

# **Ez-Transit**



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Date: [date of final presentation]

## **Final Approval**

This is to certify that we have read the report submitted by *Ali Rayyan (25858)*, *Abdur Rahman Farooqi (25435)* for the partial fulfillment of the requirements for the degree of the Bachelors of Science in Software Engineering (BSSE). It is our judgment that this report is of sufficient standard to warrant its acceptance by Riphah International University, Islamabad for the degree of Bachelors of Science in Software Engineering (BSSE).

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## **Declaration**

We do confirm that neither this document nor any of its contents, in whole or in part, have been taken directly from any other source. It is also declared that, with the expert direction of our lecturers, particularly our supervisor **Mr. Sadaqat Ali**, we completed this project and the accompanying report based on our efforts. We will bear the consequences if any component of the system is shown to have been copied directly from another source or to be an exact copy of a project located elsewhere.

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## Dedication

We dedicate this project to our Creator, Almighty Allah, who is our pillar of strength, our source of inspiration, wisdom, knowledge and understanding. It is our source of strength throughout the entire plan. We also dedicate our work to our family, friends, and teachers. Better support from parents and good support from teachers is the reason why this project was successful. We also dedicate our work to our supervisor, our mentor, **Mr. Sadaqat Ali**, and the faculty members.

## Acknowledgement

First of all, we are obliged to Allah Almighty the Merciful, the Beneficent and the source of all Knowledge, for granting us the courage and knowledge to complete this Project.

We are grateful to our supervisor **Mr. Sadaqat Ali** for his enthusiasm, patience, insightful comments, helpful information, practical advice, and unceasing ideas that always helped us tremendously in our project. Without his support and guidance, this project would not have been possible. Also, a special thanks to the rest of the faculty members for their unconditional support.

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## **Abstract**

**Ez-Transit** is streamlined digital solution designed for Metro Bus commuters in Islamabad and Rawalpindi. Our platform solves common issues faced by commuters, such as unfamiliarity with routes and stations, and long queues for tokens on ticket platform. Ez-Transit offers a range of features to enhance the commuting process, which includes route planning, ticketing, and wallet management. Through the Ez-Transit mobile app, commuters can easily register their accounts and access a user-friendly interface to plan their journey and reduce their travel time.

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# **Chapter 1:**

## **Introduction**

# Chapter 1:

## 1. Introduction

This part provides an overview of “**Ez-Transit**”, which is designed to assist Metro Bus commuters in Islamabad and Rawalpindi. The main goal of the system is to address and resolve commuting challenges such as unfamiliarity with Metro Bus routes and stations, and long queues on ticket platforms for purchasing token. The system allows commuters to find nearest station and route suitable for their travelling, scan QR Code to pass through turnstile and wallet management.

The main goal of Ez-Transit is to facilitate commuter those are using metro bus service in daily routine, which will help commuters in reducing their travel time and enhancing the overall transit experience.

## 1.1 Opportunity and Stakeholder

### 1.1.1 Opportunity:

- A large number of people use Metro Bus on a daily basis, leading to crowded platforms, especially during peak hours. An estimate of 135,000 people commutes through Metro Bus daily. This overcrowding can result in long queues at ticket counters, leading to delays for commuters.
- New commuter is also unfamiliar with Metro Bus stations and routes, and don't know which stations are suitable for their journey.
- As a daily Metro Bus commuter, we understand the frustration and time wasted standing in long queues and recognized an opportunity to develop a solution to overcome the inconvenience of long ticket queues and saving time for commuters.
- With the rise of digital technologies, there's a need for comprehensive solution that combines ticketing services functionalities that can significantly enhance the overall commuter experience.

### 1.1.2 Stakeholders:

1. **Commuter:** The primary users who rely on the Metro Bus for traveling on daily or occasional basis.

2. **Admin:** The team responsible for overseeing the entire system, including adding bus stations, and handling user accounts.

## **1.2 Purpose**

The purpose of this system is to offer a swift and convenient solution for Metro Bus commuters encountering waiting time in long queues. Ez-Transit aims to provide a seamless process for generating QR Code or passes through turnstiles by scanning QR code, along with a station Information for new commuters and wallet top up options.

This system is designed to help Metro Bus commuters save their time by skipping long queues to scan QR Code to pass through the turnstile, and a station update to guide new commuters to those stations which are suitable for their journey.

## **1.3 Problem Statement**

- Metro Bus commuters often face challenges when travelling on Metro Bus. Commuters have to wait in long queues to buy token, which takes a lot of time and is frustrating. New commuters are also not familiar with Metro Bus routes and don't know from which station they have to change the bus.

## **1.4 Proposed System**

Ez-Transit is a proposed solution that streamlines the Metro Bus journey. Ez-Transit tackles the issues faced by Metro Bus commuters. It provides a digital platform for station updates and wallet top-up options. The system offers a user-friendly interface mobile application for commuters and web-based admin panel.

## **1.5 Scope of the Project**

The project scope includes developing a mobile application for users (commuters) with features such as user-friendly register/login, integrated wallet for seamless payments, easy top-up options, Station Updates, QR code- based payments for faster and more convenient boarding process and efficient web-based admin panel with management tools for administrators.

## **1.6 Report Outline**

This report aims to provide a comprehensive understanding of Ez-Transit, covering various aspects of the system to ensure clarity and comprehension. The report is structured into 7 chapters as follows:

### **1.6.1 Chapter 1:**

This chapter offers an overview of “Ez-Transit”, outlining its requirements, primary objectives and the stakeholders it serves. It defines the system’s purpose, scope and mission, laying the groundwork for a thorough understanding of the project’s vision

### **1.6.2 Chapter 2:**

In this chapter, we explore the existing challenges faced by the commuters and the limitations of current transportation solutions. “Ez-Transit” is presented as an innovative service poised to address these challenges efficiently and with a user-friendly approach, revolutionizing the commuting experience.

### **1.6.3 Chapter 3:**

This section delves into the specific needs and problems “Ez-Transit” aims to solve. It identifies the primary user groups involved and analyzes the system’s impact on their daily interactions. Emphasis is placed on designing a solution that is responsive to real-world demands and user scenarios.

### **1.6.4 Chapter 4:**

Here, we provide an in-depth exploration of “Ez-Transit’s” design rationale, detailing its architectural structure and the interactions between various system components. The chapter includes the working mechanisms that ensure the system’s effectiveness and user engagement.

### **1.6.5 Chapter 5:**

The concluding section offers a comprehensive evaluation of “Ez-Transit” within its deployment environment. It assesses the system’s performance, focusing on key metrics such as usability, effectiveness and adaptability. This evaluation is essential for validating the system’s capabilities and informing ongoing refinement efforts.

# **Chapter 2:**

# **Market Survey**



# **Chapter 2:**

## **Market Survey**

### **2 Introduction**

In this chapter, The literature review highlights the evolution of public transit technologies, emphasizing the significance of automated fare collection systems, secure payment integrations, and user-friendly interfaces. Market survey findings indicate a high demand for improved transit applications, driven by urbanization. Administrators seek efficient station management, user account management, and accept or decline top-up request , while users prioritize real-time updates, easy QR code generation, and secure wallet top- ups. Competitor analysis reveals a gap in seamless, user-centric designs, presenting an opportunity for Ez-Transit to offer a comprehensive, innovative solution that meets the needs of both administrators and commuters.

### **2.1 Market Survey**

#### **2.1.1 The Interview**

The interview technique was utilized to gather comprehensive insights into the requirements of Ez-Transit. The interview process involved discussions on organizational details, problem specifics, user environments, usability considerations, analyst input, solution assessments, opportunity assessment, reliability, support, and performance needs.

#### **2.1.2 Market Survey Findings**

- Our market survey conducted among urban area revealed a significant demand for quick boarding solution. The survey indicated a preference for digital platforms that offer real-time assistance, underscoring the potential market for Ez-Transit.
- Interviews with regular metro bus users highlighted the importance of a platform that connects them directly with customers, indicating a gap that Ez-Transit could fill.

## 2.2.1 Existing Systems

Table 2.2.1 | Existing System

Feature	EZ-Transit	Existing System
Mobile Application Active	✓	✗
User-friendly Interface	✓	✓
Find Station	✓	✗
Add Station	✓	✗
Station Management	✓	✗
Secure Wallet Top-Ups	✓	✗
Delete User Account	✓	✗
QR Code Scanning	✓	✗
Accept or Decline Top-Up Request	✓	✗
User Account Management	✓	✗
Automated Fare Collection	✓	✗
Announcements	✓	✗

### **2.2.3 Summary**

The feature comparison table between Ez-Transit and existing metro bus systems highlights that Ez-Transit offers a comprehensive and user-friendly solution with features like real-time update through announcement, generating QR code, secure wallet top-ups, scan QR code. While existing systems vary in their implementation of these features, Ez Transit ensures full integration and additional functionalities such as advanced user account management, station information, and an intuitive admin dashboard. This comprehensive approach addresses gaps in current systems, providing a more seamless and efficient experience for both users and administrators.

# **Chapter 3:**

# **Requirement Analysis**

# Chapter 3:

## Requirement Analysis

### 1. Introduction

This section provides an overview of Ez-Transit, a comprehensive digital platform tailored to streamline the commuting experience for commuters. Ez-Transit is designed to address the challenges faced by commuters in navigating information about metro bus station, generating qr code, managing wallet and accessing station information. The discussions that follow outline the specific functional requirements essential for the successful development and deployment of Ez-Transit. These requirements encompass various aspects including system functionality, performance, security and usability ensuring that Ez-Transit meets the diverse needs of commuters while maintaining Reliability and efficiency.

#### 1.1 Problem Scenarios

**Table 3.1.1 | Problem Statement**

Problem Statement – 1	
<b>The Problem of</b>	Long queues and delays at Metro stations during peak hours.
<b>Affects</b>	Commuters
<b>The Result of which</b>	Commuters experience frustration, wasted time and delays in work due to long queues.
<b>Benefits of</b>	Implementing a qr code scan system within Ez-Transit that allows commuters to generate qr code in advance, reducing queue times and streamlining the boarding process. This system improves commuter satisfaction, reduces congestion at Metro stations and enhances overall travel experience.

**Table 3.1.2 | Problem Statement**

Problem Statement – 2	
<b>The Problem of</b>	Lost tokens leading to inconvenience and delays.
<b>Affects</b>	Commuters
<b>The Result of which</b>	Commuters may face difficulties accessing transportation services, resulting in missed journeys or additional expenses.
<b>Benefits of</b>	Introducing a scan qr code feature in Ez-Transit that eliminates the need for physical tokens or tickets. Commuters can store their tickets electronically within the app, reducing the risk of loss and providing easy access to their travel credentials.

**Table 3.1.3 | Problem Statement**

Problem Statement – 3	
<b>The Problem of</b>	Commuters not familiar with optimal station or transportation options.
<b>Affects</b>	Commuters
<b>The Result of which</b>	Commuters may select wrong direction metro bus or experience confusion during their journey, leading to inefficiencies and increased travel time.
<b>Benefits of</b>	Integrating a find station and announcement feature into Ez-Transit that provides commuters with real-time qr code generating, request for wallet top-up to admin options and estimated travel times. This empowers commuters to make informed decisions, optimize their stations and navigate the Metro system more efficiently.

## 1.2 Requirements

Functional requirements are documented to list all set of operations and functionalities which software must perform. Whereas non-functional requirements describe some constraints on functional requirements to ensure the quality of the software.

## 1.3 Functional Requirements

In this table each functional requirement is assigned a serial number which will be used as reference. Type represents the priority of functional requirement. Status gives the information whether the requirement is completed, pending or is currently selected for development.

Module	S. No	Functional Requirement	Type	Status
<b>ADMIN</b>	1	Admin can login into the system.	Core	
	2	Admin can add station into the system.	Core	
	3	Admin can delete station from the system.	Core	
	4	Admin can approve top-ups.	Core	
	5	Admin can delete user account.	Core	
	6	Admin can update the commuters by add announcement	Core	
	7	Admin can decline top-up request.	Core	
<b>USER / COMMUTER</b>	8	User can register into mobile application.	Core	
	9	User can find station into the system	Core	
	10	User can top-up their wallet by generating request to admin.	Core	
	11	User can generate qr code.	Core	
	12	User can scan QR code for pass through turnstile.	Core	
	13	User can view travel history.	Core	
	14	User can view announcement	Core	
	15	User can view top-up history.	Core	



## **1.4 Summary**

As shown above, we have written all the functional requirements using technique like interviewing and brainstorming. Moreover, we have written requirements of our system which we considered are must by analyzing the requirements of the system.

# **Chapter 4:**

# **System Design**

# CHAPTER 4:

## System Design

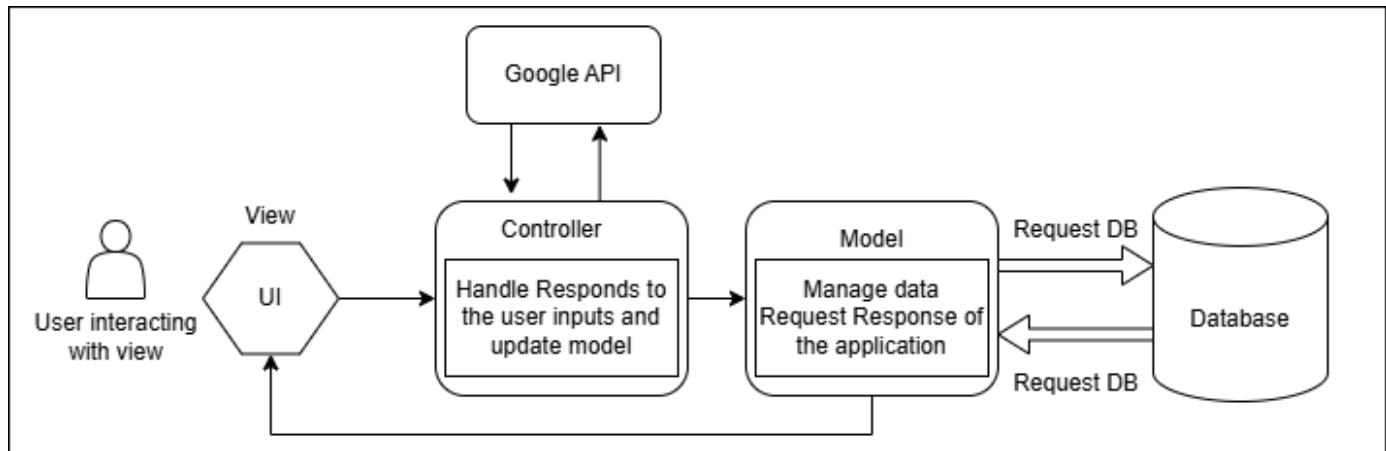
### 2. Introduction

In Ez-Transit, the system designer plays an important role in defining the structure and functionality of software components. This involves responsibilities, attributes, operations and relationships of each component, while ensuring alignment with the implementation environment. The design process is deeply rooted in the requirements collected from user feedback and inputs.

In this chapter, we embark on a journey through various design diagrams that illuminate the inner workings of Ez-Transit. These diagrams encompass architectural design, use case design, activity diagram, fully dressed use case, sequence diagrams. Each diagram serves as a visual representation, meticulously crafted to illustrate the workflow and technical design aspects of the system.

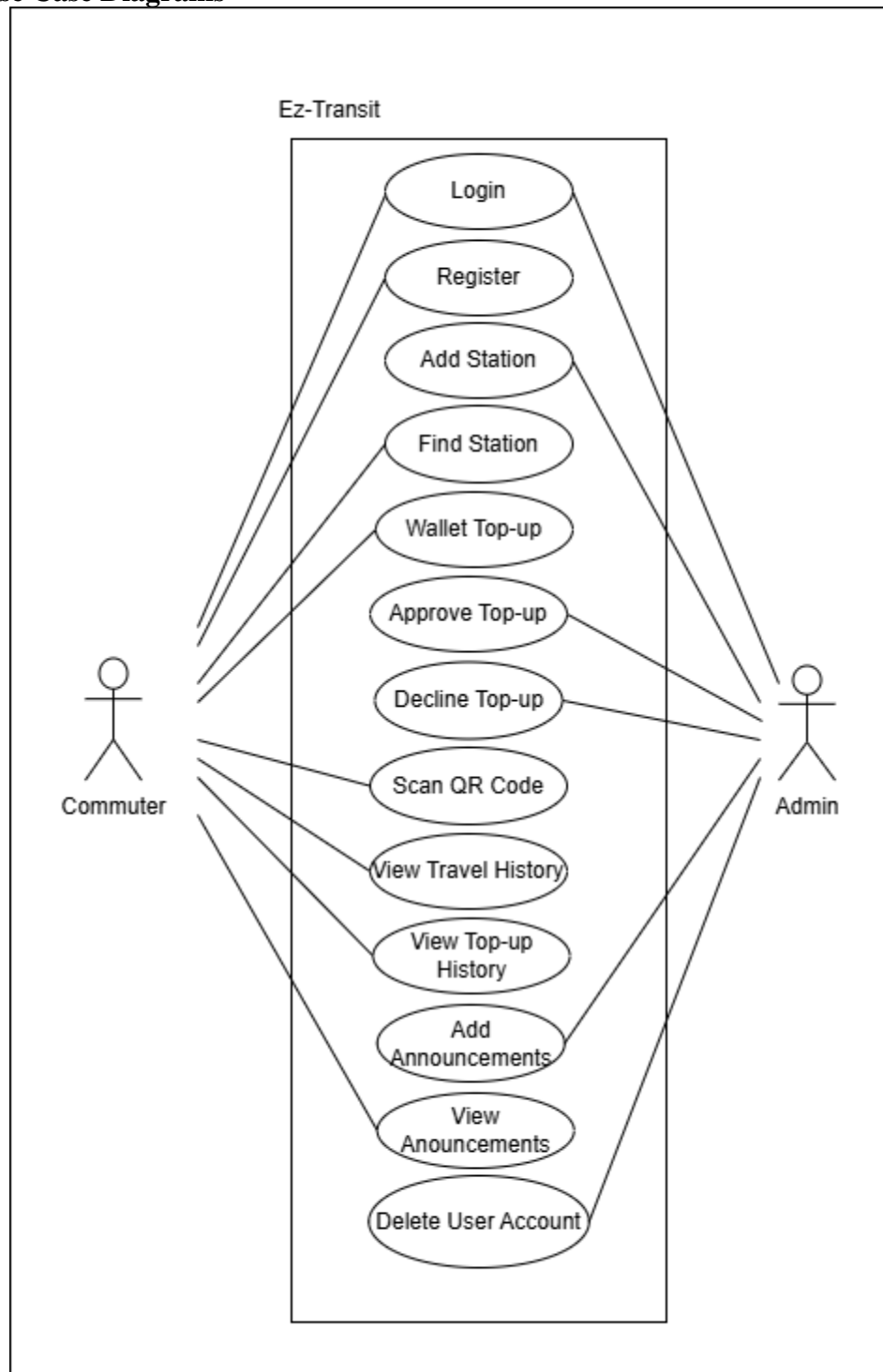
Through these design artifacts, we aim to provide insight into the intricacies of Ez-Transit, shedding light on its structural framework, operational flow, and underlying mechanisms. By exploring into these design elements, stakeholders gain a deeper understanding of how Ez-Transit works and how its features are written to deliver a seamless commuting experience.

## 2.1 Architectural Design

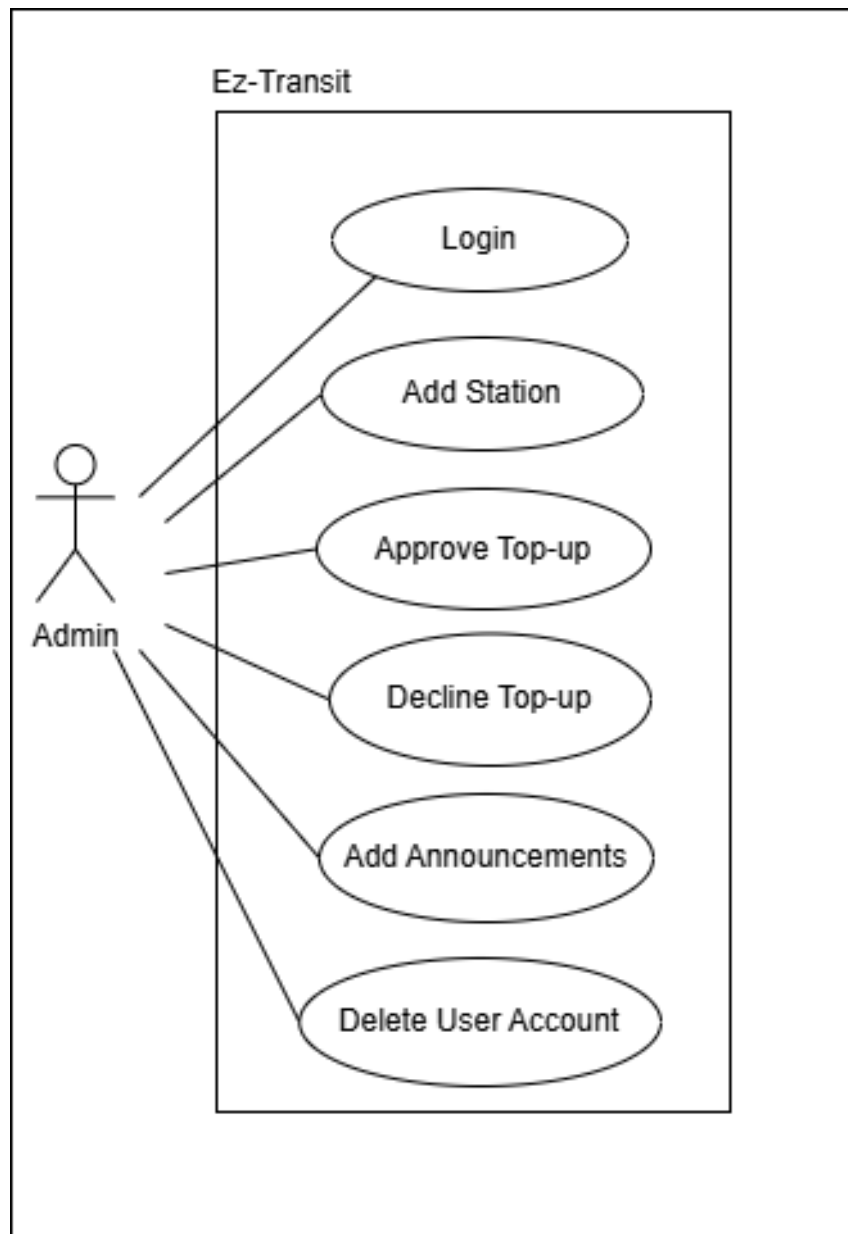


## 2.2 Detailed Design

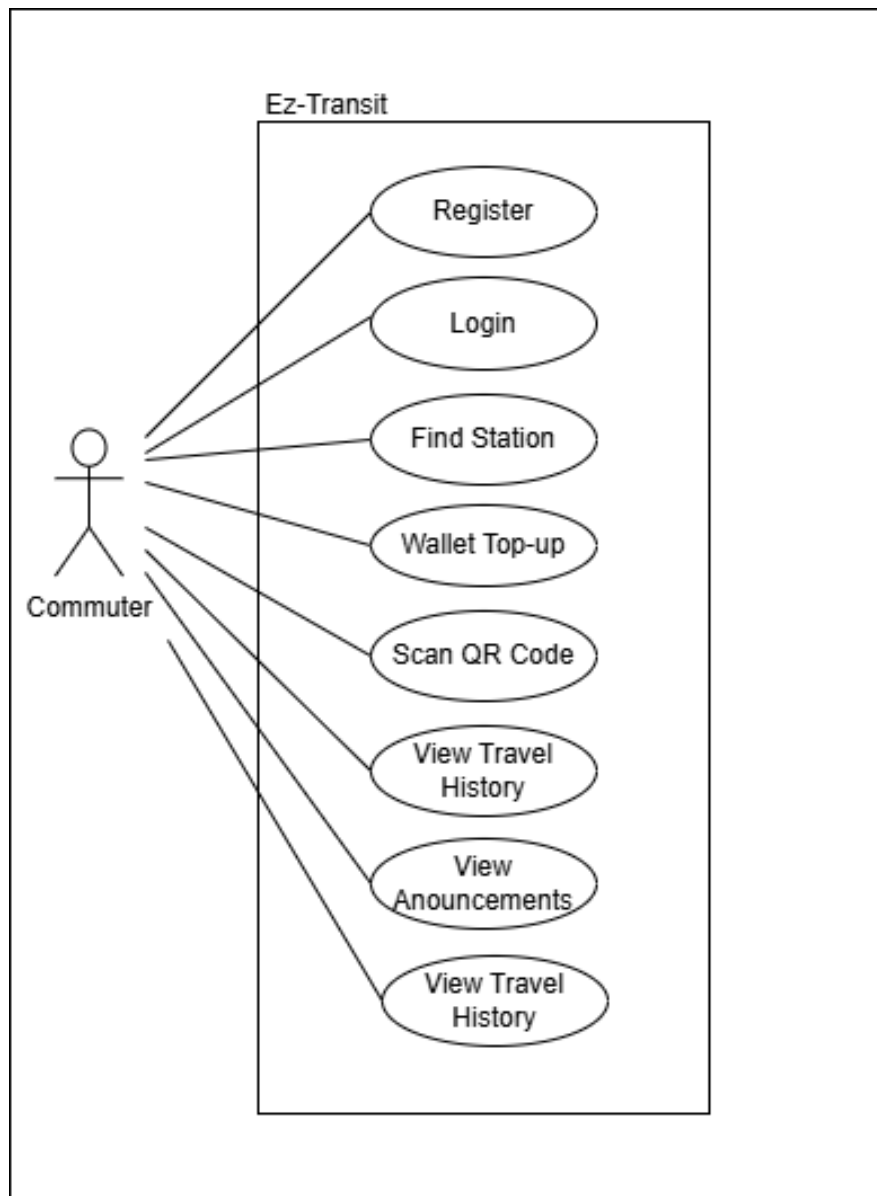
### 2.2.1 Use Case Diagrams



**Figure 4.2.1.1 | Use Case Diagrams**



**Figure 4.2.1.2 | Admin Use Case Diagrams**



**Figure 4.2.1.3 | Commuter Use Case Diagrams**

#### 4.2.2 Use case Fully Dressed

##### 4.2.2.1 Login

Table 4.2.2.1 | Login

Use Case #	1	
Use Case Name :	Login	
Actors :	Admin	
Description :	This use case involves an admin logging into system to gain access to administrative functionalities.	
Precondition :	The admin user must have valid credentials (username and password).	
Post condition :	The admin is successfully logged into the system and gains access to administrative features.	
Normal Flow :	Admin	System
	<ol style="list-style-type: none"><li>1. The admin navigates to the login page.</li><li>2. The admin enters username and password.</li></ol>	<ol style="list-style-type: none"><li>3. The system verifies the credentials.</li><li>4. If the credentials are valid, the admin is logged in and directed to the admin dashboard.</li></ol>
Alternative Flow:	If the credentials are invalid, the system displays an error message and prompts the admin to re-enter the correct credentials.	



#### 4.2.2.2 Register

Table 4.2.2.2 | Register

Use Case #		2
Use Case Name:	Register	
Actors:	Commuter	
Description:	This use case involves a commuter registering for an account on Ez-Transit mobile application.	
Precondition:	Commuter must have Ez-Transit app installed.	
Post condition:	The commuter successfully registers an account and gains access to commuter functionalities.	
Normal Flow:	Commuter	System
	1. The commuter navigates to registration page. 2. The commuter fills out the registration form with required information (e.g. name, email, and password). 3. Commuter gains access to commuter functionalities.	4. The system validates the information provided. 5. If the information is valid, the system creates new commuter account.
Alternative Flow:	If the provided information is invalid or incomplete, the system displays error messages and prompts the commuter to correct the information.	

#### 4.2.2.3 Add Station

Table 4.2.2.3 | Add Station

Use Case #	3
Use Case Name:	Add Station
Actors:	Admin
Description:	This use case involves an admin add a new station to the system.
Precondition:	The admin must be logged into admin panel.
Post condition:	A new Station is successfully added.
Normal Flow:	<ol style="list-style-type: none"><li>1. The admin navigates to the Station management section.</li><li>2. The admin selects the option to add a new station.</li><li>3. The admin fills out the station details (e.g. origin, destination and distance).</li><li>4. New station is added to the database.</li></ol>
Alternative Flow:	If station already exists, the system prompts the admin to correct the information.

#### 4.2.2.4 Find Station

Table 4.2.2.4 | Find Station

Use Case #	4	
Use Case Name:	Find Station	
Actors:	Commuter	
Description:	This use case involves a commuter finding station for travelling.	
Precondition:	The commuter must be register into Ez-Transit mobile app.	
Post condition:	App shows nearest station to commuter between origin and destination provided by the commuter.	
Normal Flow:	Commuter	System
	1. The commuter navigates to the station search section. 2. The commuter enters the origin and destination.	3. The system retrieves and displays the station between the origin and destination.
Alternative Flow:	If there are no station available or if there's an error in retrieving station information, the system notifies the commuter accordingly.	

#### 4.2.2.5 Wallet Top-up

Table 4.2.2.5 | Wallet Top-up

Use Case #		5
Use Case Name:	Wallet Top-up	
Actors:	Commuter	
Description:	This use case involves a commuter adding funds to their wallet within the app.	
Precondition:	The commuter must be logged into the system.	
Post condition:	The commuter's wallet balance is successfully updated with the added funds after approval from the admin.	
Normal Flow:	Commuter	System
	<ol style="list-style-type: none"><li>1. The commuter navigates to the wallet section.</li><li>2. The commuter selects the option to top-up their wallet.</li><li>3. The commuter enters the amount they wish to add to their wallet.</li><li>4. Once payment is successful, after admin's approval, the commuter's wallet balance is updated with added funds.</li></ol>	<ol style="list-style-type: none"><li>5. The system processes the payment transaction securely.</li></ol>
Alternative Flow:	If the payment transaction fails or encounters error, the system prompts the commuter to retry.	

#### 4.2.2.6 Approve Top-up

Table 4.2.2.6 | Approve Top-up

Use Case #	6
Use Case Name:	Approve Top-up
Actors:	Admin
Description:	This use case involves an admin approving commuter's wallet top-up request.
Precondition:	The admin must be logged into the system.
Post condition:	The commuter's wallet top-up request is either approved or declined.
Normal Flow:	<ol style="list-style-type: none"><li>1. The admin navigates to the wallet management section.</li><li>2. The admin views pending wallet top-up requests.</li><li>3. The admin reviews the details of the top-up request (e.g. amount and commuter information).</li><li>4. The admin approves or decline the top-up request.</li><li>5. If approved, the commuter's wallet balance is updated accordingly.</li></ol>
Alternative Flow:	If the admin declined the top-up request, the system notifies the commuter with the reason for declined.

#### 4.2.2.7 Scan QR Code

Table 4.2.2.7 | Scan QR Code

Use Case #	7
Use Case Name:	Scan QR Code
Actors:	Commuter
Description:	This use case involves a commuter scanning QR code to pass through tripod turnstile.
Precondition:	The commuter must be logged into the system and must have sufficient balance in their wallet.
Post condition:	Commuter successfully scans QR code and passes through the turnstile.
Normal Flow:	<ol style="list-style-type: none"><li>1. The commuter opens the ticket section.</li><li>2. The commuter aims their device camera at the QR code.</li><li>3. The QR code is scanned, balance from commuter's wallet is deducted and passes through the turnstile.</li></ol>
Alternative Flow:	If there is insufficient balance in commuter's wallet, QR code will not be scanned and system prompts commuter to recharge their account.

#### 4.2.2.8 View Travel History

**Table 4.2.2.8 | View Travel History**

Use Case # 8		
Use Case Name:	View Travel History	
Actors:	Commuter	
Description:	This use case involves a commuter viewing their travel history within the app.	
Precondition:	The commuter must be logged into the app.	
Post condition:	The commuter successfully views their Travel history.	
Normal Flow:	Commuter	System
	1. The commuter navigates to the travel history section within their account.	2. The system retrieves and displays the commuter's travel history.
Alternative Flow:	If there are no travel history available or if there are technical issues retrieving the history, the system notifies the commuter accordingly.	

#### 4.2.2.9 View Top-up History

Table 4.2.2.9 | View Top-up History

Use Case #	9	
Use Case Name:	View Top-up History	
Actors:	Commuter	
Description:	This use case involves a commuter viewing their transaction within the app.	
Precondition:	The commuter must be logged into the system.	
Post condition:	The commuter successfully views their transaction.	
Normal Flow:	Commuter	System
	1. The commuter navigates to the transaction history section within their account.	2. The system retrieves and displays information regarding to transaction history.
Alternative Flow:	If there are no transaction history available or if there are technical issues retrieving the history, the system notifies the commuter accordingly.	



#### 4.2.2.10 Add Announcements

Table 4.2.2.10 |Add Announcements

Use Case #	10
Use Case Name :	Add Announcements
Actors:	Admin
Description:	This use case Involves the admin to create and publish announcements for daily bases to commuters.
Precondition:	The admin must be logged into the system.
Post condition:	The announcement is successfully published by the admin and visible to commuters.
Normal Flow:	<ol style="list-style-type: none"><li>1. The admin navigates to the announcement section.</li><li>2. Admin enters the announcement details and publishes the announcement to the commuters.</li></ol>
Alternative Flow:	If there are technical issues publishes the announcement the system notifies the Admin accordingly.

#### 4.2.2.11 View Announcement

Table 4.2.2.11 | View Announcement

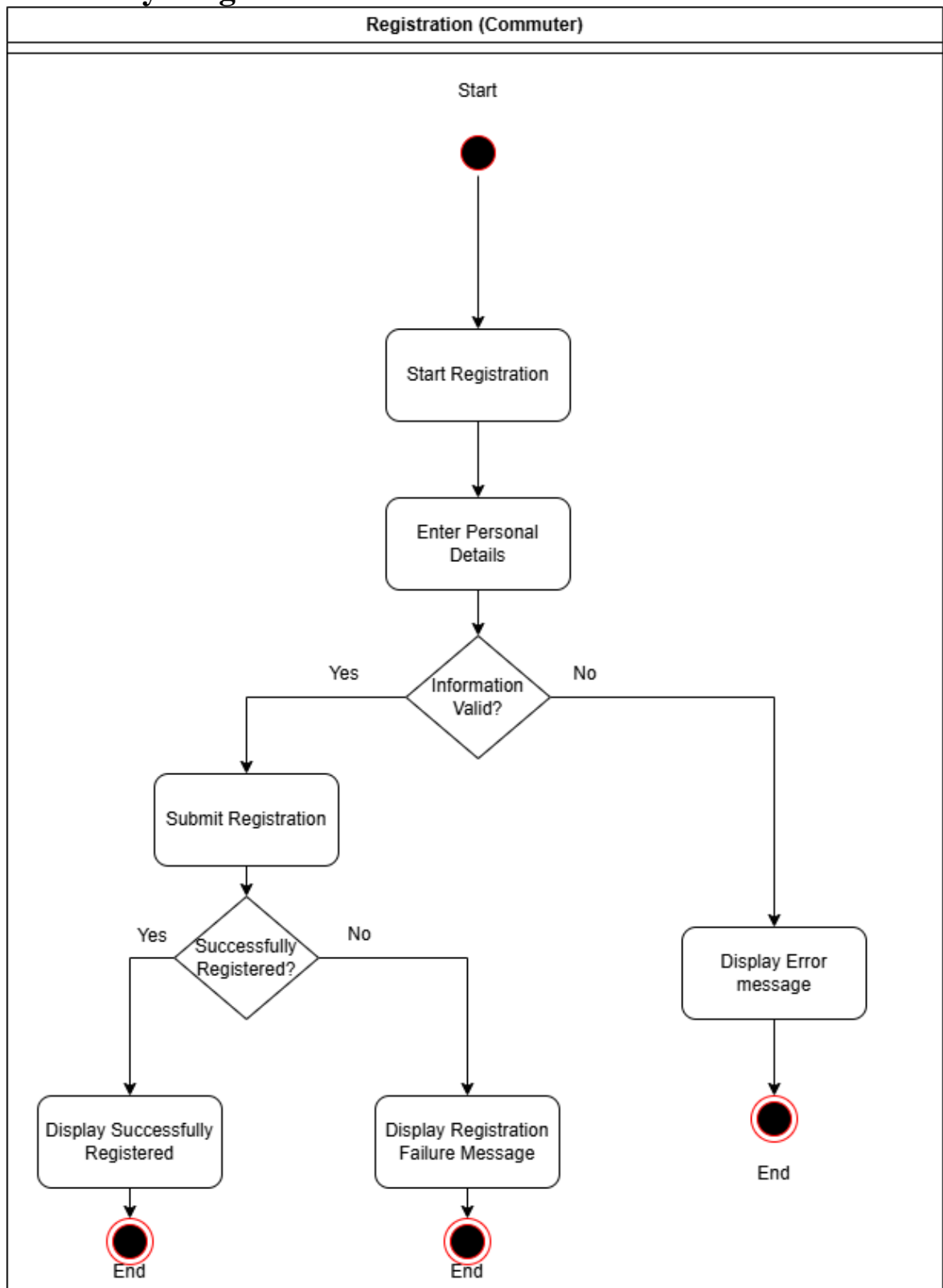
Use Case #	11	
Use Case Name:	View Announcement	
Actors:	Commuter	
Description:	This use case involves commuter to view latest announcement posted by the admin to stay updated.	
Precondition:	The commuter must be logged into the system.	
Post condition:	The commuter successfully views the latest announcements.	
Normal Flow:	Admin	System
	<ol style="list-style-type: none"> <li>1. The commuter navigates to the announcement section.</li> <li>2. The commuter selects an announcement to view details to the latest update.</li> </ol>	The system displays the latest announcement updated by the admin.
Alternative Flow:	If no announcements are available, the system shows the message accordingly.	

#### 4.2.2.12 Delete User Account

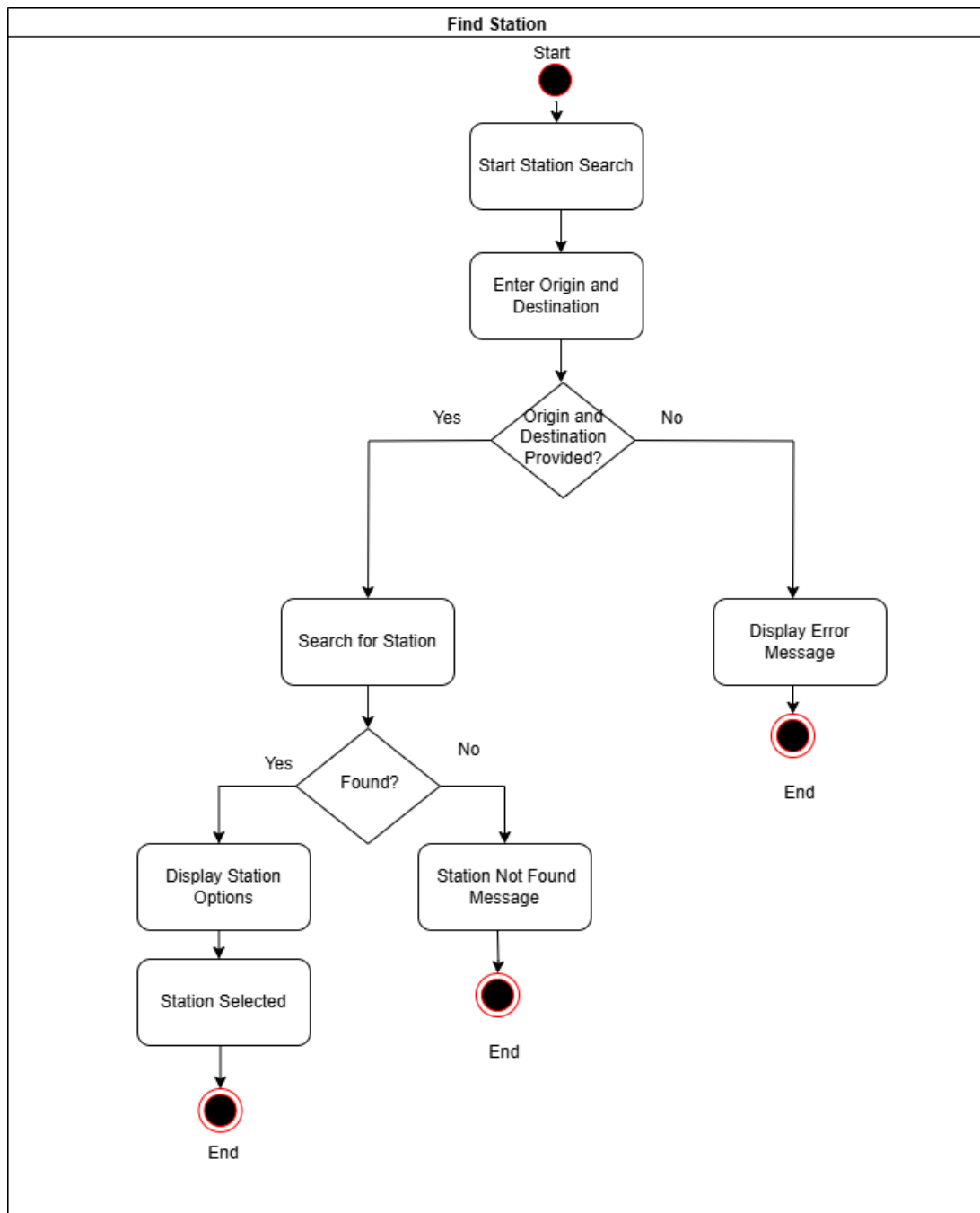
**Table 4.2.2.12 | Delete User Account**

Use Case #		12	
Use Case Name:	Delete User Account		
Actors:	Admin		
Description:	This use case involves an admin delete a user account to the system.		
Precondition:	The admin must be logged into the system.		
Post condition:	The user’s access to the system is successfully deleted		
Normal Flow:	Admin	System	
	<div>1. The admin navigates to the user management section within the admin dashboard.</div> <div>2. The admin searches for the user they want to delete.</div> <div>3. The admin selects the option to delete the user account.</div>	<div>The system response the admin action and delete user account.</div>	
Alternative Flow:	If there are technical issues processing the delete account or if the user cannot be found, the system notifies the admin accordingly.		

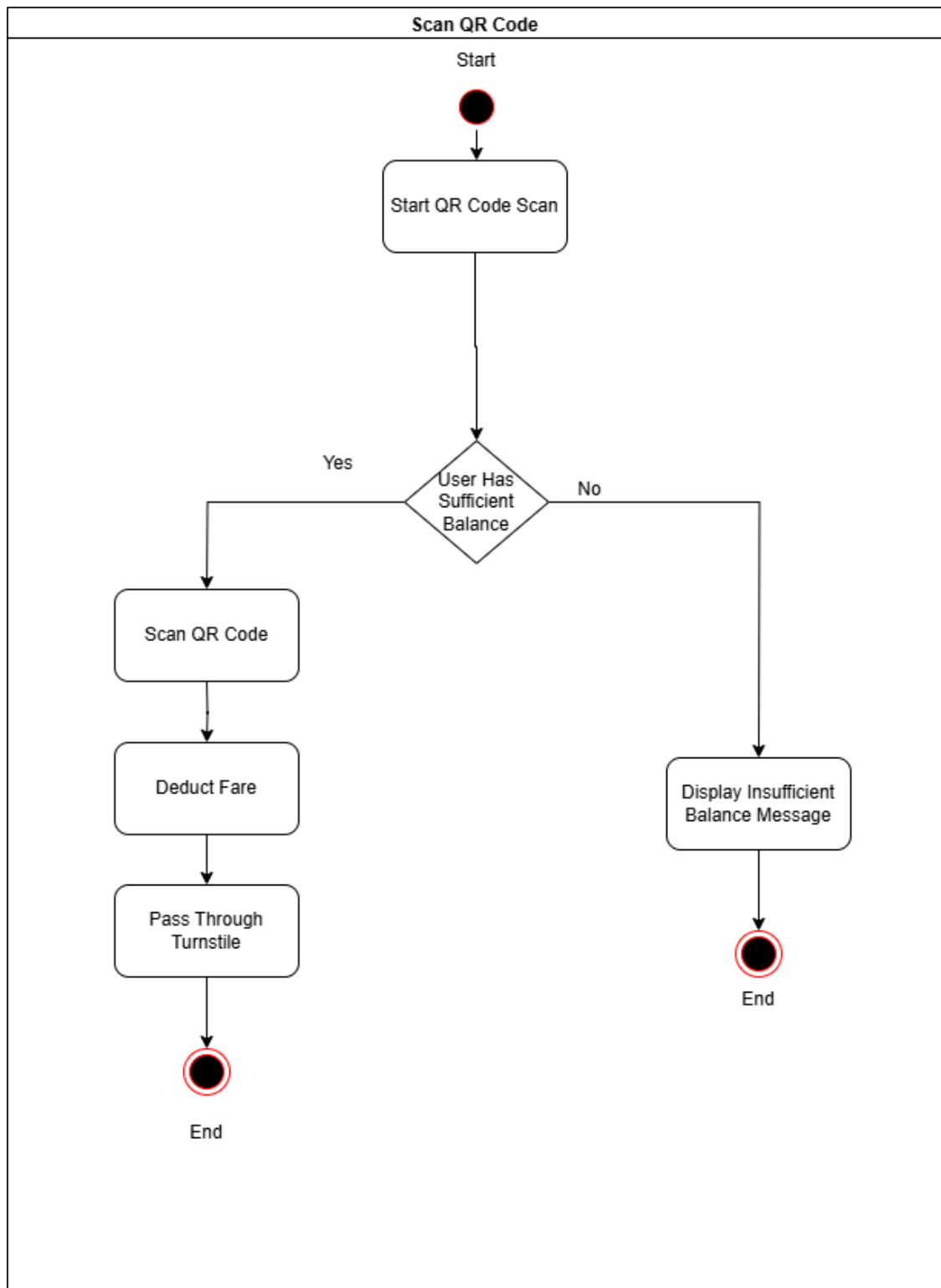
### 4.2.3 Activity Diagrams



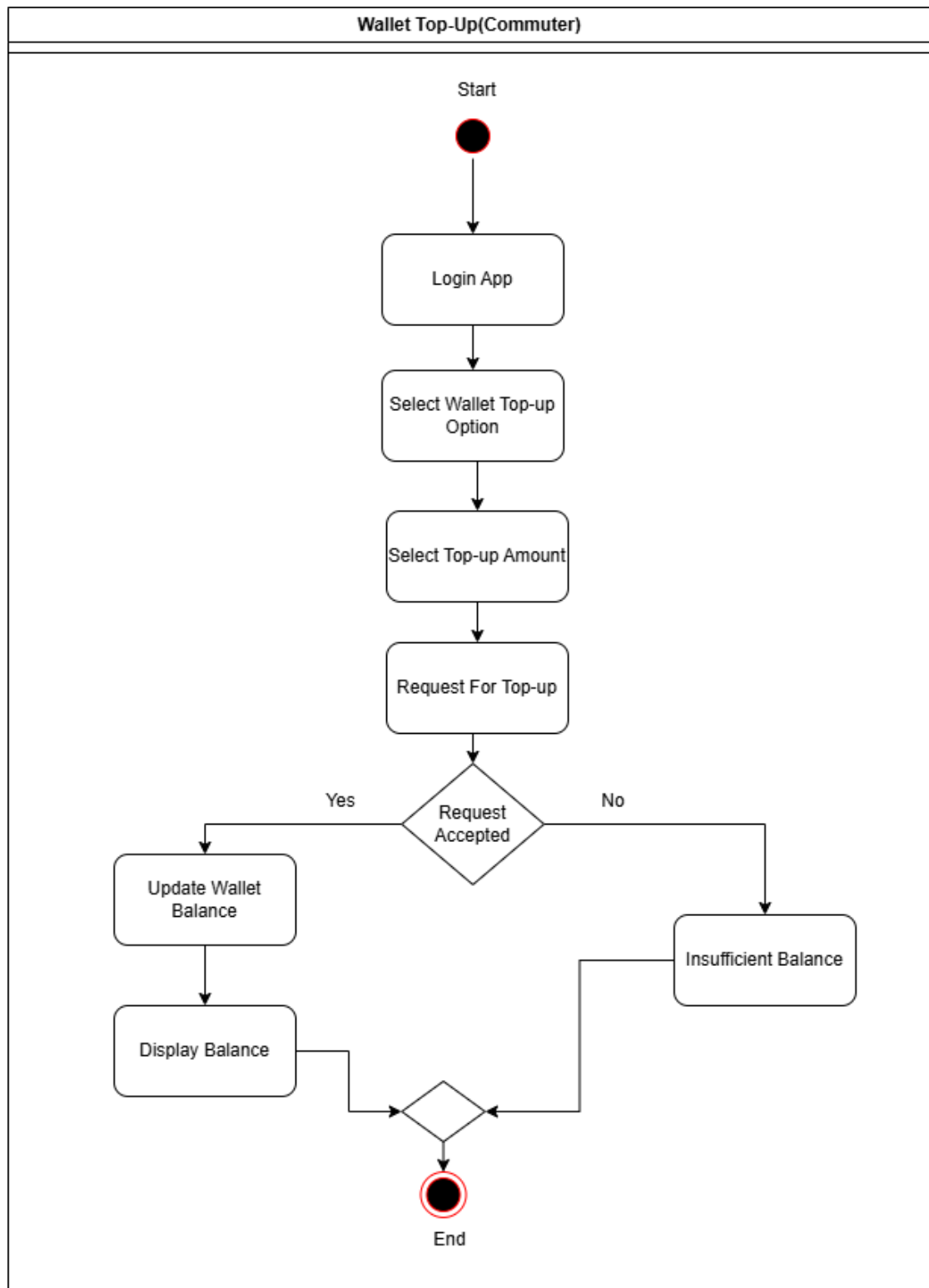
**Figure 4.2.3.1| Registration (Commuter)**



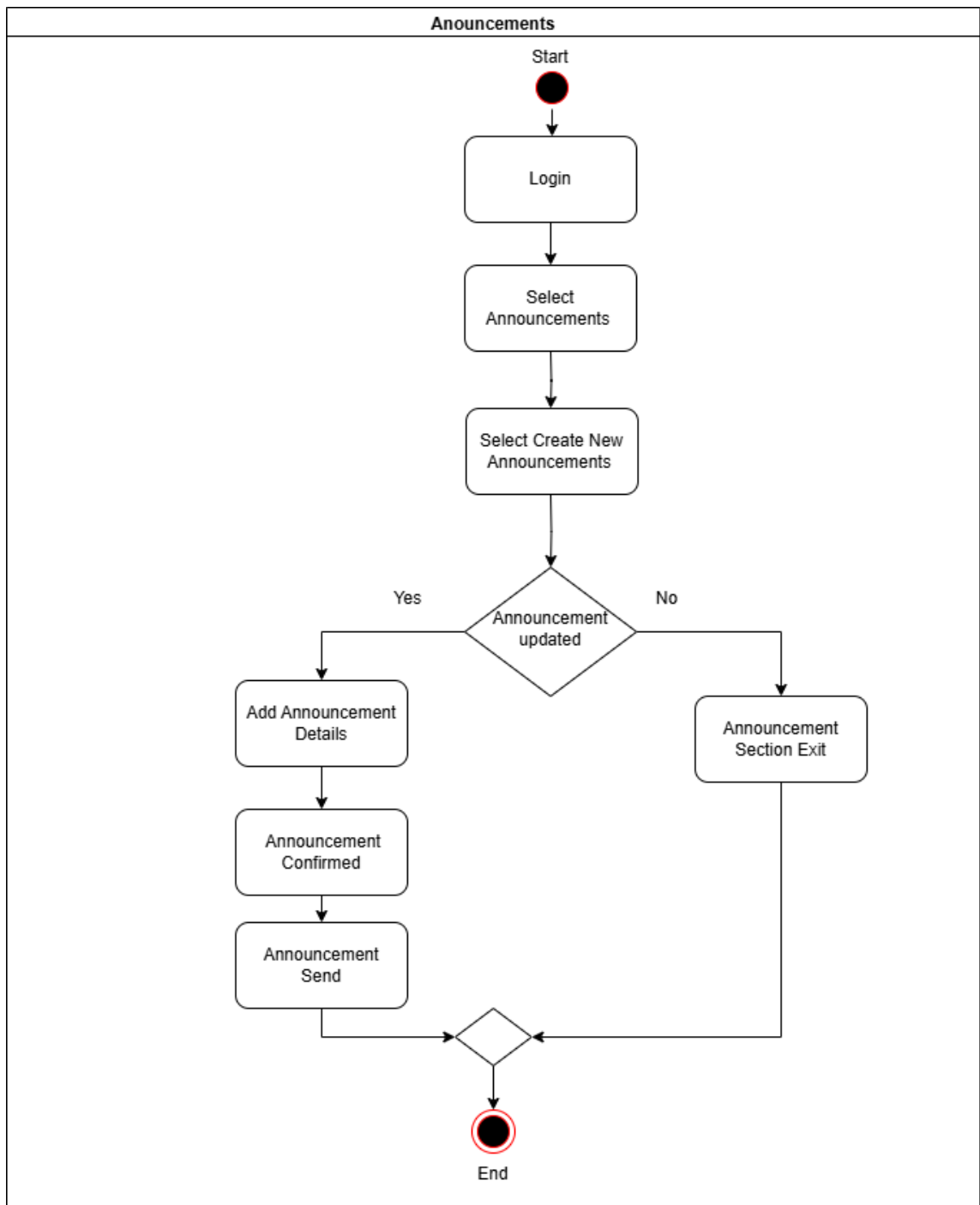
**Figure 4.2.3.2 | Find Station  
(Commuter)**



**Figure 4.2.3.3 | Scan QR code (Commuter)**

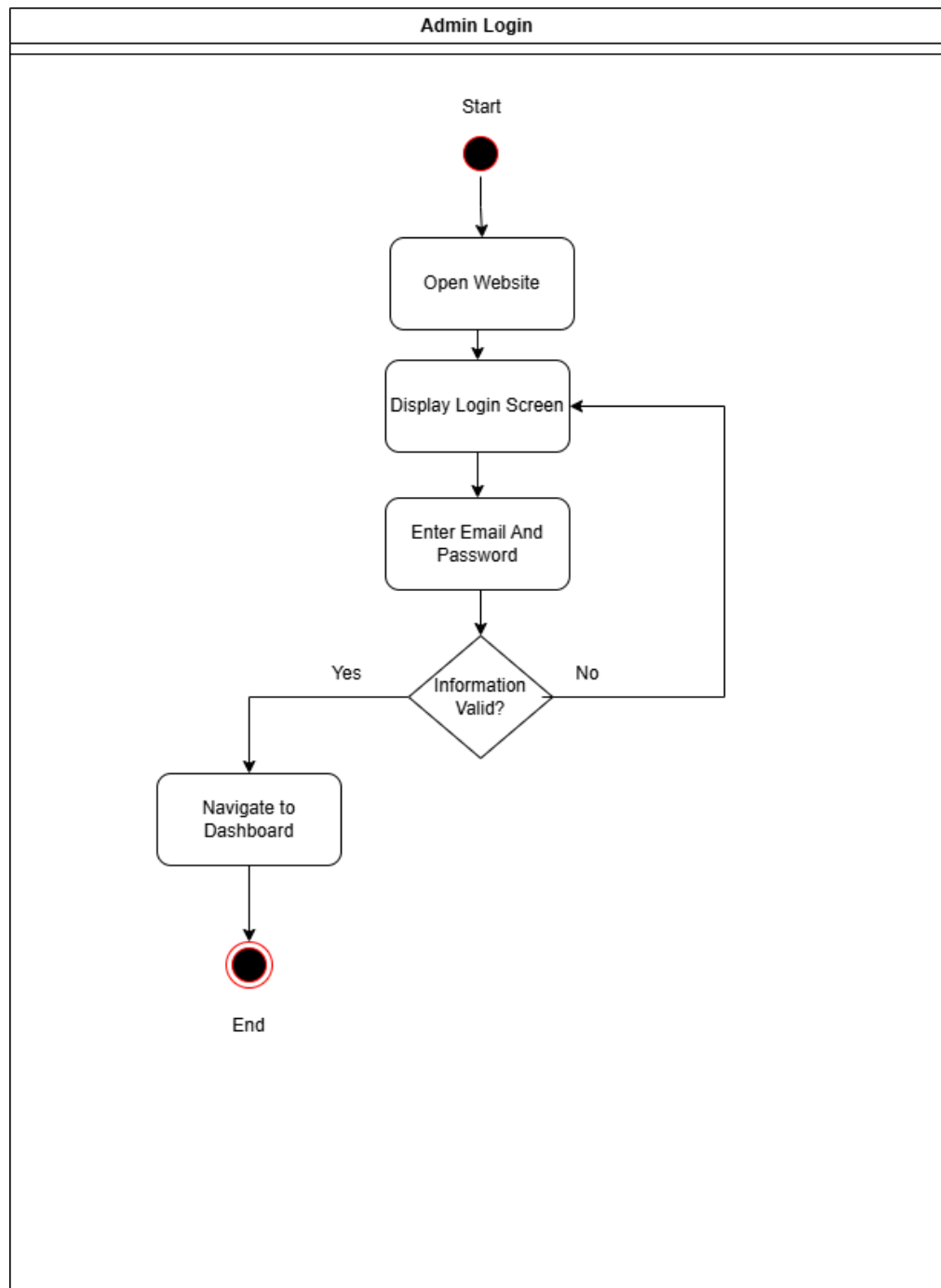


**Figure 4.2.3.4 | Wallet Top-up (Commuter)**

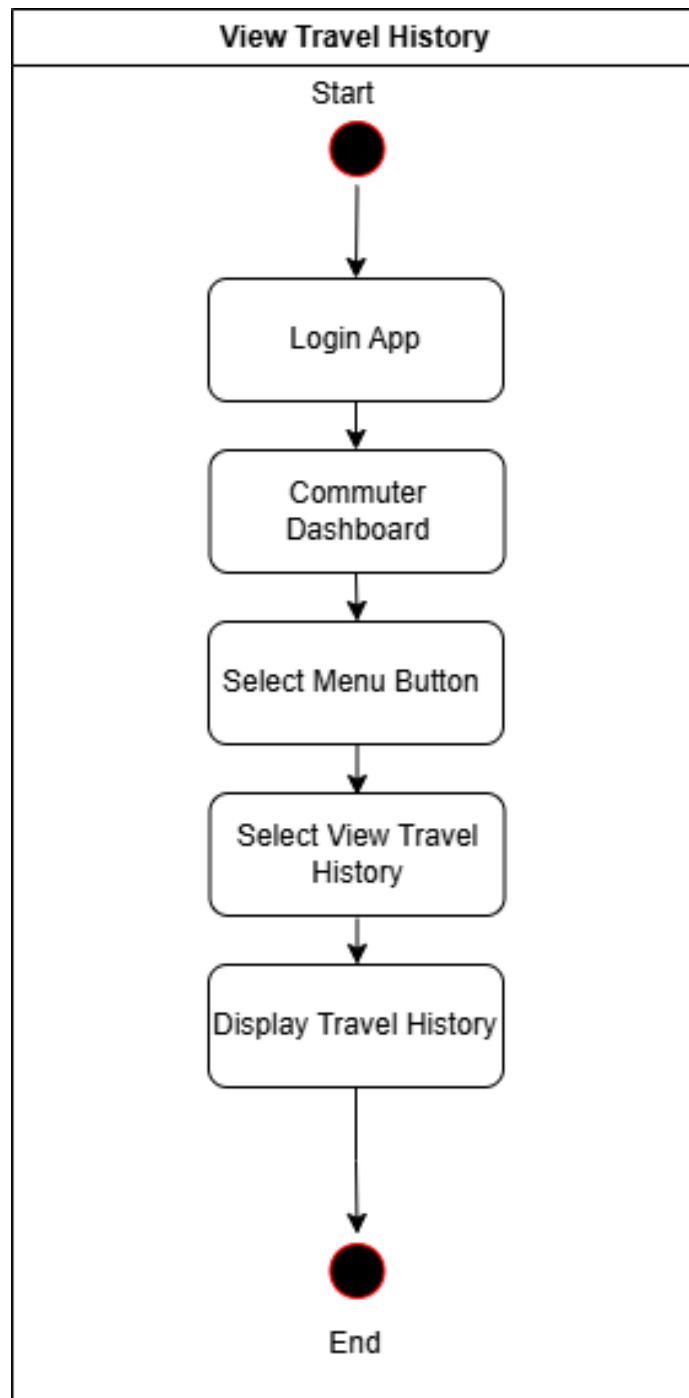


**Figure 4.2.3.5 | Announcement (Admin)**

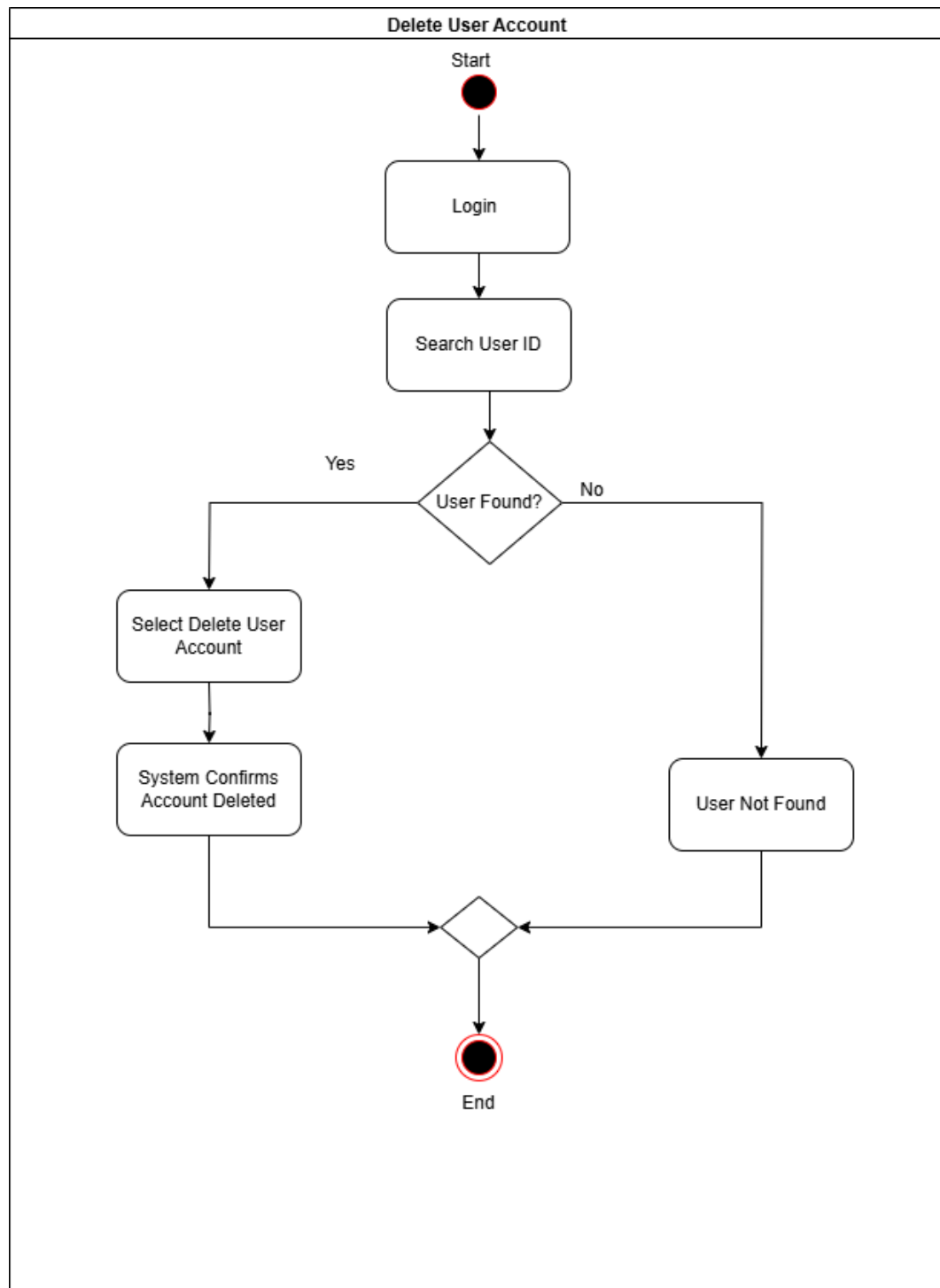




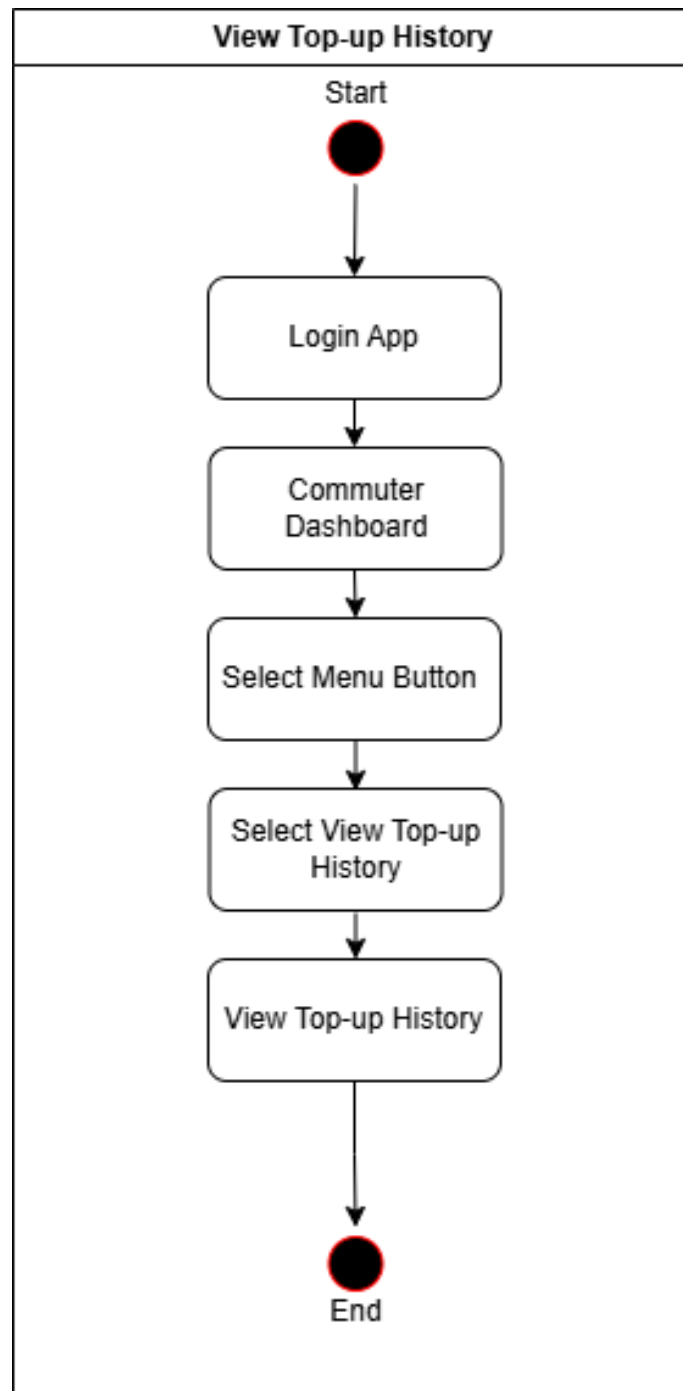
**Figure 4.2.3.6 | Admin Login**



**Figure 4.2.3.7 | View Travel History**



**Figure 4.2.3.8 | Delete User Account  
(Admin)**



**Figure 4.2.3.9 | View Top-up History**

## 4.2.4 Sequence Diagram

### 4.2.4.1 User Register

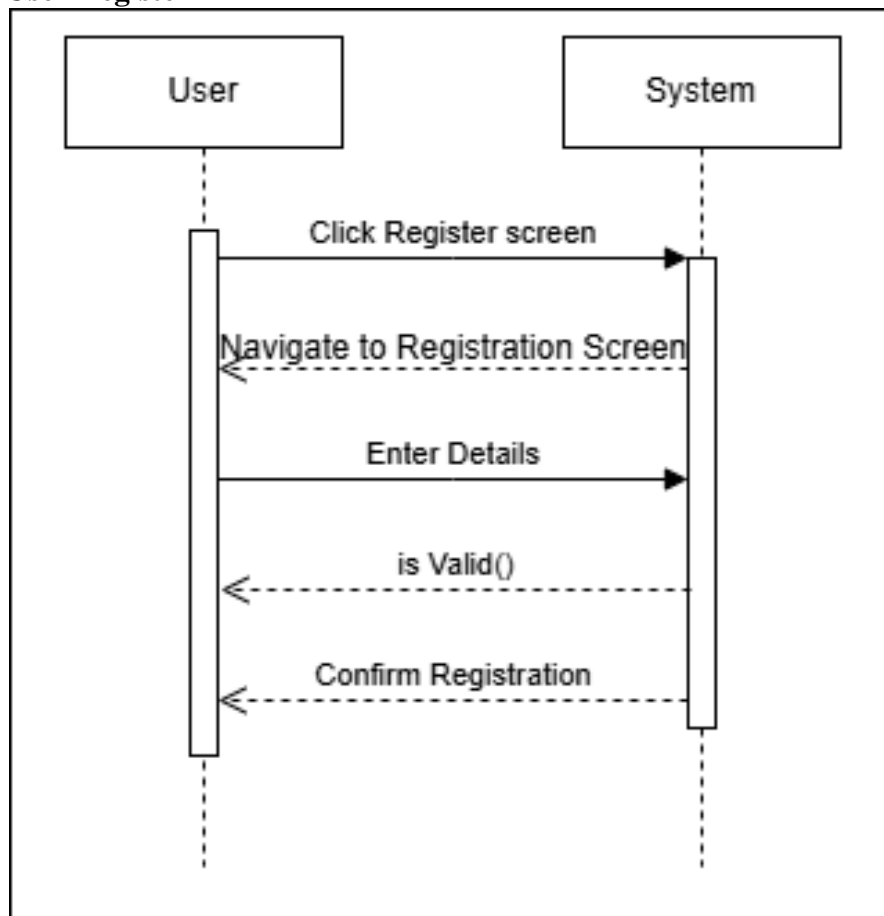
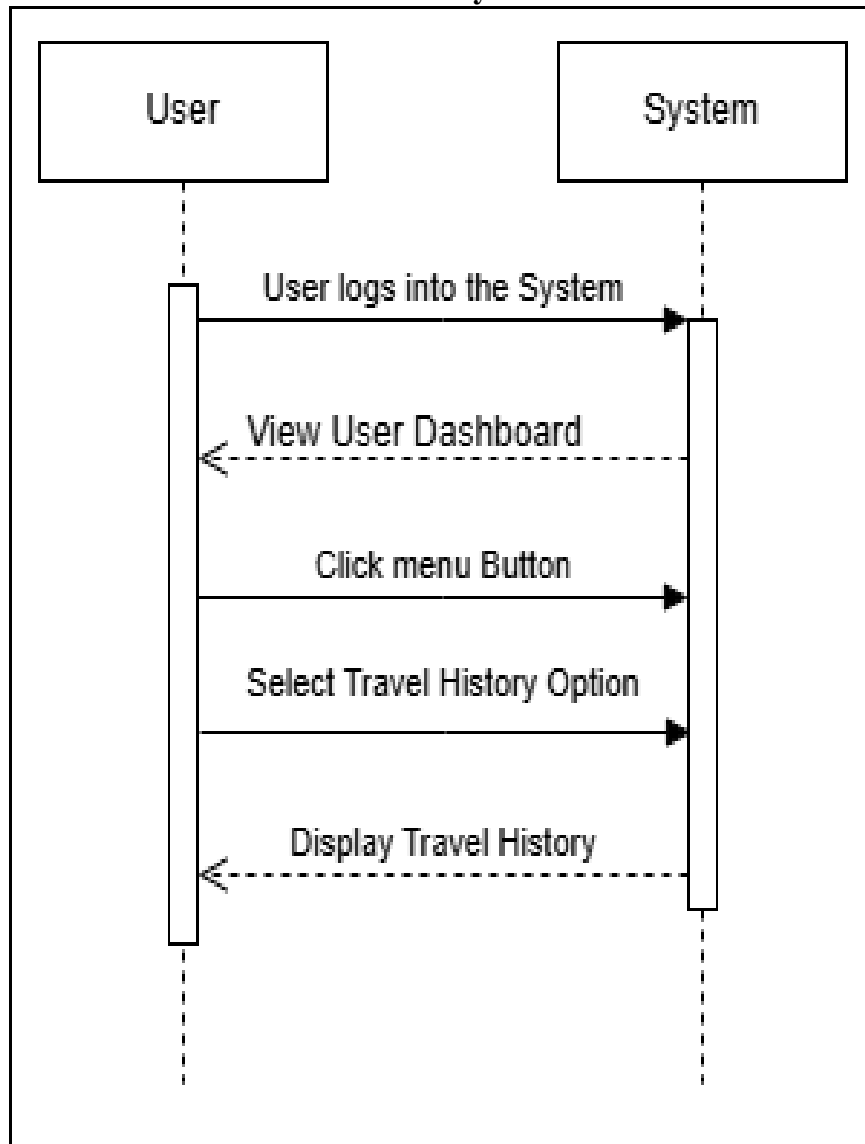


Figure 4.2.4.1 | User Register

#### 4.2.4.2 User View Travel History



**Figure 4.2.4.2 | User View Travel History**

#### 4.2.4.3 User Wallet Top-up

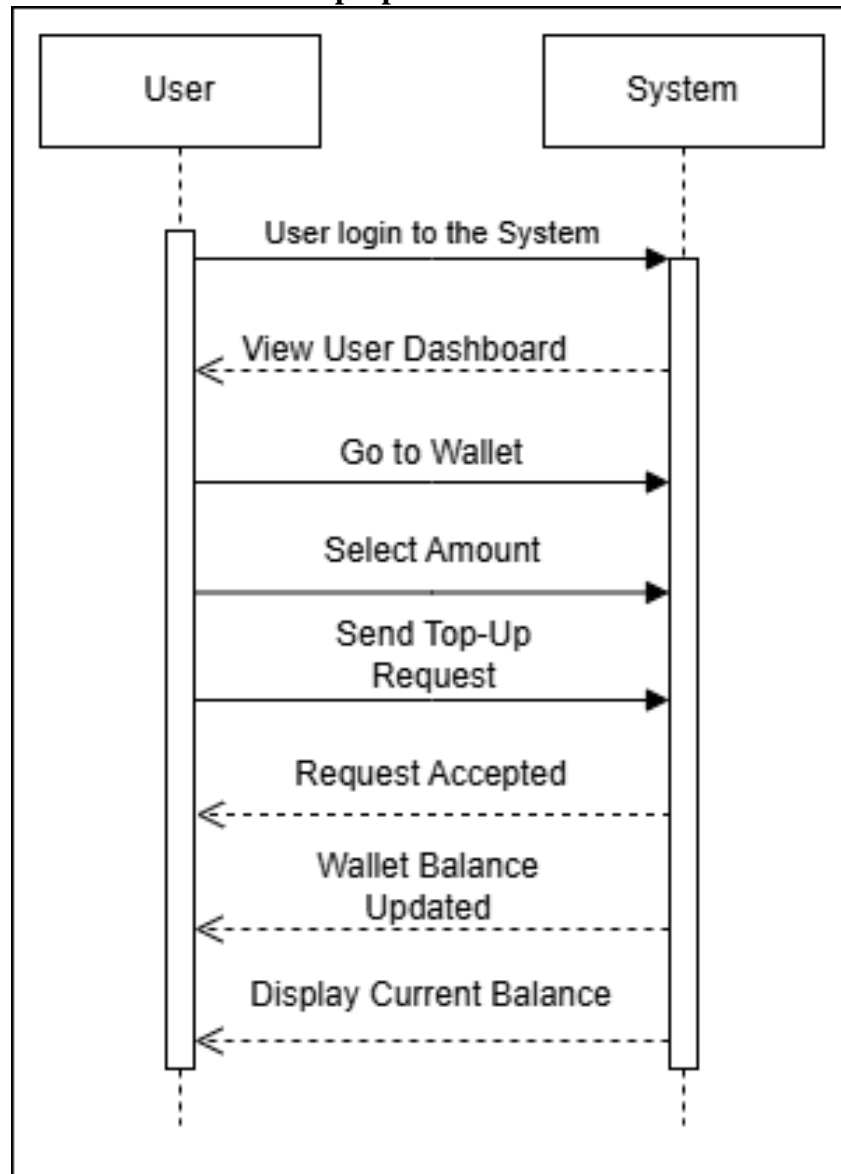


Figure 4.2.4.3 |User Wallet Top-Up

#### 4.2.4.4 User Find Station

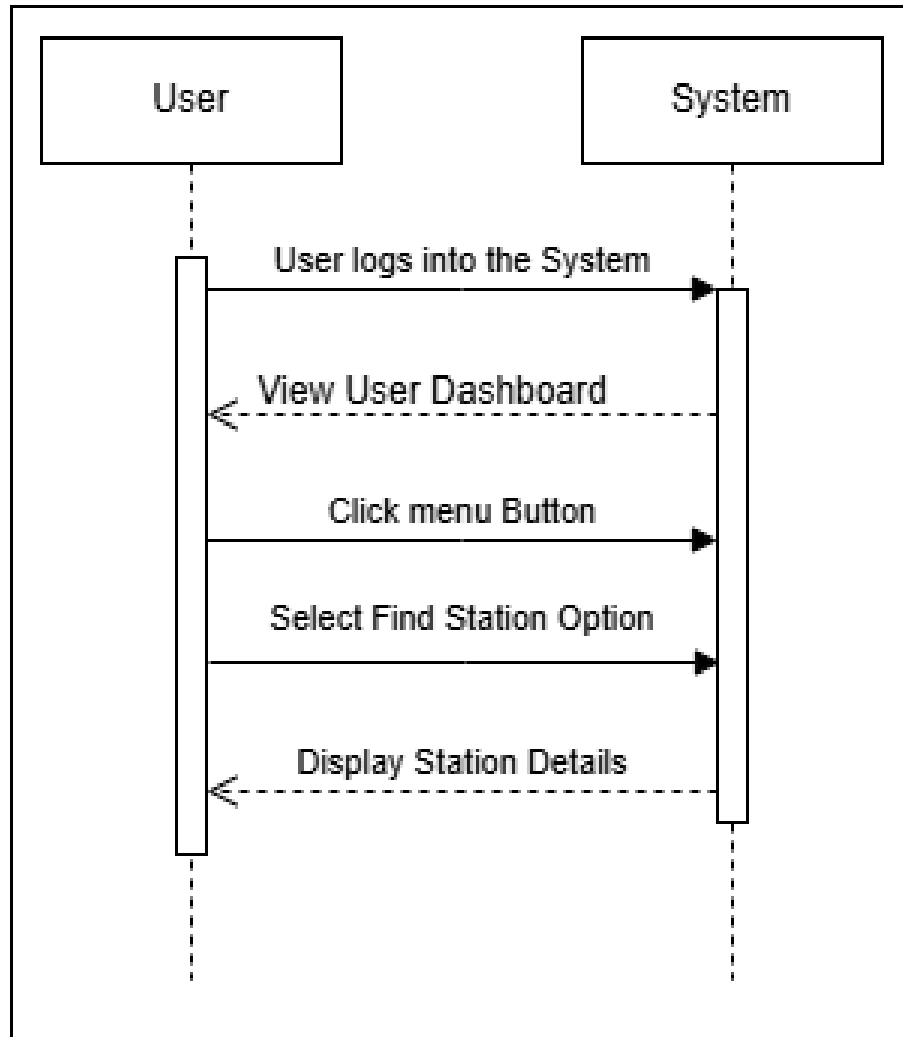


Figure 4.2.4.4 | User Find Station



#### 4.2.4.5 Admin Login

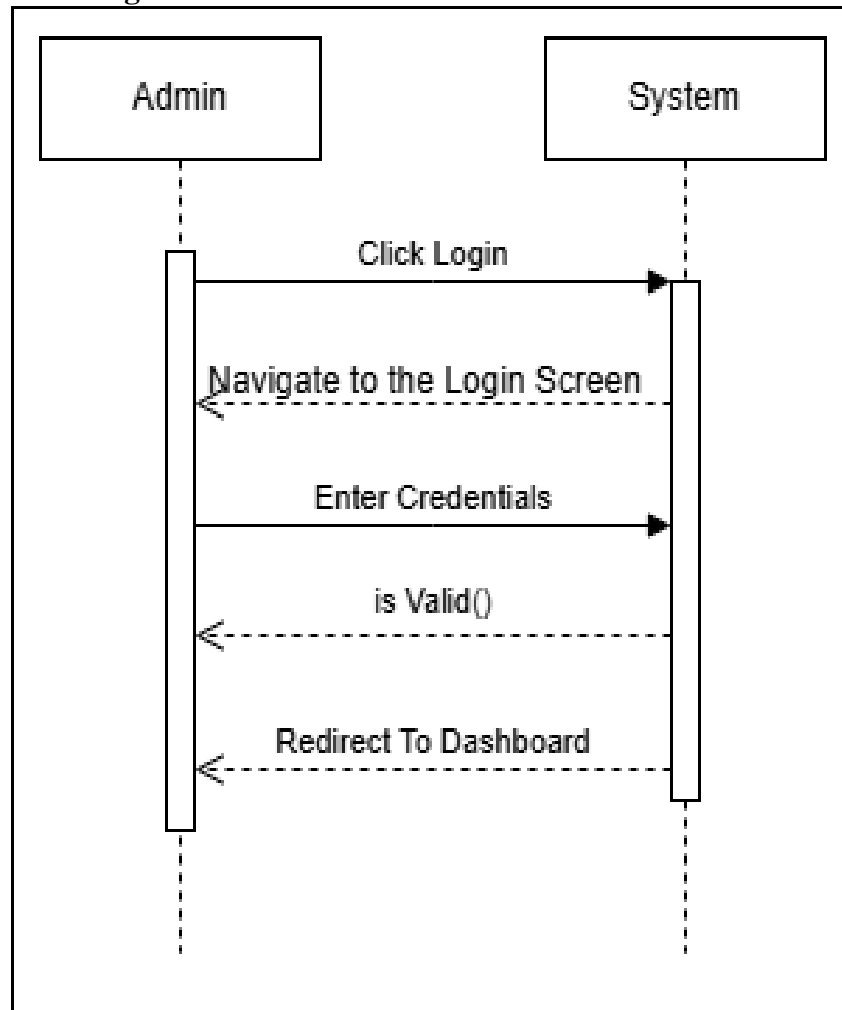


Figure 4.2.4.5 | Admin Login

#### 4.2.4.6 Admin Delete User Account

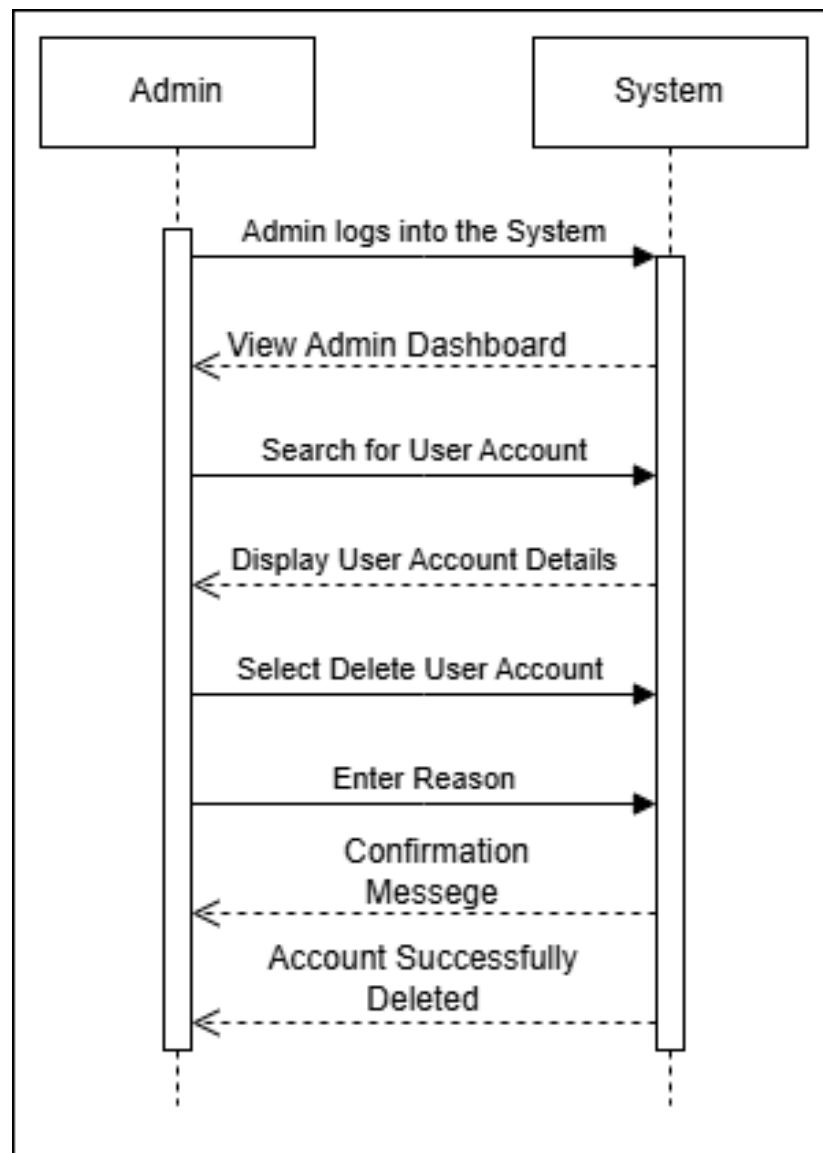


Figure 4.2.4.6 | Admin Delete User Account

#### 4.2.4.7 Admin Announcement

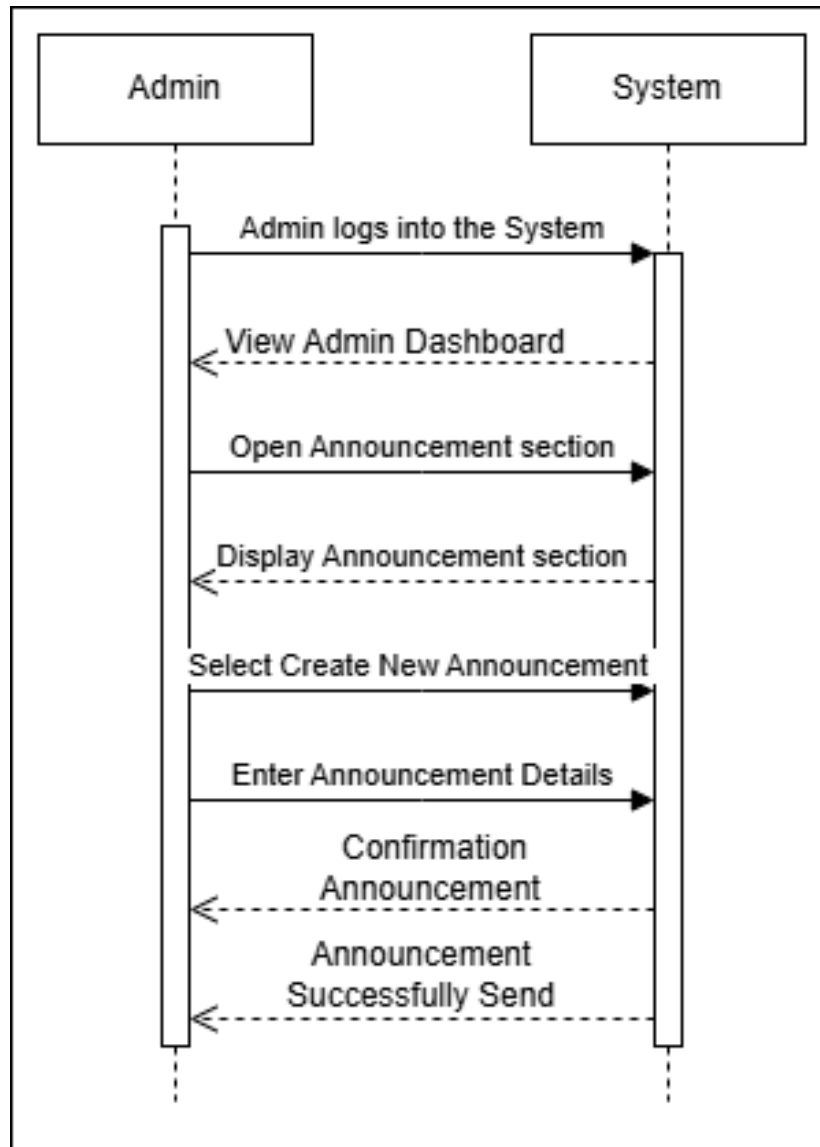


Figure 4.2.4.7 | Admin Announcement

#### 4.2.4.8 Admin Approve Top-ups

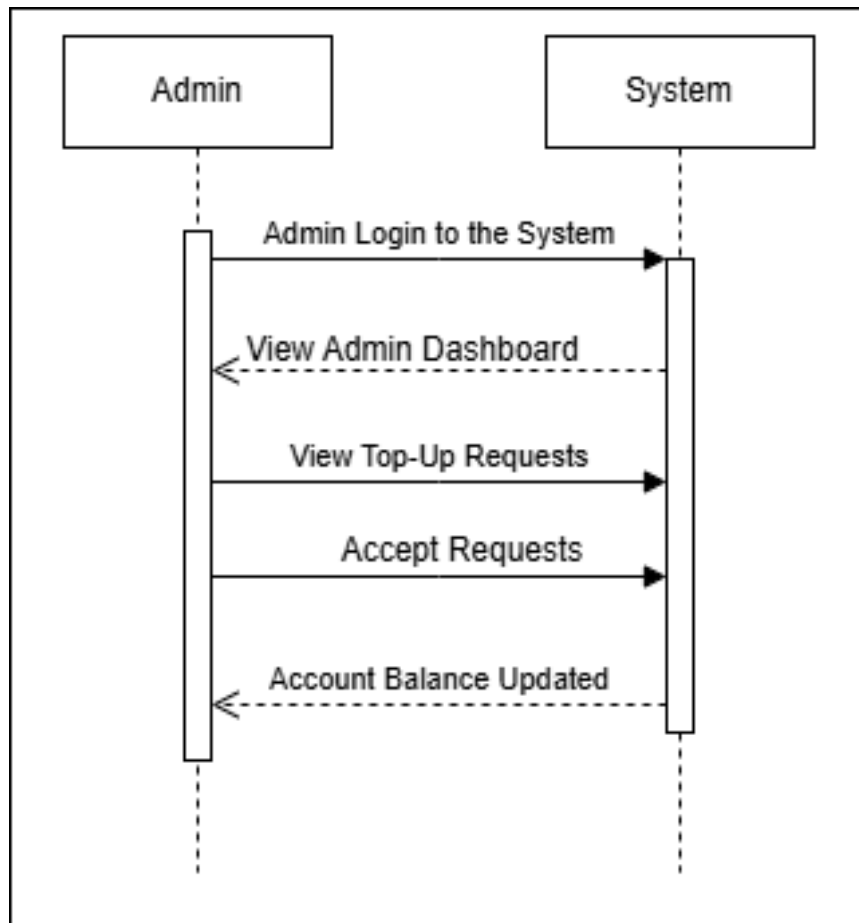


Figure 4.2.4.8 | Admin Approve Top-ups

### **4.3 Summary**

In this chapter, we have outlined the design aspects of the "Ez Transit " system through various diagrams. These include the architectural design, which illustrates the overall system structure, and the use case diagram, showcasing user interactions. The activity diagram provides a flow of operations, while the sequence diagram illustrates the chronological order of processes. Collectively, these diagrams offer a comprehensive understanding of "Ez-Transit from its technical framework to its functional workflow.

# **Chapter 5:**

# **Implementation**

# Chapter 5: Implementation

## 5 Endeavour

### 5.1 Team

- Ali Rayyan
- Abdur Rahman

WBS#	WBS Deliverable	Activity to Complete Deliverable	Responsible Team Member(s)	Date
1.1	Content Control System Initial Document	Brainstorming	Ali Rayyan Abdur Rahman	17/4/24
1.2	Evaluation & Recommendation	Discuss with Supervisor and Proposal Presentation	Ali Rayyan Abdur Rahman	22/4/24
2.1	Literature/Market Survey	Complete Research Regarding features	Ali Rayyan Abdur Rahman	19/5/24
3.1	Requirement Analysis	Functional Requirements	Ali Rayyan	4/5/24
4.5	System Design	Architecture Diagram	Abdur Rahman	14/4/24
4.2		Use case Diagram	Abdur Rahman	25/4/24
4.3		Fully Dressed Use Cases	Ali Rayyan	29/4/24

## **5.2 Components, Libraries, Web Services and Stubs**

- Reactive Native
- MongoDB
- Visual Studio

## **5.3 IDE, Tools and Technologies**

- MS Word
- Visual paradigm
- Visual Studio Code
- Draw.io
- GitHub
- Canvas

## **5.4 Best Practices / Coding Standards**

For E-Mechanic we will use following coding conventions/practices:

- Adherence to Established Standards
- Consistent Naming Conventions
- Limitation on Line Length
- Avoidance of Deep Nesting
- Refactoring and Optimization

## **5.5 Development Practices & Standards**

- Code Organization
- Code Style and Formatting
- Documentation
- Version Control (e.g., Git)
- Automated Testing
- Continuous Integration and Deployment (CI/CD)
- Error Handling and Logging
- Performance Optimization
- Accessibility
- Security
- Internationalization and Localization
- Code Reviews



## **5.6 Summary**

In this chapter, we explore the foundational elements of the software's structure and behavior. Key components and libraries integral to the system's operation are identified, along with the development environment and frameworks that will support the building process. The rationale for these choices is explained, ensuring they align with our objectives. Coding standards and best practices that will be implemented are also covered, highlighting our commitment to quality and maintainability in the software's development.

# **Chapter 6: Testing and Evaluation**

# **Chapter 6:**

## **Testing and Evaluation**

### **6.1 Introduction**

For promising the quality of the system, testing is the most important step for assuring the quality of the system. The purpose of testing is to find out the system errors and bugs in the application. So, in this chapter we will discuss testing of our application Ez-Transit. We will use the black box testing. In black box testing we will exam the functionality of an application from requirements without looking at the code structure.

## 6.2 List of Test Scenarios

### 6.2.1 Test Case Design User Register

Test Case ID	Test Scenario	Test Steps	Expected Output
1	Valid registration	Enter valid Name, Email, Phone, and Password.	User successfully registered and redirected to login screen
2	Empty name field	Leave name field empty.	Error message: Name is required
3	Empty Email Field	Leave email field empty	Error message: email is required
4	Invalid name format	Enter numbers or special character in name.	Invalid name format
5	Invalid email format	Enter valid email format	Enter valid email address
6	Invalid phone format	Enter non-numeric characters or less than required digits	Enter valid phone number

### 6.2.1 User Registration

#### Valid Input:

- Name: Abdur Rahman
- Phone:03213213215
- Email:[abdcgf@gmail.com](mailto:abdcgf@gmail.com)

#### Invalid Input:

- Name: !2346

- Phone: 07656#67
- Email: [abdcgf@gmail.com](mailto:abdcgf@gmail.com)

### 6.2.2 Test Case Design User Login

Test Case ID	Test Scenario	Test Steps	Expected Output
1	Valid login	Enter valid phone number and password	User successfully and redirected to dashboard
2	Incorrect password	Password not matched	Invalid password
3	Incomplete phone number	Phone number digits incomplete	Incomplete digits

### 6.2.2 User Login

#### Valid Input:

- Phone:03213213215

#### Invalid Input:

- Phone: 07656#67

### 6.2.3 Test Case Design Admin Login

Test Case ID	Test Scenario	Test Steps	Expected Output
1	Valid login	Enter valid email and password	Admin successfully and redirected to dashboard
2	Incorrect password	Password not matched	Invalid password
3	Invalid email	Enter unregistered email	Email not found

### 6.2.3 Admin Login

#### Valid Input:

- Email: [ALI@gmail.com](mailto:ALI@gmail.com)

#### Invalid Input

- Email: [ALI@@#gmail.com](mailto:ALI@@#gmail.com)

### 6.2.4 Test Case Design User Wallet Top-up Request

<b>Test Case ID</b>	<b>Test Scenario</b>	<b>Test Steps</b>	<b>Expected Output</b>
1	Valid top-up amount	Enter a valid top-up amount	Successfully updated the wallet amount
2	Empty amount field	Empty field	No output
3	Below minimum top-up limit	Enter an amount below the minimum allowed limit	Amount below the minimum allowed limit
4	Above minimum top-up limit	Enter an amount above the minimum allowed limit	Amount above the minimum allowed limit.
5	Insufficient funds in payment source	Attempt top-up with insufficient funds in bank account.	Insufficient funds
6	Cancel top-up request	Start a top-up request but canceled	Top-up is canceled wallet balance remains unchanged.

### 6.3 Summary

In this chapter we have provided list of test scenarios we have designed to evaluate our project. We have listed all the test cases of the commuter and admin involved in our system.

# **Chapter 7: Conclusion and Outlook**



## **Chapter 7:**

### **Conclusion and Outlook**

#### **7.1 Introduction**

The **Ez-Transit** project was designed to enhance the metro commuting experience in Islamabad and Rawalpindi by addressing common challenges such as route unfamiliarity, long ticket lines, and overall convenience. By simplifying the process of finding stations, scanning QR codes for entry, and managing a digital wallet, Ez-Transit focuses on making daily travel seamless for commuters.

#### **7.2 Achievements and Improvements**

The app helps commuters locate the nearest station and choose ideal routes, minimizing confusion and enhancing travel efficiency. By enabling QR code scanning for turnstile access, Ez-Transit eliminates the need for physical tokens, cutting down wait times and providing faster entry. The addition of wallet management offers users a cashless, secure way to pay for travel, making top-ups request and payments convenient and secure.

#### **7.3 Critical Review**

The Ez-Transit project is an endeavor that aims to meet the requirements of commuter. Our app sending updates to commuter through announcement for route changes, delays. Enabling administrators to access comprehensive user data for optimizing routes, scheduling, and maintenance.

## **7.4 Summary**

Ez-Transit successfully addresses the key pain points of metro commuting in Islamabad and Rawalpindi through innovative features. Its improvements in user navigation, QR-based access, and wallet management have made travel simpler and more efficient. Announcement and qr code feature can enhance the commuter experience, ensuring that Ez-Transit plays a vital role in daily metro bus users' life.