E-Ticket

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APPROVAL

This project titled on "**E-Ticket**", submitted by **Sazzad Hossen Anik (ID:211-35-700)** to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Software Engineering and approval as to its style and contents.

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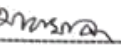

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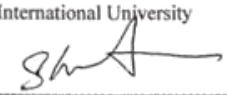

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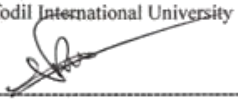

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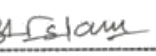

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DEDICATION

I therefore declare that I have done this project under the oversight of “Dr.Imran Mahmud”, Head & Associate Professor, Department of Software Engineering, Daffodil International University. Also declare that neither entire record nor any portion of this record has been submitted somewhere else for my degree.

ABSTRACT

E-Ticket is an advanced mobile application ticket booking software tool, that helps users to Research,Plan and Book exploring experiences hassle free. This system was intended a prototype of E-Ticket government level application to solve a real problem- accessibility in travel. Travellers can search destination details, explore hand-pickedlocations and book in a user-friendly setting. Meanwhile, administrators have a simple and efficient dashboard in order to handle users and tour data. A smart travel companion that makes it easy for people to discover new adventures with ease and clarity, E-Ticket is more than a website.

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LIST OF ABBREVIATIONS

HTTPS	HyperText Transfer Protocol
JWT	JSON Web Token
CSS	Cascading Style Sheets
MERN	MongoDB, Express.js, React.js, Node.js
ER	Entity Relationship
SRLC	Software Release Life Cycle

CHAPTER 1

INTRODUCTION

1.1 Background

In the past few years, there has been a growing need for cost-effective and easy-to-use ticketing systems that are available to everyone as many functions have moved towards an online setting. Conventional means of ticketing - particularly for state operated services and public utilities, are characterised by long queues, human interaction, and low availability. These factors cause problems for customers as well as ticket control bodies.

E-Ticket system is developed to overcome these challenges. The website is actually a government ticketing source aimed at simplifying the process of buying tickets whether online or through other means. Users can book tickets easily on the digital platform and for those who have no access to internet, offline ticket issue is also available via designated counters. This double whammy guarantees that all our users, regardless of their technical competences or (dis)connectivity are included/ accessible.

Combining the capacity of new web technologies with a powerful admin backend, this innovative ticketing system provides a professional event management experience. The system also helps avoid human errors whilst saving time and effort of users as well as administrators. In the end, E-Ticket is a part of the government's continued efforts to lead digital innovation and provide better public services for its people.

1.1.1 Context and Relevance

The emergence of online platforms has significantly disrupted several industries including transportation, event assistants and public services management. Among this digital shift, the ticketing sector has experienced a lot of evolution over the years, as it evolved from conventional paper-based methods to automated and web-based tools. Technology in this area provide benefits such as corporate simplification, better user experience, streamlined data management, and a more efficient service delivery.

In Bangladesh and other developing countries, many of these governments run ticketing systems are still largely manual driven with poor access to online booking, waiting in long lines at transportation terminals and no central information hub. These inefficiencies typically result in user unhappiness and operational delays. E-Ticket There are several problems of booking

the ticket and our E-Ticket provides highly effective, wide-reaching, convenient and reliable system to book tickets simultaneously online and offline.

The wider significance of this work stems from its compatibility with the "Digital Bangladesh" aspiration of the government to offer digital based services for better access and transparency in public domains.

Further, with the growth of mobile and web technologies, there is an opportunity to leverage these new technologies to advance traditional service systems. Our use case E-Ticket also reflects to the trend leveraging innovative technology with service of public convenience and no discrimination on anyone whether anyone has a particular device or technical know how.

1.1.2 Problem Identification

Although digitalisation of services has been taking place in feverish pace in recent years, many government-run ticketing systems here are inefficient and traditional down to the bone. These systems are typically unproductive, time consuming and error prone. Passengers need to line up in long row at ticket counter, especially during rush hours or special events, which is very inconvenient and time wasting. Moreover, restricted entry to online ticketing in rural and lowconnectivity regions also denies more than 9 out of 10 mobile users from the convenience and experience of modern booking processes.

A few online booking companies have been established in private sectors, but tey are specific to CMDs or private activities with little support for government systems. Furthermore, these current solutions tend not to offer assistance offline and do not serve the needs of users who have unreliable connectivity. Therefore, there is a need for an all inclusive and unified system which is adapted to process efficiently on-line and offline ticketing application through the same platform.

E-Ticketing is an attempt to bridge this gap by providing a government certified platform for making ticket booking process accessible, transparent and efficient. In addition to allowing customers buy things online, or check the availability of items in a store, the system permits an agent behind the counter to sell tickets offline without tying up their dial-up line. By adopting this hybrid model, we are able to overcome the disadvantages of previous solutions and help towards a more inclusivity, citizen friendly public service.

1.1.3 Purpose and Justification

The objectives of the E-Ticket application are to create a common system that generates an efficient ticket booking system for users and administrator. By combining online with offline functions on the same platform, the project seeks to facilitate greater convenience of purchasing tickets for all citizens—whether well-versed in technology or heavily reliant on unstable internet services.

The rationale for the project is to remedy decades of inefficiency in legacy ticketing systems across much of government. However, data confusion and ticket duplication may be caused by the traditional physical issuing procedureService quality is affected and user comfort declines shortened service time of users. E-Ticket reduces or eliminates these shortcomings by digitizing the process and bringing in automation, real-time data handling and added security.

The project also is aligned with the Digital Bangladesh vision that aims to enhance public services through use of ICT. The solution enables to minimize the cost and error from human operative, while enabling dispatching center centralized tracking and reporting. It's particularly good for those in the government to come up with better control, transparency and analytics over the ticket selling and ticket consumption.

In short, the E-Ticket initiative brings tremendous value to Goodger Service Delivery, stimulates public accessibilities and supports eGoverment by requiring digital transformation of governments ticket infrastructure. This means that citizens enjoy improved, faster and more efficient access to ticketing, while also ensuring equitable services for all – helping make the public service a smarter one.

1.1.4 Scope

About E-Ticket The E-Ticket project is to create an integrated digital ticketing system for all types of Government operated transportation services, in-line with the modern technology advancement. The system includes both online and offline ticketing mechanisms, catering for broad based users irrespective of place or internet availability.

The system comprises two main user interfaces: one for general users and another for administrative or counter operators. The interface has given customers the opportunity to view it looks set on line and confirm digitally. The admin panel or counter interface allows the authorized persons to maintain ticket records, offline reservation and overall ticket sale statistics.

Functionally the project encompasses secure user login, real time availability of tickets, control over the entire database and files being centrally managed through it used for storage, a management report generation in which such reports need to meet such end goals are admin needs and customer preferences. By combining these elements, llonö hopes to achieve a robust and effective system for providing tickets in both digital and manual modes of service.

But the project is limited to the work of ticket booking and does not involve anything of Payment gateway, big system deployment or any third party services integration in ongoing part.

Potential improvements could be the expansion of mobile app, analytical methods to analyse data and integration with other government services platforms.

1.2 Project Planning and Initiation

Feasibility Study (Step-by-Step)

The feasibility study determines whether it is possible, desirable and beneficial to implement ETicket system. It concentrates on a variety of aspects that affect how successful the project is likely to be.

Phase 1 Preliminary Analysis & Project Scope Definition:

During the Preliminary Analysis, we will determine what value an E-Ticket system Hold for ITWORLDS: AIMTo gain a general understanding of -what this project all about? At this level, the

project objectives, system demands and user requirements are determined to ensure that the project will satisfy real world needs.

The E-Ticket System will upgrade the ticketing service of public transportation into a new digital fare box era. Instead of paper, it is an electronic ticketing system that eliminates the need for tickets that need to be destroyed after use. Under this system, travelers can buy, maintain and validate tickets via a mobile app, and administrators can monitor the program through an overarching dashboard.

At this stage, preliminary research and requirement collection is done to identify the issues with the traditional manual system that includes long queues, data mishandling/forgery, fraud and unaccountability. These challenges are answered by the proposed system by providing automation, secure transactions and better data accuracy.

The project will be:

i. Development of a Passengers mobile app using React Native. ii. Design of an

admin dashboard for system administration. iii. Tickets live validating and QR

code validation facilities. iv. Allowing multiple user roles (Super Admin,

Counter, User, and Gate).

This stage provides a proper basis for the rest of the design, development and test. It’s a way to make sure the project objectives are clear, technically attainable and directly serve both users’ demands and the organization’s bias.

Phase 2 Market Feasibility Analysis (or Market Research):

The Market Feasibility Analysis is intended to determine the market acceptance, demand and competition of the E-Ticket System in the public transport industry. This Step is used to assess if there is enough market need for digital ticketing and whether the space is ripe for innovation.

As the use of smartphones and mobile payment systems continue to grow in Bangladesh, the market trend does seem promising looking more towards a digital transformation. Old ticketing practices can be slow, vary widely in terms of reliability and visibility. The proposed E-Ticket System provides a convenient, safe and sustainable solution that fulfills the user's interest in digital offerings.

According to market research, passengers are opting for contactless and cash-free payment methods when using public transport more than ever before. E-Ticket app is intended for regular commuters, intercity travellers and transport organizations that are keen on optimising their daily operations efficiently. The ability to work with a range of popular payment gateways.

We also present competitive analysis to show that while several existing systems include online ticketing only limited support for real-time validation and centralized management is offered. The E-Ticket System stands out due to:

i. Real-time QR-based ticket validation.

ii. Central admin dashboard for transaction monitoring. iii. Support multi-user roles (Counter, Gate, Super Admin). iv. Cross-platform availability through React Native.

In sum, the market analysis indicates that there is strong potential for user adoption and sustained growth. The system is in line with the current government projects of Smart Bangladesh and ensures digital accessibility for transportation.

Phase 3 Technical Feasibility Analysis:

Technical Feasibility Analysis where the proposed E-Ticket System is evaluated for its technical feasibility, i.e. whether the technology, tools, and resources are present to support effective development of the system. And, the needs for hardware, software and technology expertise to sustain its functioning and performance are being met. It is developed using React Native framework for the development of a mobile application that can run natively on Android or iOS devices. The back end is written in Node. js and Express. js for efficient server-side activity and API control. Due flexibility, scalability and the ability to manage enormous amounts of ticketing and user data, we're using MongoDB as our main database. To add protection, the app implements JWT (JSON Web Tokens) to authenticate users and then secure data with HTTPS. Safe and secure transaction Integrating digital payment gateway like ekPay. The Admin Dashboard is built with the latest web technologies, such as React. User management, Reports for Super admins & Premium package users) Built with vue.

Key Technical Components:

i. UI (Mobile App): React Native ii.

Backend: Node. js, Express. js iii. Database:

MongoDB iv. Admin Panel: React. js,

Tailwind CSS

v. Authentication: JWT-based secure login vi.

Payment Gateway: ekPay vii. Deployment

Platform: Cloud-based hosting

After detailed research, I found that technically E-Ticket System is possible. All development tools, frameworks, and platforms are available and affordable. Scalability, maintainability and reliabililty are the factors that make this system applicable to a real world assignment in the transport field.

1.3 Target User Profile and Tentative Elicitation Process

Target user profile: The target profile of users helps us to construe our audience for the E-Ticket application, and determine how the app should look, behave and feel. User needs are elicited through surveys,interviews and observations so that the final system is in line with real-world expectations and practices.

1.3.1 Target User

The E-Ticket is the app for people, who often have to use public transport on daily basis. These people typically are already savvy with smartphones and digital payments.

1.3.2 User profile

Table 1.3.1: User Profile for User

User Class	**Note on Characteristics**
Type of user	User
Age range	12-65
Frequency of use	Moderate to frequent
Mandatory	Optional for general travel; required for online ticket purchase
Computer experience	Optional for general users; mandatory for ticket booking and validation
Education	Secondary to higher education
goal	To easily purchase ticket
Language skills	English, Bangla
Number of users	Potentially thousands across multiple transport networks
Training	Minimal
Others system use	None

Way of working	Users interact via mobile app for booking, payment, and ticket validation

Table 1.3.2: User Profile for SuperAdmin

User Class	**Note on Characteristics**
Type of user	Super Admin
Age range	25-55
Frequency of use	Regular,Daily,Weekly or Monthly
Mandatory	Mandatory for system operation, user management and database maintenance
Computer experience	Advance
Education	Bachelor degree or Higher Education in IT.
goal	To oversee the entire system, manage users, monitor transactions, and maintain data integrity
Language skills	Proficient in English and Bengali
Number of users	Limited usually 1- 4.
Training	Requires short technical training to operate the admin dashboard securely
Others system use	May use server management tools, analytics dashboards, and database systems
Way of working	Works through a secured admin panel; performs monitoring, data updates, and access control

Table 1.3.3: User Profile for Counter

User Class	**Note on Characteristics**
Type of user	Counter
Age range	20-55 years
Frequency of use	Daily during operational hours

Mandatory	Mandatory for ticket generation, validation, and assisting passengers
Computer experience	Basic to intermediate comfortable with desktop or tablet interfaces
Education	Minimum HSC or equivalent qualification
goal	To manage ticket sales, verify passenger details, and ensure smooth transactions
Language skills	Fluent in Bengali; basic English understanding
Number of users	Multiple users across various ticket counters and stations
Training	Requires short training on system usage,
	data entry, and troubleshooting
Others system use	May use payment terminals or report management systems
Way of working	Operates from a fixed workstation; interacts with passengers and system interface regularly

Table 1.3.4: User Profile for Gate

User Class	**Note on Characteristics**
Type of user	Gate
Age range	20-45 years
Frequency of use	Continuous during working shifts
Mandatory	Mandatory for ticket validation and passenger entry management
Computer experience	Basic trained to use handheld devices or scanners
Education	Minimum SSC or equivalent

goal	To verify and validate passengers tickets quickly and accurately at the gate
Language skills	Fluent in Bengali; basic English understanding
Number of users	Several users stationed at different gates or checkpoints
Training	Short training on scanning, verifying digital tickets, and troubleshooting
Others system use	May use ticket scanning devices or mobile verification apps
Way of working	Works in real-time using QR scanners or the gate verification app to confirm valid tickets before allowing entry

1.3.3 Elicitation Process

1. Interviews

Face-to-face interviews were carried out for transport staff, system admins and regular passengers to understand problems in the current manual ticketing process. The interviews yielded valuable qualitative information, however it was sometimes difficult to make sense of certain responses. These problems were subsequently solved by individual inference and requirement redefinition.

a) Objective: To learn more from users and their operational difficulties.
b) Participants: Transport officers, ticket counter staff and general public.

2. Surveys and Questionnaires

An online and offline questionnaire was conducted among potential users to gain a quantitative view of the user expectations. While surveys allowed to determine some general trends concerning preferred booking channels or payment types, responses were often confusing. These results were then evaluated on a case by case basis and modified to adhere to realistic system limits.

a) Objectives To rapidly ask the broader public for user opions.

b) User: Passengers ranging from different age to different level of digital literacy.

3. Focus Group Analysis (Conceptual Review)

Formal group discussions were not held but feedback and discussion results from earlier implementations of similar systems were reviewed. From this information possible usability, security and interface design features were independently evaluated and developed.

a) Objective: To examine the conceptual design of prioritization of functionality and ease-ofuse enhancements.

4. Observation

In whole, the manual ticketing in those transportation areas were studied and the inadequacies as long-queuing, delay during transaction, No-error-and-hassle handling of record was noticed. These notes were to be a vital factor for the independent verification and verification of the functional requirements.

a) This identification of problems the user may not bring up explicitly reflects real-world issues.

5. Document Review

The researchers reviewed: past support requests, ticketing system logs all transaction and log records of issues historical user feedback A few areas for performance and automation improvement were found. This review helped provide independent validation and correction of system requirements.

a) One of the motivations for establishing a provably good baseline is to provide more credibility for requirement validation and comparison.

1.4Project Block Diagram

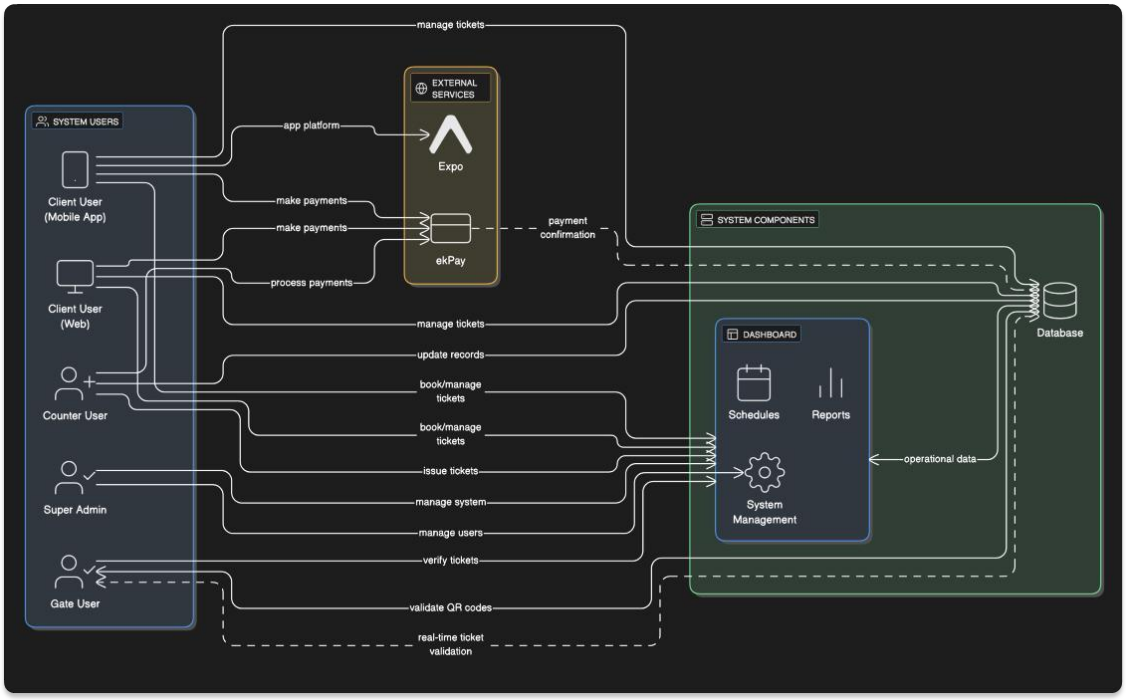


Figure 1.4.1: System Block Diagram

1.5 System Requirements

1.5.1 Hardware Requirements

I. A laptop with Intel Core i5, 8 GB memory and 256 TB SSD.

II. For server hosting: 2-4 vCPU, 4-8 GB RAM, 50 GB SSD.

III. Reliable internet access for online booking and database interaction.

1.5.2 Software Requirements

a) O**perating System:** Windows / Linux / macOS

b) MERN Stack:**MongoDB**,**Express.js**,**React.js,**Node.js

c) **Tools:** VS Code, Chrome browser

1.5.3 Constraints and Dependencies

a) System relies on internet connectivity for online booking and data synchronization.

b) Depends on Node. js server and mongodb databsase working fine.

c) QR scanning is limited by the capacity of the device's camera.

d) Offline support for Counter offline ticket booking only.

1.5Project Scheduling

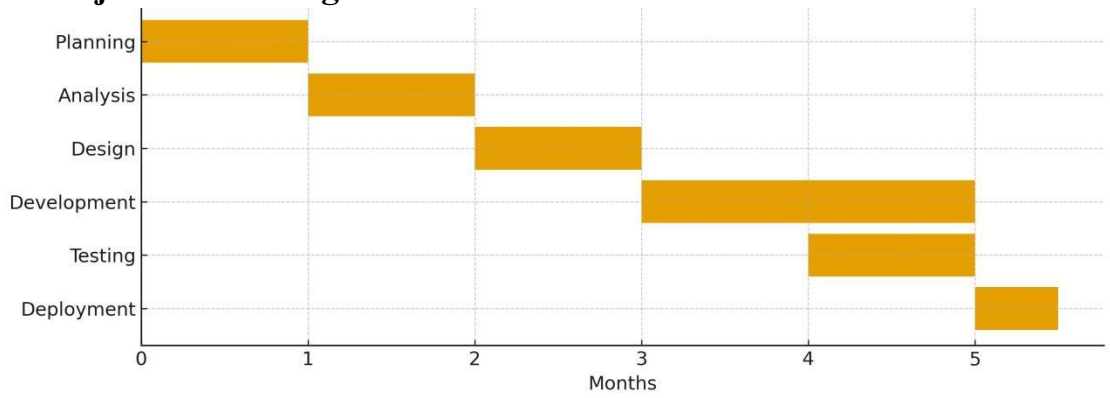


Figure 1.5.1: Project Scheduling Gantt Chart.

1.7 Summary

Design of a Digitalised Government Run Ticketsystem The E-Ticket is an advanced ticketsystem developed to enhance efficiency,transparency and easy access in the Railway ownedticketsystem. Ticketing in Bangladesh using manual system is very much time consuming and problematic for long assessment such as day long festival, event or show that lead to large queue inside the ticket sale points. Both online and offline ticketing options are made available on the platform for users to access it with or without internet.

The system is consistent with the government s Digital Bangladesh program by encouraging automation, integrated data storing, secure transaction and better service delivery. Highlights: Get to know ticket availability in real time, user authentication and management, admin rights control, offline counter ticketing and reports.

“Market demand and technology availability are there, the user is ready. It is likely, with more and more people making use of smartphones and opting for cashless transactions, that users will take to the system.

Technically, the system is built using React Native, Node. js, Express. js, MongoDB, React. js admin panel, JWT authentication and paymentgateway implementation.

E-Ticket is all-in-all a robust yet user friendly travel solution designed for passengers, counter staff and administrators. It improves convenience, reduces human error, makes sure that date is secure and also brings about the government's ambition for more "intelligent" public services.

CHAPTER 2

DESIGN AND IMPLEMENTATION

2.1 Introduction

Design: E-Ticket (TechDoc), is provides the technical specification for the E-Ticket platform. It describes Functional and Non-Functional Requirements, and out design models such as Use Case, Activity/Sequence diagram and Class Diagram to graphically display the behavior of the system. Finally, the ER Diagram illustrates a centralized database structure, which constitutes an appropriate architectural basis for the system realization.

2.2 Functional Requirements

Functional Requirements The functional requirements are the features, services and behavior provided by the E-Ticket to its users. These are the requirements that determine what the system does, such as that done by user's, administrative staff and counter operators. They support basic features such as user login/registration, event search/listing, and online/offline ticket buying/selling/event browsing, ticket management and data manipulation too.

By specifying these characteristics, functional requirements ensure that each element of the ETicket platform serves to meet its purpose and provides a seamless experience for all users.

FR01	**User Registration**
Description	There must be provision for adding of admin/manager/operator account (Super Admin, Gate Man, Counter Man) who will control the access of platform back end functions.
Stakeholder	Super Admin, Gate, Counter

FR02	**User Login**
Description	The system must have a secured authentication interface for authorised admistration and operator personnels to be able to log in and view their specific dashboards.
Stakeholder	Super Admin, Gate, Counter

FR03	**Change User Role**
Description	The Super Admin should be able to change (upgrade / downgrade) the access and role of any administrative or operator user on preference.
Stakeholder	Super Admin
FR04	**Book Ticket (Counter Reservation)**
Description	The system must allow for the Counter Man to look up services and hold a ticket slot for a user, temporarily store it once held before committing booking with final payment.
Stakeholder	Counter
FR05	**Buy Ticket (User Transaction)**
Description	The system shall support end-users (end-user) to browse through the available services, select one or more tickets and finally complete the order via a digital interface.
Stakeholder	User
FR06	**Print Ticket**
Description	The system should have the ability for authorized users (Super Admin and Counter) to be able print out a properly formatted ticket Physical Printout: Some customers would want to have their tickets printed on paper.
Stakeholder	Super Admin, Counter
FR07	**QR Code Scanning/Verification**
Description	Allowing the Gate to access a special interface for scanning and
	checking (validated/used) on the spot, in real time, the QR code of a digital or printed ticket at service point.
Stakeholder	Gate
FR08	**Offline Ticket**

Description	The application let the Counter issue tickets in offline state (or low connectivity), where data is saved offline and sync to central db when connection comes.
Stakeholder	Counter
FR09	**System Log Out**
Description	The solution needs to provide a way for all currently logged in admin and operator users to log off their session safely, thus also protecting system access.
Stakeholder	Super Admin, Gate, Counter

2.3 Non-Functional Requirements

Non-Functional Requirements describe the quality aspects, constraints and properties of the ETicket system but are not used to specify what we want the E-Ticket system to do. For a staterun platform though, you would expect nothing less than reliability, security and general effectiveness - this is a system that's supposed to be made accessible to the general public.

2.3.1 Performance

Description: The system will need to handle a high degree of responsiveness in both typical and can't miss situations so that users get not only quick response times, but also do not have to wait for multiple seconds or minutes when purchasing tickets.

Load Time: UI (online portal and counter interface) should open well within 3 seconds even at peak load.

Transaction Time: The transaction (ticket booking/purchasing/countering/QR scan verification) shall be achieved within 5 seconds.

Canthe solution scale to a minimum of5,000 simultaneoususers andprocess ticket sale peaks for large public events without degraded performance.

2.3.2 Reliability

Description: The system should have a long run time without any crashes, and ensure the integrity of the data as there is also this double functionality that we have online/offline.

Availability: The E-Ticket application must be available 99.5% on annual basis (exclusive of scheduled maintenance).

Disaster Recovery A proven backup and recovery strategy for the capture database must be readily and immediately available to restore it over a one hour window in order to achieve full system health following a major catastrophic event.

Consistent Database: Data synched from counters' offline operations must be combined seamlessly with the master database.

2.3.3 Portability

Description: Devices Typesuality must be designed take in account: device must work reliable (across enviroments, devices), with good acccessible level for public and operators.

Browser Compatibility: The citizen's web application has to work perfectly and display correctly in all modern browsers (Chrome, Firefox, Edge, Safari) and operating systems (Windows, MacOS, Android or iOS devices).

Responsiveness: The UI should be responsive - for desktop monitors, but also for tablets and mobile phones.

Platform Agnosticism: The underlying application and database should be constructed using a set of technologies that would allow for the possibility to shift to other server environments or cloud services in the future.

2.2.4 Security

Description: Since this is government based as well system handling public transaction, user sensitive data shouldbe secure and prevent unauthorized access the ensure security of ticket transactions.

Authentication & Authorization – All of the three types of user (Citizen, Counter Man, Super Admin) is passing strong Authentication and their access is supposed to be restricted one as per their pre-decided role(Role Based Access Control - RBAC).

Data Security: Sensitive information such as user credentials and transaction data have to be protected during transmission (using HTTPS/SSL) and while sitting in the database.

Fraud Protection: The system itself should feature some degree of protection (for example, purely cryptographically bound QR codes) against duplication and forgery of tickets as well as unauthorised use (e.g. scanning tickets multiple times).

2.2.5 Usability and Accessibility

Description: The system should have an intuitive experience applicable for all types of users and conducive to ensure access to all users, irrespective of their technical knowledge or connectivity, fulfilling the aim of digital inclusion.

Simple Interface: The online citizen interface, as well as the Counter Man's audience interface must be intuitively designed with an intuitive layout to reduce learning curves and avoid human error.

Offline support: The Counter Man interface doesn’t provide a visible indication that it's in offline mode and, once the connection is restored (Match-FR09), he should have some sort of confirmation that information was properly synched.

Language and Support: The system must be equipped for the primary national language (Bangla) of Bangladesh alongside English in order to reach a large number of citizens.

2.2.6 Maintainability

Definition: Code and architecture should be written clearly with modularity, and welldocumented source code for easy updates and bug fixes on the field without heavy operational downtime.

Modularity: The software should be decomposed into logically separate modules (For example User Management, Ticketing Module, Reporting Module etc.) for ease of maintenance and upgrade.

Documentation: Maintain thorough technical documentation on a code and architecture level as well as API endpoints to make it easy for new development teams to get started.

Configuration: Core system configuration elements (ticket prices, service routes, peak periods etc.) must be able to be configured through a centralised configuration interface exposed to the Super Admin that are maintained outside of code and do not require development changes for updates.

2.4Object-oriented System design using UML

2.4.1 Use Case Diagram

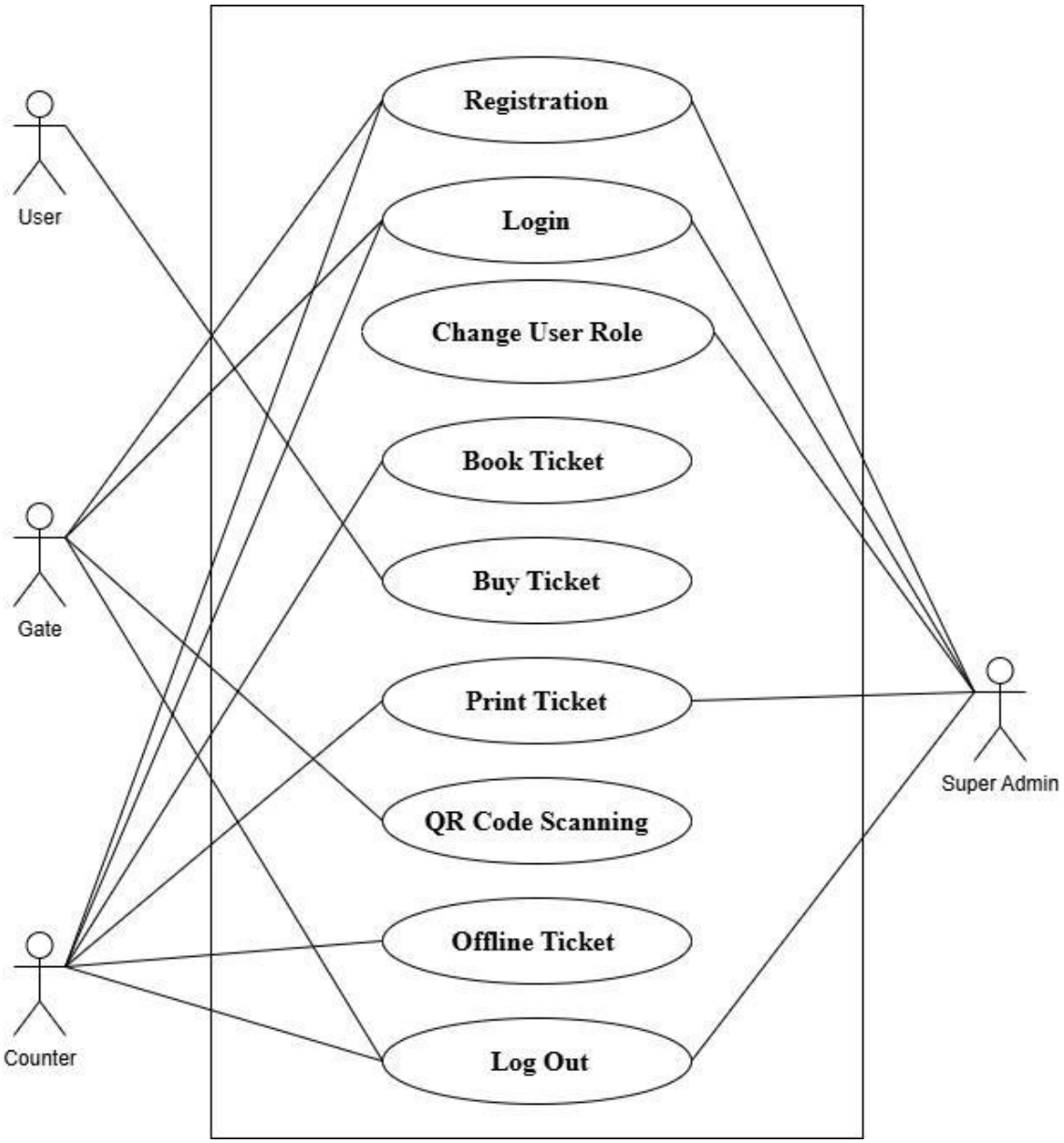


Figure 2.4: Use case Diagram

2.4.2 Case Description

Table2.4.1:Case Description-01: Registration

<table>
<tr><td>Use Case</td><td>Registration</td></tr>
<tr><td>Goal</td><td>Allow authorized users to create an account in the E-Ticket system.</td></tr>
<tr><td>Precondition</td><td>User must have valid identity and account creation permission.</td></tr>
<tr><td>Success End Condition</td><td>User account is successfully created and stored in the system.</td></tr>
<tr><td>Failed End Condition</td><td>Account creation fails due to invalid information or system error.</td></tr>
<tr><td>Primary Actors:
Secondary Actors:</td><td>Super Admin
Gate, Counter</td></tr>
<tr><td>Trigger</td><td>User selects the “Registration” option in the system.</td></tr>
<tr><td>Description / Main Success Scenario</td><td>
<table>
<tr><td>1.</td><td>User opens the registration form.</td></tr>
<tr><td>2.</td><td>System displays required fields.</td></tr>
<tr><td>3.</td><td>User enters personal and role-based information.</td></tr>
<tr><td>4.</td><td>System validates all inputs.</td></tr>
<tr><td>5.</td><td>System creates a new user profile.</td></tr>
<tr><td>6.</td><td>System confirms successful registration.</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Alternative Flows</td><td><table>
<tr><td>1.1</td><td>Required fields missing</td></tr>
<tr><td></td><td>1.1.a. System prompts user to fill all mandatory fields.</td></tr>
<tr><td>4.1</td><td>Invalid or incomplete data</td></tr>
<tr><td></td><td>4.1.a. System shows error message.</td></tr>
<tr><td>5.1</td><td>Username already exists</td></tr>
<tr><td></td><td>5.1.a. System asks user to choose another username.</td></tr>
<tr><td>6.1</td><td>System failure</td></tr>
<tr><td></td><td>6.1.a. Registration process restarts or user retries.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>The user Will fill up all the details in 5 minutes.</td></tr>
</table>

Table2.4.2:Case Description-02: Login

Use Case	Login
Goal	Allow registered users to access their dashboard.
Precondition	User must be registered in the system.
Success End Condition	User is successfully authenticated.
Failed End Condition	Login denied due to wrong credentials.
Primary Actors: Secondary Actors:	Super Admin, Gate, Counter None
Trigger	User selects “Login” on the system interface.

<table>
<tr><td>Description / Main
Success
Scenario</td><td><table>
<tr><td>1.</td><td>User opens login page.</td></tr>
<tr><td>2.</td><td>User enters username and password.</td></tr>
<tr><td>3.</td><td>System validates credentials.</td></tr>
<tr><td>4.</td><td>System authenticates the user.</td></tr>
<tr><td>5.</td><td>System redirects to role-based dashboard.</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>2.1</td><td>Missing credentials</td></tr>
<tr><td></td><td>2.1.a. System requests user to enter details.</td></tr>
<tr><td>3.1</td><td>Wrong credentials</td></tr>
<tr><td></td><td>3.1.a. System shows “Invalid Login.”</td></tr>
<tr><td>4.1</td><td>Account blocked</td></tr>
<tr><td></td><td>4.1.a. System displays access denied.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>The system will validate credentials within 5 seconds.</td></tr>
</table>

Table2.4.3:Case Description-03: Change Role

Use Case	Change Role
Goal	Allow Super Admin to modify the role of a registered user.
Precondition	User must already exist in the system.
Success End Condition	Role updated successfully.
Failed End Condition	Role change fails due to invalid input or system issue.
Primary Actors: Secondary Actors:	Super Admin Gate, Counter
Trigger	Super Admin selects “Change Role” option.

<table>
<tr><td>Description / Main
Success
Scenario</td><td><table>
<tr><td>1.</td><td>Super Admin opens the user list.</td></tr>
<tr><td>2.</td><td>System displays all users.</td></tr>
<tr><td>3.</td><td>Super Admin selects a user.</td></tr>
<tr><td>4.</td><td>Super Admin chooses a new role.</td></tr>
<tr><td>5.</td><td>System updates role in database.</td></tr>
<tr><td>6.</td><td>System confirms role modification.</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>3.1</td><td>User not found</td></tr>
<tr><td></td><td>3.1.a. System shows error.</td></tr>
<tr><td>4.1</td><td>Invalid role</td></tr>
<tr><td></td><td>4.1.a. System shows warning.</td></tr>
<tr><td>5.1</td><td>Database error</td></tr>
<tr><td></td><td>5.1.a. System rejects change.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>Role change must be completed in under 30 seconds.</td></tr>
</table>

Table2.4.4:Case Description-04: Book Ticket

Use Case	Book Ticket
Goal	Allow Counter Man to book tickets for citizens at the counter.
Precondition	Ticket availability must exist. permission.
Success End Condition	Ticket is successfully booked and stored.
Failed End Condition	Booking fails due to unavailability or error.
Primary Actors: Secondary Actors:	Counter User
Trigger	Counter selects “Book Ticket.”

<table>
<tr><td>Description / Main
Success
Scenario</td><td><table>
<tr><td>1.</td><td>Counter opens ticket booking interface.</td></tr>
<tr><td>2.</td><td>System displays available tickets.</td></tr>
<tr><td>3.</td><td>Counter selects desired ticket.</td></tr>
<tr><td>4.</td><td>System checks availability.</td></tr>
<tr><td>5.</td><td>System books the ticket.</td></tr>
<tr><td>6.</td><td>System generates booking confirmation.</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>2.1</td><td>No available tickets</td></tr>
<tr><td></td><td>2.1.a. System shows "Sold Out."</td></tr>
<tr><td>4.1</td><td>Ticket already booked</td></tr>
<tr><td></td><td>4.1.a. System redirects to new selection.</td></tr>
<tr><td>5.1</td><td>Booking failure</td></tr>
<tr><td></td><td>5.1.a. System retries or cancels.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>Ticket must be booked in less than 1 minute.</td></tr>
</table>

Table2.4.5:Case Description-05: Buy Ticket

Use Case	Buy Ticket
Goal	Allow citizens to buy tickets digitally.
Precondition	Citizen must have access to the platform.
Success End Condition	Ticket is purchased successfully.
Failed End Condition	Payment or selection fails.
Primary Actors: Secondary Actors:	User None
Trigger	User clicks “Buy Ticket.”

<table>
<tr><td>Description / Main
Success
Scenario</td><td><table>
<tr><td>1.</td><td>User views available tickets.</td></tr>
<tr><td>2.</td><td>User selects a ticket.</td></tr>
<tr><td>3.</td><td>System checks availability.</td></tr>
<tr><td>4.</td><td>User confirms purchase.</td></tr>
<tr><td>5.</td><td>System processes the order.</td></tr>
<tr><td>6.</td><td>System generates digital ticket.</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>3.1</td><td>Ticket unavailable</td></tr>
<tr><td></td><td>3.1.a. System shows error.</td></tr>
<tr><td>5.1</td><td>System error</td></tr>
<tr><td></td><td>5.1.a. Purchase fails.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>Purchase process must complete within 2 minutes.</td></tr>
</table>

Table2.4.6:Case Description-06: Print Ticket

Use Case	Print Ticket
Goal	Allow printing of tickets when needed.
Precondition	Ticket must be booked or purchased.
Success End Condition	Ticket is printed successfully.
Failed End Condition	Printing fails due to system or printer errors.
Primary Actors: Secondary Actors:	Super Admin, Counter User
Trigger	User selects “Print Ticket.”

Description / Main Success Scenario	1. User opens ticket details. 2. System displays ticket. 3. User selects print option. 4. System sends ticket to printer. 5. Printer prints ticket.
Alternative Flows	3.1 Printer not connected 3.1.a. System shows alert. 4.1 Printing error 4.1.a. Retry option provided.
Quality Requirements	Print must be generated within 10 seconds.

Table2.4.7:Case Description-07: QR Scan

Use Case	QR Scan
Goal	Verify ticket validity at gate.
Precondition	Ticket must contain a valid QR code.
Success End Condition	Ticket verified and user allowed to enter.
Failed End Condition	Invalid QR or system-denied entry.
Primary Actors: Secondary Actors:	Gate User
Trigger	Gate Man scans QR code.

<table>
<tr><td>Description / Main
Success
Scenario</td><td><table>
<tr><td>1.</td><td>Gate opens scanner.</td></tr>
<tr><td>2.</td><td>Scanner reads QR.</td></tr>
<tr><td>3.</td><td>System checks ticket validity.</td></tr>
<tr><td>4.</td><td>System approves entry.</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>2.1</td><td>QR unreadable</td></tr>
<tr><td></td><td>2.1.a. Request rescan.</td></tr>
<tr><td>3.1</td><td>Ticket invalid</td></tr>
<tr><td></td><td>3.1.a. Deny entry.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>QR scan must complete within 2 seconds.</td></tr>
</table>

Table2.4.8:Case Description-08: Offline Ticket Book

Use Case	Offline Ticket Book
Goal	Allow ticket booking without an internet connection.
Precondition	System must support offline mode.
Success End Condition	Ticket stored locally and synced later.
Failed End Condition	Local storage error.
Primary Actors: Secondary Actors:	Counter User
Trigger	Counter selects “Offline Book Ticket.”

<table>
<tr><td>Description / Main
Success
Scenario</td><td><table>
<tr><td>1.</td><td>System switches to offline mode.</td></tr>
<tr><td>2.</td><td>Counter enters ticket details.</td></tr>
<tr><td>3.</td><td>System stores data locally.</td></tr>
<tr><td>4.</td><td>System generates temporary confirmation.</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>2.1</td><td>Missing details</td></tr>
<tr><td></td><td>2.1.a. System requests completion.</td></tr>
<tr><td>3.1</td><td>Storage full</td></tr>
<tr><td></td><td>3.1.a. System denies booking.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>Offline booking must complete within 1 minute.</td></tr>
</table>

Table2.4.9:Case Description-09: Logout

Use Case	Logout
Goal	Securely log out the user from the system.
Precondition	User must be logged in.
Success End Condition	User session ends successfully.
Failed End Condition	Session remains active due to system error.
Primary Actors: Secondary Actors:	Super Admin, Gate, Counter None
Trigger	User clicks the “Logout” option.

<table>
<tr><td>Description / Main
Success
Scenario</td><td><table>
<tr><td>1.</td><td>User selects logout.</td></tr>
<tr><td>2.</td><td>System ends session.</td></tr>
<tr><td>3.</td><td>System redirects user to login page.</td></tr>
</table></td></tr>
<tr><td>Alternative Flows</td><td><table>
<tr><td>2.1</td><td>System error</td></tr>
<tr><td></td><td>2.1.a. System notifies user and attempts session termination again.</td></tr>
</table></td></tr>
<tr><td>Quality Requirements</td><td>Logout must occur within 3 seconds.</td></tr>
</table>

2.4.3 Activity Diagram

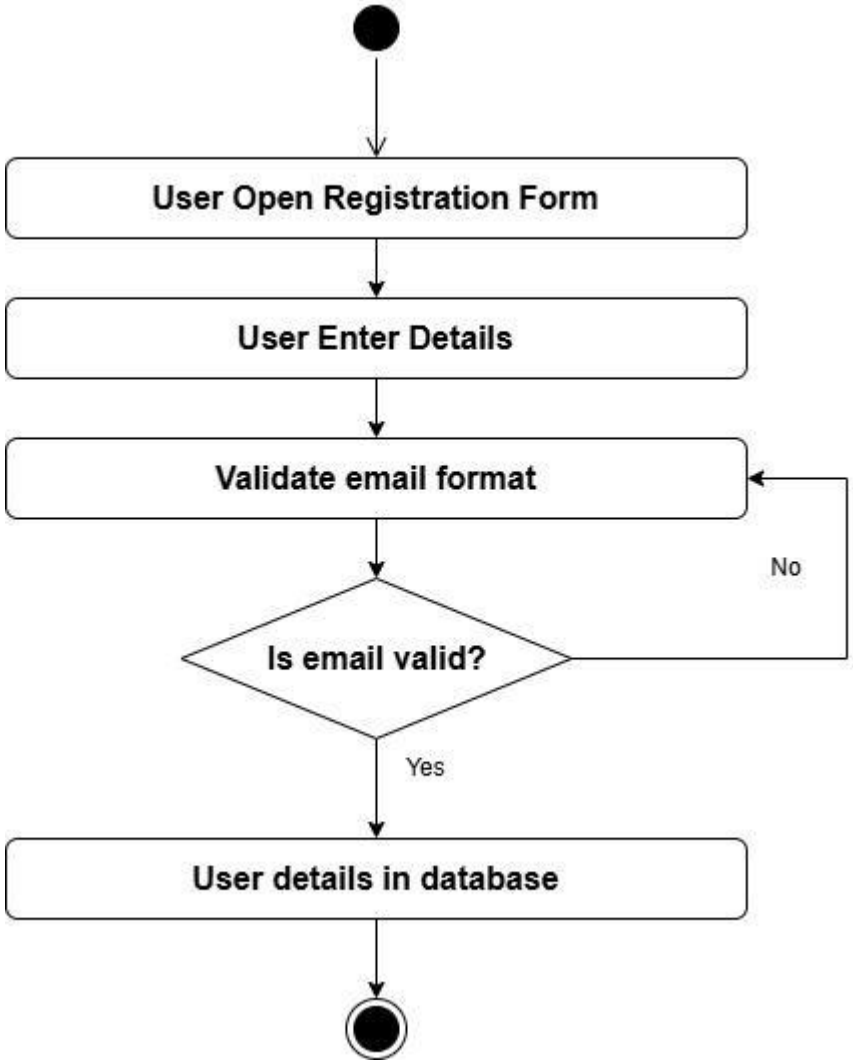


Figure 2.4.1: Activity Diagram for User Registration

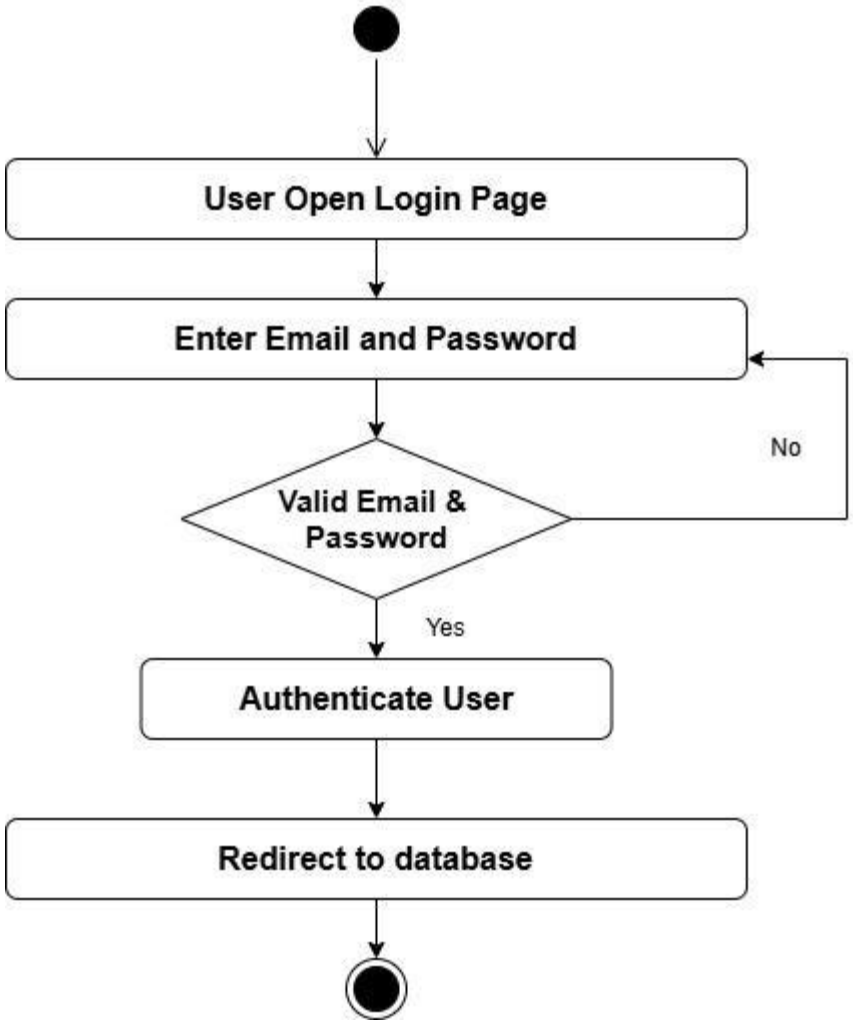


Figure 2.4.2: Activity Diagram for User Login

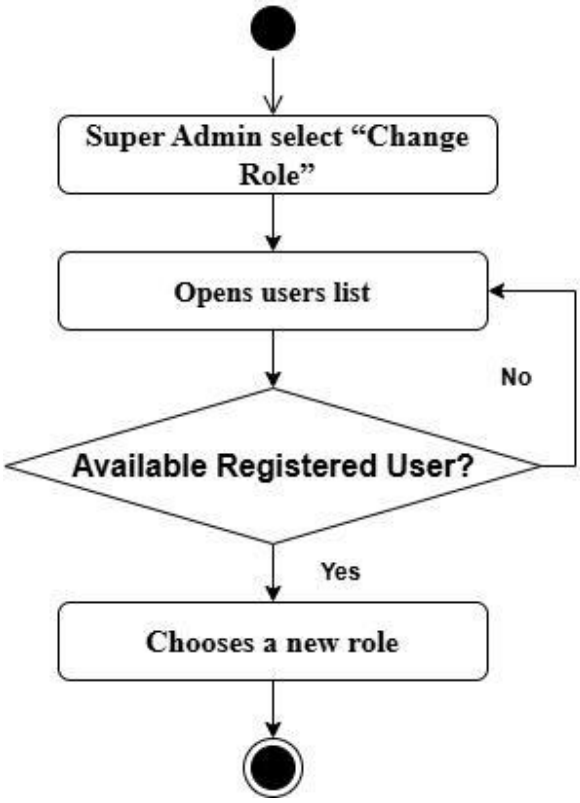


Figure 2.4.3: Activity Diagram for Change Role

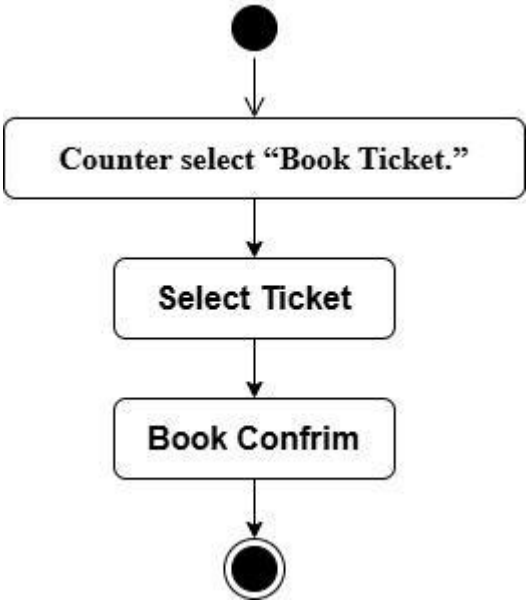


Figure 2.4.4: Activity Diagram for Book Ticket

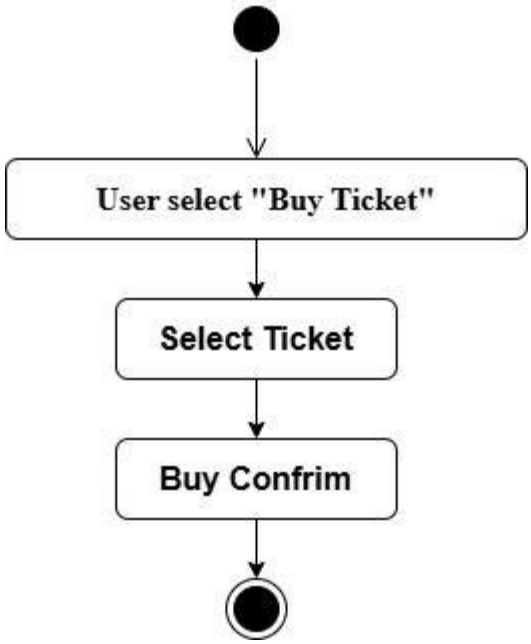


Figure 2.4.5: Activity Diagram for Buy Ticket

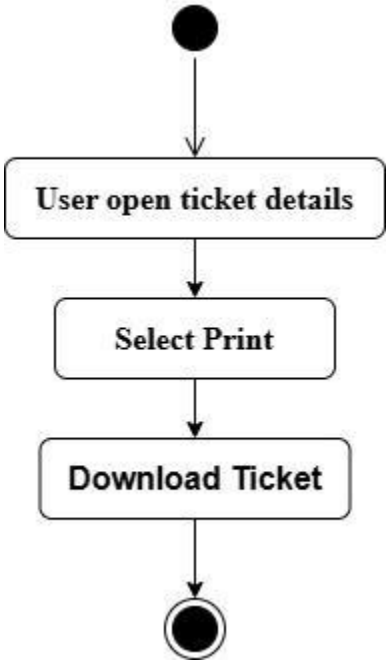


Figure 2.4.6: Activity Diagram for Print Ticket

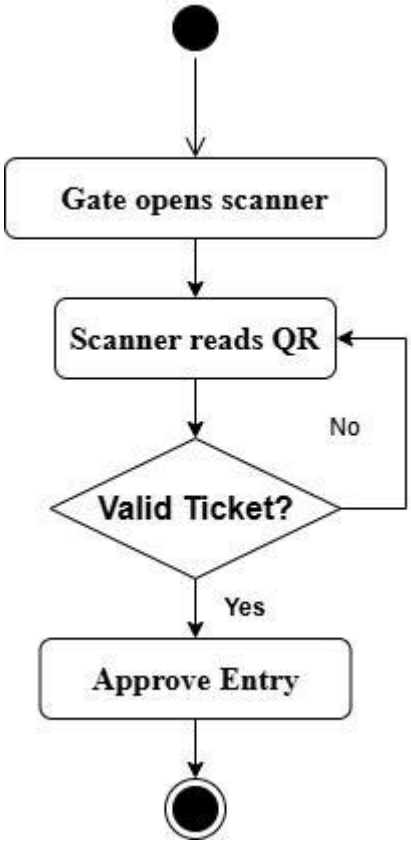


Figure 2.4.7: Activity Diagram for QR Code Scanning

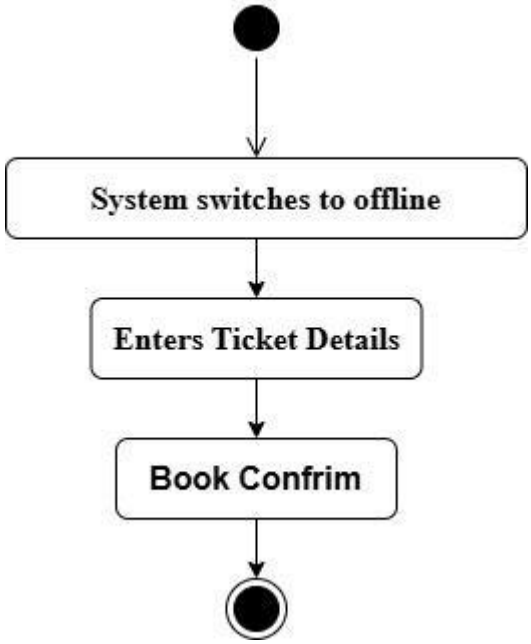


Figure 2.4.8: Activity Diagram for Offline Ticket Book **2.4.4**

Sequence Diagram

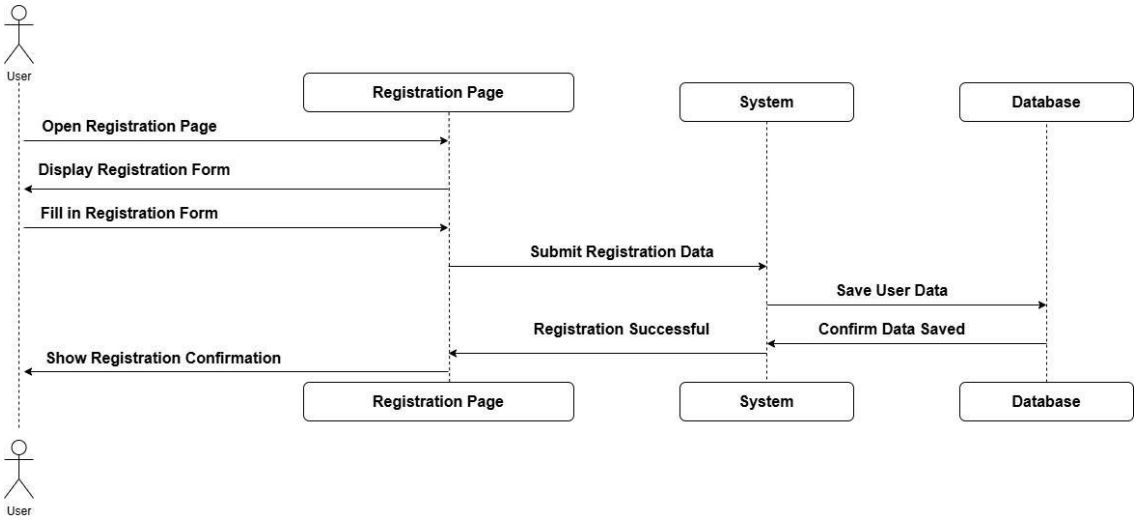


Figure 2.4.9: Sequence Diagram for User Registration

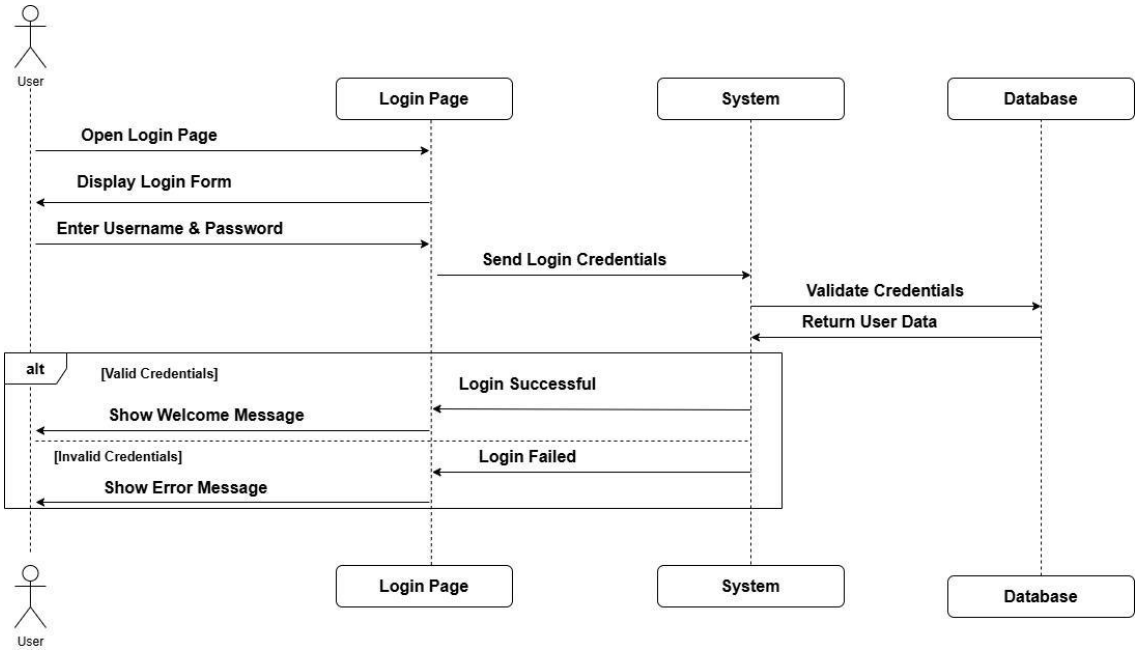


Figure 2.4.10: Sequence Diagram for User Login

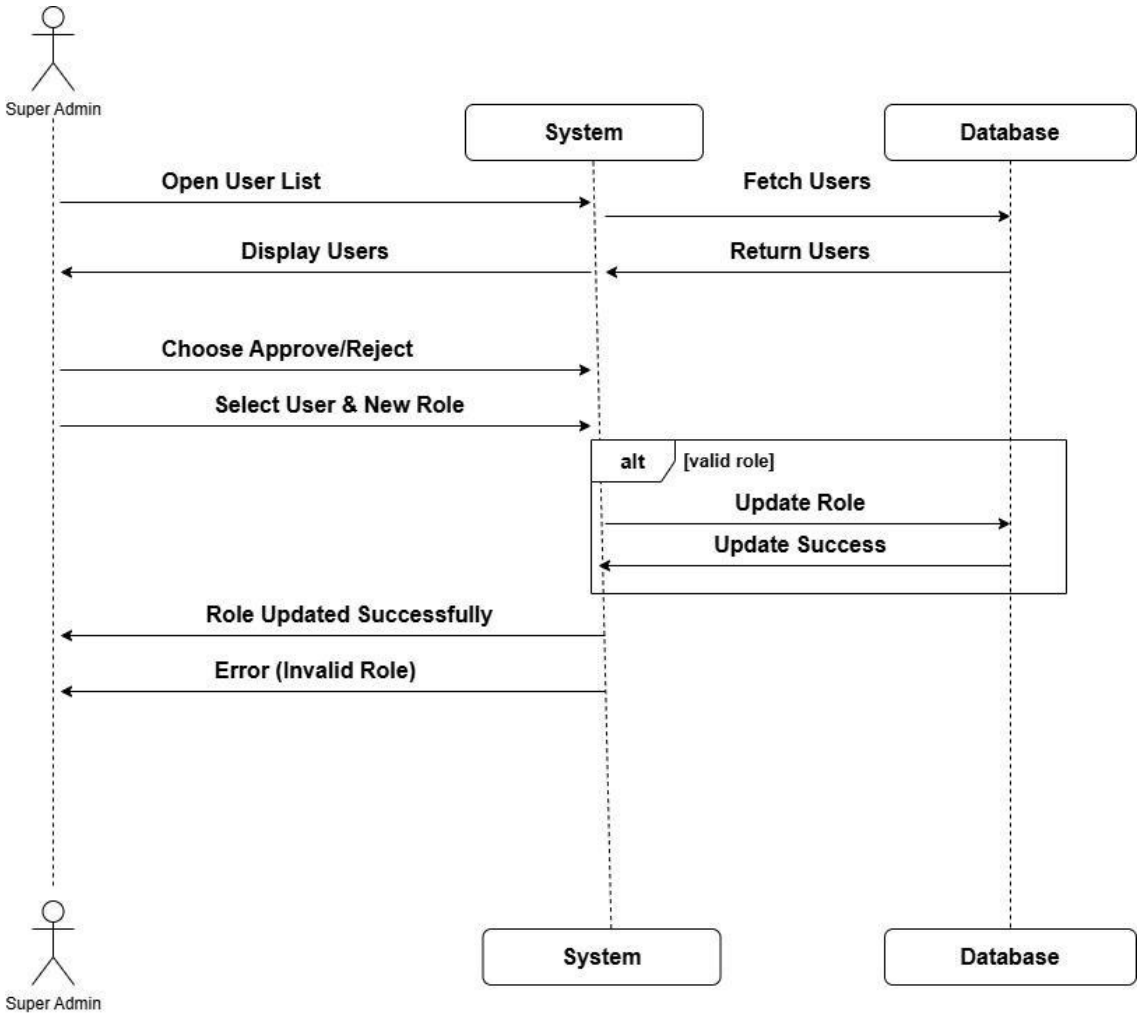


Figure 2.4.11: Sequence Diagram for Change Role

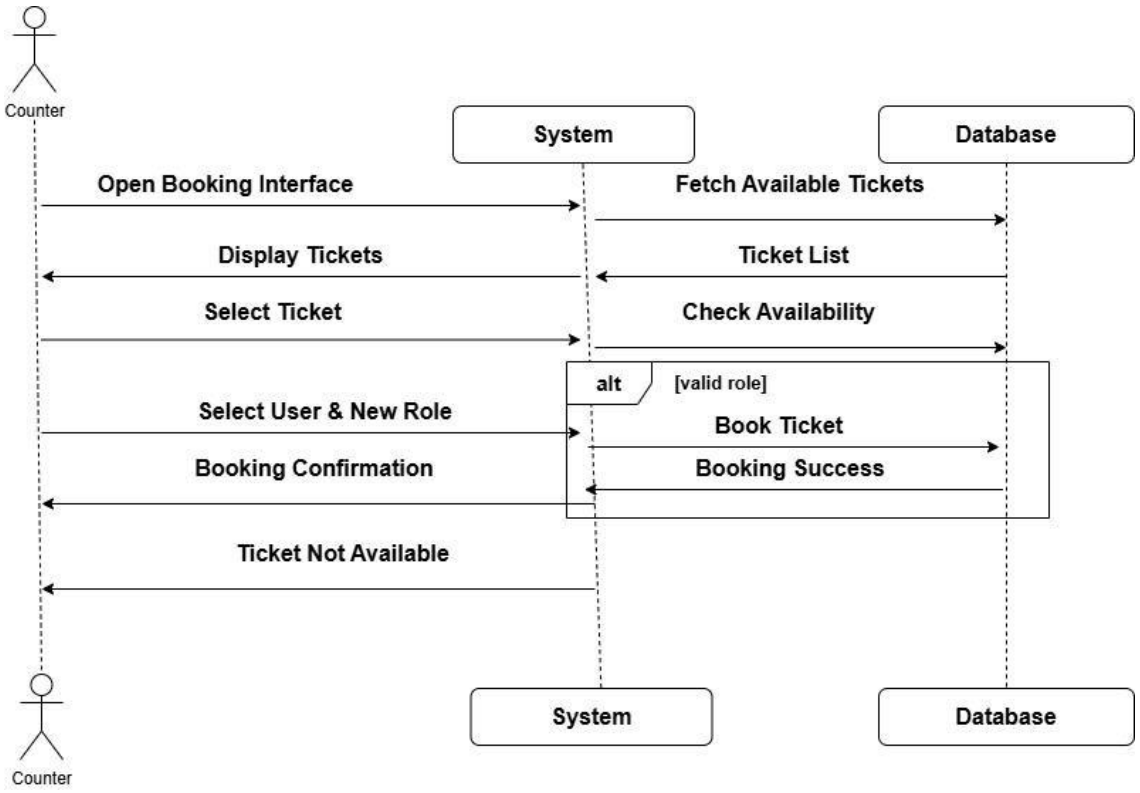


Figure 2.4.12: Sequence Diagram for Book Ticket

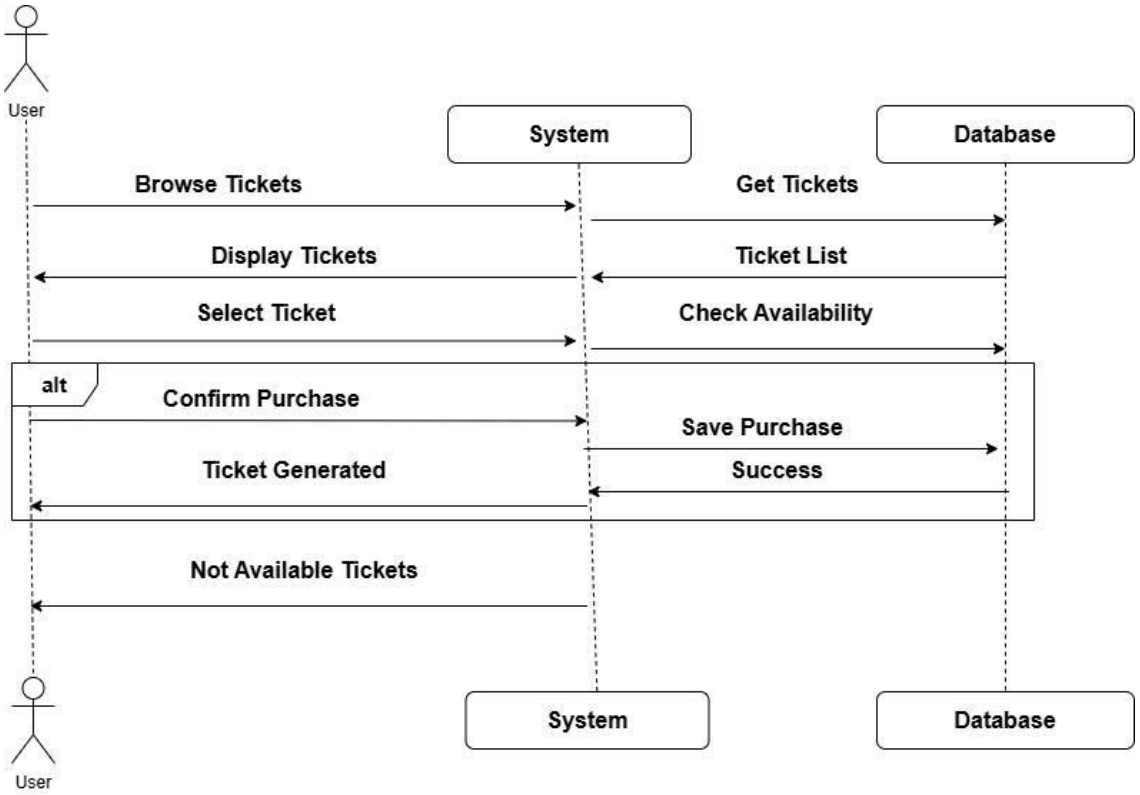


Figure 2.4.13: Sequence Diagram for Buy Ticket

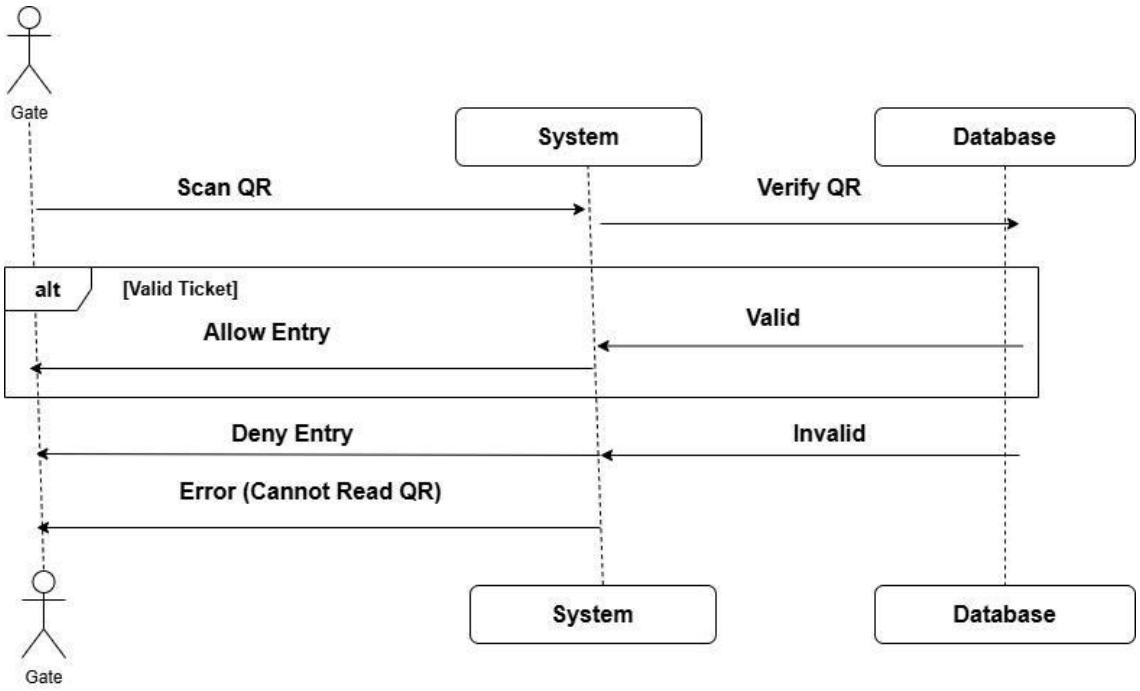


Figure 2.4.14: Sequence Diagram for QR Code Scanning

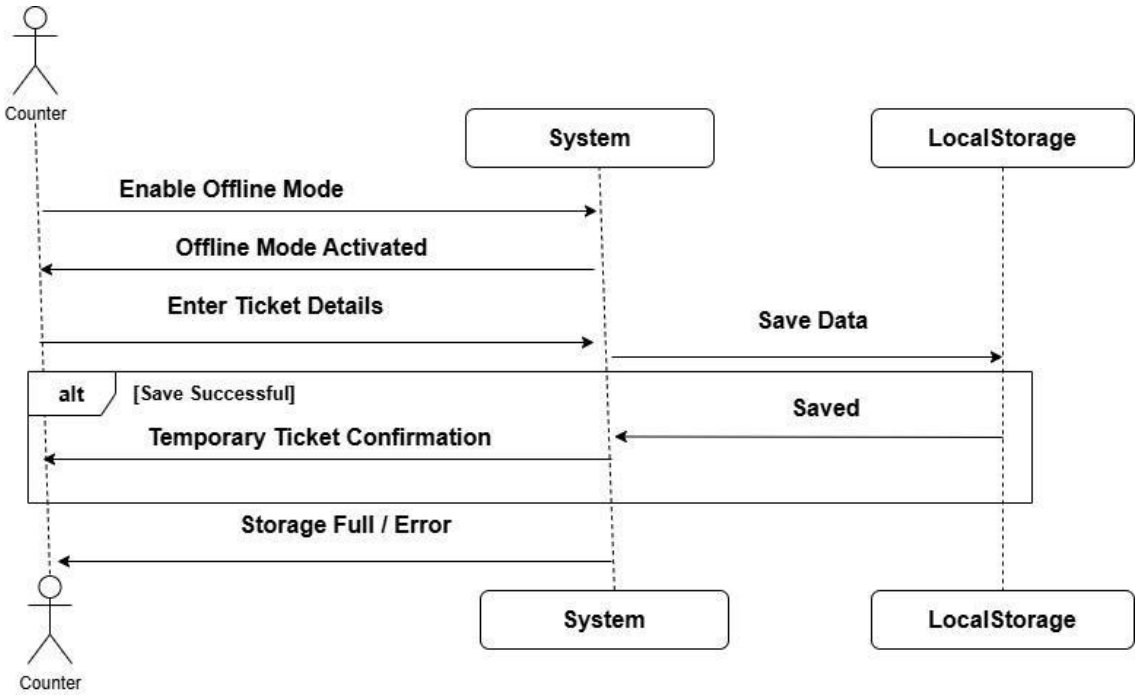


Figure 2.4.15: Sequence Diagram for Offline Ticket

2.4.5 ER Diagram

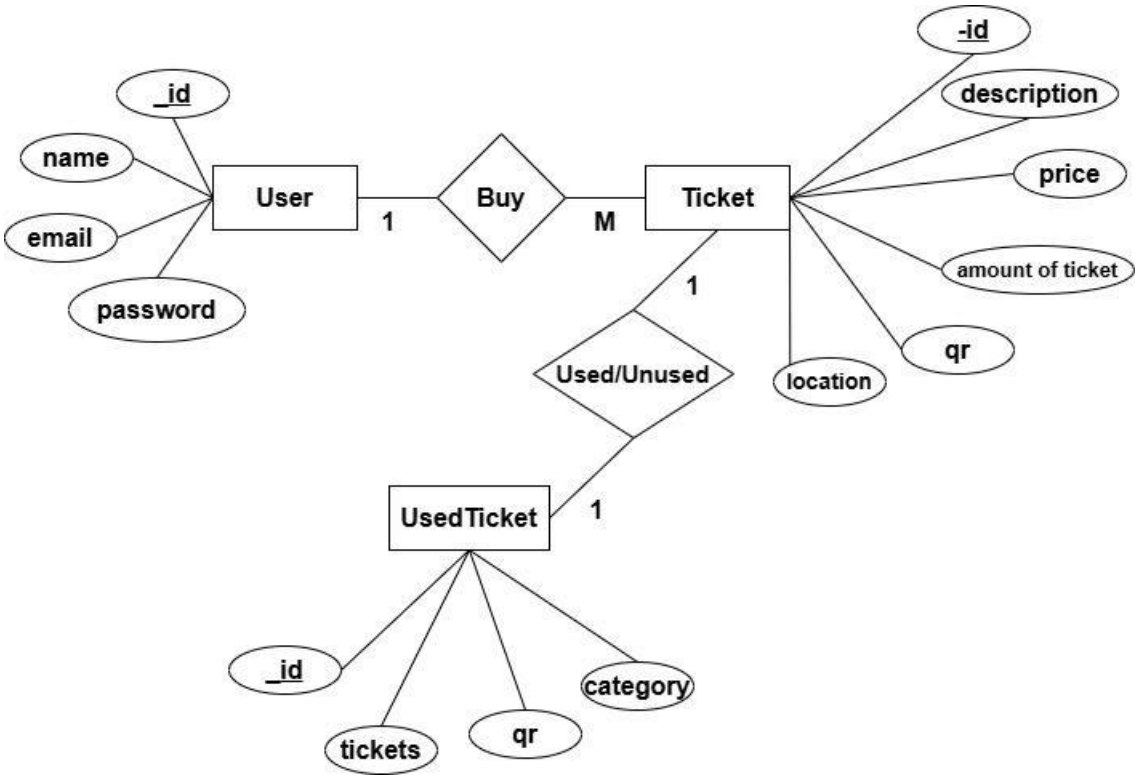


Figure 2.4.16: Entity Relationship Diagram for E-Ticket

2.5 Summary

The E-Ticket system's technical plan is described in detail within the Design and Implementation chapter. It specifies the Functional and Non-Functional Requirements which will direct the behaviour, performance, and quality of this system. With design models, such as Use Case, Activity, and Sequence diagrams and the chapter shows how the various system devpents interact and function. Also, ER Diagram represents how the data will be stored in a central database so as to fulfill these constraints. The combin ation of these components creates the architectural base through which a system can be developed, integrated and deployed.

Chapter 3

Software Testing

3.1 Introduction

Testing Testing is an important step in developing the E-Ticket system to make sure it is running as it should and user will able to run reliablly, efficient and secure. The testing purpose is to find errors, test the function and validate that system meets user's and business requirements. ETicket being a digital ticket for government services, these testing make sure of the functionality from online as well as offline ticket booking processes, user identification and administrative activities.

The functions of the system to be tested include user registration, login, ticket reservation application, offline issuance and identification by QR code as well as management based on input from coordinator or hosts. By critically assessing each module, the system will ensure a flowless and error free experience to both citizens and operators while still ensuring data integrity, security and accessibility.

3.2 Testing Features

3.2.1 Feature to Be Tested

a. User Registration.
b. User Login.
c. Book Ticket.
d. Buy Ticket.
e. QR Validation

3.3 Testing Strategies

3.3.1 Test Approach

The E-Ticket solution will be thoroughly and systematically tested to guarantee that the system works well and fulfils both user- and business needs. The first step of testing is unit testing in which each module such as user registration, login, ticket booking; QR code scanning etc are tested individually for correctness. Integration testing after the components are unit-tested to make sure each of the modules works well with one another (e.g., that online ticket booking updates your central database correctly, or when counter operator does offline bookings and internet came back, it synched well). System testing

then occurs where the whole solution, fully integrated, is tested against full system requirements – functional and non-functional which would range from performance to security and reliability under both normal load conditions through to peak condition. User Acceptance Testing is also performed, where real users (citizens, counter operators and administration) are able to 'use' the application to check whether it is userfriendly, accessible and matches what is needed out in the 'real world'. Toward the end of the development cycle, regression testing takes place to ensure that new code does not destabilize legacy systems, performance testing is conducted to throttle test peak load, security testing confirms that data is secure, access controls are enforced as expected based on user type and ticket transactions are protected from tampering.

3.3.2 Pass/Fail Criteria

The testing pass or fail of the E-Ticket system has benchmarks that are to be achieved. A test case passes if the module or system operates as expected, resulting in all outputs being appropriate (ticket confirmation, user notifications, QR code verification). Appropriate security and role-based access cannot be compromised in the system, and performance targets, such as load times, transaction processing rates are expected to be maintained by such systems. Offline ticketing must be able to synchronise effectively with the central database when connectivity is re-established. On the other hand, a test case is considered failed if unwanted or unexpected behavior is produced by the system; when security and access controls are not respected or broken; when offline and online records mismatch. Failure is considered to be a crash, freeze, or an error (e.g: unhandled exception) that causes the application to terminate without meeting the application's performance requirements. Every unsuccessful test is documented and researched, corrected and retested until it works well according to the defined pass criteria a product of high reliability, security and ease-of-use.

3.4 System Testing (Test Cases with Report)

Table 3.4.1: Test Case Report for User Registration.

Test Case: 3.4.1	**Test Case Name: User Register**

System: E-Ticket	Subsystem: User Authentication
Designed by:Sazzad Hossen Anik	**Design Date: 22-11-2025**
Executed by: Sazzad Hossen Anik	**Execution Date: 22-11-2025**

Description: The user registers for the "E-Ticket" system by providing valid registration information.

Pre-condition: The user accesses the registration page.

Test ID	Name	Email	Password	Response	Pass/Fail	Comment
1	Sazzad Hossen Anik	sazzad@gmail.com	123456	Registration successfully	Pass	The user registration is successful with valid information
2		sazzad@gmail.com	123456	Name field empty	Fail	User must input a name
3	Sazzad Hossen Anik		123456	Email field empty	Fail	User must input a email

4	Sazzad Hossen Anik	sazzad@gmail.com		Password field empty	Fail	User must input password
Post-condition: The user is successfully registered and registration process is considered successful with valid information.						

Table 3.4.2: Test Case Report for User Login.

Test Case: 3.4.2			**Test Case Name: User Login**			
System: E-Ticket			**Subsystem: User Authentication**			
Designed by:Sazzad Hossen Anik			**Design Date: 22-11-2025**			
Executed by: Sazzad Hossen Anik			**Execution Date: 22-11-2025**			
Description: The registered user logs into the E-Ticket system.						
Pre-condition: The user has valid registration credentials.						
Test	**Name**	**Email**	**Passwo**	**Respons**	**Pass/F**	**Comment**

ID			rd	e	ail	
1	Sazzad Hossen Anik	sazzad@gmail.com	123456	Login Successful	Pass	User is redirected to the dashboard.
2	Sazzad Hossen Anik	sazzad@gmail.com	12345	Invalid credentials	Fail	Incorrect password; login denied.
3	Sazzad Hossen Anik		123456	Email field empty	Fail	User must input a email
4	Sazzad Hossen Anik	sazzad@gmail.com		Password field empty	Fail	User must input password
Post-condition: The user logged in with valid data, or received the appropriate error message with invalid input.						

Table 3.4.3: Test Case Report for Book Ticket

Test Case: 3.4.3	Test Case Name: Book Ticket

System: E-Ticket				Subsystem: Ticket Book		
Designed by:Sazzad Hossen Anik				Design Date: 22-11-2025		
Executed by: Sazzad Hossen Anik				Execution Date: 22-11-2025		
Description: The user purchases a ticket online through the E-Ticket system.						
Pre-condition: The user is logged in and browsing available services.						
Test ID	**Service**	**Date/Time**	**Seat**	**Response**	**Pass/Fail**	**Comment**
1	Ticket Sell	22/11/2025, 10:00 AM	10	Ticket Book	Pass	Ticket booking successfully
2	Ticket Sell	22/11/2025, 12:00 PM		Payment Failed	Fail	Not Available Tickets
Post-condition: The ticket book is completed successfully						

Table 3.4.4: Test Case Report for Buy Ticket

Test Case: 3.4.4	Test Case Name: Buy Ticket
System: E-Ticket	Subsystem: Ticket Buy
Designed by:Sazzad Hossen Anik	Design Date: 22-11-2025

Executed by: Sazzad Hossen Anik				Execution Date: 22-11-2025		
Description: The user purchases a ticket online through the E-Ticket system.						
Pre-condition: The user is logged in and browsing available services.						
Test ID	**Service**	**Date/Time**	**Seat**	**Response**	**Pass/Fail**	**Comment**
1	Ticket Sell	22/11/2025, 10:00 AM	10	Ticket Purchased	Pass	Ticket purchased successfully
2	Ticket Sell	22/11/2025, 12:00 PM		Payment Failed	Fail	Not Available Tickets
Post-condition: The ticket purchase is completed successfully						

Table 3.4.5: Test Case Report for QR Validation

Test Case: 3.4.5	**Test Case Name:** Ticket Validation
System: E-Ticket	**Subsystem:** Ticket Validation
Designed by:Sazzad Hossen Anik	**Design Date: 22-11-2025**

Executed by: Sazzad Hossen Anik				Execution Date: 22-11-2025	
Description: The Gate Man scans and verifies the validity of digital tickets using QR codes.					
Pre-condition: The user must have a valid ticket.					
Test ID	**Ticket Type**	**QR Code**	**Response**	**Pass/Fail**	**Comment**
1	Digital	Valid QR	Ticket Verified	Pass	The physical ticket QR is scanned successfully.
2	Digital	Expired QR	Ticket Expired	Fail	The system correctly identifies expired tickets.

3	Digital	Already Used QR	Ticket Invalid	Fail	The system prevents reuse of the same ticket.
4	Digital	Damaged	Scan Error	Fail	QR code cannot be read
Post-condition: The ticket is verified successfully if valid, or rejected if invalid, expired, or previously used.					

3.5 Summary

The E-Ticket system was thoroughly tested to have all functionalities run smoothly and securely. Functional &Non- functional requirements were thoroughl y tested by ensuring key features User Registration, User Login, Ticket Booking, Ticket Buy, QR& Code Verification are systematically tested. The testing methodology was unit/integration/system/user acceptance testing that provided 100% coverage of the entire platform, and clear pass/fail criteria were established to determine successful completion. Reports of the results of system testing show how each feature reacts to valid and invalid input and how the typical loading (load time is important) is borne by this evidence. In general, the testing chapter beared the rough winds and confirmed E-Ticket is feature-complete, easy to use and safe for deployment as it provides warning/necessary error reports.

Chapter 4

Deployment and Maintenance

4.1 Introduction

This chapter describes deployment, management and maintenance of the\\newl E-Ticket System after software development. Deployment -It is about to host the MERN application in server, connect the database and expose application to user. Maintaining the system to support regular updates, bug fixing, monitoring of performance and functionality enhancements. This chapter explains the procedures that were carried out to deploy, run and evolve a system.

4.2 Try to follow the SRLC (software release life cycle)

The development plan is structured as per Software Requirement Lifecycle (SRLC) framework to make the development process organized, systematic and efficient. SRLC helped steer the project from idea to realization through identifying project phases, providing clarity on each phase in development. Definition of objectives and deliverables for all the phases, such as requirement collection, analysis, design, implementation, testing and maintenance.

With the use of SRLC, this project was able to maintain steady progress and narrowed down on ambiguous requirements and enhanced coherency between team members. This organized methodology also provided for early discovery of risk, a more thorough examination of user needs, and the resultant system had few deviances from the intended functional and nonfunctional requirements. In general, the application of SRLC helped to improve project quality, reliability and maintainability.

Chapter 5

User Manual

5.1 Introduction

The E-Ticket User Manual, with simple, clear 'how-to' instructions for utilizing all system options. It is developed to assist Super Admin, Counter, Gate and Users role types in order to easily access their respective features within the system. The manual includes accessing the system, management of accounts, booking and paying for tickets, scanning of QR-codes through the application along with other administrative capabilities. The goal is for everyone to be able to use the platform by working through exercises and activities without running into technical roadblocks.

5.2 Project Functionalities

Login

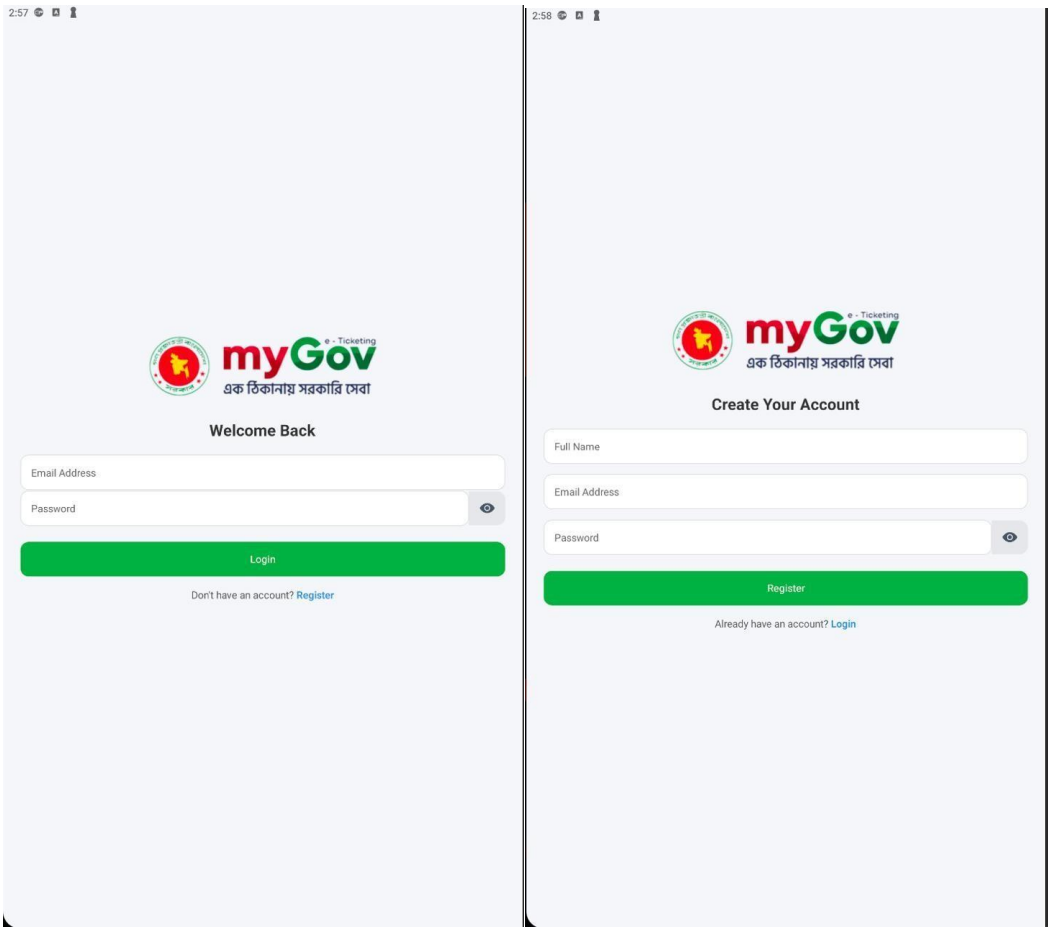


Figure 5.2.1: Login.

Super Admin Dashboard **Assign Role**

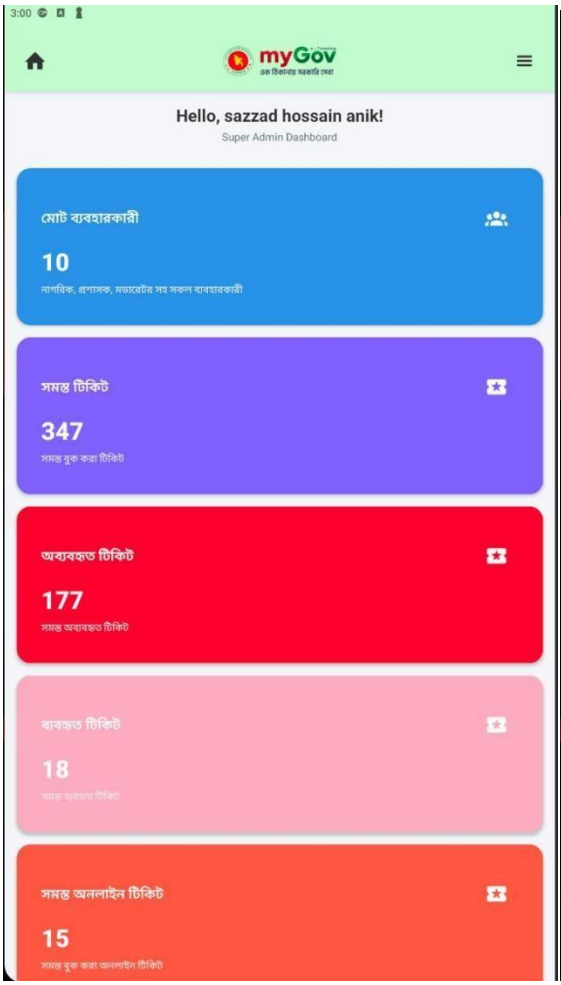


Figure 5.2.2: Super Admin Dashboard.

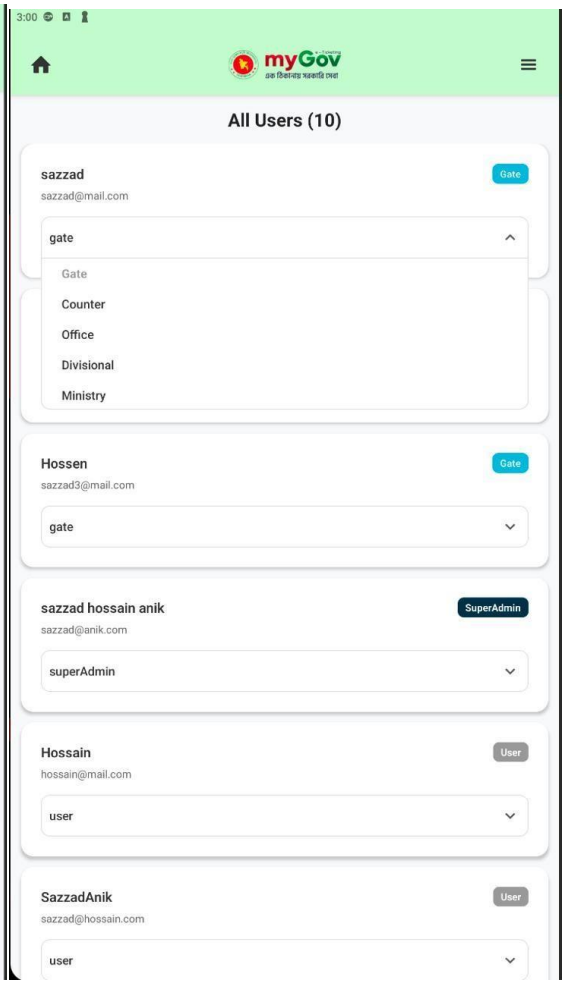
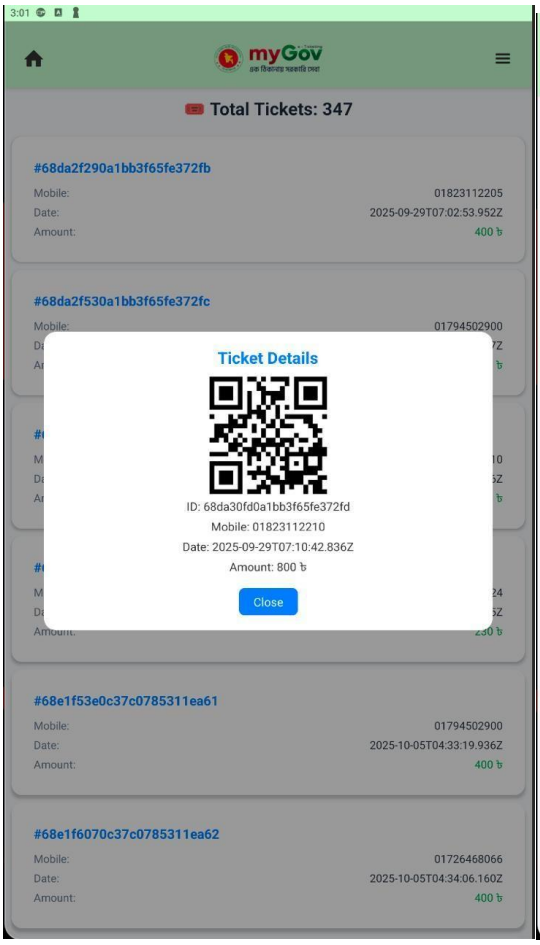


Figure 5.2.3: Assign Role.

Ticket Example **Counter Dashboard**



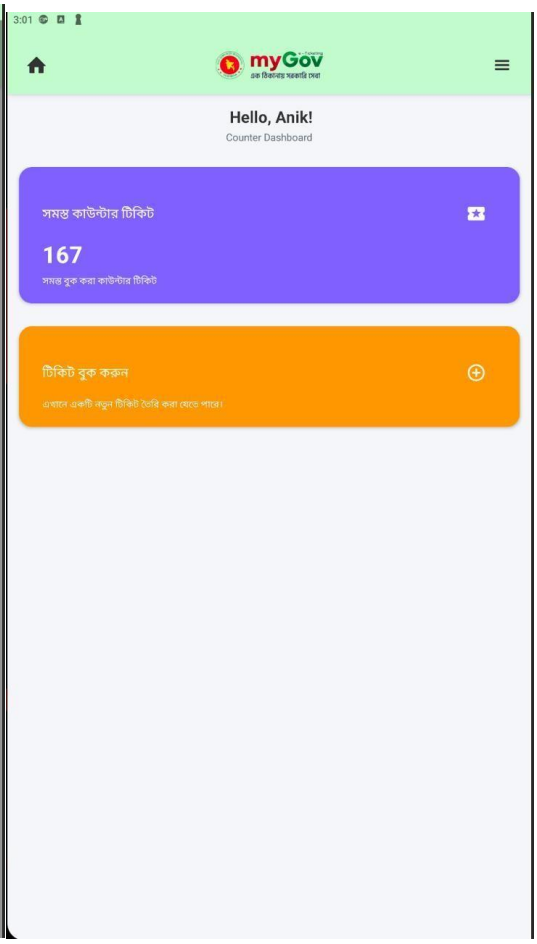


Figure 5.2.4: Ticket Example . **Figure 5.2.5: Counter Dashboard.**

Counter Ticket Book **Users Landing Page**

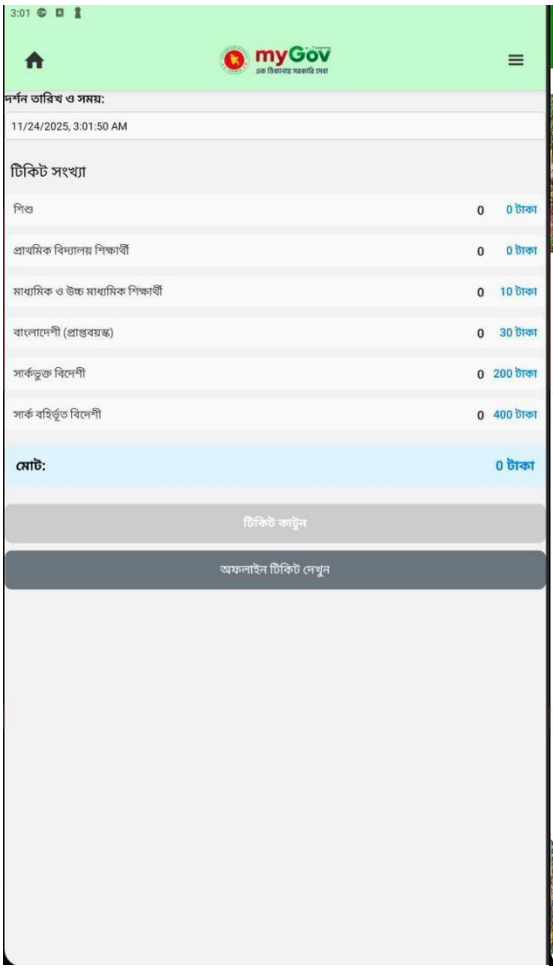
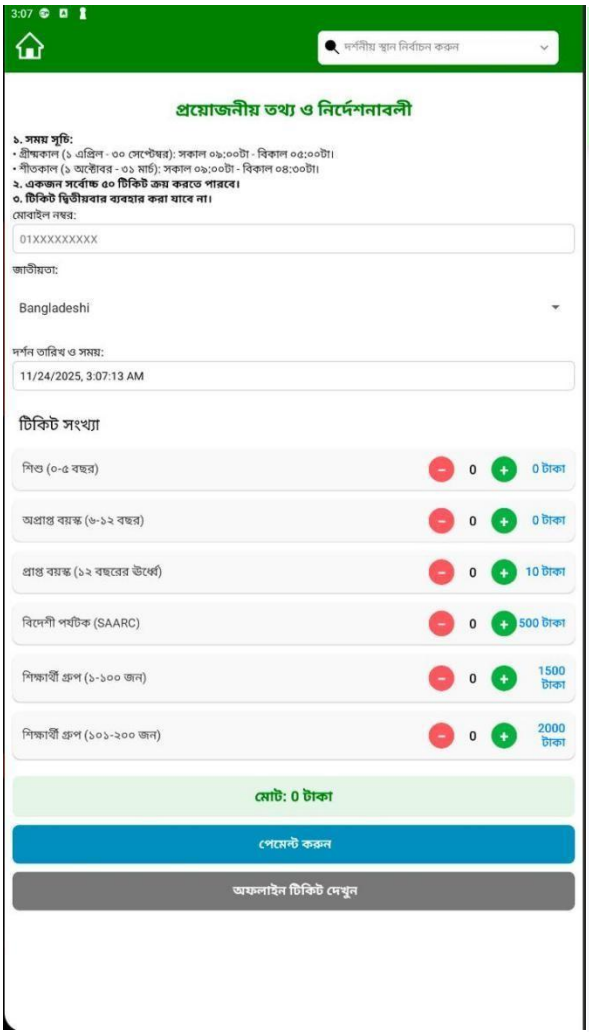


Figure 5.2.6: Counter Ticket Book.

Figure 5.2.7:Users Landing Page.

Online Ticket Book **Gate Dashboard**



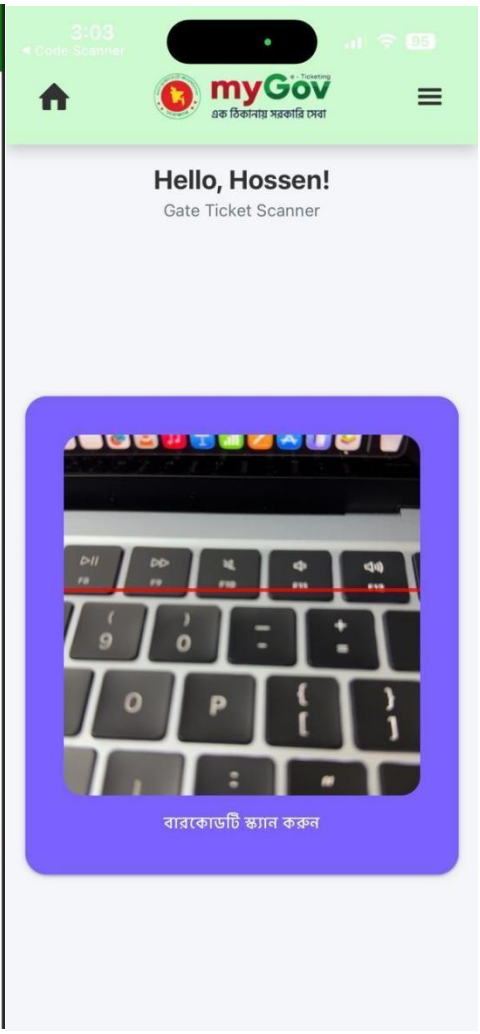
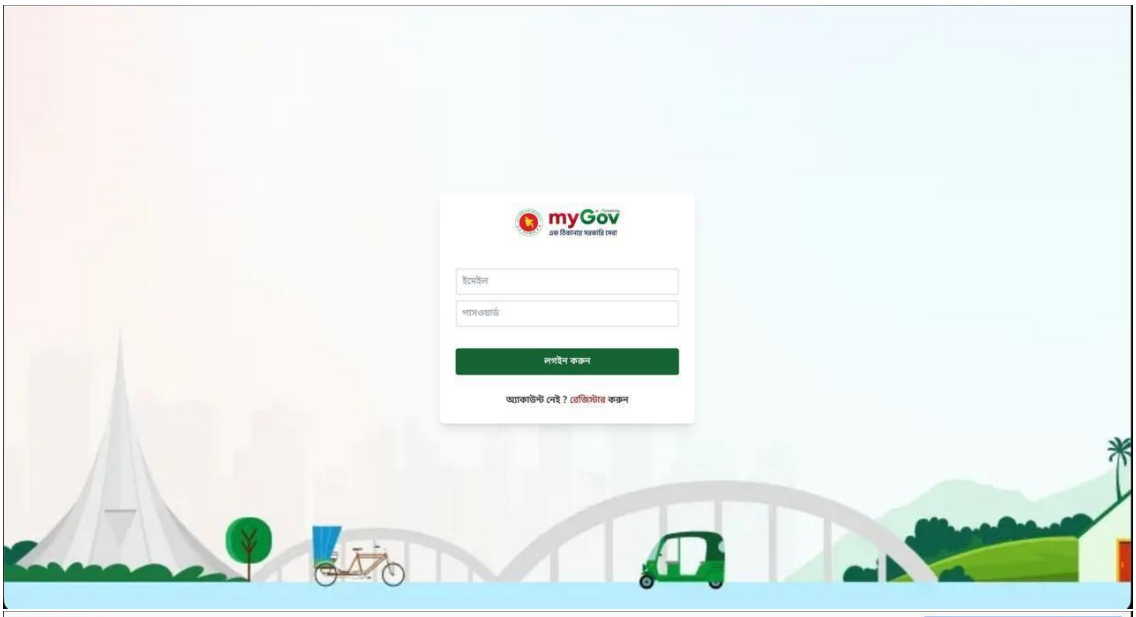
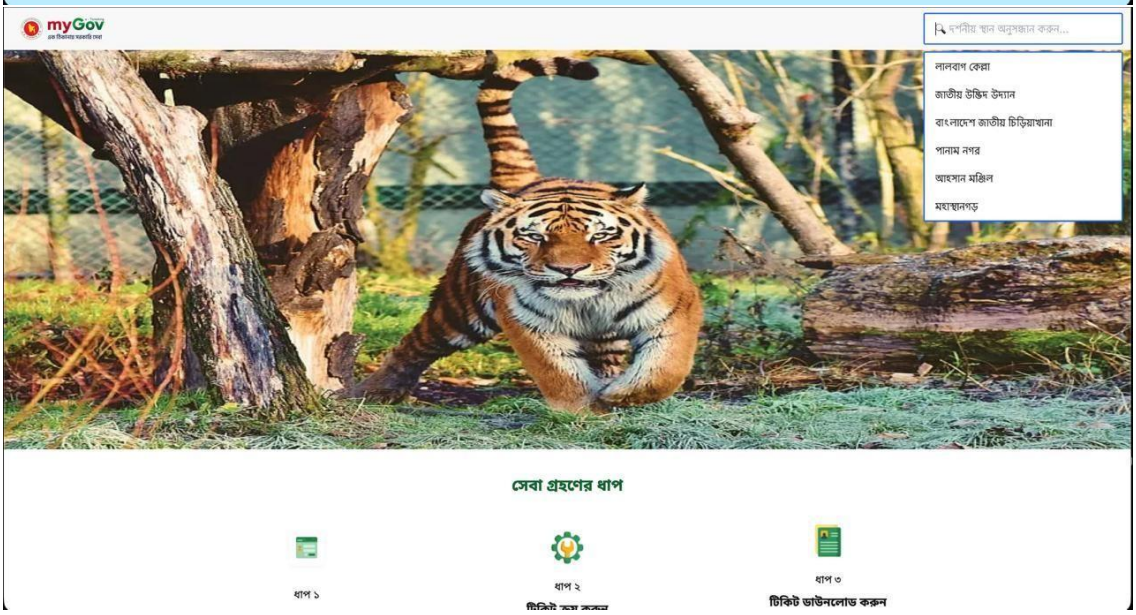
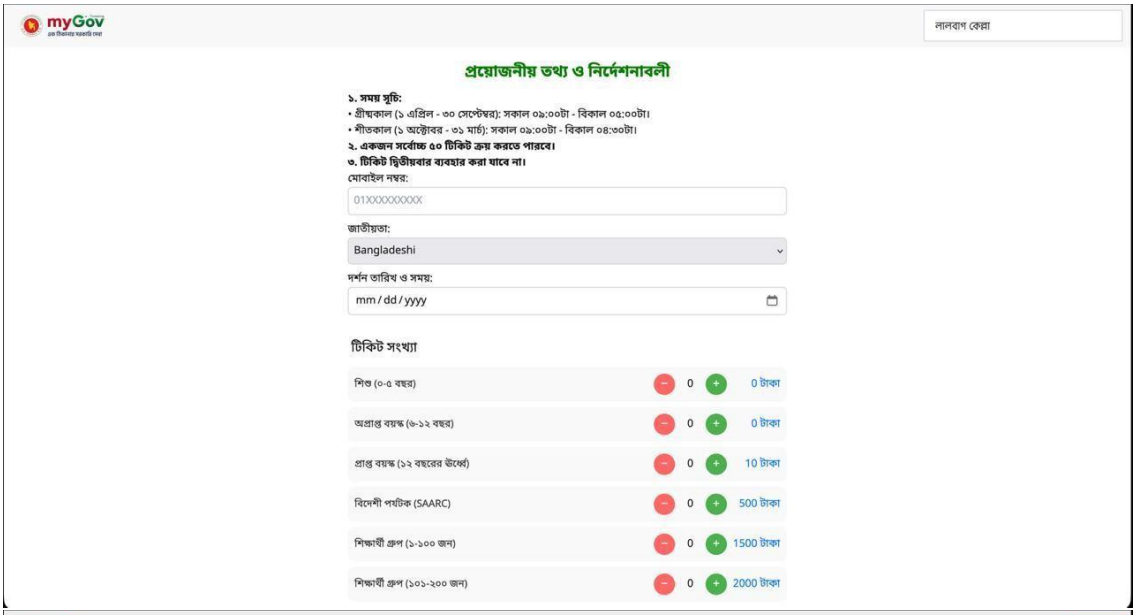


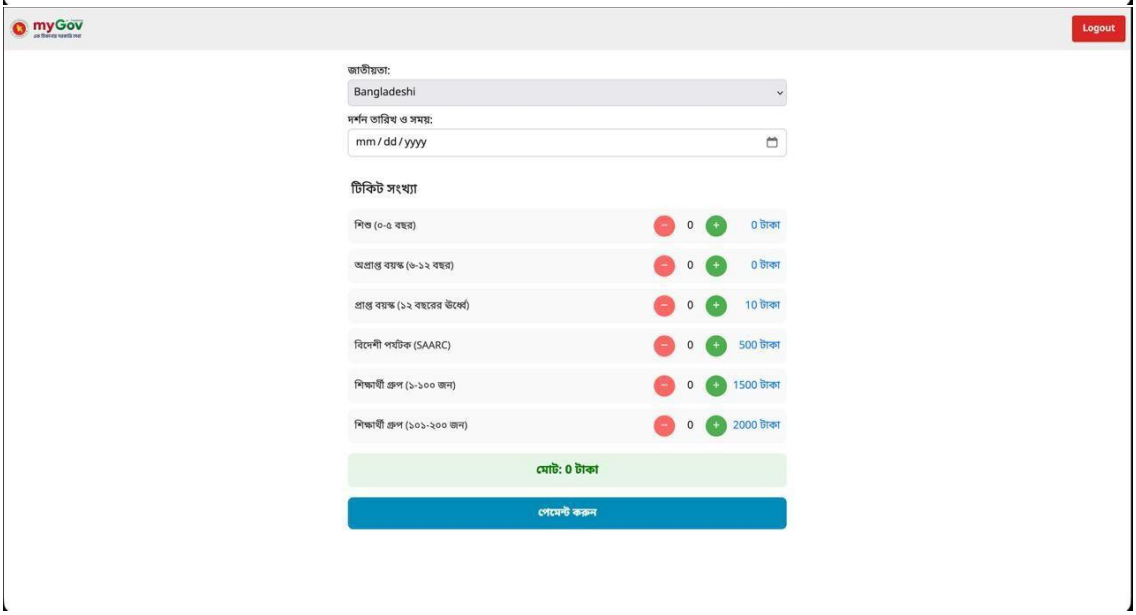
Figure 5.2.8: Online Ticket Book . **Figure 5.2.9: Gate Dashboard.**

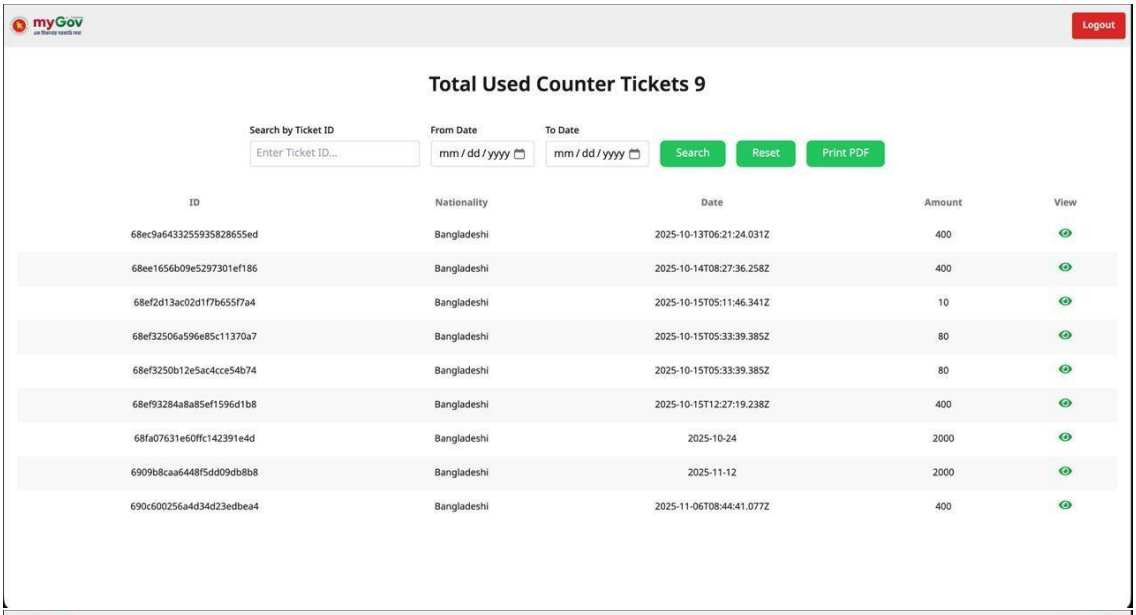
Web Version Examples

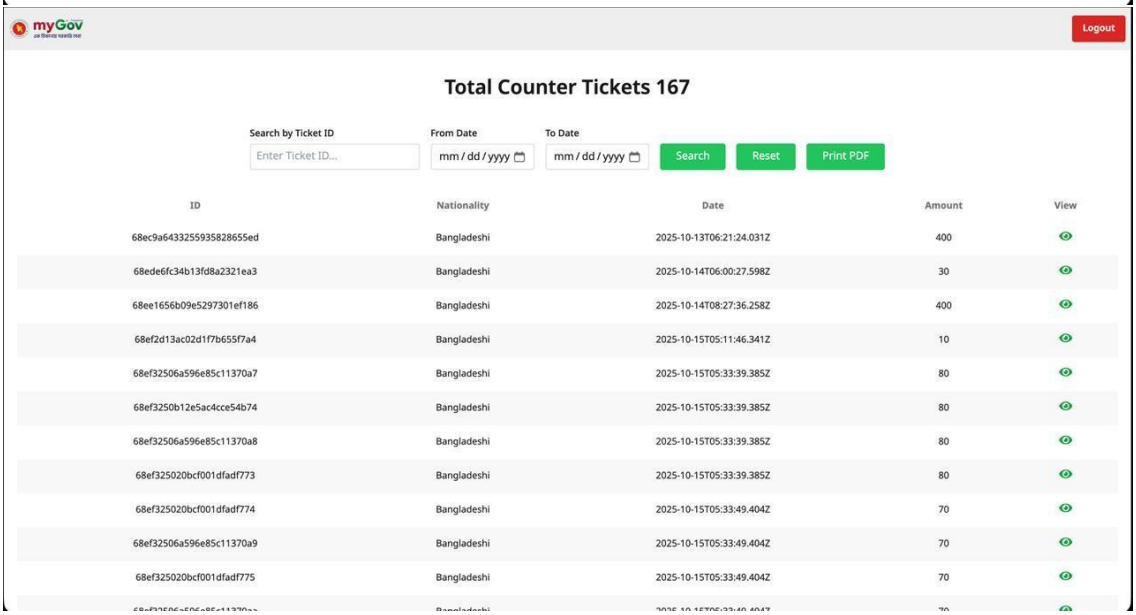


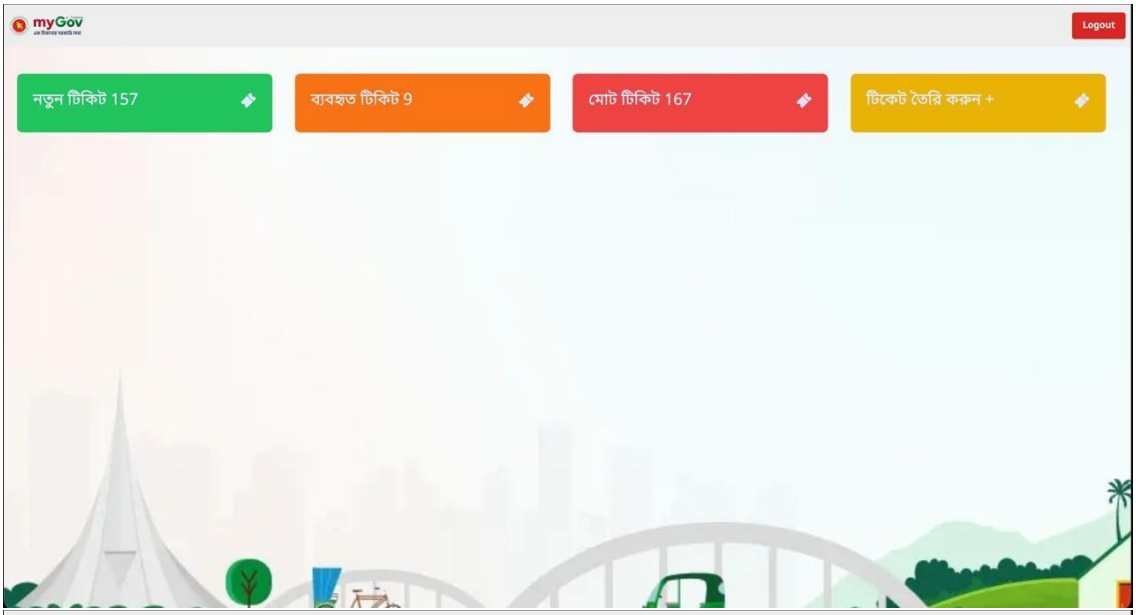


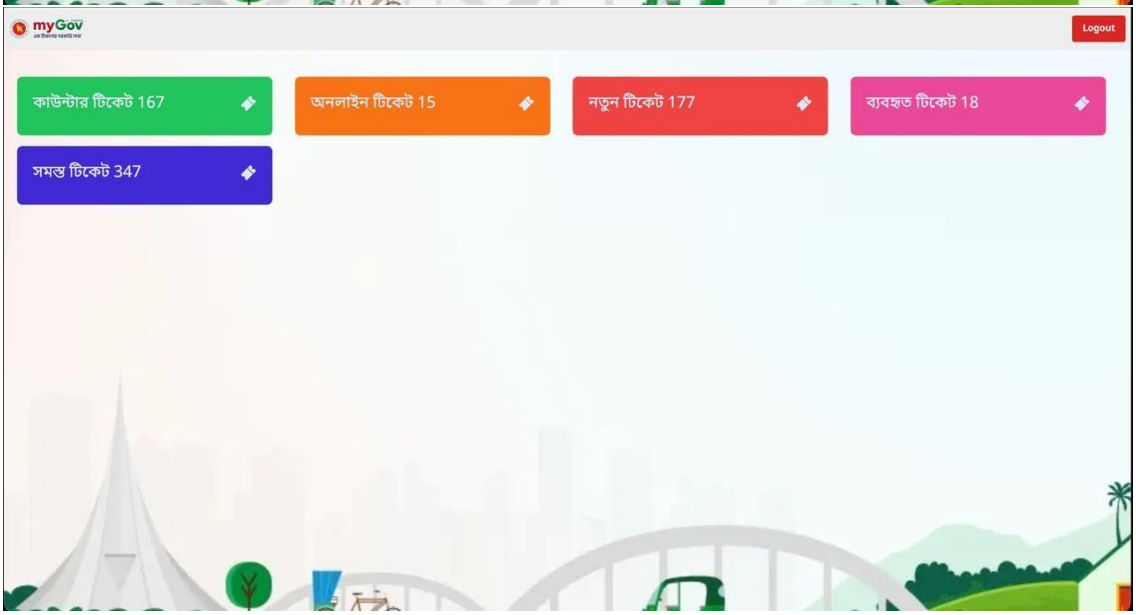












5.3 Summary

The E-Ticket User Manual for Hands-On Operations of the E-Ticket has been prepared for assisting all kinds of users from Super Admin, Counter, Gate and Users. It covers how to sign in, handle accounts, reserve or purchase tickets, validate QR codes and employ administrative tools. The chapter is designed so that your users can grasp the features in a gradual and easy manner, allowing them to sail thru the system and get their work done without having any techie troubles.

Chapter 6

Project Summary

6.1 Introduction

E-Ticket design’°on salient findings, drawbacks, area of coverage and future work. It describes the process that was followed, assesses the system's performance and discusses how the project satisfied its original goals. The objective of this abstract is to give a view of what we have already done and how much remains for improvement.

6.2 Project Limitation

The E-Ticket System has been developed successfully, but we encountered some challenges during the project. However I didn't have time to add full payment integration etc. Budget constraints resulted in solution using free tools and minimal hosting service which limited system scalability. Some features planned such as multi-role access and advanced analytics were not realized because of lack of resources. The performance of the system relies on a fast internet connection and server access, and at times may be unreliable.

6.3 Scope

2.2 The Scope of the E-Ticket System The features and modules that were specified included in this project as follows:

I. User Registration and Login

II. Ticket Booking

III. QR Code Generation and Scanning

IV. Offline ticket book

V. Payment Processing

VI. Users Tickets Reports Manage Panel

VII. See sales, bookings & system activity with Control Panel

6.4 Future Work

The E-Ticket System can be further improved and other features added to it in the later versions as:

i. Full Payment Gateway Integration ii.

AI-Based iii. Offline QR scanning

6.5 Conclusion

The E-Ticket Management System project fulfilled its objectives by delivering an online, efficient and easy to use system for ticket booking, procuring and validating tickets. By adding the functionalities of user registration, secure login, QR-supported verification and role based access to the system, an increase efficiency along with a more convenient experience for the customer and staff is provided. A few time, budget and high end functionality constrains aside, this project provides a robust solution that meets the core needs. The development also served as an important exploration for system design, implementation of MERN in the domain, testing and project management which has provided invaluable experience on future work of improvements or refinements

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