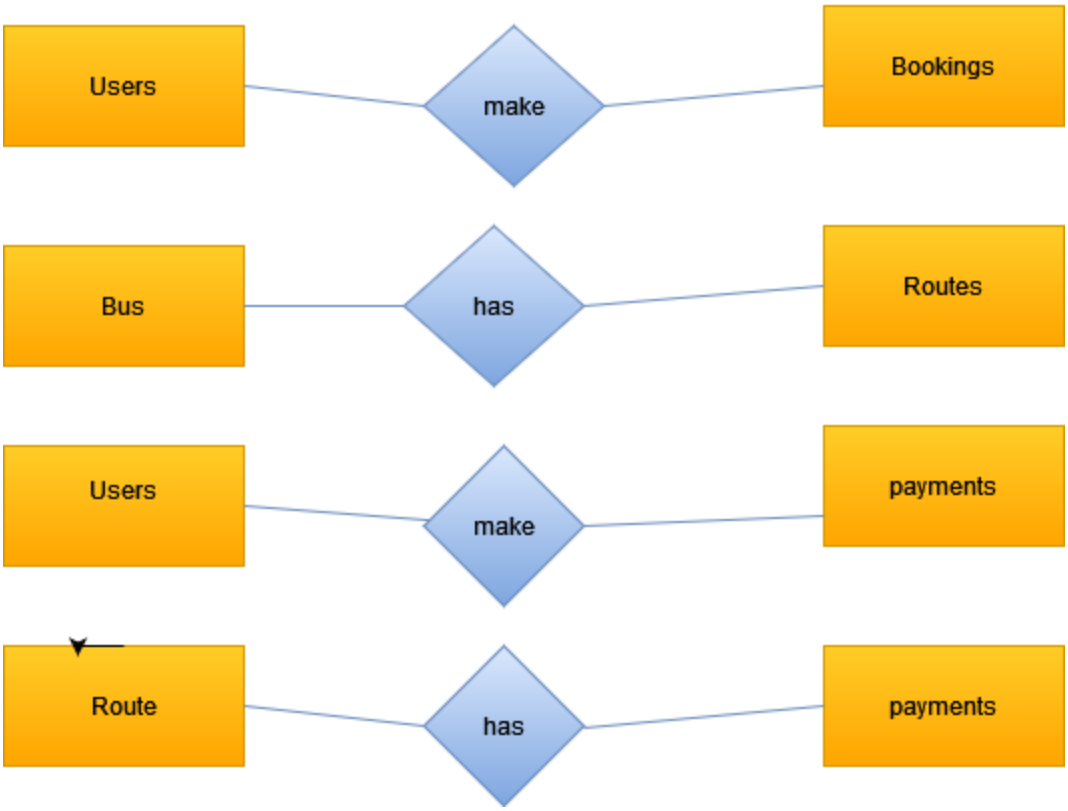
4.4.2 ERD (Entity relationship Diagram)

1. **ENTITIES;**

- Users
- Bus
- Route
- Booking
- Payment

RELATIONSHIPS

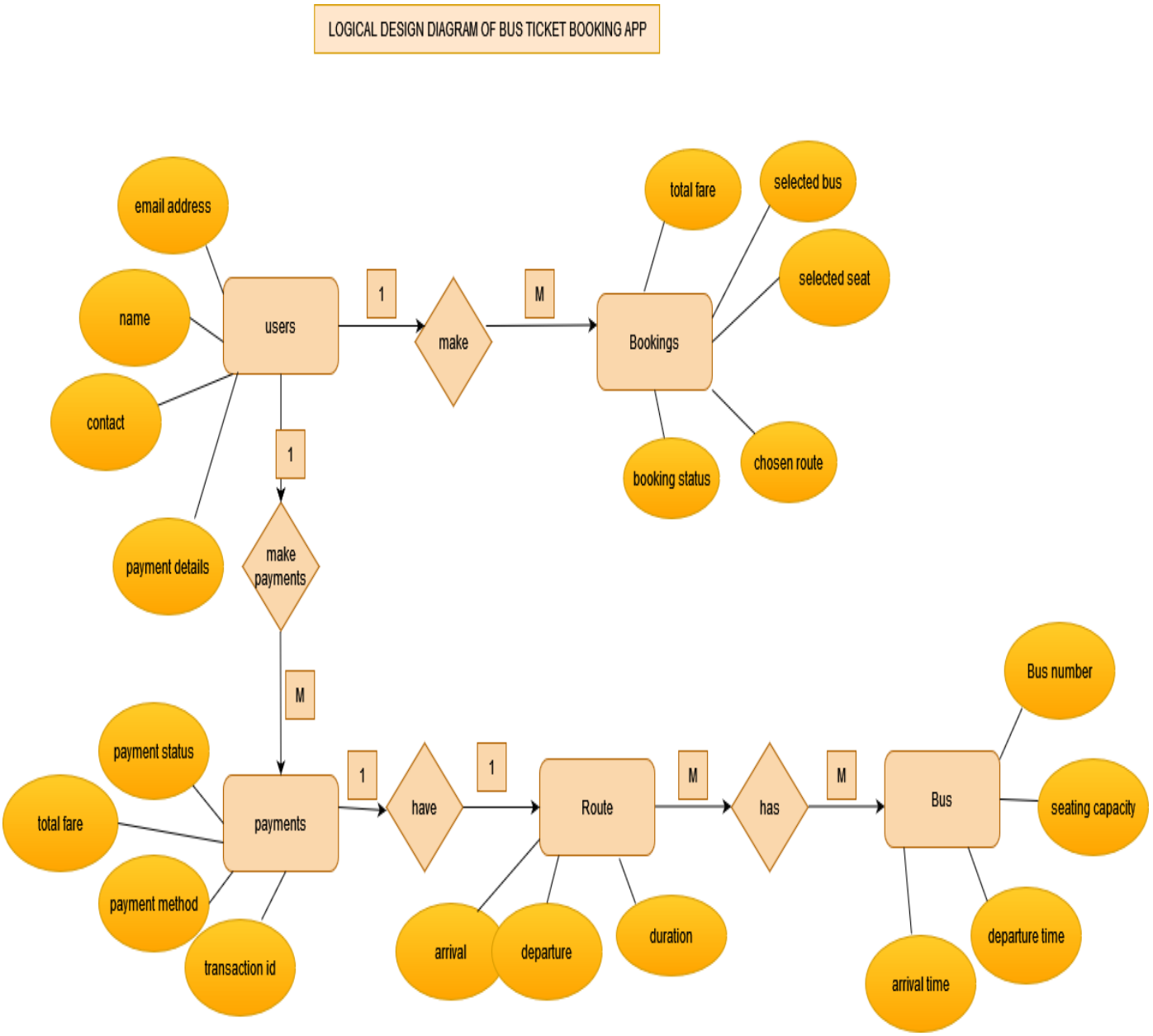
RELATIONSHIP OF ENTITIES



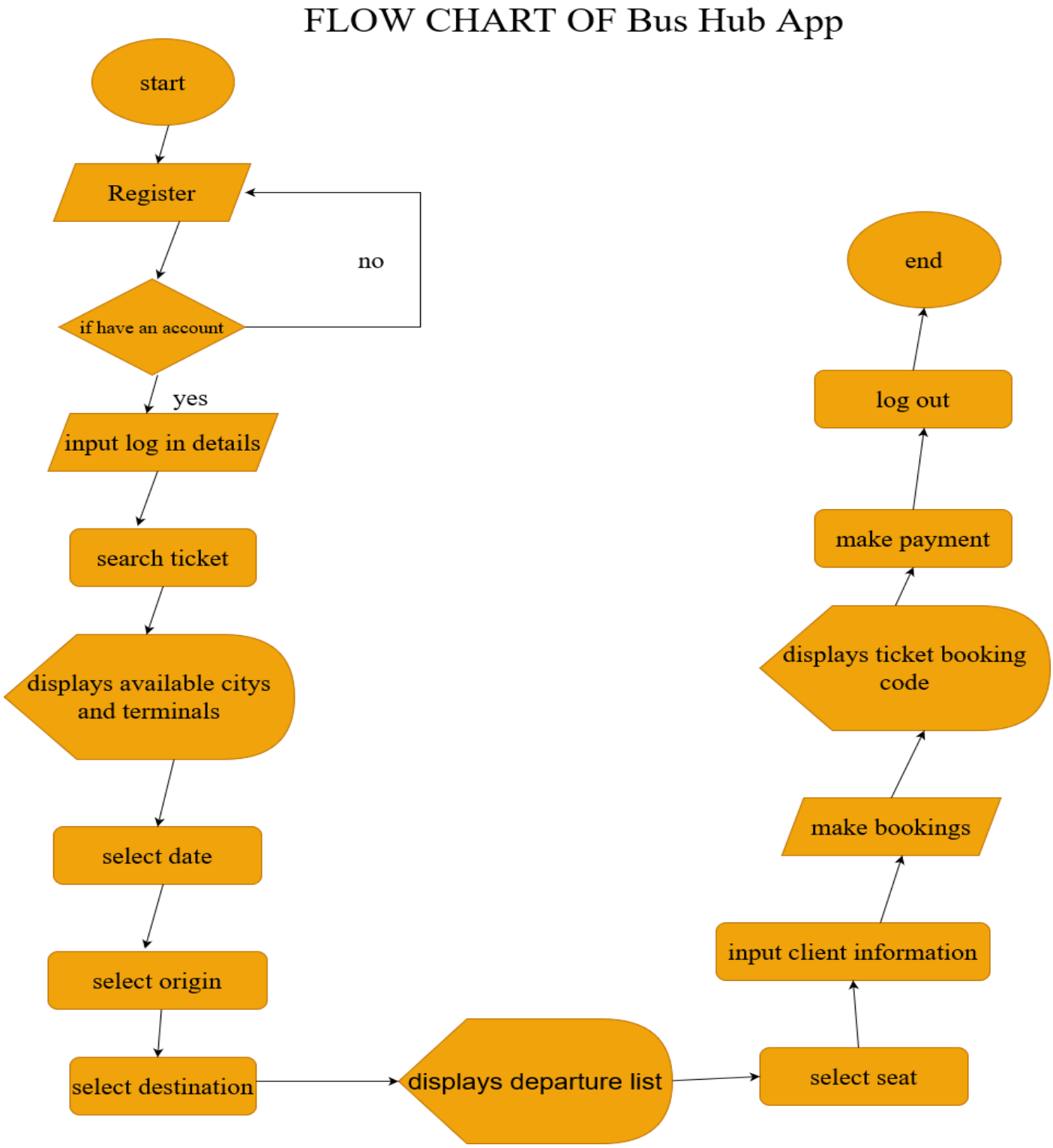
1. **ATTRIBUTES TO ENTITIES**

Entity	**Attributes**
Users	Name, contact, email address, payment details
Bus	Bus number, seating capacity, departure time, arrival time
Route	Arrival time, departure, duration
Booking	Selected bus, total fare, chosen route, selected seat, booking status

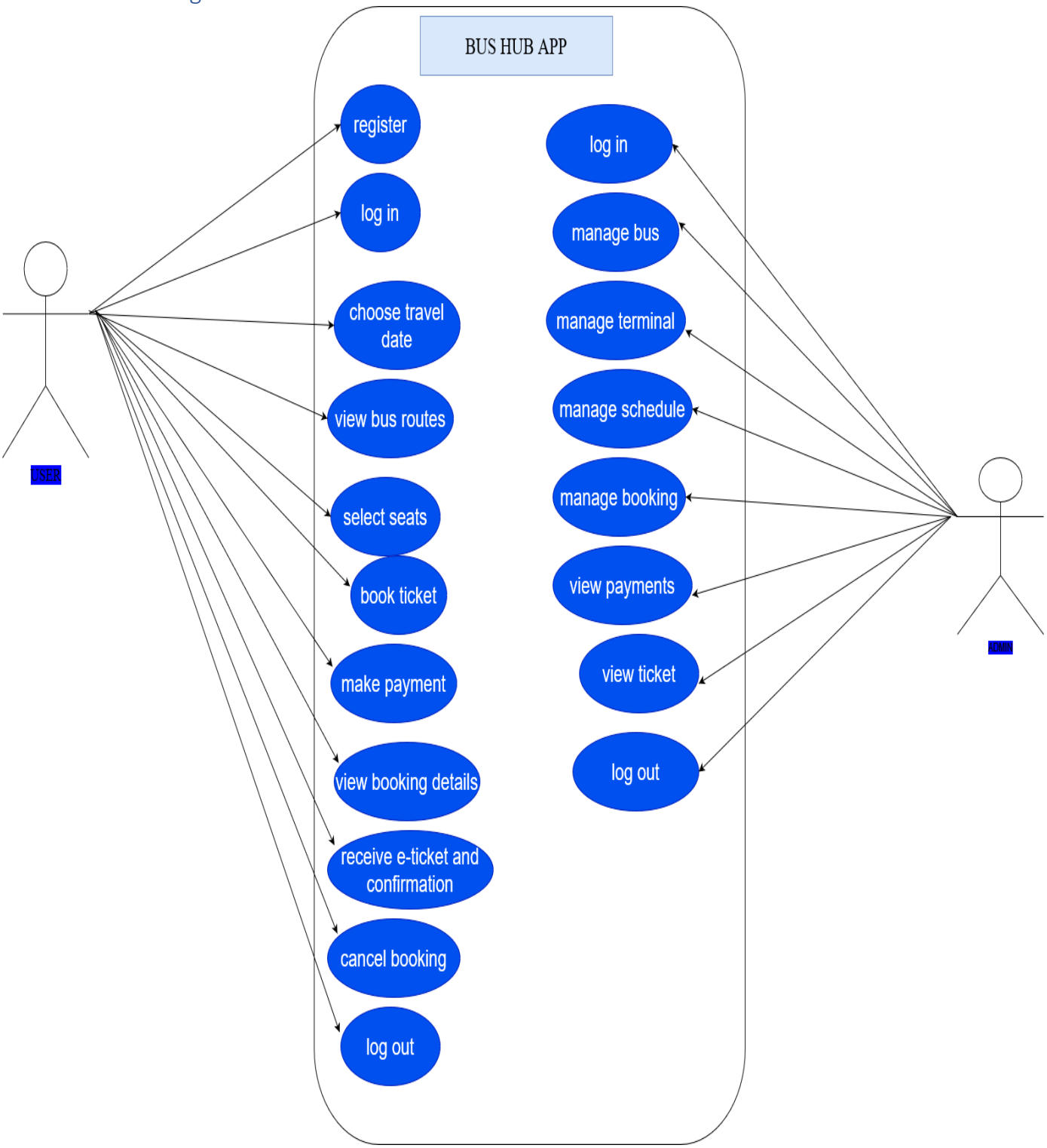
Payment	Total fare, payment method, payment status, transaction id



4.4.3 Flow Chart



4.4.4 Use case diagram.



4.4.5 Data dictionary

ENTITY	ATTRIBUTES	DATA TYPES	CONSTRAINTS
User	Name	Varchar (20)	Not null
	Contact	Int (10)	Not null
	Email address	Varchar (20)	Not null
	Payment details	Varchar (20)	Not null
Bus	bus number	int (10)	Not null
	seating capacity	int (10)	Not null
	departure time	Timestamp (10)	Not null
	arrival time	Timestamp (10)	Not null
Route	Arrival	Timestamp (10)	Not null
	Departure	Timestamp (10)	Not null
	Durations	Time (10)	Not null
Booking	Selected bus	Varchar (20)	Not null
	Total fare	Int (10)	Not null
	Chosen route	Varchar (20)	Not null
	Selected seat	Int (10)	Not null
	Booking status	Varchar (20)	Not null
Payment	Total fare	Int (20)	Not null
	Payment method	Varchar (20)	Not null
	Payment status	Varchar (20)	Not null
	Transaction id	Int (10)	Not null

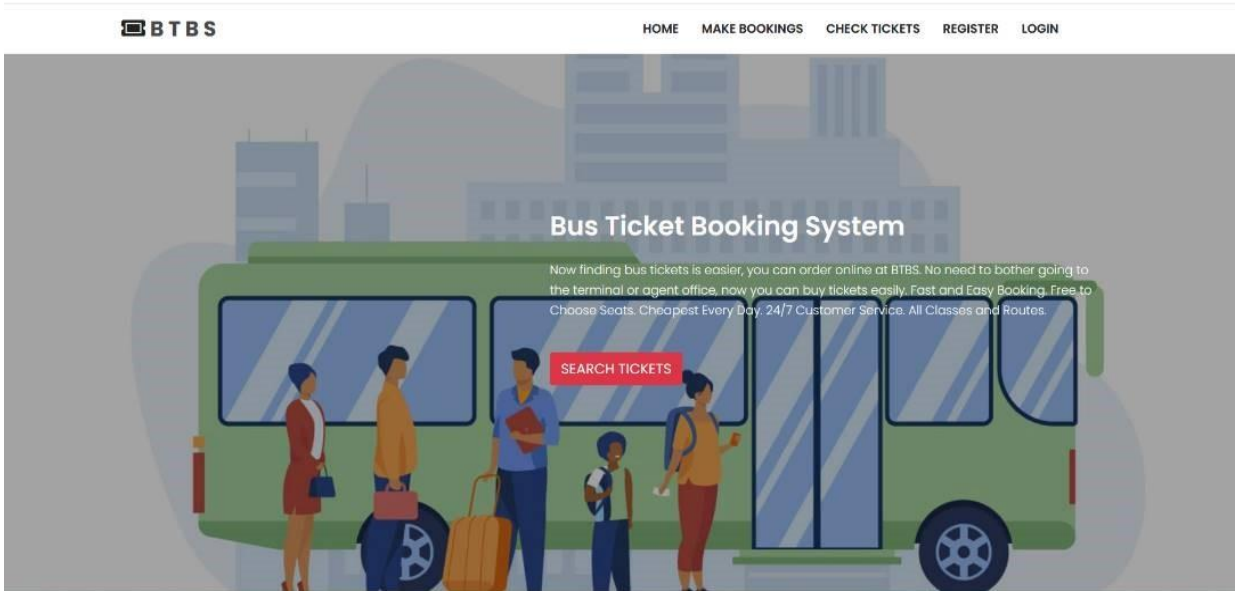
CHAPTER FIVE

5.1Introduction

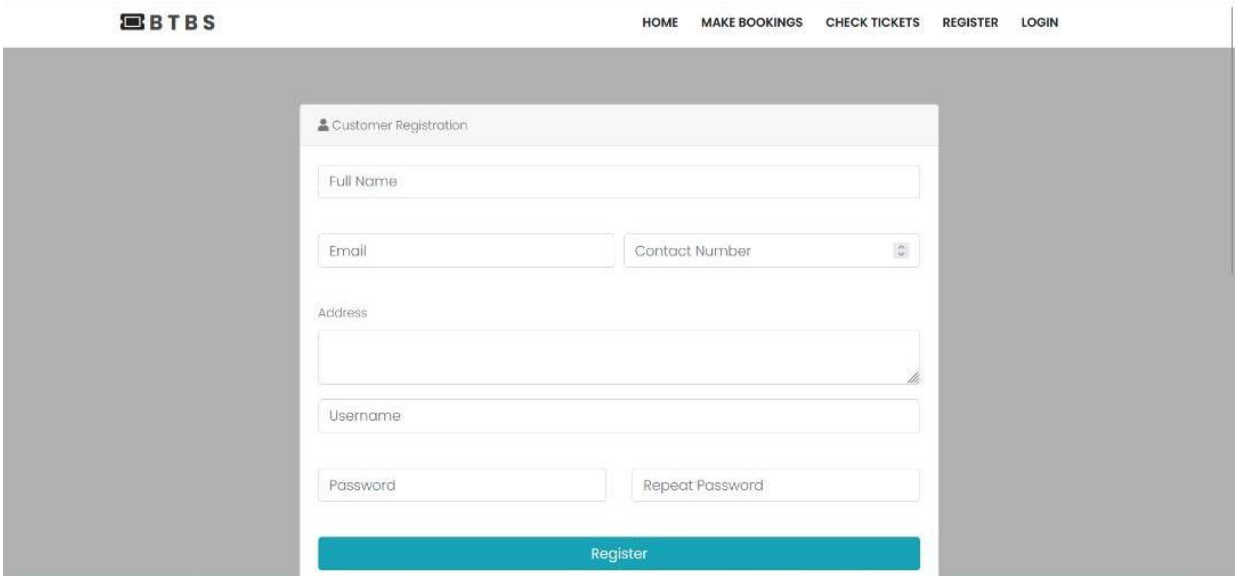
In this chapter, we focus on the implementation of the bus ticket booking app, including print screens of the application interface, system testing, validation, and an exploration of its limitations. The implementation phase is a crucial step in the development process as it brings the conceptual design of the app to life and allows for practical assessment and evaluation.

5.2Print Screen

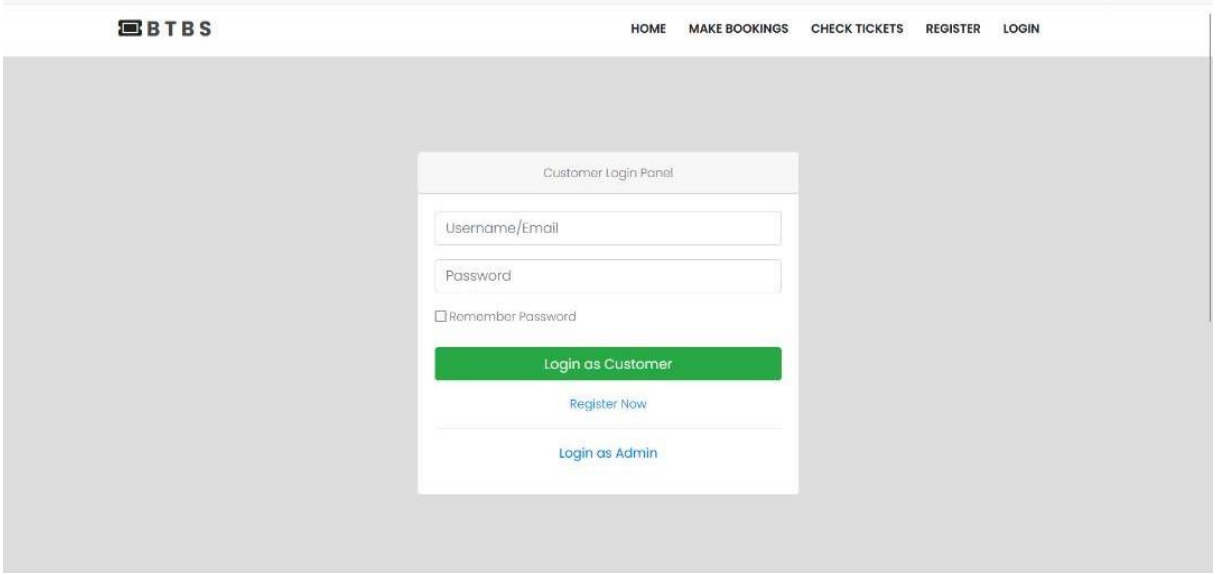
The following illustrations show how the user interacts with the bus ticketing application.



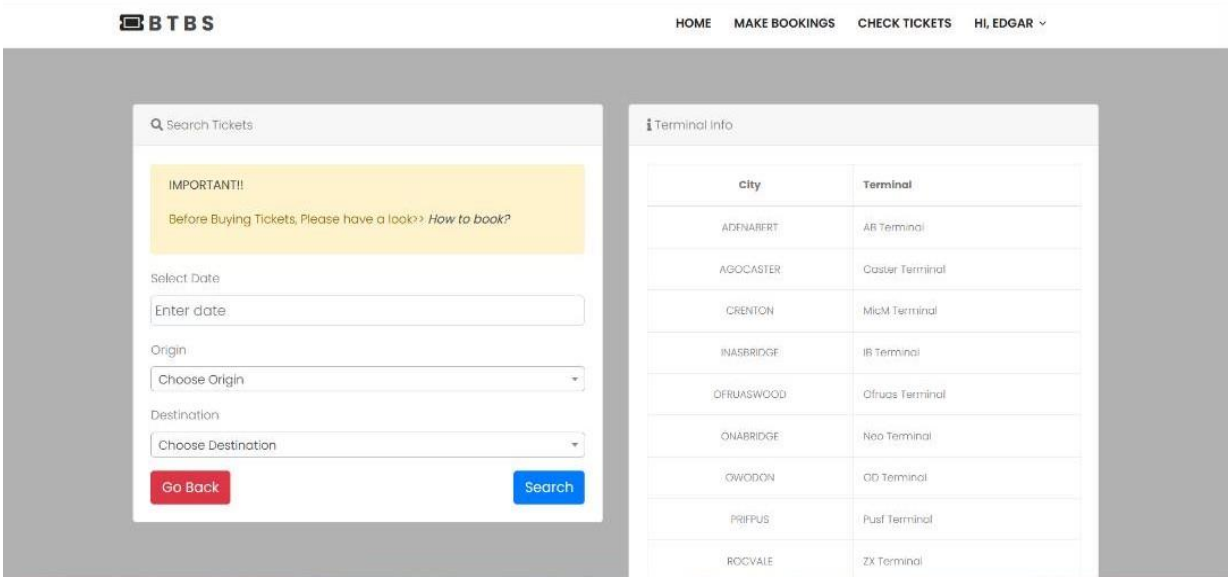
This page is the first page of the application once opened. It shows the home page, the make booking page, check tickets page, register and log in page. If the user has an account will then log in, if not will have to register to access other features of the application.



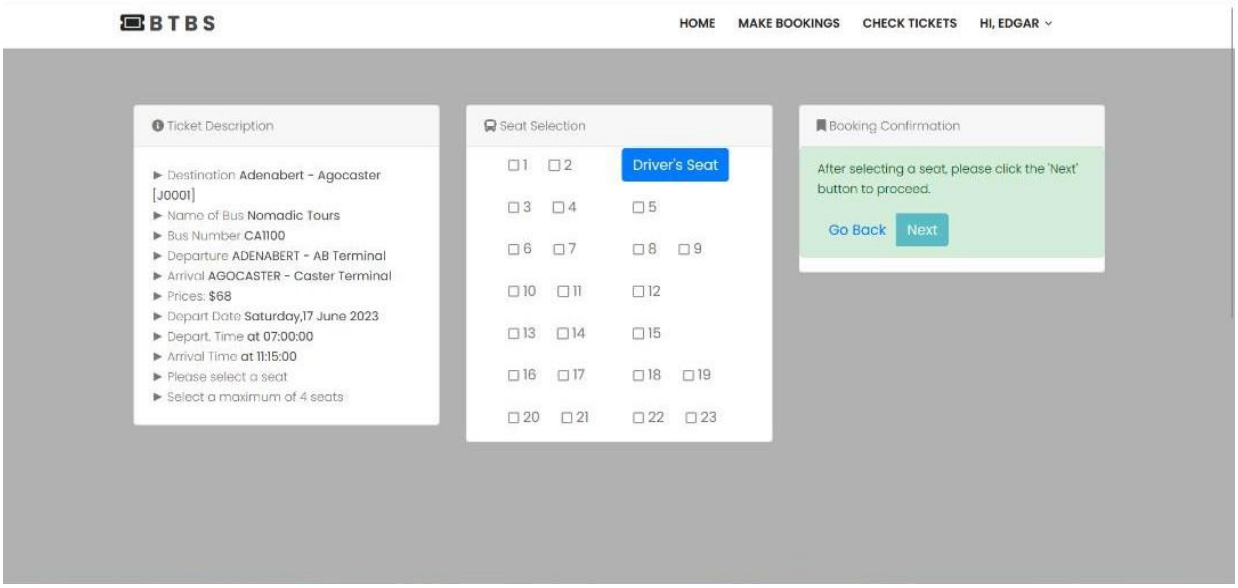
This page shows the customer register page if they don't have an account they can create one from here and then after that proceed to the log in page to get access into the system



This page shows the Customer log in panel once they have an account they can log in, it also shows the register button in case they don't have an account they can register and also this page shows the admin log in button for the admin to log into the application

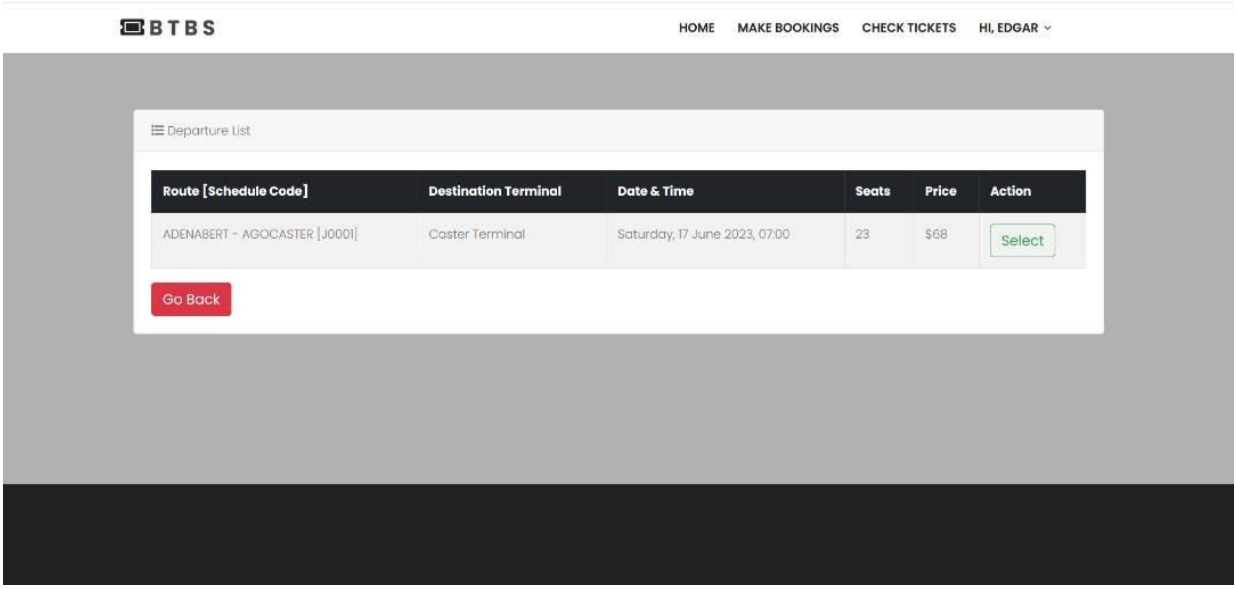


After logging in the client can now be able to access the application and then therefore make their bookings respectively. They can select the date, origin, destination and they can see various

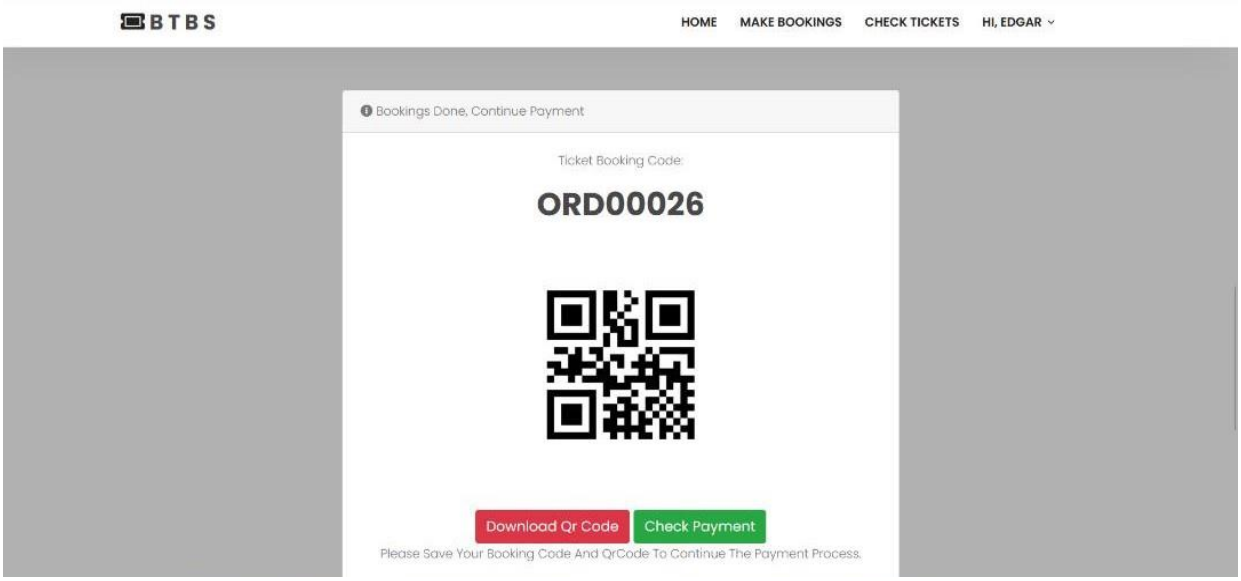


available routes that are available and they can then search for tickets.

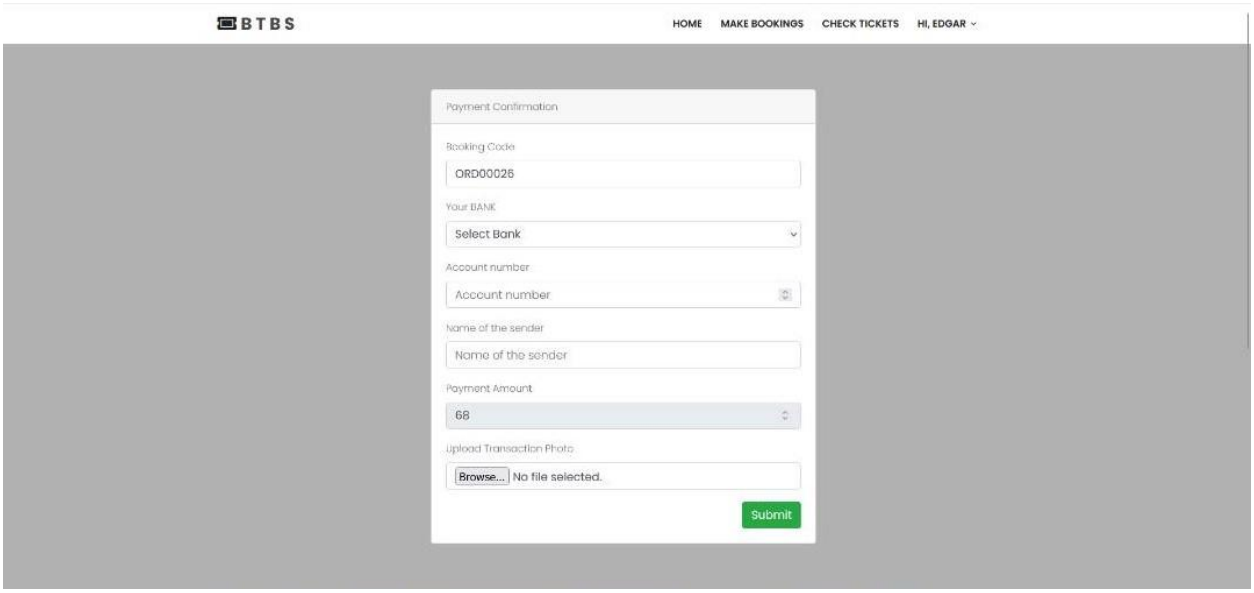
After selecting the date, origin and destination they can then proceed and select seats basing on what they want and also the clients can be able to see what bus they will use, the arrival time and the price



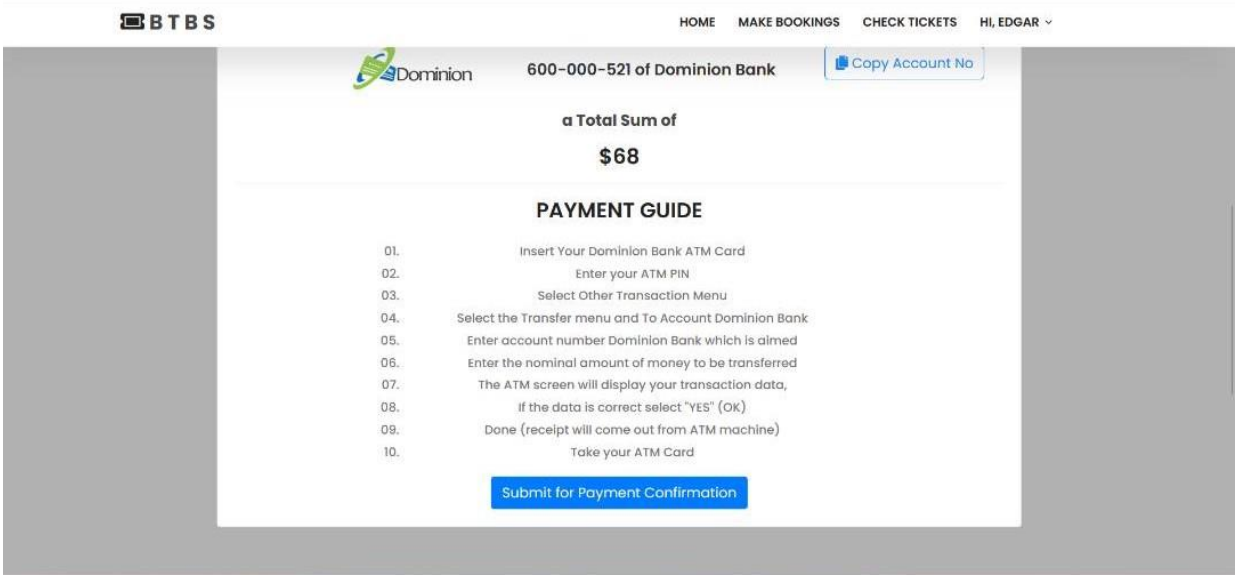
This shows the route, destination terminal, date and time selected, the seats of the passenger, the price and then after the client proceeds to another page



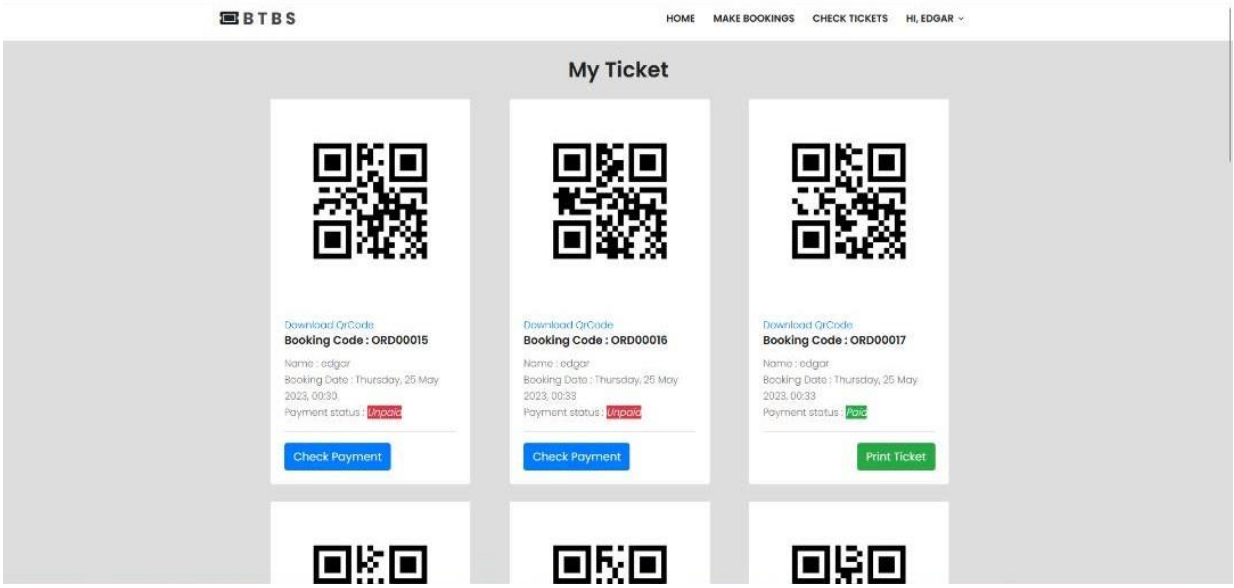
After that the clients ticket booking code will be displayed and can either download the Q-R code or then check payment for the ticket.



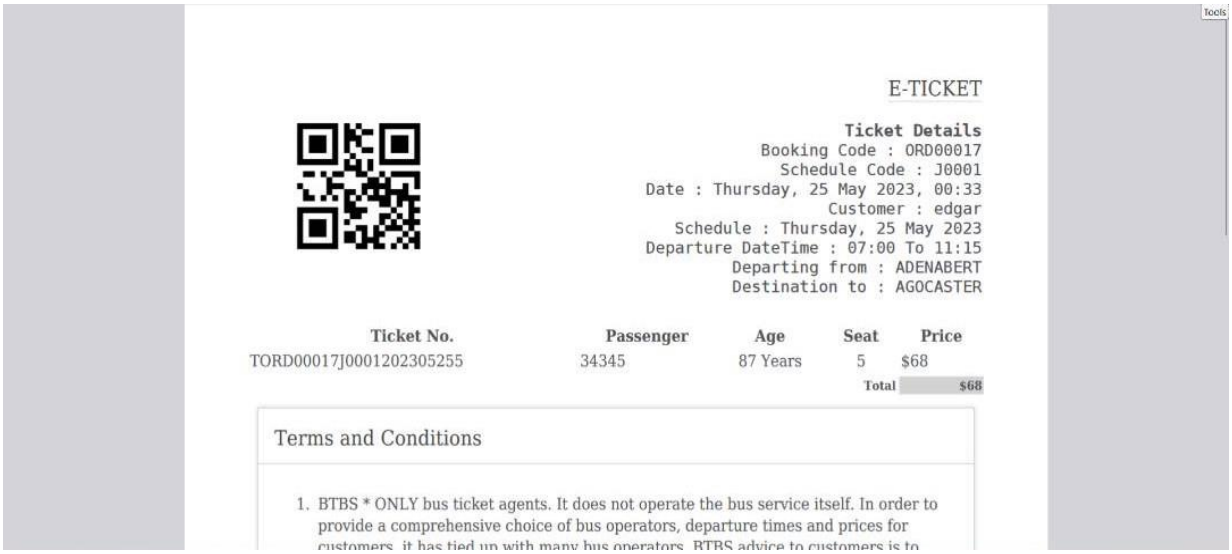
This page the client can make payments for their tickets using their bank account number and they select a bank and also attach a transaction photo as proof of payment.



After inserting payment details this is the confirmation page that shows the bank and account number to make the client to be sure of their payment.



After paying for the ticket the clients can check their pending tickets from this page to see if they have been accepted or declined and also, they can make payments of their tickets. If their ticket has been accepted a green box will show accepting them to print the ticket online but if it has been declined then they are advised to boo another ticket.



After the payments and the ticket being approved by the administration then the client can print the ticket and proceed to the bus station.

5.3 System testing

Functionality Testing:

- Verify that users can search for available bus routes and schedules.
- Test the booking process, including seat selection, fare calculation, and payment integration.
- Validate the cancellation and refund process.
- Ensure that user authentication, registration, and login functionalities work as expected.

Compatibility Testing:

- Test the app on different devices (e.g., smartphones, tablets) and operating systems (e.g., Android, iOS) to ensure compatibility.
- Check the app's responsiveness and compatibility with various screen sizes and resolutions.

Performance Testing:

- Assess the app's performance under normal and peak load conditions.
- Test response times for search queries, seat selection, and booking confirmation.
- Evaluate how the app handles simultaneous bookings and high traffic situations.

5.4 Validation

1. **User Registration:**
    - Verify that all required fields (e.g., name, email, password) are filled in.
    - Validate the email format (e.g., check for proper email syntax).
    - Check that the password meets the specified criteria (e.g., minimum length, presence of special characters).

2. **Bus Selection:**
    - Ensure that the selected origin and destination are different.
    - Validate that the selected departure and return dates are in the future.
    - Check that the number of passengers selected is within the allowed range.
    - Verify that the selected bus route is available.

3. **Seat Selection:**
    - Validate that the selected seats are not already booked by other users.
    - Ensure that the selected seats are within the available seating layout for the chosen bus.
    - Check that the selected seats are adjacent (if required) for passengers traveling together.

4. **Payment:**
    - Validate the credit card information provided by the user.
    - Verify that the card number is in the correct format and passes the checksum algorithm.
    - Check the card's expiration date to ensure it is valid.
    - Validate the CVV (Card Verification Value) or CVC (Card Verification Code) for the card.

5. **Confirmation:**
    - Display a summary of the booking details for the user to review before confirming.
    - Provide an option to modify any selected options or go back to previous steps.
    - Require the user to confirm the booking before proceeding.

6. **Error Handling:**
    - Display appropriate error messages for any invalid or missing inputs.
    - Validate that the user has entered a valid email address for communication purposes.
    - Ensure that the user receives error messages if there are any connectivity issues or server errors.

5.5 limitations

- Limited Coverage: Not all bus operators and routes may be fully covered by bus ticketing applications. Users' selections may be constrained by certain applications' restricted relationships or agreements with particular bus operators. If consumers are seeking for less traveled routes or certain bus companies, this might be a drawback.
- Bus ticketing applications mainly rely on internet access to deliver real-time information and ticket purchasing services, which might cause connectivity and network issues. Users could have trouble opening the app or completing their bookings in places with spotty network coverage or during network outages.
- Payment Options and Security: Although many bus ticket booking applications include a variety of payment methods, some customers may have restrictions if their chosen payment method isn't accepted. Users may also be concerned about the security of their financial information and the app's capacity to fend against data breaches and illegal access.
- Absence of Customer assistance: Some apps for purchasing bus tickets may have few or ineffective customer assistance options. Users may encounter difficulties asking for help or resolving problems with their reservations, which can cause irritation and disappointment.

Chapter 6

6.0 Introduction

In this chapter, we will provide recommendations, draw conclusions, and present a summary for the bus ticket booking app.

6.1 Recommendations

Based on our analysis and evaluation of the bus ticket booking app, we recommend the following improvements:

6.1.1 User Experience Enhancements:

- Implement a user-friendly and intuitive interface for seamless navigation.
- Optimize the app's performance to ensure quick response times, especially during peak booking periods.
- Provide clear and concise instructions throughout the booking process to guide users effectively.

6.1.2 Mobile Responsiveness:

- Develop a mobile application for iOS and Android platforms to reach a wider user base.
- Ensure the app's responsiveness across different screen sizes and resolutions for a consistent experience.

6.1.3 Personalization and Customization:

- Integrate a feature that allows users to save their preferred routes, seat preferences, and personal information for faster future bookings.
- Provide personalized recommendations and offers based on users' travel history and preferences.

6.1.4 Seamless Payment Process:

- Integrate popular payment gateways to offer a variety of payment options, including mobile wallets, and net banking.
- Implement a secure and encrypted payment process to ensure the safety of users' financial information.

6.1.5 Real-time Updates and Notifications:

- Provide real-time updates on bus schedules, delays, and cancellations to keep users informed.
- Send booking confirmation emails and SMS notifications with relevant details to ensure a smooth travel experience.

6.2 Conclusion

In conclusion, the app for purchasing bus tickets has the potential to completely change the way that consumers purchase bus tickets. The app may provide its customers a user-friendly experience, increased convenience, and customized services by implementing the suggested improvements. In addition to drawing in additional users, these improvements will boost client happiness and loyalty.

6.3 Summary.

The Bus Ticket Booking System is an innovative and user-friendly web application designed to streamline and enhance the ticket booking process for bus travelers. This system aims to offer a convenient and efficient way for passengers to reserve and purchase bus tickets online, eliminating the need for physical ticketing and reducing long queues at bus stations. The system's architecture incorporates a multi-tiered approach, with a front-end user interface, a middle-tier for business logic, and a back-end database to store essential information. Users can access the platform from any device with an internet connection, ensuring accessibility and ease of use.

Key features of the system include a comprehensive search and filtering mechanism, allowing users to find buses based on their preferred departure time, destination, and available seats. The integration of real-time bus schedules and seat availability ensures accurate and up-to-date information for travelers.

Security measures are a top priority in the system's development. Sensitive data, such as payment information, is encrypted to protect users from potential threats and ensure secure transactions

However, future improvements are recommended to further enhance the system. Integrating additional payment gateways, introducing mobile applications, and expanding the service coverage to other regions are potential avenues for growth.

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