

## **ABSTRACT**

This study focuses on developing a web and mobile application for online ticketing, monitoring, and management system called TransitEase. It is designed to innovate the commuting experience for users and optimize business operations for LRT-1. TransitEase integrates NFC payment to help lessen crowd congestion. The added feature of the system also incorporates monitor the crowd status in the station.

*Keywords: TransitEase, NFC payment, Monitor crowd status*

## Chapter 1

### **INTRODUCTION**

Light Rail Transportation (LRT) 1 facing a high demand for public transportation as it serves an average of 500,000 passengers daily (Philstar.com, November 2017). Its usage grows each year. The passenger volume reached more than 13 million on August 2017, and on the following year the usage grows to 14 million (A. J. Pateña, September 2018). LRT-1 faces several challenges and issues like crowd congestion, long queues, environmental concerns, and overall commuter dissatisfaction. In order to resolve these challenges, the project “TransitEase: An Online Ticket Management System with Mobile Application for LRTA-1” is introduced. This project seeks to make far-reaching changes to public rail transportation by integrating cutting-edge technologies, including NFC for payment, mobile app solutions, and crowd status monitoring.

This system aims to provide useful benefits to the commuters uses single journey tickets in LRT-1, including efficient commuting experience and commuting processes, monitor crowd volume status. The system engaging travel options, encouraging the local and foreign commuters to choose rail transportation, if necessary, instead of looking an alternative way of transportation that may lead to inconvenience. TransitEase system aims to have community engagement. This system seeks to have communication among commuters.

## **1.1. Purpose and Description**

Commuting is an essential part of most Filipinos' lives. A commute is defined as traveling back and forth regularly. 12% of Filipino households own private vehicles, according to an article by A. Cruz (2022) and the remaining percent resort to commuting from home to work and vice versa. They rely heavily on public transportation such as jeepneys and trains.

According to a survey by Statista (2023), 60% used public transportation, such as trains and buses, as their primary mode of transportation. The pros of using a rail transport system are Convenience and Accessibility. Commuters appreciate the train system as a convenient mode of transportation in Metro Manila, especially during peak traffic hours. It offers a faster alternative than traveling by road, and the stations are generally accessible from schools. It is also cheap compared to the other modes of transportation. The cons are overcrowding and capacity issues. One common complaint about the Metro Manila train system is overcrowding during rush hour. Trains can get extremely crowded, leading to discomfort and safety concerns for passengers.

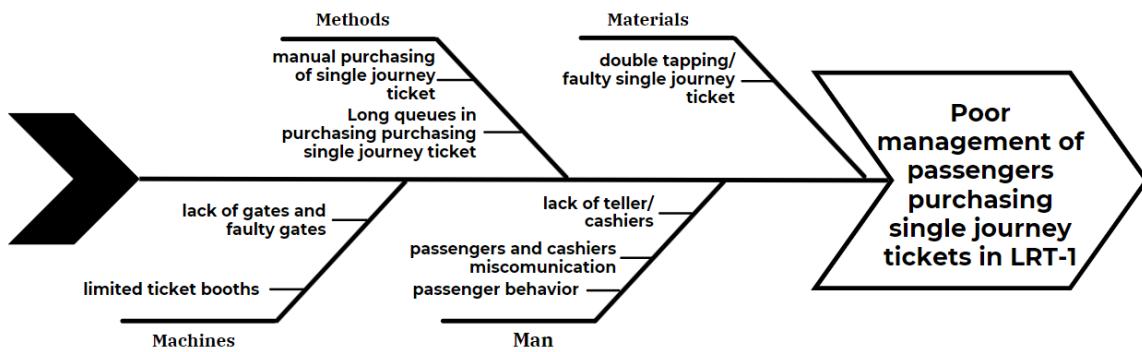
This is why the TransitEase project aims to be a strategic move for LRT-1 users to address Metro Manila's existing rail transportation challenges. Our project aims to make it convenient for commuters, especially the single journey ticket users, to make the commuter's life easier, reduce overcrowding and long queues, and improve operation.

## **1.2. Project Context**

LRT-1 is one of the most common public transports used in the daily life of Filipinos. However, due to lack of management of the passengers purchasing single

journey tickets, it grapples a series of challenges and struggles. With the said problem, commuters tend to find an alternative mode of transportation even if it is less convenient than rail transportation just to save time.

The TransitEase is an online ticket management system with mobile is designed to address these struggles. For those who are literate on using technology, they can purchase single journey ticket in the application while others can still buy their single journey tickets in the ticket booths, to lessen the crowd congestion. And real-time crowd monitoring is a feature of the application that monitors the crowd status in the station flag with context colors. And implementation of real-time updates that notify the commuters about the train condition and delayed train arrivals to improve the overall commuting experience of the commuters.



**Figure 1. Fishbone Diagram**

Figure 1 stated that the main problem of the LRT-1 was the management of the passengers purchasing single journey tickets and manual purchasing of tickets. Having only two teller/cashier in the ticket booth, the employees cannot accommodate the passengers fast they cannot keep up to the build of queues buying single journey tickets. Only two cashiers were assigned for accommodating the passengers buying single

journey tickets in the station, and responsible for faulty ticket. Most passengers manually purchasing single journey tickets and lead to long queues especially during rush hours. And, passengers and cashier's miscommunication lead to long queues.

### **1.3. General Objectives**

This project aims to develop and implement an online ticketing specifically single journey tickets with crowd monitoring and management system for LRT-1.

### **1.4. Specific Objectives**

- a. To integrate an easier way of payment using NFC.
- b. To implement real-time updates of commuter's volume in each station.
- c. To implement announcement module.
- d. To develop feedback module.
- e. To integrate Google Map API for enhanced route navigation
- f. To have a Content Management System.
- g. To test the system using ISO 9126.

### **1.5. Scope and Delimitations**

The scope of this research is mainly focused on passengers who often use the single journey ticket as their main mode of payment for transportation as the main feature of the system is to enable users to top-up and purchase single journey tickets online to avoid long queues. The project aims to develop an online ticketing system that focuses on single journey tickets for LRT-1. NFC and QR code will be integrated as a primary means of payment to scan the digital ticket. Upon accessing the application, the commuters

navigate to the ticket purchase section and will provide their desired destination. The system will calculate the appropriate fare price. The commuters should link their NFC-enabled devices to the system. With this integration, the commuters can simply tap their smartphone to the NFC reader. And for the beep card user, the top-up feature is included to load their beep via gcash or maya using the application.

The online ticket management module of the system will let the system administrator create, update, view, and delete users' information inside the system and management of purchasing single journey ticket transactions, Beep Card load, and monitoring of the crowd volume based on the ticket usage and will notify the user about the crowd volume situation of the passengers in the platform. This module will let admin monitor the transactions and activity promptly. The content management module facilitates the generation of comprehensive reports, offering valuable insights into system performance, user behavior, and transaction trends. These reports enable administrators to make data-driven decisions, identify areas for improvement, and optimize system operations effectively.

The announcement module will let the admin to announce or notify the commuters if there are delays on train arrivals and sudden maintenance so that the commuters will be informed and stay updated with the current situation and no longer visit other social media platforms just to check if there are any announcements on LRT-1, with this module the users can plan ahead to save time and efficiency of their travel. For the commuters they access the announcement module in mobile application to view what are the current announcement.

The feedback module included viewing of reports submitted by the commuters if they encountered any problems using the application or if the commuters want to suggest improving the application.

This system acknowledges the limitations that may put impact on the implementation and functionality of the TransitEase application. The system focuses on LRT-1 services only, excluding the other lines and mode of public transportation. And for mobile application this system is only for android users only. The commuters who are not that literate on using technology is also a limitation and for some older version of android devices that are not NFC-enabled.

The NFC technology will help to solve the problem because it will allow the commuters to easily enter and exit the gates of the station and it will save more time instead of manually buying ticket in the cashier and it is more convenient for passengers instead of queuing and waiting for ticket, they will just quickly proceed through the gates. With traditional methods, purchasing tickets manually can often lead to long queues, especially during peak hours when passenger traffic is at its highest. By contrast, NFC transactions are quick and efficient, allowing passengers to complete their transactions within seconds. This not only reduces congestion at station entrances but also improves the overall flow of passenger traffic, contributing to a more fluid and hassle-free commuting experience.

## 1.6. Conceptual Framework

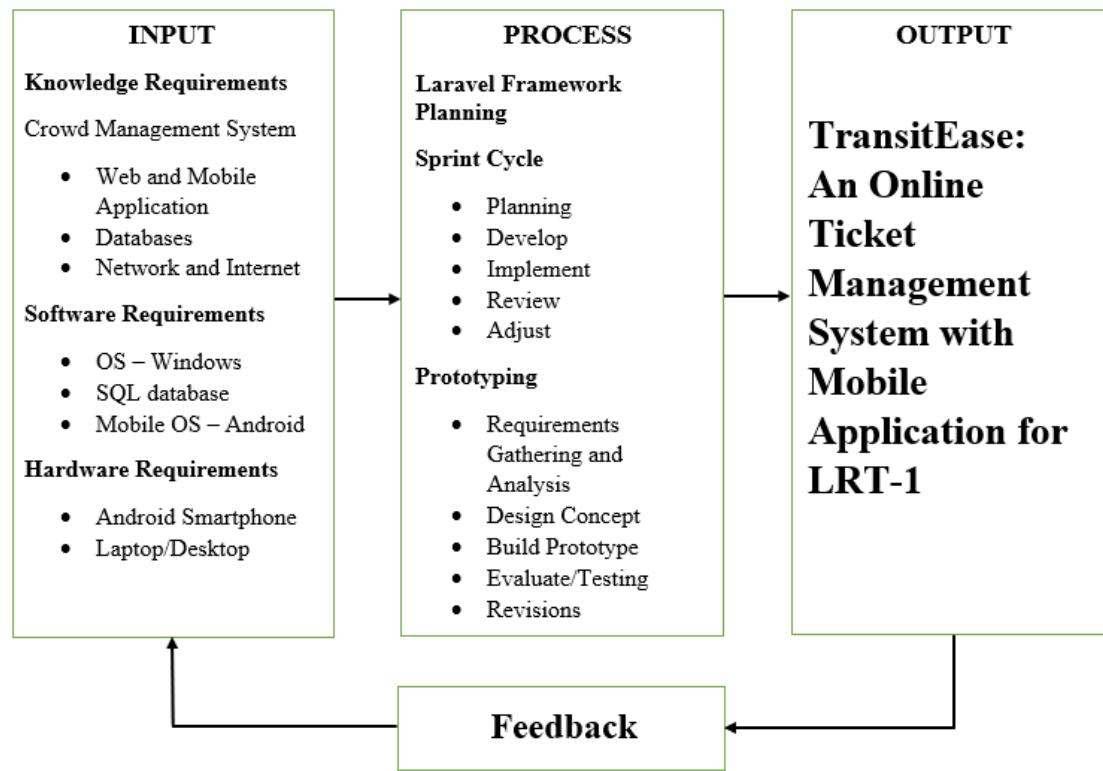


Figure 2. Conceptual Framework

## 1.7. Significance of the Study

The main purpose of this study is to enhance the commuting experience for passengers by making drastic changes in the urban rail transport system in Metro Manila. It also aims to address the problems faced by the passengers and the authorities. The beneficiaries of the study will include:

**Commuters** - The proposed system will provide significant advantages to both commuters and passengers by incorporating real-time updates, a convenient payment system, and crowd status features to enhance their commuting experience.

**LRT Line 1 Authorities** - The system's crowd monitoring capabilities will assist authorities in effectively managing passenger flow at each station, thereby reducing overcrowding and improving queue times at the LRT Line 1 stations.

**Local Businesses** - Businesses in close proximity to transportation hubs may experience a positive impact on foot traffic and overall accessibility for customers, potentially resulting in a boost in revenue for neighboring establishments.

## **1.8. Definition of Terms**

### **1.8.1. Technical Terms**

NFC (Near Field Communication) - is a short-range wireless communication technology that allows the exchange of data between devices in proximity. In the context of the "TransitEase" project, NFC is utilized for payment transactions, providing a convenient and contactless method for commuters to pay.

QR code - bar code that is used to provide easy access to online information through the digital camera on a smartphone.

Real-Time Updates – concurrent update of information to the users about the status of trains, stations, any potential delays, and crowd status.

Google Maps API – a system feature designed to assist the users both local and foreign in navigating the location of the train station to avoid getting lost and save time.

Content Management System (CMS) - A software application used for creating, managing, and modifying digital content.

LRT (Light Rail Transportation) – is a public transportation in the Philippines.

ISO 9126 - A standard for evaluating software quality, focusing on characteristics such as functionality, reliability, usability, efficiency, maintainability, and portability.

### **1.8.2. Operational Terms**

Crowd Congestion – the situation when excessive number of people in a station that leads to blockages and discomfort.

Feedback module – a feature that allows the user to provide insights and recommendations to improve the TransitEase system. And used for reporting bugs or problems of the system, train, and the station.

## Chapter 2

### **REVIEW OF RELATED LITERATURE**

In this chapter presents the local and foreign literature and studies that can strengthen the importance of present study. In the TransitEase scenario, the following are served as an informative material that will help and support to the creation of the system. Related systems are also included here which serves as guidance when it comes to comparing and implementing different features. Synthesis also presented here to understand and have a better understanding of the study and to support the development of TransitEase.

#### **2.1. Local Literature**

##### **2.1.1. Existing Systems for LRT & MRT**

In Metro Manila, there are many options to choose from when it comes to transportation. One of them is the LRT and MRT, which are known as the busiest train transport systems in Metro Manila. These trains are designed to offer swift and convenient transportation to passengers. The two urban rail lines in Metro Manila are owned by the government and operated by the Light Rail Transit Authority (LRTA): LRT-1 and LRT-2. While LRT-2 is run by the LRTA, LRT-1 is operated and maintained by the private Light Rail Manila Corporation (LRMC),

which is also required by contract to expand the line south. LRT-1 is a 19.65-kilometer train line with 20 stations. LRT-2 is a 17.6-kilometer route with 13 stations that operates in a general north-south direction. a route that runs roughly east west. The MRT-3, Metro Manila's third urban rail system, is owned by the private Metro Rail Transit Corporation (MRTC) but is run by the government. The MRTC constructed the facility and is leasing it to the government under a build-lease-transfer agreement that expires in 2025. The real Metrostar Express is 15, a division of the DOTR. Operator. MRT-3 typically travels 16.9 km north-south, with 13 stations along the way. According to Navarro and Latigar (2022), the country's weak and poor rail and road transportation infrastructure is still problematic. The Philippines is lagging behind its neighbors in ASEAN in terms of both the number and quality of its road and rail transportation infrastructure improvements.

The train transport system has been suffering from many issues. An article written by Luna (2022); the rail industry has suffered from "years of neglect." Luna further observes that "Unfortunately, the development of the country's rail transport sector stagnated for decades, and it is only recently that a more aggressive asset buildup is being pursued." Luna also notes, "Despite the recent attempts to catch up in the expansion and improvements, the task is simply gargantuan that the recent progress cannot be considered significant." Luna's insights shed light on the systemic challenges facing the rail sector, including outdated infrastructure, regulatory hurdles, and insufficient investment. Moreover,

the lack of modernization has resulted in decreased efficiency and reliability, impacting both freight and passenger services alike.

### **2.1.2. Challenges and Limitations**

The challenges and limitations in our society when using rail transit is that it is one of the most used modes of transportation nowadays, which leads to overcrowding, especially for students and employees. The rail transits are one of the most used modes of transportations in our society nowadays. In an article by Estember et al. (2020), the volume of passengers is growing extremely as the years go by. Due to the increased number of commuters, transportation has become a major problem since it causes road traffic congestion, pollution, and stress for all of the commuters. The number of commuters on rail transportation also increases, which can result in different problems like overflowing commuter volume, long service in buying tickets, and long waiting time on trains that causes delays to the commuters. These problems result in stress and productivity loss of the passengers. There are lengthy lines at the LRT Line 1 central station in the platform, ticketing, entrance, and checkpoint during busy hours. The trains are the primary cause of the lengthy lines. People had already filled up the station when they arrived, which led to passengers at the following station being unable to board the train.

According to Arnaldo (2022), the issue of commuting in the Philippines is widespread. It extends beyond the daily difficulties in Metro Manila, where long

bus and MRT lines are the standard. The article suggests that to address the concerns of commuters properly, government employees should give up their air-conditioned agency-assigned service cars and use trains or public transportation until the transportation problems are fixed. It emphasizes that taxpayers deserve to benefit from the taxes they faithfully pay.

There are several problems that may lead to inconvenience to the passengers because of the lack of proper maintenance, which can lead to unproductiveness. According to Delgado (2023), other issues are that trains are frequently malfunctioning and technical issues that prevent the train from running properly. Plenty of times, passengers are left stranded on train platforms for hours or stranded inside the train, which can result in wasted time and loss of productivity. Millions of Filipinos have to deal with the hardship of traveling by rail. Nonetheless, many Filipinos will continue to find their daily commute difficult until problems are fixed, which would lower their productivity and quality of life. Making public transit more effective, dependable, and available to all Filipinos must be the government's top priority.

## **2.2. Foreign Literature**

### **2.2.1. Effects of Train Delay on Passengers**

Train Delays are one of the issues that LRT and MRT have in common. These delays can lead to mixed emotions for a passenger. As stated by Rezapour

et al. (2021), various psychological and physiological feelings that commuters experience due to the shortcomings of rail transport are a major concern. The impact of the commuter's psychological feelings is higher than the commuter's physiological effects. Public transportation systems are crucial staples in our society. The benefits of using rail transport are reduced traffic congestion, gasoline consumption, and carbon emissions. If commuters face fewer delays, they are more likely to choose that service instead of other modes of transportation (Jansson, 1993). This study collected that frustration and anger were some of the passengers' feelings experienced regarding delays when waiting for the train. The initial survey of the data revealed that an overwhelming majority of the passengers rated the impact of delay as very negative and in favor of various emotional or physical feelings. Physiological effects include neck pain, headache, muscle stiffness, and back pain, while psychological symptoms are anger, sadness, and frustration. Train delays are not just about the valuation of money or time of the commuters; they also concern the psychology of the commuters. This research was made to fulfill the following objectives: the various physical and psychological effects the commuters experience when waiting for a delayed train.

This study demonstrates how commuters' physical and mental well-being is impacted by train delays. It was discovered that when a train is delayed, passengers frequently experience frustration and anger. Both physical discomfort, such as back and neck pain, and psychological worry can result from these delays.

Enhancing train services requires an understanding of these consequences. This study is important because it examines more than just the time- and money-related aspects of train delays. Through an analysis of the existing research on the psychological and physiological impacts on commuters, we can create more effective plans to improve their overall experience.

### **2.2.2. Importance of Rail Transport**

Rail transport is essential to our society because it is one of the means of transportation that can transport numerous passengers. Based on Pietrzak et al. (2019) assert that providing the basic transportation services required for capital city growth is one of public transportation's most important roles. These services may include meeting their requirements for social, cultural, and recreational activities, as well as transportation to and from their places of employment, public locations, schools, and medical facilities on a regular basis. Because these transportation services improve accessibility and have an impact on communities through transit infrastructure, they are essential to the promotion of sustainable regional growth. In the capital region, rail transit has two major benefits: it increases tourism and reduces long commutes. However, the technological state of the transportation infrastructure frequently presents difficulties.

Public transportation serves as a driving force behind fair growth and decreased traffic. Furthermore, upgrading transportation infrastructure solves current issues and sets up the area for future expansion and resilience. In order to

fully realize the potential of the capital city and its surroundings, policymakers and stakeholders must prioritize investments in modernizing and expanding public transit networks, even as they acknowledge the challenges posed by the technological state of transportation infrastructure.

In simpler terms, the study is related to our objective of promoting train usage for commuting, which can also reduce carbon emissions.

### **2.2.3. Enhancing the European Rail System**

The optimization of the rail system is identified as crucial, requiring strategic enhancements in various areas of railway systems, including vehicles, operations, infrastructure, technology and region. (Armando, C.Z. 2024). Since the article focuses on the Rail Research and Innovation Agenda (RRIA) which is the European Rail System, it discusses the concept of the optimization of the rail system.

First is the Efficiency Improvement wherein it involves the strategic enhancement of operational processes to achieve better efficiency. It includes streamline scheduling, minimizing its delays, optimizing routes to ensure a reliable system. Next is Capacity Utilization where it maximizes the use of existing infrastructure, implementing signaling systems and adopting traffic management solutions. After that is the Cost Reduction which it aims to minimize costs while maintaining or even improving quality. It can be achieved via various

energy saving methods so that by reducing resource consumption, rail operators can create a financially viable transportation system.

By integrating technologies such as Artificial Intelligence (AI) and data analytics, it enables predictive maintenance and real-time monitoring which results in a more reliable and resilient rail network. The rail system optimization also aligns with sustainable development. By promoting mass transit over private vehicles, it will contribute to less carbon emission. Lastly is Safety Enhancement where safety measures for the passengers will be enhanced because of the advanced signaling systems, automated control and intelligent infrastructure. (Armando, C.Z et al. 2024).

#### **2.2.4. Mobile-based Train Ticketing System**

“TrainGo” which is a mobile-based ticketing system designed for railway use in Sri Lanka. As stated by (A.D Supun Nimesh, Wickramasinghe, S., Hettiarachchi, S. 2020), the railway department in Sri Lanka uses a traditional method to issue tickets to passengers via counters. Because of that, passengers will have to endure the long queue and there is a possibility of them to miss the train. It uses a QR Code scanning mechanism to reserve and purchase tickets. The mobile-based train ticketing system provides a better service to the passengers by enhancing the ticket issuing process. Dynamic QR codes, E-Wallet system, Ticket booking system, Report generating system, and Admin backend panel are the

main processes of the mobile-based train ticketing system. The QR Codes for the stations are generated by the devices dynamically based on the station and date.

Another similar system situated in China is an online railway booking system which allows their passengers to register, book and cancel their rides. (Zongjiang, 2012.). It consists of a three-layer system which includes the DB layer, Application service layer and the user interface layer. The DB Layer holds the data of user registration, ticket ordering and ticket data while on the other hand, the Application service layer consists of the business logic of the Railway online booking system. The system has a customer register function, cancellation, searching, booking, and refunding function.

#### **2.2.5. Digitization of Rail Transport**

The use of modern technologies in rail transport particularly RFID, NFC and QR codes. Both technologies have their own advantages and disadvantages, the analysis in the study suggests that QR code is the most advantageous and is accessible in the current railway environment. (Juraj, C., Kendra, M., Zuzana, Z., Petr, S., Jiri, C., 2023). It was also found that users that use mobile phones with internet connections can significantly improve processes in the field of rail transport.

Another modern technology which is used in the article is “Biometrics”. It is a way of authenticating living organisms and or the biological characteristics of an individual. (Crockett et al. 2017). On the other hand, another technology used

is magnetic labels. It is widely used as a medium on payment cards. (Lopez-Vicente et al., 2023). The use of these modern technologies brings new possibilities and improves the efficiency of rail systems.

## **2.3. Local Studies**

### **2.3.1. Pedestrian Access around Transit Stations**

There are many factors affecting pedestrian access around transit stations especially in Metro Manila. The main focus of the study by (Wabe, A. and Montalbo, C. 2022) is to identify various factors surrounding mass transit stations in Metro Manila and the study analyzes the impact on pedestrians. The study provided road network data and landscape information to analyze street patterns, road infrastructure, connectivity, urban blocks, land plots, and land use around the stations. Furthermore, it has been revealed that land fragmentation emerged as a significant factor thus influencing the extent of pedestrian accommodation around transit stations. These findings highlight its importance, emphasizing that land characteristics are considered in station transit designs and urban planning.

The findings of this study provide valuable insights for city planners in Metro Manila, providing concepts and criteria on how to improve pedestrian access around transit stations. By understanding these factors affecting pedestrian spaces, transportation systems can be optimized to increase accessibility and reduce traffic congestion in neighborhoods.

### **2.3.2. Safety of Passengers**

The passengers' safety is essential because it can build and maintain public trust, ensuring that people will continue to choose rail transport over other transportation. To improve commuters' quality of life, Bucu et al. (2023) suggest that timetable construction methods be added to the typical operating schedule of LRT and MRT. The schedule only displays the time of the first and last train; however, a train's arrival and departure time at a station should also be shown and updated in real-time. This would allow for creating a timetable app that displays the train arrival time at a given station. The procedure follows: The user would choose LRT-1, LRT-2, MRT-1, or MRT-2 from a drop-down menu. There would be a designated station in the chosen line. In the app, there would be an estimated arrival time. Two arrival times, one for Baclaran and one for Roosevelt, would be displayed, for instance, if a rider used a station from LRT-1. The following table shows an example of the application's content. The user is expected to go by train from Monumento Station.

They also stated that Quality equipment and overall process efficiency is a sort of quality assurance application called TrenCheck is produced. It is a software program and QR Code reader designed to notify railroad customers about the current state of the train's apparatus at this time. Each LRT or MRT train has a tangible QR Code sticker that passengers can scan utilizing the program. After implementation, the application would display various aspects of the train, including its current status, indicating efficiency. Presently, existing mobile

applications offer users travel information, estimated fares, maps, and other pertinent details. However, they lack the assurance of safe travel to the intended destination. This proposed application aims to address this gap by providing users with real-time updates on the safety and efficiency of train operations. Since railway systems undergo rigorous quality control measures and provide daily status reports throughout operations, incorporating such information into the application is feasible. If successfully implemented, railway users would feel more confident using the system, as they would have access to detailed information about its performance during boarding.

### **2.3.3. Crowd Control Management**

Efficient crowd management can lead to hassle-free and smoother operations. As mentioned by Goh and Goh (2019), Light Rail Transit (LRT) 1 in the Philippines is one of the Filipino people's most popular public mass transit options for commuters traveling to their specific Metro destinations in Manila. However, the state of the trains has been declining during the previous few years, leading to inadequate trains to accommodate commuter demand during rush hours, disgruntled travelers, train arrival delays, and trains and stations too packed to be comfortable. They created Smart Crowd Management system's design system by combining contactless and infrared sensors, smart card, NFC reader, and writer, in addition to many desktop and tablet applications, were discovered to be practical for gauging the passenger volume in the waiting areas of the LRT 1 stations location, on a designated rail coach, and on a paid platform area. As a tool

for station crowd management and status monitoring, the hardware prototype and multi-platform software applications were successfully integrated utilizing the Xamarin Framework and Web-API MCV Framework along with Visual Studio, SQL Server Management Studio, and the Arduino IDE. Thus, the system uses desktop and mobile applications to update all end users on crowd status information in real time. In terms of accuracy and applicability, the Smart Crowd Control Management System works as intended, and in terms of security, it performs admirably.

This study utilizes smart technologies and embedded systems; our objective is related to this study. We also aim to optimize the commuter flow and enhance overall travel efficiency, addressing challenges associated with overcrowding and discomfort during peak hours.

#### **2.3.4. Train Maintenance**

Specialized software has been developed and designed for planning, controlling, and maintaining transportation systems to prevent breakdown and ensure customer safety and satisfaction. Trains risk facing mechanical problems that can lead to accidents and service interruptions if maintenance is improperly observed. According to (Intal et al., 2019) they created a software which they can verify if the parts of the system are not working properly or have damage due to the long term use. An information system and a number of functions that process data and provide indicators to support

maintenance activities form the basis of a computerized maintenance management system (CMMS), a tool to support maintenance strategy. Typically, a number of features and applications are allocated to the CMMS, such as 1. Asset management includes keeping track of all assets (or equipment), as well as a history of repairs and an inventory of equipment parts; 2. Work Order Management: This enables the maintenance technicians to be assigned and receive work orders. 3. Preventive Maintenance Management facilitates the organizing, arranging, and managing of tasks; 4. Inventory control: providing information on the availability of spare parts. 5. Report Management: CMMS generates performance indicators by processing a lot of data.

Once assigned, the technician will be responsible for inspecting and testing the trains. Once the train and all of its components have passed testing, the technician will update the train's status and declare the spare part to be operational, indicating that it is ready for service. In the event of an interruption, the train driver will alert the technician for further assessment. He will prepare a ticket request in case the train requires corrective action. The technician may look for previous disruptions that are similar to the one they are experiencing right now when preparing the ticket request. The system would present previous records that are similar to the current interruption. The technician would then have a quicker way to resolve the issue. The system will show the ticket as pending in the dashboard when it has been submitted for pending approval. The ticket request to acknowledge the interruption will be confirmed by the administrator or a control

center employee. The administrator can choose to specify how many personnel should be assigned, but by default, the system will assign the technicians who are available to complete the assignment and determine how many technicians are needed based on the severity of the situation. When the train is ready for servicing, the technician will document the results and put the plan into action before turning in the completed ticket.

## **2.4. Foreign Studies**

### **2.4.1. Public's Perception and Satisfaction**

Public opinion refers to how passengers perceive and evaluate the overall quality, reliability, and performance of the public transportation system. Accurate and reliable real-time information greatly affects public perceptions of public transportation. Inaccurate or unreliable information about delays not only increases passenger stress and anxiety but also reduces the perceived quality of travel services therefore ensuring that information is provided in a timely manner and accuracy through passenger information systems is important to increase citizens' satisfaction and confidence in using public transportation. (Mahdi R. & Ferraro F.R., 2021). Research conducted by (Mohd. Mahudin et al. 2012) are more concerned with public perceptions and satisfaction with public transport systems related to congestion. It highlights an important relationship between a passenger's perception of public transport. Understanding and addressing these

factors is essential to improving the overall efficiency of public transport services and increasing passenger satisfaction.

This study aligns with our objectives, such as designing a user-friendly interface for local and foreign users and developing one emphasizing passenger satisfaction. Also Incorporating Google Maps integration aligns with the emphasis on real-time information for commuters navigating the railways' stations. Our objectives aim to provide commuters with reliable and up-to-date information.

#### **2.4.2. Technological Innovations in Public Transportations**

The study conducted by (Shuran, C. and Xiaoling, Y. 2020) proposes a payment platform for public transport that integrates the use of NFC and QR technologies. This integration marks a remarkable breakthrough in travel payment systems, as it not only streamlines the payment process but also enhances the overall experience of the passengers, thus allowing the system to prioritize convenience, efficiency and satisfaction. The studies also integrate payment methods using NFC and QR technologies to build a platform to overcome deficiencies. The integration of these technologies into transportation and payment systems can lead to improvements in user experience, efficiency and affordability.

As discussed in this study, integrating QR code scanning mechanisms and e-wallet systems reduces friction in commuting transactional aspects. Our

objectives align with this study, such as facilitating an easier way of payment using a 3rd party such as Gcash/Maya.

#### **2.4.3. Commuting Patterns and Preferences of Individuals**

A study conducted in Jakarta states that many commuters in the region opt to ride on private vehicles such as motorcycles instead of taking the new LRT despite the high accident risk involved. The importance of providing a reliable timetable and pedestrian facilities may encourage commuters to use other active public utility transport instead of private motorcycles. As stated in the study, 42% of the respondents would rather walk than ride private motorcycles unless there were well designed pedestrian networks and facilities. (Elsevier, B.V 2020). Despite having other proposed improvements to railway networks, private vehicles especially cars and motorcycles still continue to be a common way of commuting due to lack of accessibility and policies to use public transportations.

By identifying commuting trip patterns and preferences of passengers, it can help improve the design and operation of the transportation infrastructure especially in rail transport systems. It can also help the development of transportation policies in the system which includes improved accessibility, better fares and incentives for using public transport can be implemented. In the long run, the study aims to contribute to the development of a sustainable and efficient

transportation system, aiming to support economic growth and improve the life of residents. (Tjajhono, T. Kusuma, A. Septiawan, A. 2020)

#### **2.4.4. Convolutional Neural Networks (CNN) for Crowd Analysis**

The CNN or Convolutional Neural Network focuses on crowd surveillance tasks such as counting, classification and density estimation. Human crowd analysis has become an increasingly important research area due to its wide range of applications in fields such as security, transportation and marketing (Idrees H, Saleemi I, Seibert C, Shah M 2013). The study explores applications such as pedestrian detection and behavior recognition; it also discusses the challenges faced while executing such as varying crowd densities and changes in crowd population over time.

Crowd counting using CNN is a popular approach for estimating the number of people, it has five(5) methods which includes density-based, detection based, patch-based, regression-based and lastly, hybrid methods. (Chan AB, Vasconcelos N 2012). Moving onto Crowd monitoring using CNN, there are also five(5) ways to monitor the crowd which includes density estimation, movement analysis, anomaly detection, event detection and emotion analysis. These methods can be used depending on the specific aspects of crowd behavior.

The study highlights CNN's favorable performance especially in human crowd analysis, surpassing traditional methods of crowd analysis. The study also serves as a valuable resource for researchers and practitioners especially in developing a crowd control/analysis system.

#### **2.4.5. Cyber-security risks on the Railway**

There are significant changes and challenges due to the digitization of railways. Cyber-attacks are now threatening railways as evidenced by several cyber-attacks in the past decade. Rail systems are increasingly at risk from human error such as failures to update and configure software correctly. Many cyber security breaches are due to human error which can affect signallers, drivers and maintainers. This includes actions as seemingly innocent as attaching unauthorized devices to networks, which may expose or introduce vulnerabilities. (Altaf et al., 2019). Another risk involved is due to increased automation in the system. As more rail systems adapt to automation, it is more prone to cyber-attacks. Another risk stated by the interviewee in this study is that when the railway organizations place new equipment on the railways, the human part of the integration is not always considered, which poses another cyber-security risk.

In the study by (Thron, E., Faily, S., Dogan, H.. 2024), it has been considered that the cyber security issues on the railways provided an opportunity

to explore the relationship between security and HF practitioners in the field. This led to an exploration of issues such as security awareness, training or education.

## 2.5. Similar Titles in the Market

### 2.5.1. Japan Travel by NAVITIME



Figure 3: Interactive Railway Map

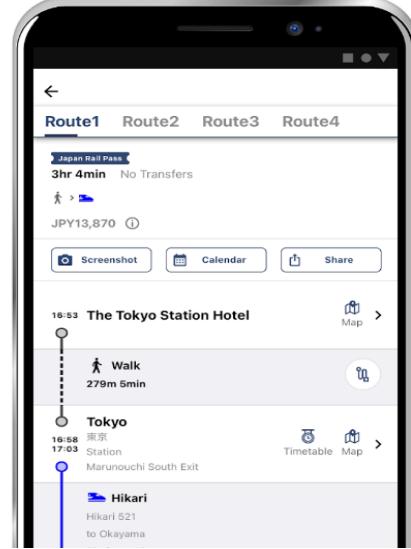
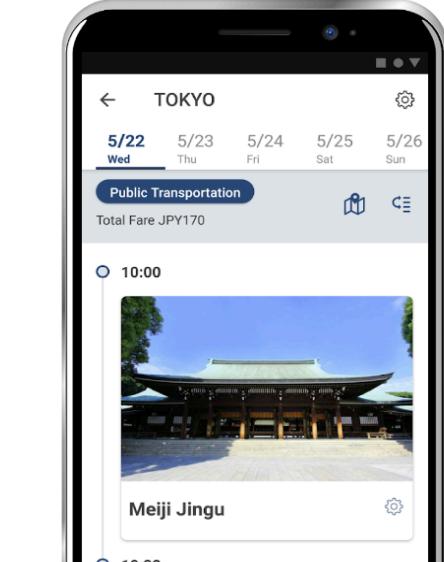
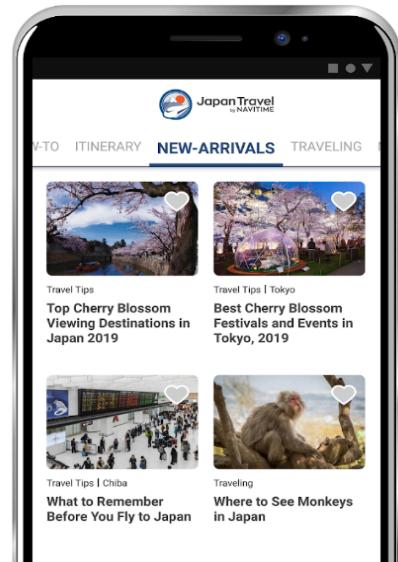
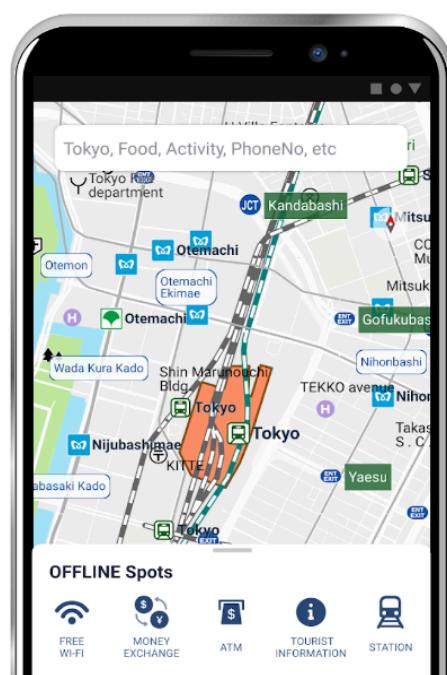


Figure 4: Japan Rail Pass routes



**Figure 5: Explore (Travel guides/Articles) Itineraries**

**Figure 6: Travel Itineraries**



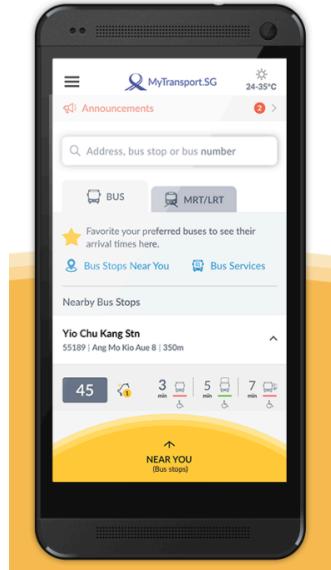
**Figure 7: Map/ Offline Spot Search**

**Figure 8: Japan Travel Website**

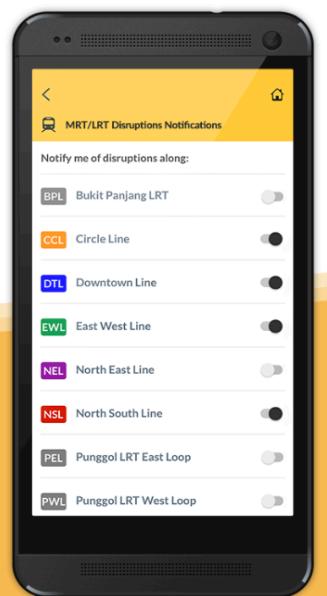
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Japan Travel by Navitime is a mobile application released on September 30, 2013. This application is available on both Android and IOS devices. This application is free and there are also paid features you can buy for more convenience. The free version itself is already useful for both foreign and local users, offering essential information, convenient navigation, offline functionality, and travel planning features to enhance the overall travel experience in Japan. The paid features are also helpful for the users like voice navigation, detour route search, and ranking of popular sightseeing articles.

### 2.5.2. MyTransport.SG

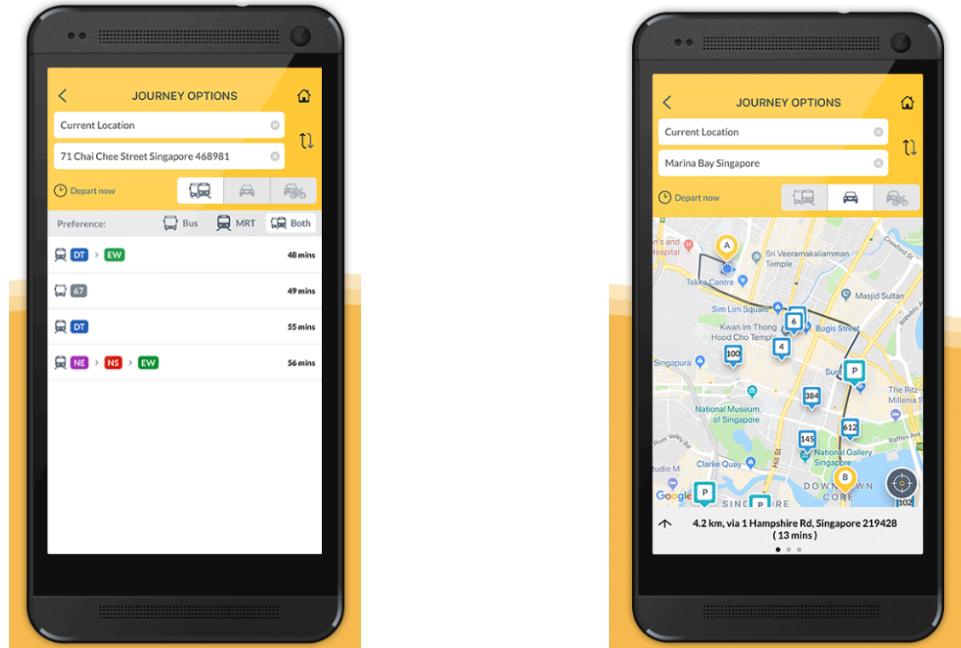


**Figure 9: Home screen**



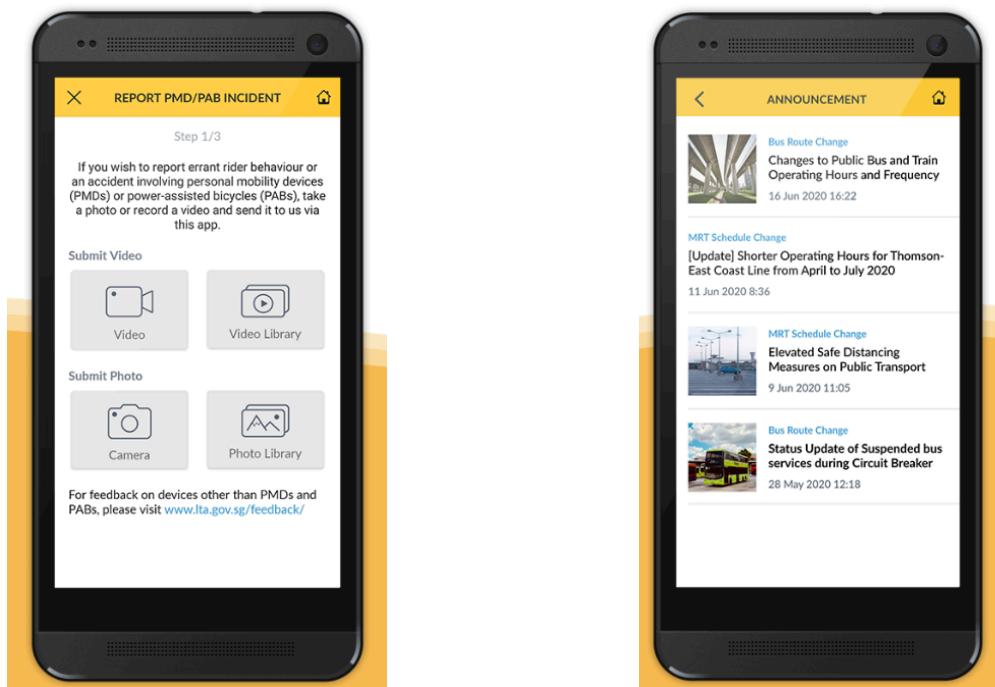
**Figure 10: Near You**

**Figure 11: Notifications**



**Figure 12: Journey Planner**

**Figure 13: Parking Availability**



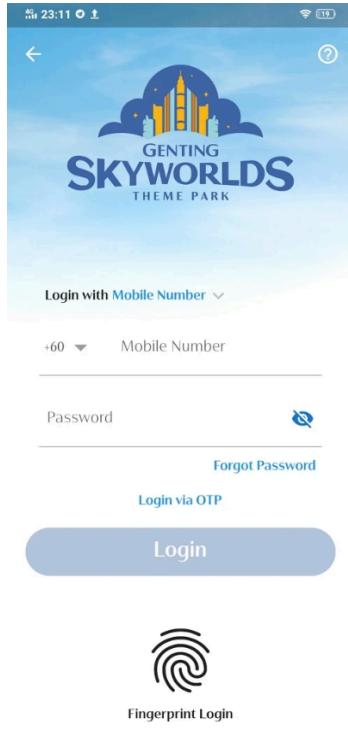
**Figure 14: Help and Support**

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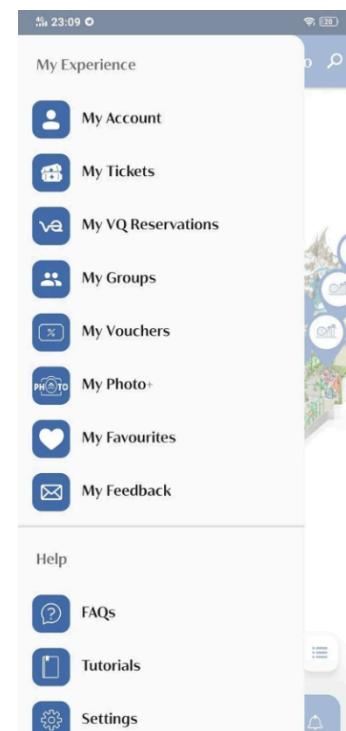
MyTransport.SG is a mobile application released on September 6, 2018 and available on Android and IOS devices. The app allows users to quickly access information about their frequently used bus services and traffic updates. This application also enhances the commuting experience for users in Singapore by providing personalized and real-time information, offering a multi-modal journey planner, and ensuring transparency about battery usage implications.

**Figure 15: Announcement**

### 2.5.3. Genting Skyworlds



**Figure 16: Login page**



**Figure 17: Menus**



**Figure 18: Map/ Route**

### **Figure 19: Genting Skyworlds Website**

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Genting Skyworlds is a mobile application released on January 5, 2022, and it is available on Android and IOS devices. This app is free-to-download that allows the users purchase tickets, view attraction times, view park guides, and make virtual queue reservations for attractions. The application serves as a guide to the foreign visitors and even for the local residents allowing them to save time for what they are looking for in the park itself.

#### 2.5.4. LRT1 ikot MNL

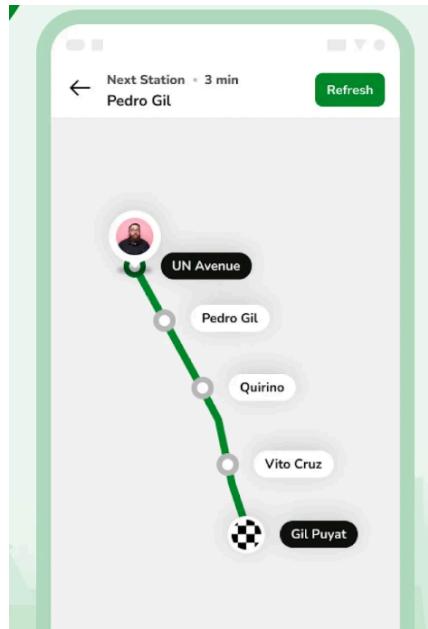


Figure 20: Real-time train location

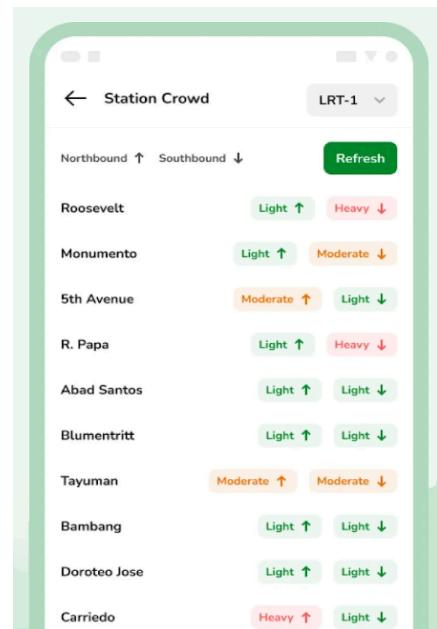
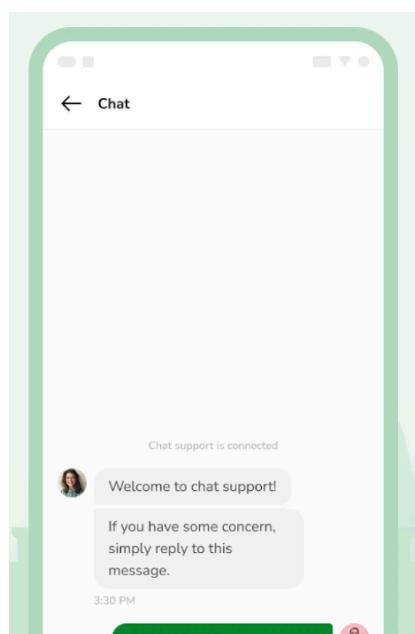


Figure 21: Crowd Status

**Figure 22: Fare Checker**

**Figure 23: Ticket Purchase**



**Figure 24: Help and Support**

A screenshot of the ikotMNL website. At the top, there's a navigation bar with links for "ABOUT", "LRT-1 STATIONS", "EXPLORE", "VLOGS", "EVENTS", "MEDIA BUZZ", and "BOOK AN ADVENTURE". The main feature is a large banner image of a statue in front of a building with the text "LRMC's ikotMNL movement revitalizes Manila heritage site Liwasang Bonifacio" overlaid. Below the banner, there's a green footer bar with the text "Mamasyal. Mag-food trip. Mag.shopping. Mag-ikotMNL!" and a "BOOK YOUR ADVENTURE" button.

**Figure 25: ikotMNL homepage Website**

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The application ikotMNL was released on November 2019 on Android and IOS devices. This app is free-to-download on play store and app store. The application aims to make a guide for LRT-1 users that allows them to save time when travelling. It also allows the users to check the possible train arrival and the user can check on how dense the crowd in the station. The users of this application can buy tickets through beep card QR code so they do not need to fall in line when they arrive in the station to buy their ticket to save time and the users can also check the fare prices if there are changes. And this application has help and support if the users encounter any problem using the ikotMNL application.

System Titles	Real-time Updates	Crowd monitoring	NFC based payment	Route Navigation	Feedback module	Web	Mobile
Transit Ease	✓	✓	✓	✓	✓	✓	✓
Japan Travel	✓		✓	✓	✓	✓	✓
MyTransport.SG	✓			✓	✓		✓
Genting Skyworlds	✓			✓	✓	✓	✓
ikotMNL	✓	✓	✓		✓	✓	✓

**Figure 26: Feature matrix**

## **2.6. Synthesis**

Our local and foreign literature references discussed what are the problems and how they come up with the solution to solve the problem in rail transportation. One of the major hindrances in rail transportation is technological problems on how to manage the crowd congestion when using rail transportation. The explanation for this problem is the long queues when purchasing tickets in the station and lack of supervision. It also states that the rail transport system lacks on updating the commuters if there are any problems with the train itself and if there will be a schedule of maintenance on the transport system. And for the foreign visitors and local commuters that are not familiar with the station locations they tend to use an alternative mode of transportation even if the rail transport is the best option. With these hindrances mentioned in the references, our team came up with a solution to develop a system called TransitEase, a rail transport management system.

The gathered local and foreign studies references focus on the safety of the commuters, safety of trains used, and the density of crowds when using rail transportation. By understanding the surroundings around the train stations, it has a huge impact on the safety of the commuters such as road infrastructure, and also the physical layout of the station itself may affect the safety of the commuters. With these it will build and maintain the trust of the people to use rail transportation where the quality of life of the commuters will be efficient.

There are systems that are considered similar to TransitEase used in different countries, but there are features that other systems do not have in the other system. Since

our rail transportation in the Philippines is different from other countries like Japan, our team made an adjustment to meet the needs of local and foreign users of the TransitEase. We are confident that our system is different from the existing system in the market, especially in the Philippines. TransitEase will make sure that the clients will experience the best quality of service and convenience when they use our rail transport management and crowd control system.

## Chapter 3

### **METHODOLOGY**

Our research study covers the methodology used to build the proposed system. It includes project creation, sampling strategies, research methodologies, data collection, and system testing. The researchers opted for quantitative research methods for data collection. The chapter also delves into the requirement analysis, project design, project development model, software testing, software evaluation model, and statistical treatment - all of which are essential techniques used in this study.

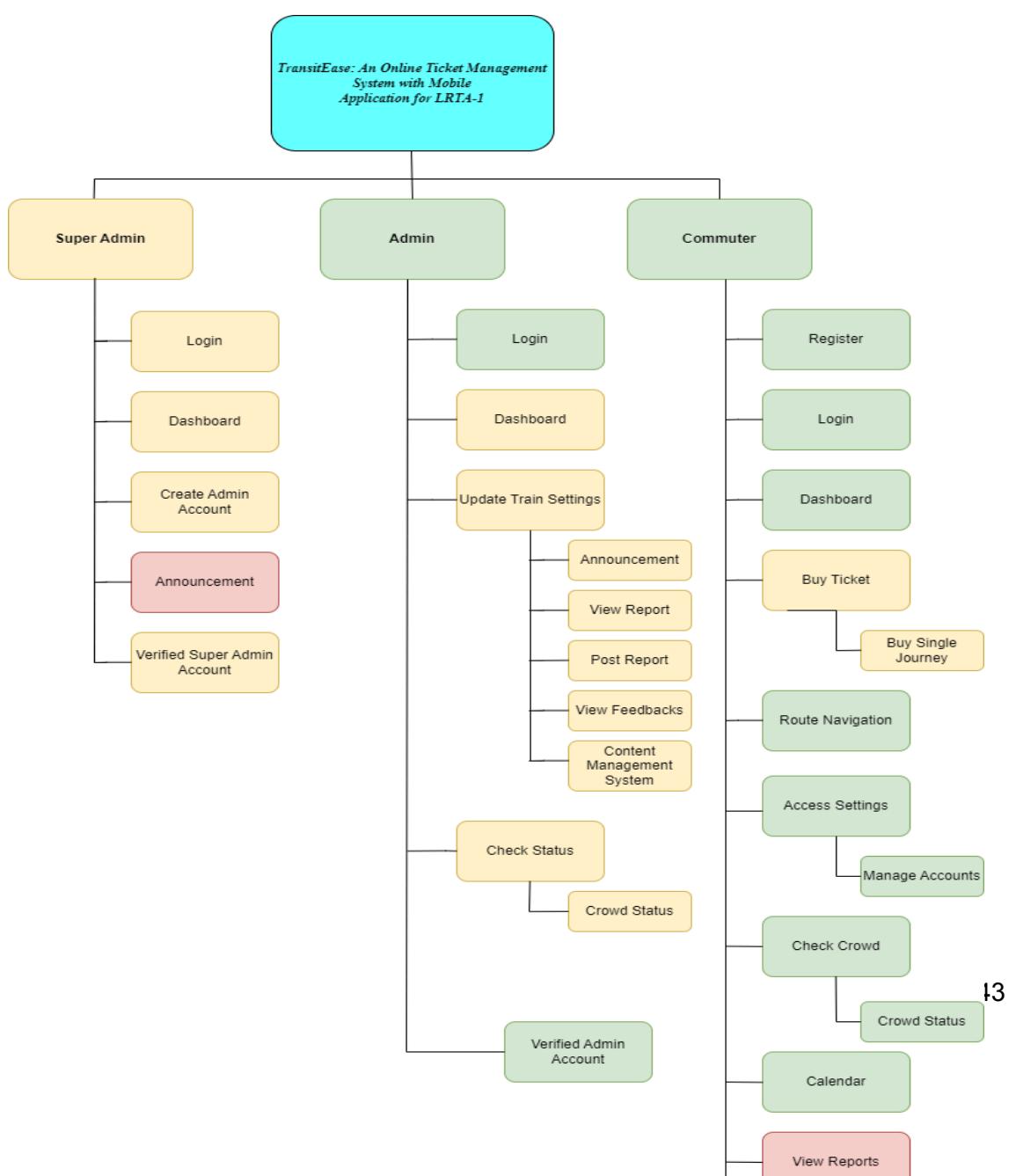
#### **3.1. Requirement Analysis**

The requirement analysis is a critical aspect of this research study. It involves evaluating reports to determine if the proposed Rail Transport Management System meets the operational, technical, scheduling, and financial feasibility requirements. This analysis is necessary to identify any potential issues that the team may encounter during the development process. Our stakeholders, including commuters, transportation authorities, and technology providers, were thoroughly examined to identify their needs

and expectations. The goal was to identify the essential features and functionalities that could help address the issues currently present in the urban rail transportation system in the Philippines.

### **3.1.1. Operational Feasibility**

The operational feasibility assessment was conducted to determine the viability of implementing the suggested Rail Transport Management System. It aimed to identify if the system could be successfully incorporated into the existing transportation infrastructure and operational procedures. The assessment considered various factors, such as stakeholder readiness, resource availability, and compatibility with technology, to determine the feasibility of implementing the system in real-world settings. The operational feasibility analysis involved consulting with various stakeholders, including potential end-users, technology specialists, and representatives from transportation agencies. Discussions were held to gather insights into the current operational challenges, technological capabilities, and organizational dynamics that could impact the implementation of the proposed system. An evaluation of the current infrastructure and systems was conducted to determine the feasibility of incorporating new technologies and functionalities.



### **Figure 27: Functional Decomposition Diagram**

The study's Functional Decomposition Diagram (Figure 27) shows how the system is divided into three entities: users, employees, and administrators. Every entity has particular functions that are suited to the roles that they play. While the Employee entity is in charge of monitoring, reporting, and updating train settings, the Admin entity is concentrated on system management, announcements, and employee account management. In order to serve commuters, the User entity provides a number of features, such as access settings, payment management, and crowd monitoring. This diagram gives a thorough overview of the operational structure of the system and highlights the various roles and responsibilities of each entity in supporting effective crowd control and rail transport management for LRT.

#### **3.1.2. Technical Feasibility**

An assessment of the proposed Rail Transport Management System's technical viability was done to see how well it would work with the current technological infrastructure and capabilities. With the help of available

technology resources and a minimal amount of significant technical hurdles, the purpose of this assessment was to ascertain whether the system could be implemented. To determine whether implementing the suggested system would be technically feasible, important factors like data integration, software compatibility, and system scalability were considered.

### 3.1.2.1. Hardware Requirements

**Table 1: Hardware Requirements**

Mobile	Desktop/Laptop
<b>Devices:</b> Smartphone or Tablet	<b>Processor:</b> i5 or ryzen5 and up
<b>OS:</b> Android 9 and up	<b>OS:</b> Windows 10 and up
<b>Memory:</b> 4gb RAM	<b>Memory:</b> 8gb RAM
<b>Internet:</b> Wi-Fi or Mobile Data	<b>Internet:</b> Wi-Fi or Ethernet

Based on the technical specifications of the suggested functionalities and the expected workload, the TransitEase's hardware requirements were established. Table 1 shows the hardware parts and setups required to ensure the system operated without any problems were included in these requirements.

### **3.1.2.2. Software Requirements**

**Table 2: Software Specification for Deployment**

<b>Software Specification (Deployment)</b>	
<b>Software</b>	<b>Specification</b>
Operating System (OS)	Windows 10 home or Pro
Browser	Google Chrome Version 98.0.4758.102

Certain software components are required for the deployment of TransitEase to guarantee compatibility and smooth operation. For compatibility with a range of hardware configurations, Windows 10 Home or Pro is the required operating system. The recommended browser for best results is Google Chrome Version 98.0.4758.102, which is well-known for its security, stability, and interoperability with contemporary web technologies.

**Table 3: Software Specification for Design and Development**

<b>Programming Languages</b>	HTML5
	CSS
	MySQL
	Bootstrap
	Laravel
	Apache
	Java

<b>Software</b>	Visual Studio Code
	XAMPP
	Browser
	Android Studio
<b>OS</b>	Windows

Software tools and frameworks are necessary for the TransitEase design and development phase to make the creation and testing of various components easier. With Apache, Laravel, and MySQL, XAMPP offers a complete development environment for backend development. The recommended tool for developing mobile applications, Android Studio, makes it easy to create and test Android applications. With support for HTML5, Bootstrap, CSS, and Java, Visual Studio Code provides a flexible web development platform for creating and managing web content. By guaranteeing the effective design and development of TransitEase, these software specifications set the groundwork for a reliable and user-friendly rail transport management system.

### 3.1.3. Schedule Feasibility

TASKS		2024											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
REQUIREMENT ANALYSIS	System Planning												
	Data Requirements Gathering												
	Data Requirements Analysis												
	System Documentation												
SYSTEM DESIGN	Web UI Design												
	Mobile UI Design												
	Database Design												
SYSTEM MODULES	Payment Module												
	Crowd Monitoring Module												
	Announcement Module												
	Route Navigation Module												
	Calendar Module												
	CMS												

### **Figure 28: Gantt Chart of Development of TransitEase**

Figure 28 illustrates the time given for planning, analysis, and design of the system. The left side of the chart lists certain tasks that are categorized into systematic processes to be conducted during the timeframe of the system's development. Each task is represented by a bar. Whose position and length reflect the start, duration, and finish date of the task. The period starts during the second semester of A.Y. 2023-2024, from September 2023 up to April 2024.

As seen in the chart, requirement analysis and system design had six (6) months of work. Having requirement analysis takes about four (4) months to complete and two (2) months for the system design, accounting for analysis having the longest timeframe during the course of the system's progress.

#### **3.1.4. Economic Feasibility**

Based on a cost-benefit analysis, one way to determine if a proposal is reasonable and feasible is to use the Economic Feasibility method. Evaluated to determine if utilizing the system would yield benefits that surpass the implementation costs, both tangible and intangible. In contrast to monetary measurements of tangible advantages, intangible or soft benefits are advantageous improvements that are not easily quantifiable.

#### **Table 4: Start-up Cost**

<b>Equipment</b>	<b>Cost</b>
NFC Technology	Php 1,800
Deployment of the System	Php 0.00
Web Hosting & Domain Registration	Php 2,000.00
Google Playstore	Php 1,250.00

The tangible costs and benefits include:

1. The system streamlines commuter processes, reduces down on delays, and boosts efficiency throughout.
2. Public transportation is preferred over private vehicles by TransitEase, which not only reduces traffic but also promotes environmentally friendly travel options.
3. Implementation of NFC payment reduces the need for physical tickets and manual transactions that leads to cost savings.
4. Commuter forums and sustainability tracking are a couple of features that increase community involvement.

The intangible costs and benefits include:

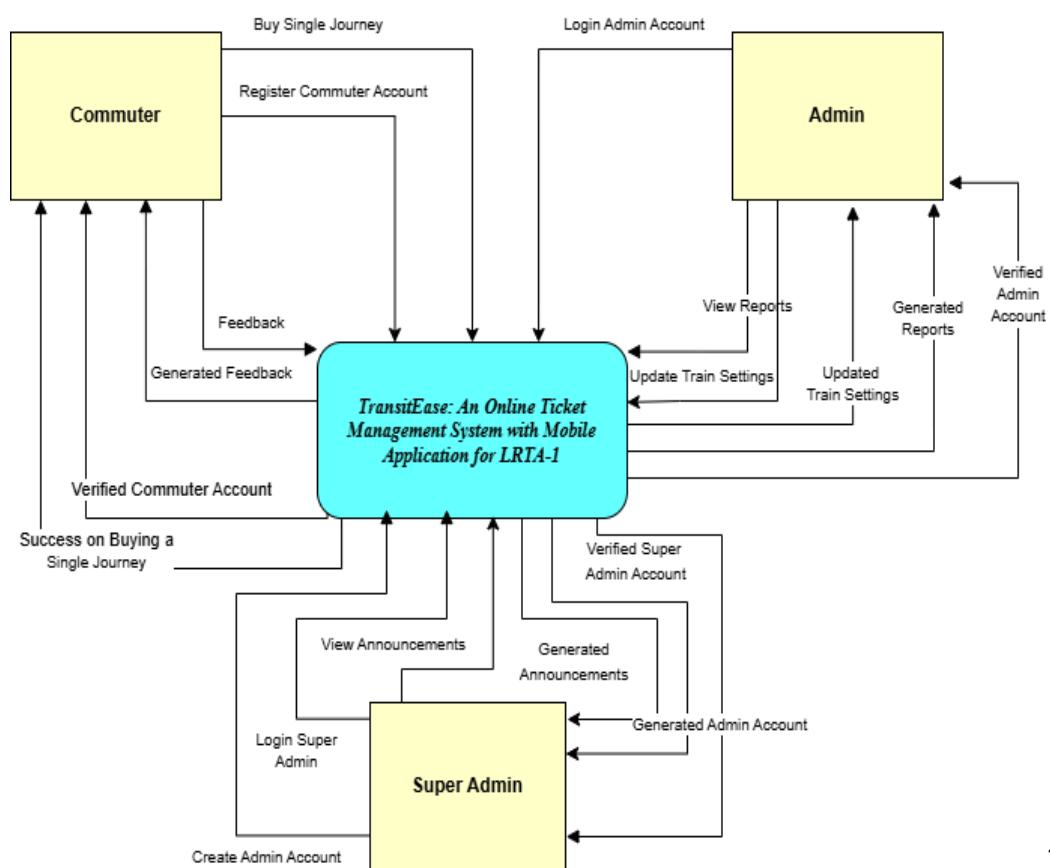
1. TransitEase encourages social inclusion by guaranteeing that transportation services are available to all community members, regardless of socioeconomic status or physical ability, by offering accessible and user-friendly transportation options.

2. The system improved the commuter experience by providing real-time updates, effective crowd control, and individualized services, which gave commuters peace of mind and convenience.
3. TransitEase generates useful data about commuter preferences, behavior, and traffic patterns.
4. TransitEase encourages social inclusion by guaranteeing that transportation services are available to all community members, regardless of socioeconomic status or physical ability, by offering accessible and user-friendly transportation options. Our study could lessen the carbon footprint, which aligns with SDG 7 (Affordable and Clean Energy) because it does not require commuters to walk too far or line up to cashier to buy the SJT. It also benefits our society and preserves the cleanliness of our surroundings. Our application includes purchasing SJT, which NFC will use. Our study also aligns with SDG 9 (Industry, Innovation, and Infrastructure).

### **3.2. Project Design**

In the process of developing a system, system planning is followed by project design. It contains several diagrams that show various system flows. Project design conceptualizes how data elements relate to one another. By creating precise models, the specifications' accuracy can be guaranteed. This comprises crucial diagrams like the data flow and context diagrams.

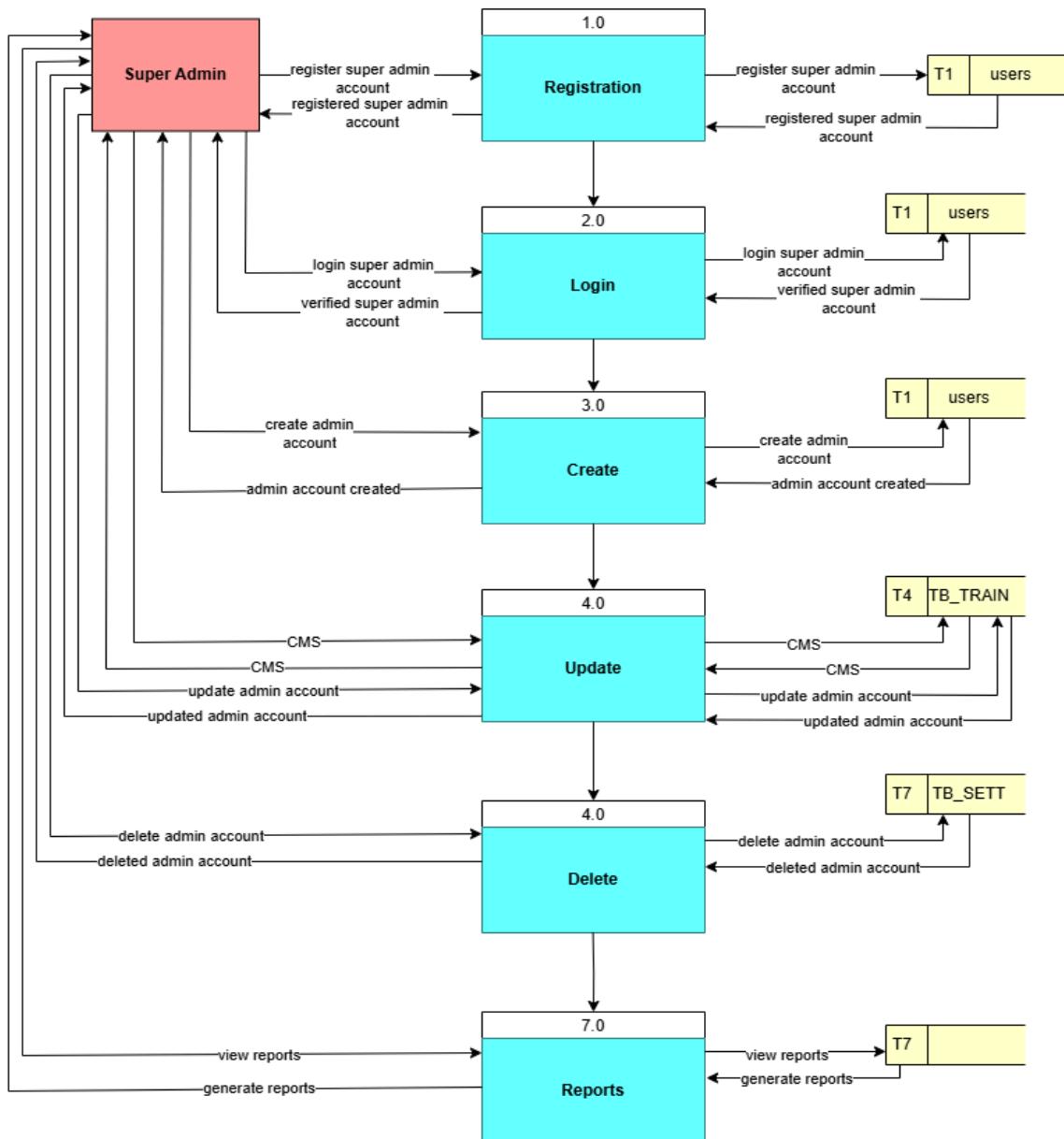
### 3.2.1. Context Diagram



**Figure 29: Context Flow Diagram**

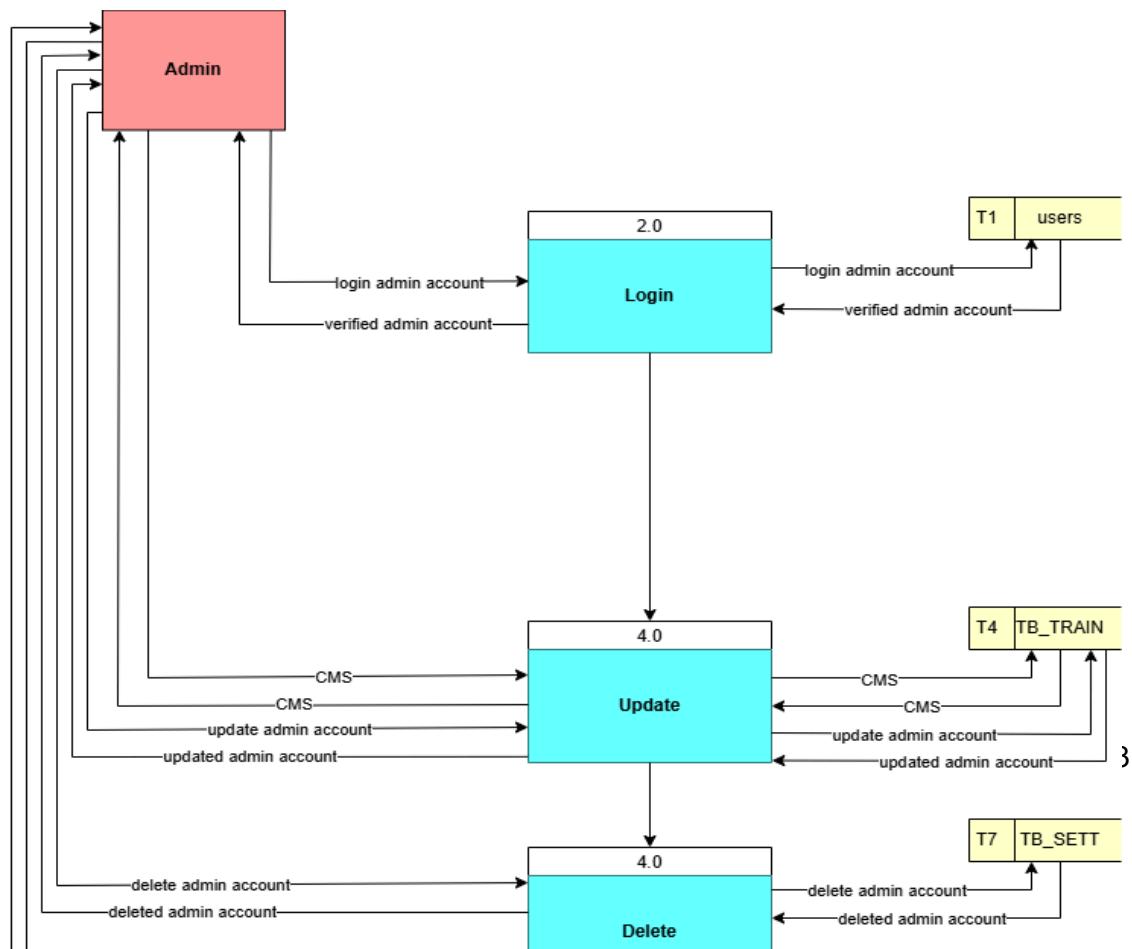
In the Figure 29, a context diagram is used to convey in a clear and concise manner how users or actors interact with TransitEase. It is shown as the entire system along with all of its components. The super admin, admin, and commuter are the three users of the system, and they all interact with it in both similar and unique ways.

### 3.2.2. Data Flow Diagram



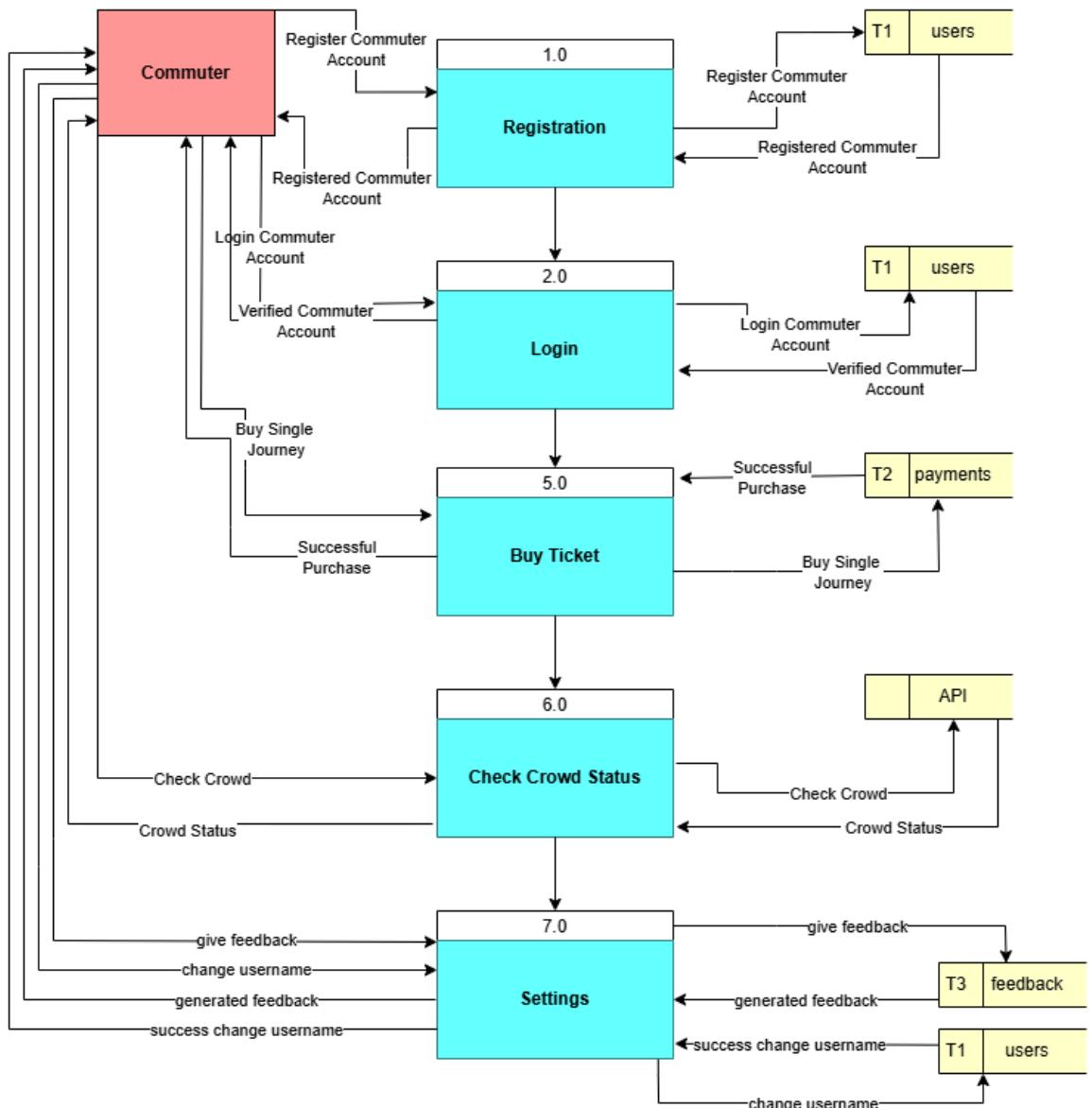
**Figure 30: Data Flow Diagram for Web Application (Super Admin)**

The information flow through a process is illustrated in the data flow diagram. The data flow diagram that follows demonstrates how each system user's data is handled within the website. The general layout of TransitEase is displayed in Figure 30. The one of the users of the system—the super admin is displayed. It is allowed for the super admin to create an admin account and to access such data on the system. However, the admin could view reports and update the train settings by logging into their admin account. Lastly, the commuter inputs data by registering, logging in, authenticating, and managing their accounts. Along with topping up and buying single journey ticket, they can also view the crowd status and reports posted by the admin and other commuters.



**Figure 31: Data Flow Diagram for Web (Admin)**

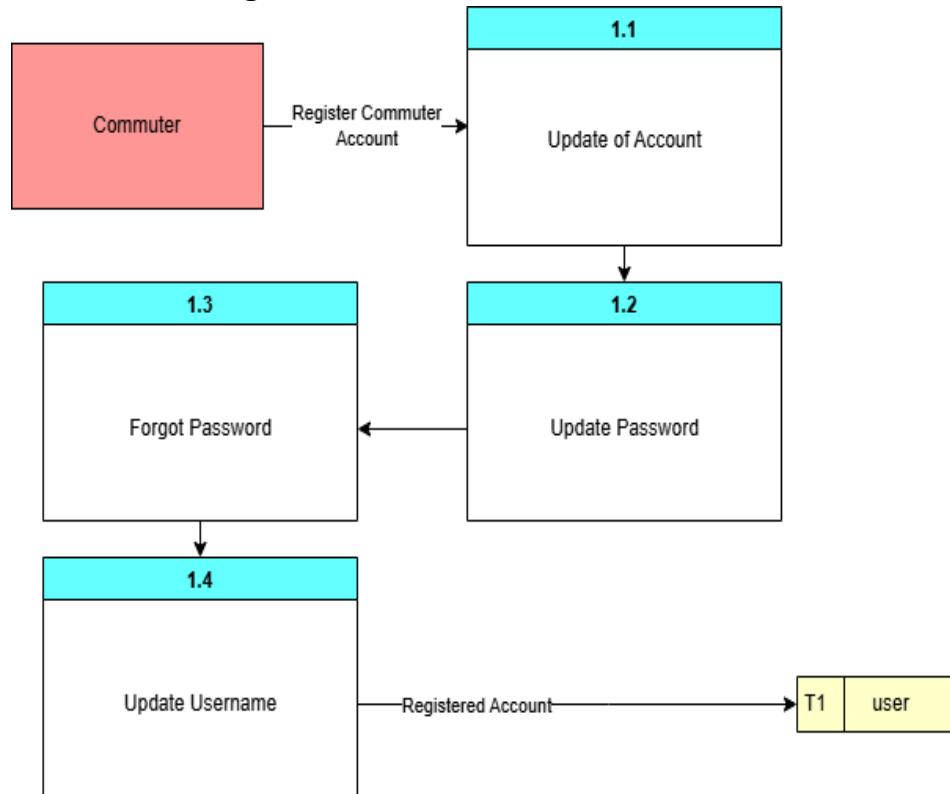
The information flow through a process is illustrated in the data flow diagram for admin, it displays a detailed relationship of commuter input data onto the system's database. The admin can also update the train settings on the mobile version of the application.



**Figure 32: Data Flow Diagram for Mobile Application (Commuter)**

The information flow through a process is illustrated in the data flow diagram for commuters, it displays a detailed relationship of commuter input data onto the system's database. Where the commuter can Buy Ticker, Check Status, and Access Settings on the mobile version of the application.

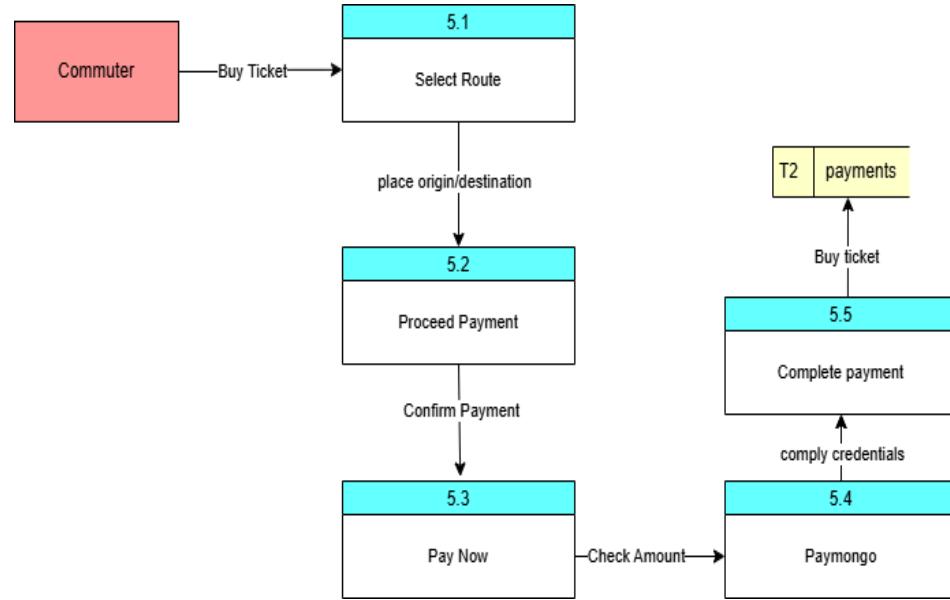
### 3.2.2.1. Child Diagram



**Figure 33: Level 2 DFD for Registration**

This figure shows the structure of the Commuter that will register their account. First, the user will need to register an account, and they will

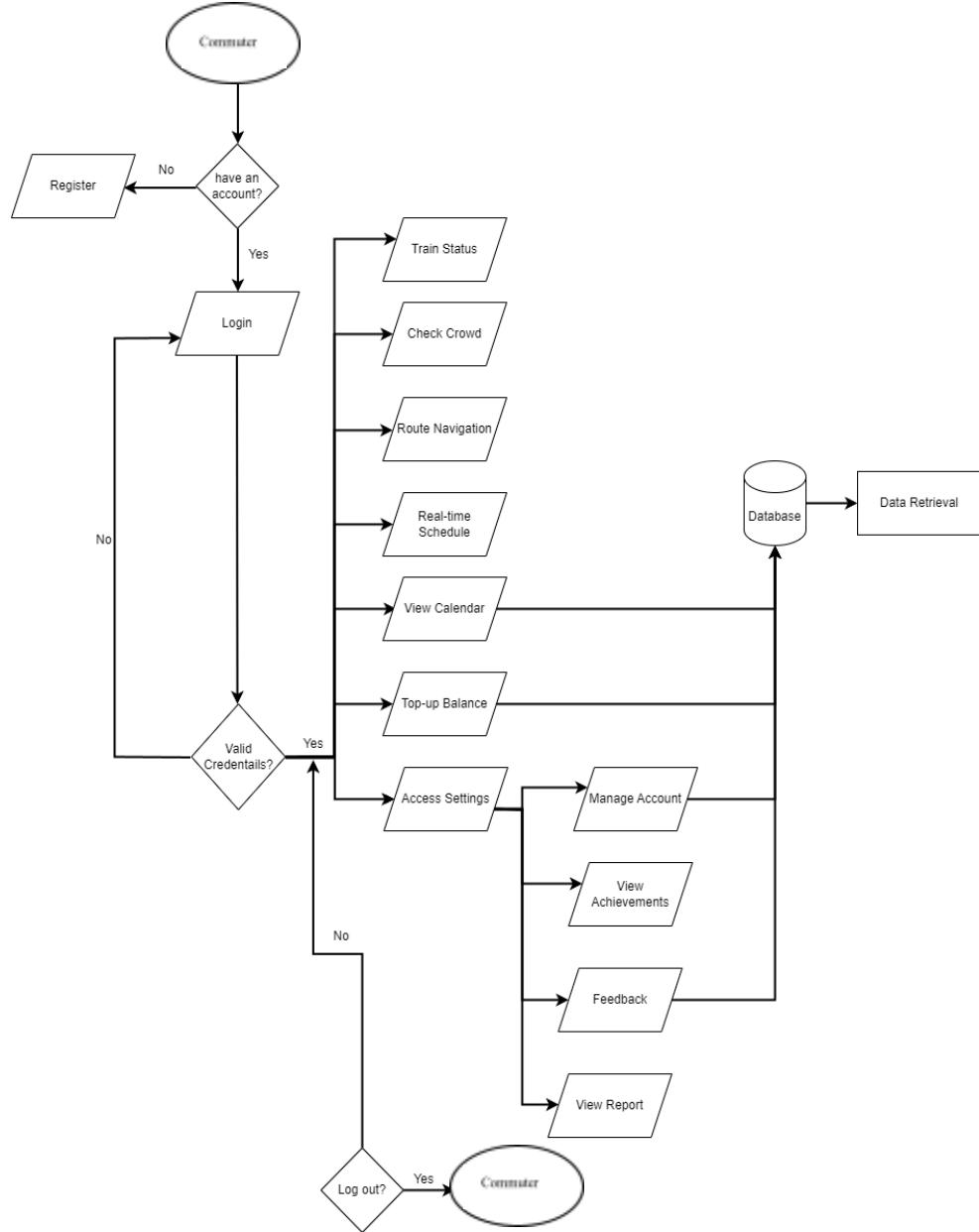
need to input their password. The user also needs to put a profile picture. The user can also update their email and contact number.



**Figure 34: Level 2 DFD for Buy Ticket**

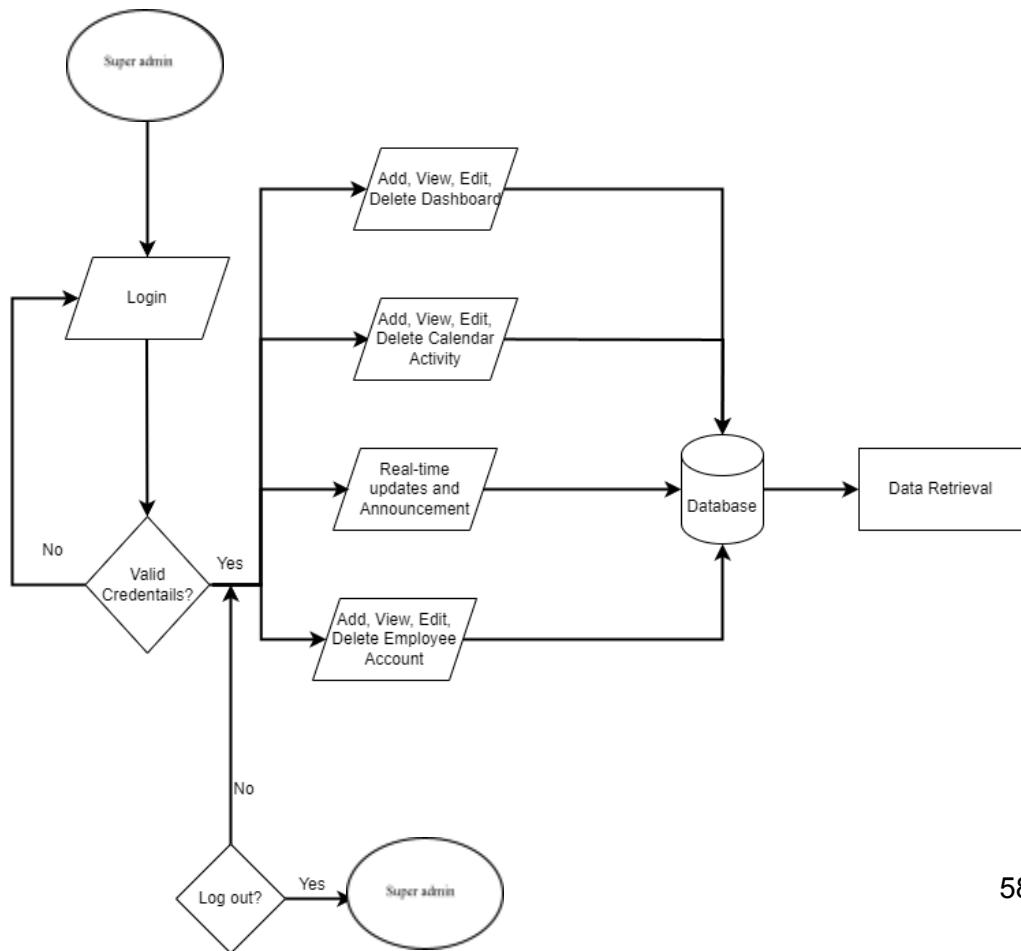
This figure represents the Commuter can top-up load or balance for their beep or stored value card and buy SJT or the Single Journey Ticket. Also, when there's a problem when topping up it will be reimbursed. The commuter can also view their balance.

### 3.2.3. Activity Diagram



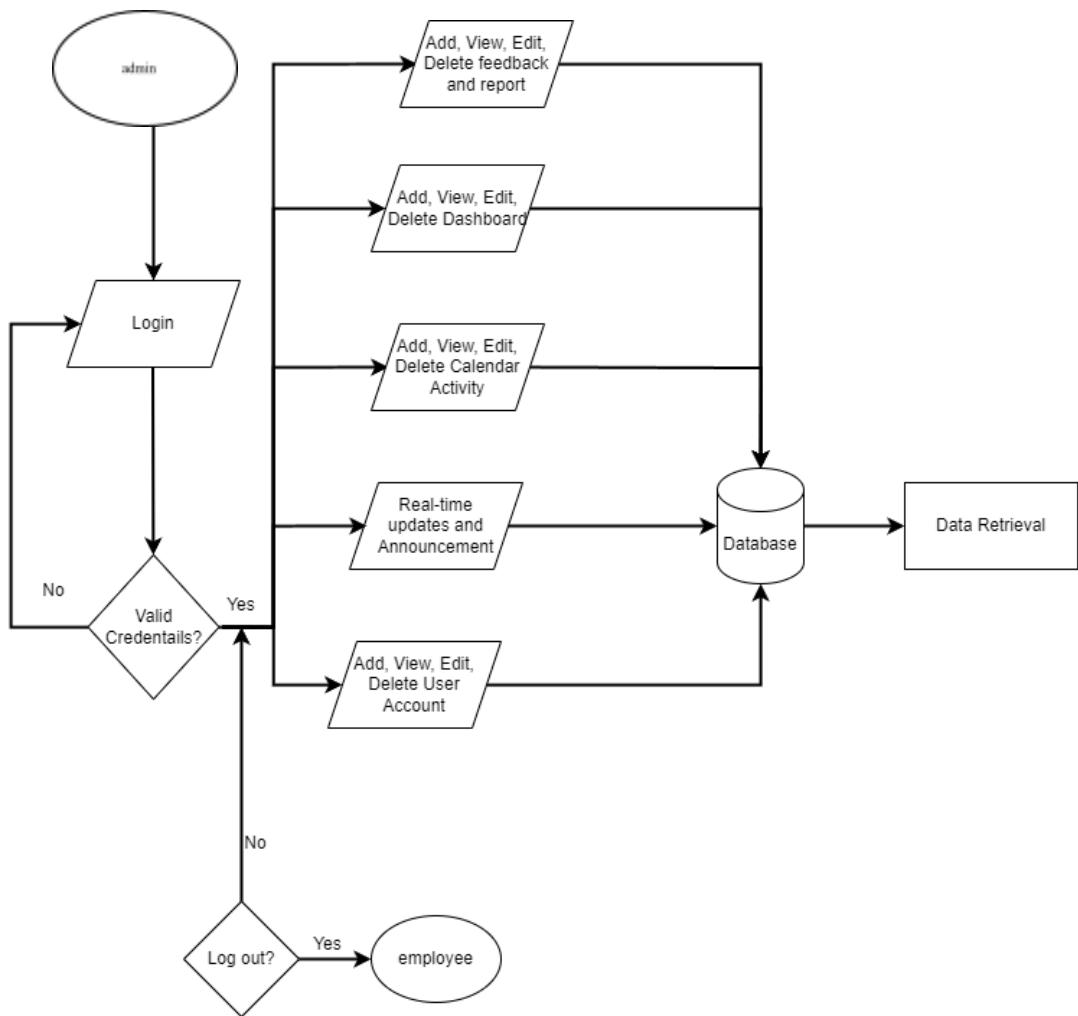
**Figure 35: Commuter Activity Diagram**

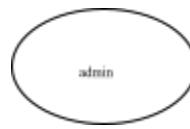
This figure shows how the system will work for the commuter; first, if the User has an account, and if the User has no account, they need to register, but if they have an account, it will direct the User to log in; if the User has invalid credentials, the User must log in again. The User must have valid credentials to view the dashboard, allowing them to see the Train Status, Check Crowd, Route Navigation, Real-Time Schedule, and View Credentials stored in the database. The User can also Top-up balance which is also stored in the database. Lastly, they can also Access Settings, which they can Manage their Account and feedback that will be stored in the database, view their Achievements, and view reports, leading to data retrieval. Lastly, users can choose no or yes if they want to log out of their account.



**Figure 36: Super Admin Activity Diagram**

This figure describes how the Super Admin will log in to his account; his credentials must be valid; if not valid, it will go back to log in; if the credentials are valid, it will direct the Admin to Add, View, Edit, Delete Dashboard. Add View Edit Delete Calendar Activity. Real-time updates, Announcements, and Add, View, Edit, and Delete Employee Accounts. These are inside the database, and the Admin can retrieve the data. Lastly, the Admin can choose no or yes if he wants to log out.

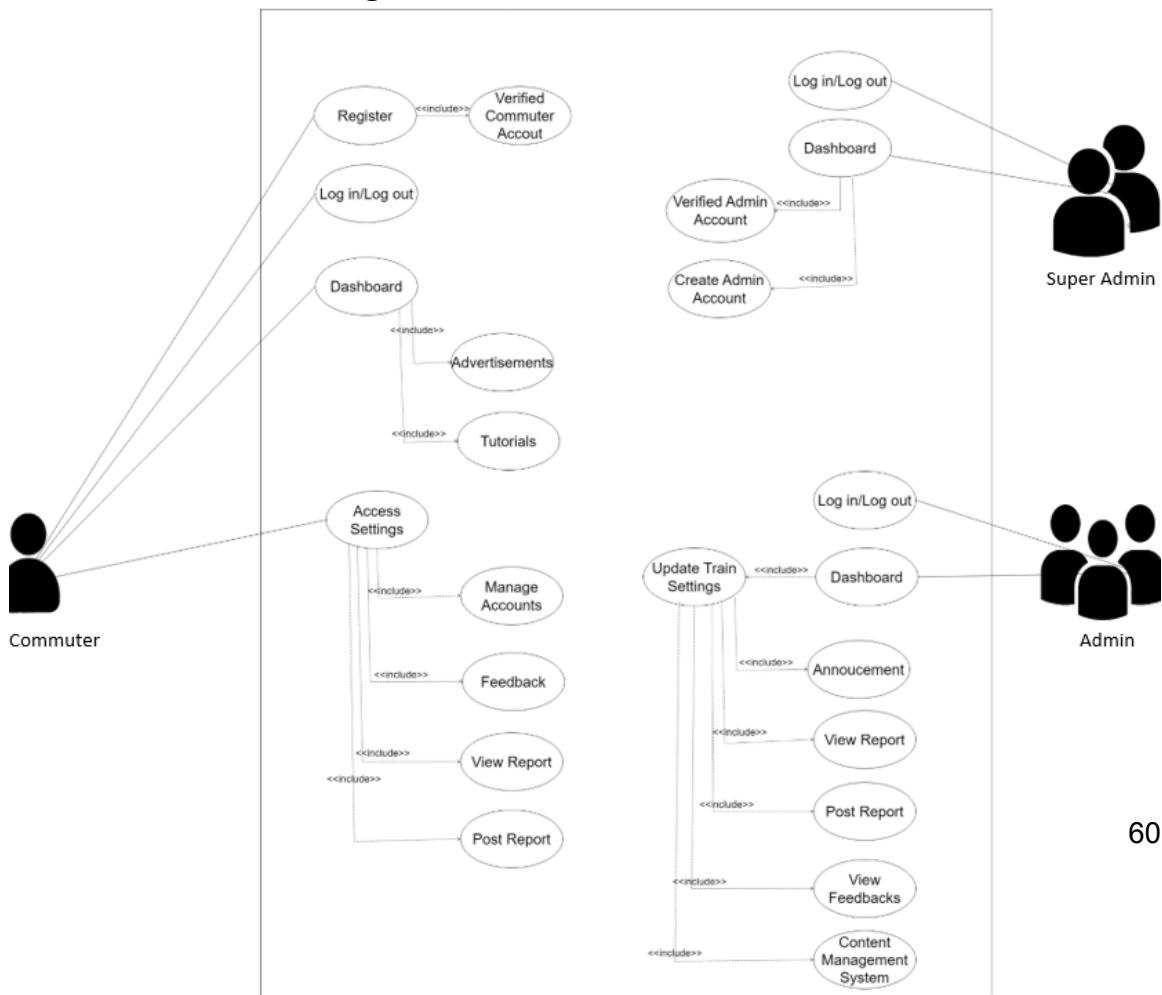




**Figure 37: Admin Activity Diagram**

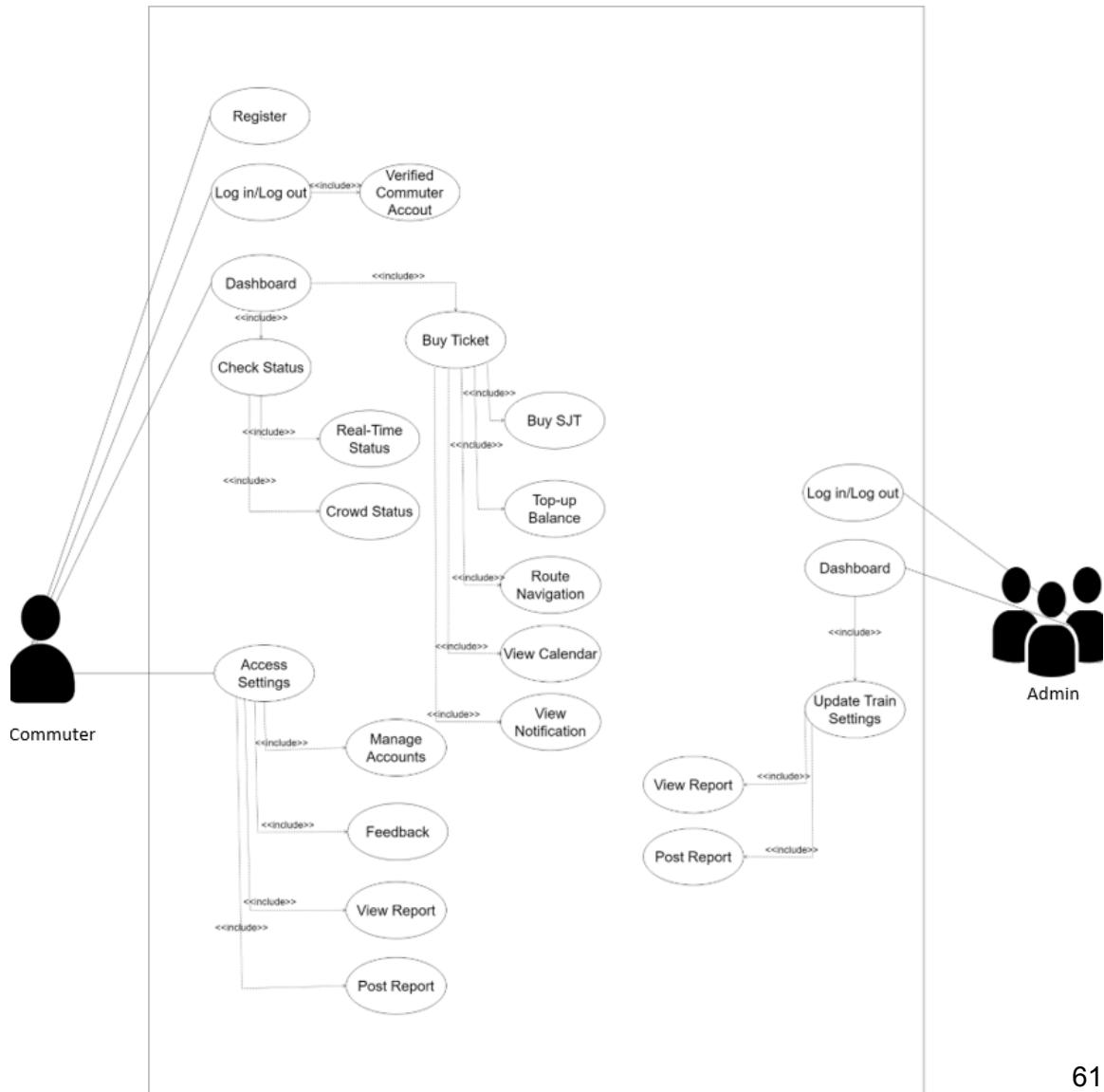
This figure describes how the Admin will log in to his account; his credentials must be valid; if not valid, it will go back to log in; if the credentials are valid, it will direct the Employee to Add, View, Edit Delete feedback and report, Add, View, Edit, Delete Dashboard. Add View Edit Delete Calendar Activity. Real-time updates, Announcements, and Add, View, Edit, and Delete User Account. These are inside the database, and the Employee can retrieve the data. Lastly, the Employee can choose no or yes if he wants to log out.

### 3.2.4. Use Case Diagram



**Figure 38: Use Case Diagram (Web)**

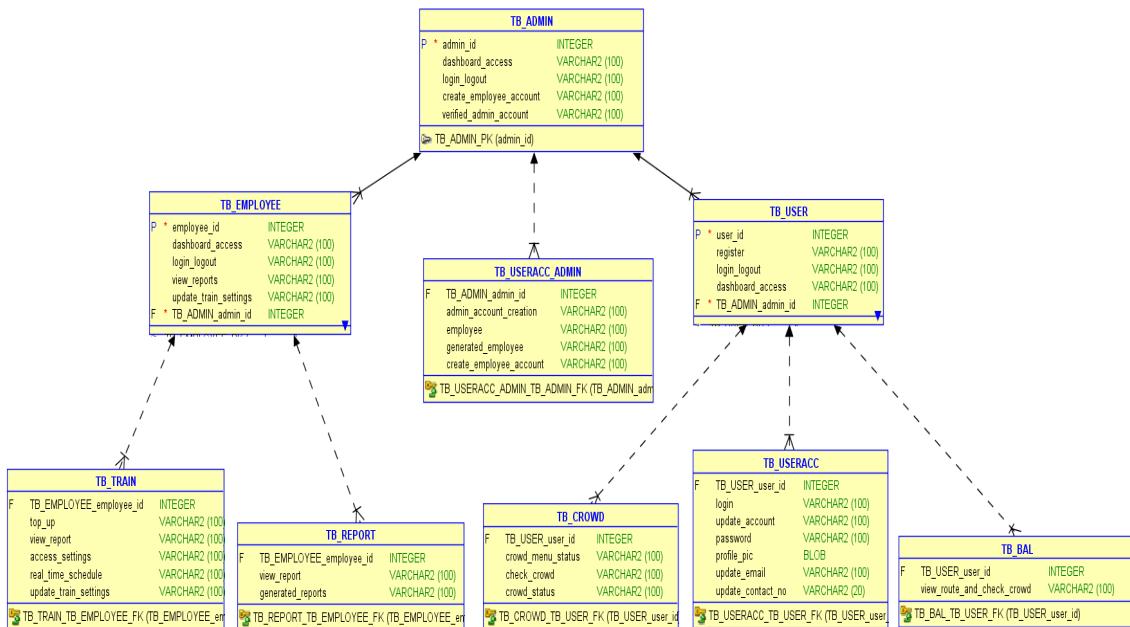
Figure 40 shows the use case diagram for web which shows the type of users that will utilize the system. The users are namely, the Commuter, Admin, and Super Admin.



**Figure 39: Use Case Diagram (Mobile)**

Figure 41 shows the use case diagram for mobile which shows the type of users that will utilize the system. The users are namely, the Commuter, Admin, and Super Admin.

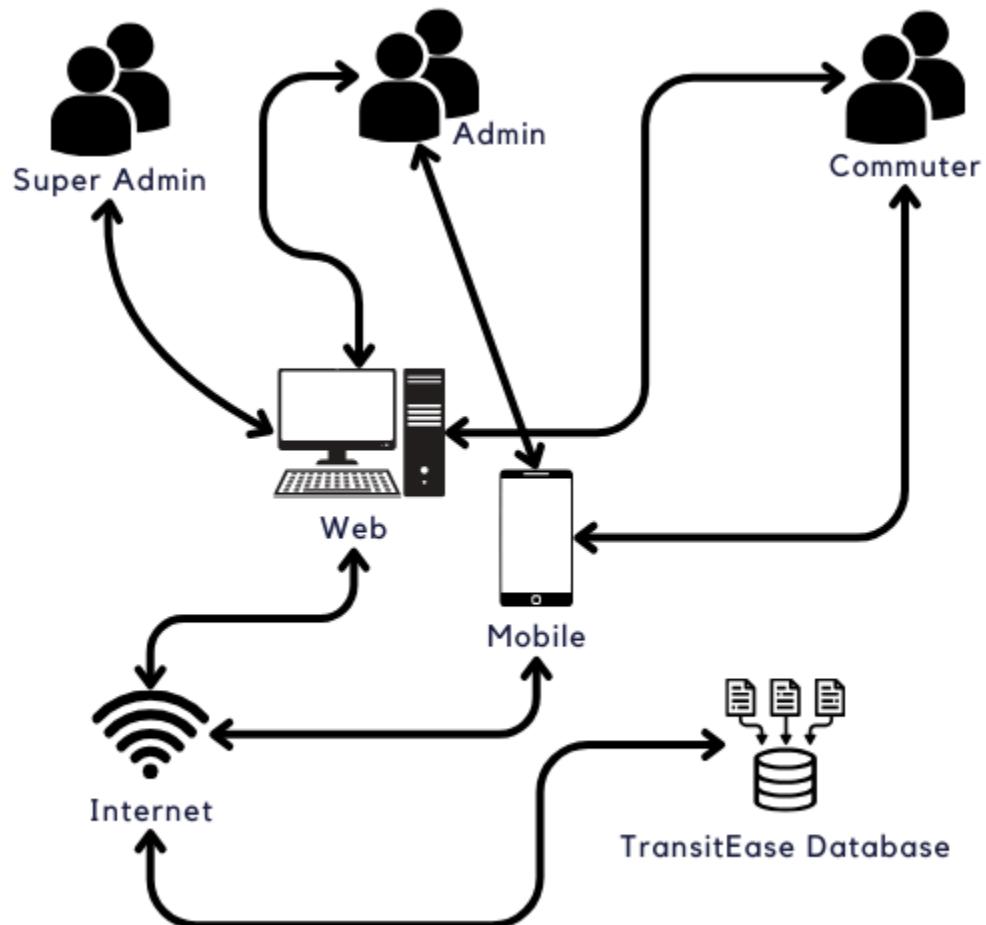
### 3.2.5. Entity Relationship Diagram



**Figure 40: Entity Relationship Diagram**

The entity relationship diagram, or ERD, represents classes and its relationship that exists in the system.

### 3.2.6. System Architecture



**Figure 41: System Architecture**

Figure 42 outlines the overall structure of TransitEase's system architecture and management of its mobile application and website. It illustrates

how users from the devices would send requests to the TransitEase domain and database and receive responses via the internet as the medium.

### 3.2.7 User Interface Design

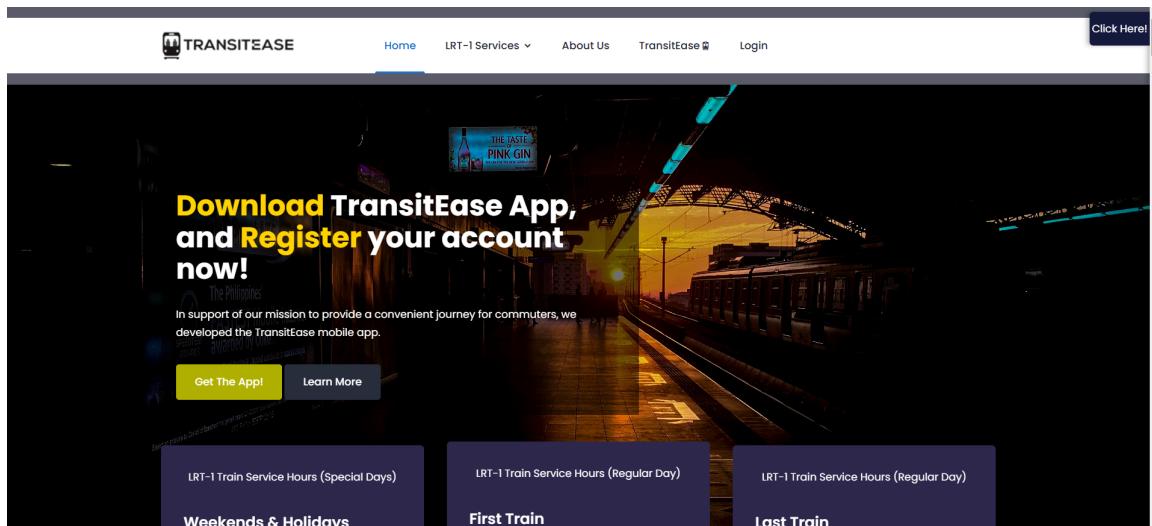


Figure 42: Home Page

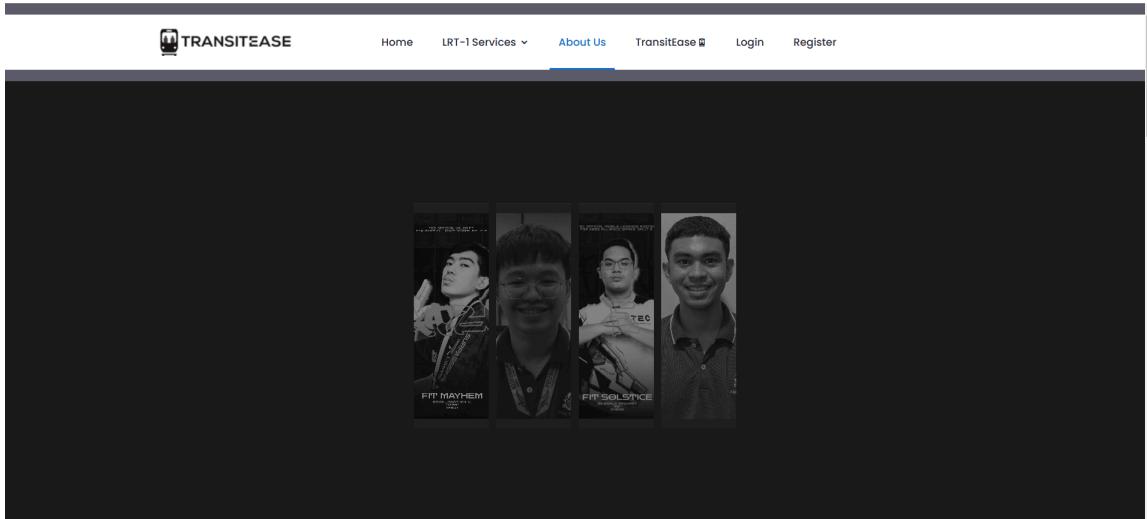


Figure 43: About Us Page

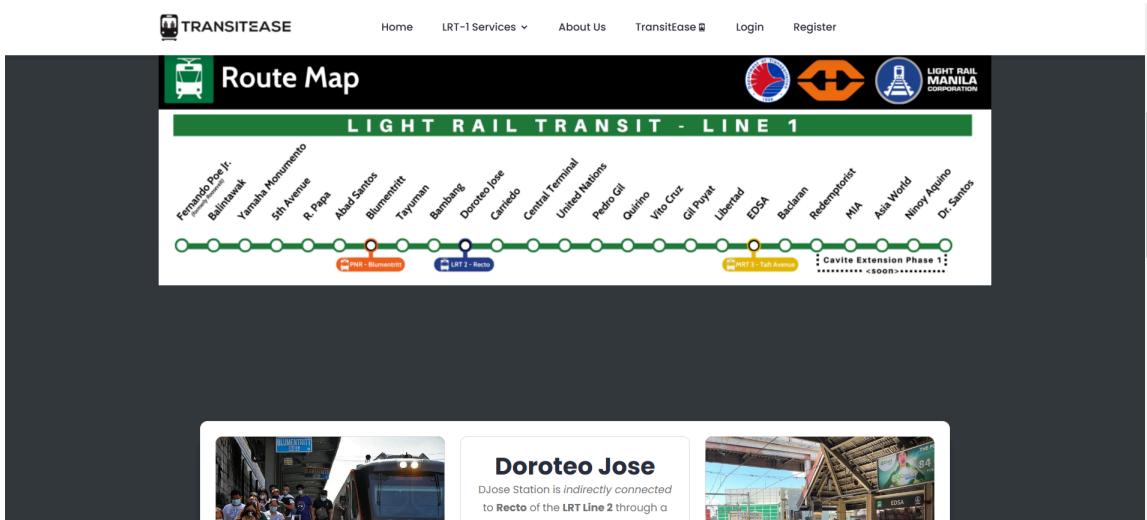
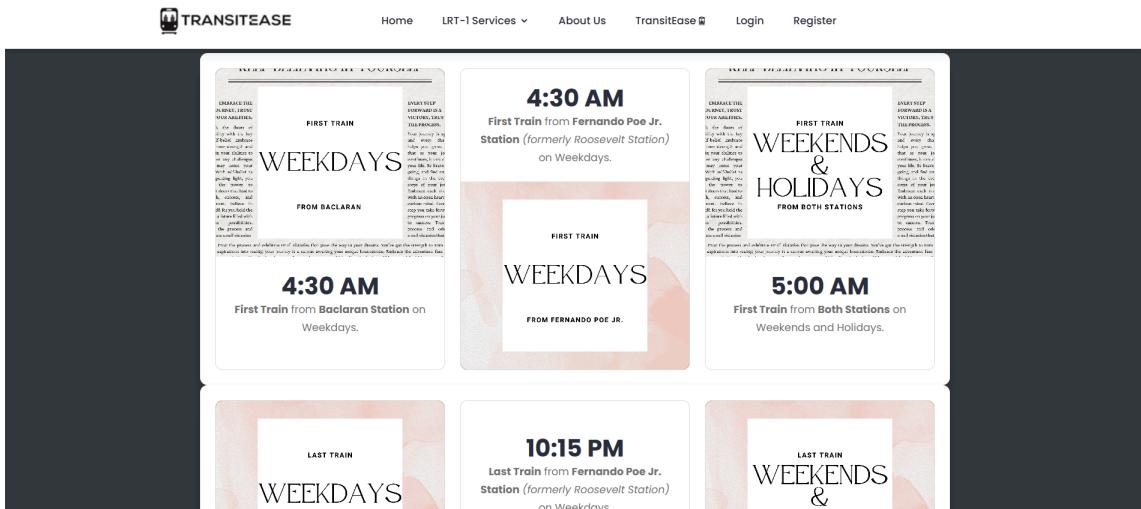
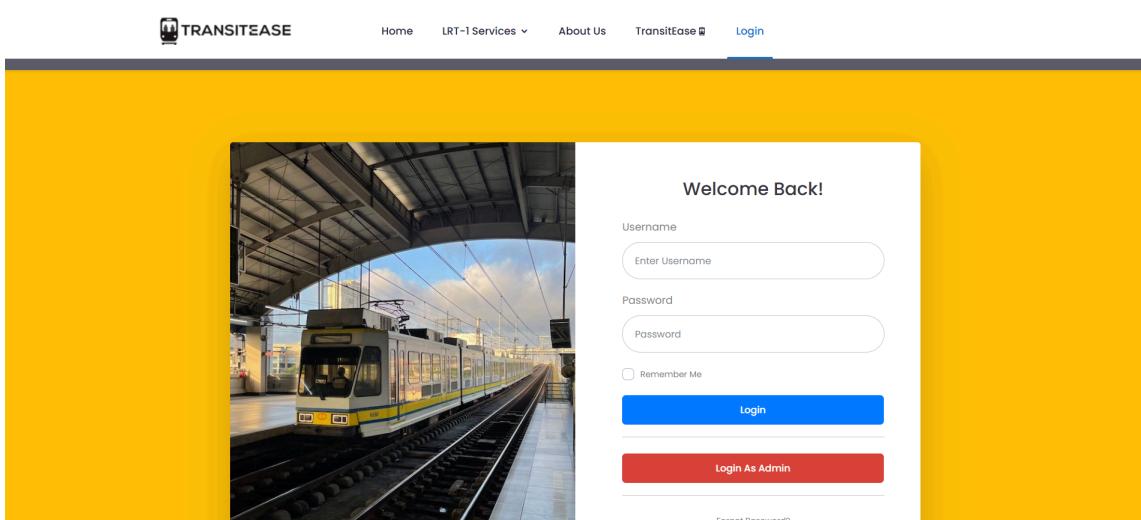


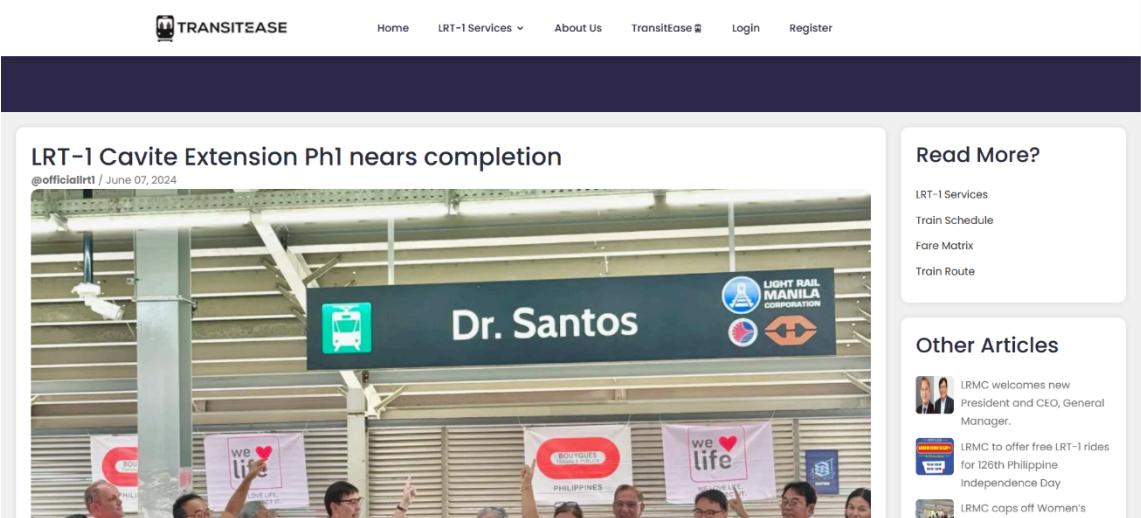
Figure 44: Route



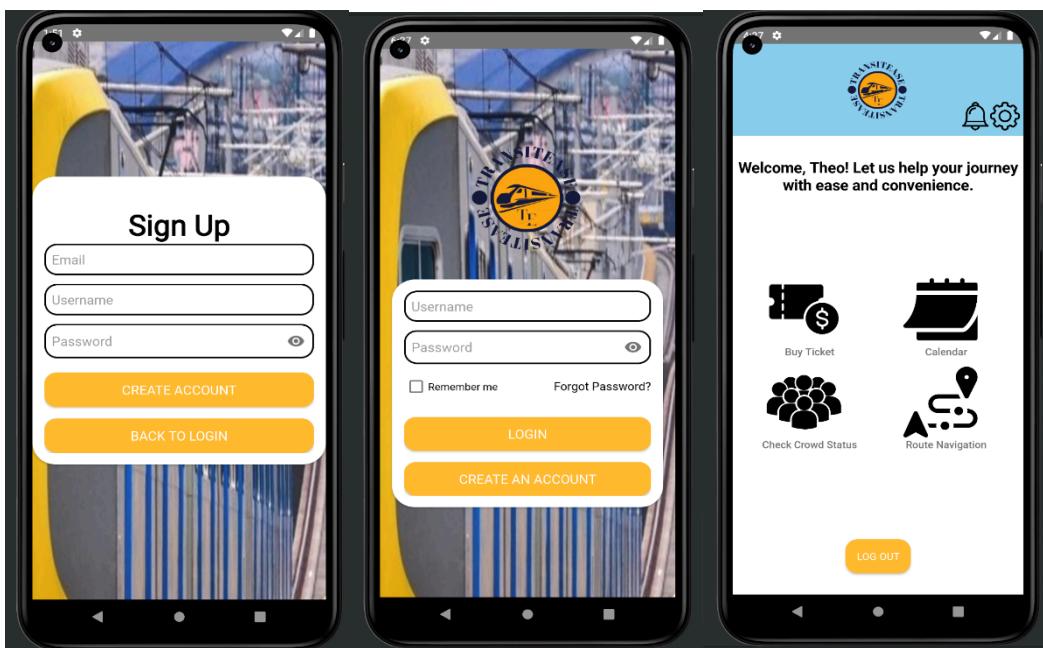
**Figure 45: Train Schedule**



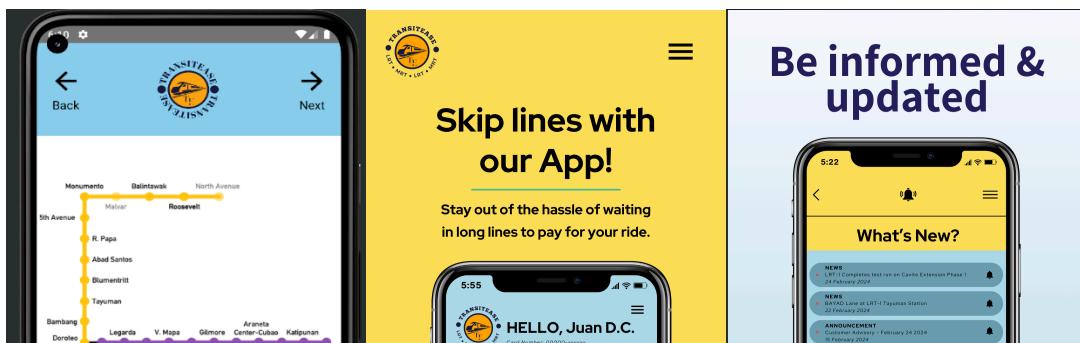
**Figure 46: Admin page**



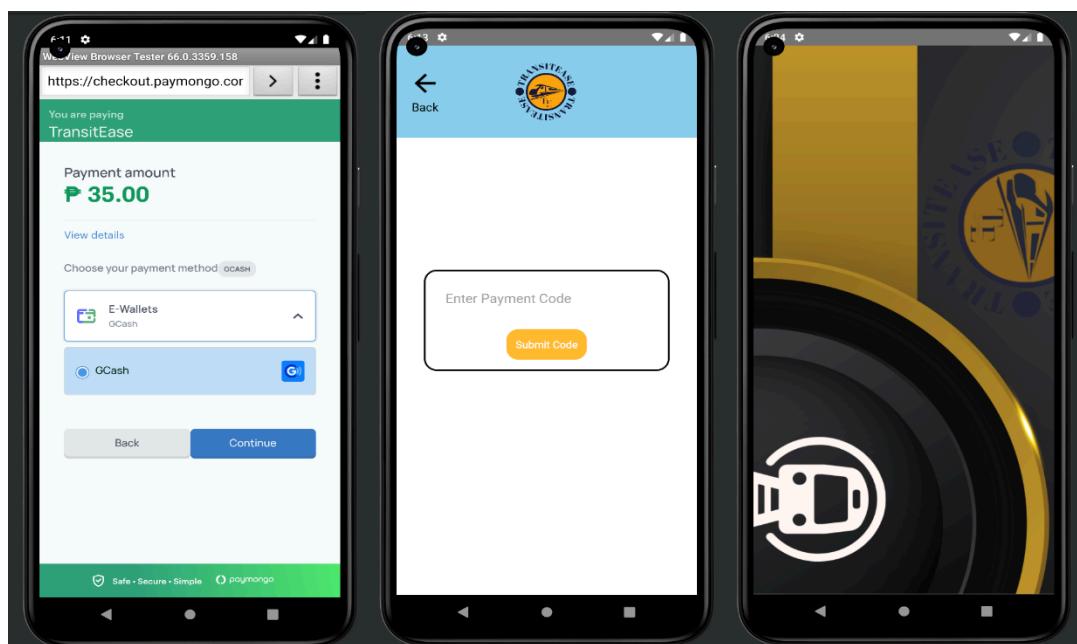
**Figure 47: Announcement Page**



**Figure 48: Mobile App 1**

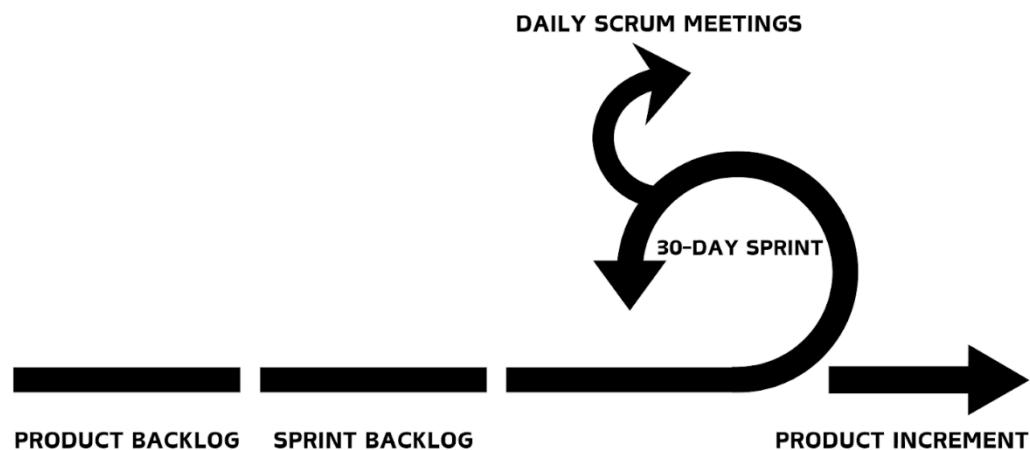


**Figure 49: Mobile App 2**



**Figure 50: Mobile App 3**

### **3.3. Project Development**



**Figure 52: Scrum Agile Diagram**

#### **3.3.1. Scrum Agile Diagram**

Scrum methodology is an agile framework that offers value to the clients throughout the project development. Scrum methodology will be used by the researchers in developing the project since it is suitable for sudden changes in the project. Scrum is flexible, adaptive, rapid, incremental, and effective. Scrum's

primary goal is to meet the client's wants and needs by fostering open communication, shared ownership, and continuous improvement. The methodology applies to the project because the client might issue some changes while developing the project. Also, scrum is appropriate because of the schedule of the researchers, developers, and stakeholders.

### **3.4. Data Gathering**

This section contains the data gathered from the interview conducted. The data gathering procedure was done with the purpose of gathering insights and perspective from the interviewee regarding various aspects of the LRT systems. The data gathered will be used to identify the strengths and weaknesses of the LRT stations which can be incorporated into the system.

#### **3.4.1. Sampling Techniques**

The sampling method used by the researchers is purposive sampling. In the case of this study, the researchers select a participant based on a specific criterion. By using this method, it ensures that the data gathered is relevant to the study. In the case of the study, supervisors at LRT stations were interviewed since the role of supervisor makes the interviewee a knowledgeable and relevant participant to provide insights into the LRT system's operations.

$$n = \frac{N}{1 + Ne^2}$$

### 3.4.2. Statistical Treatment

Thematic Analysis will be used in this study to treat the qualitative data gathered. The researchers examine the data to identify the common topics or ideas that show up in the transcript. It allows the data to be flexible and can be sorted easily. The goal is to produce a detailed and subtle data that addresses the question or objective.

## 3.5 Testing

In this section the reliability, quality, and performance of TransitEase will be tested and emphasized. Different types of testing will be applied such as Alpha testing, Beta testing, User Acceptance and Security testing will be utilized to ensure that TransitEase will have a solid foundation when developed.

### 3.5.1. Alpha Testing

Alpha testing will be conducted to test the different aspects of TransitEase. The same as most of the software alpha testing will be done internally, which means that the researchers will be the sole testers of the system. Identification of the possible problems/issues and possible bugs will be crucial in this phase, therefore it is the main goal of the researchers during the procedures of alpha testing. As sole testers of TransitEase in alpha testing, the researcher's will have to conduct tests that involve the functionality of the system, emphasizing the different

features of the system, its usability which includes the intuitiveness of the interface and the performance of the system.

### **3.5.2. Beta Testing**

The system will undergo beta testing to find any issues that were missed in the alpha testing phase. Feedback of the external user will be the main focus of this phase and their insights on how to improve the system. External users will use the system at this phase to confirm that it will function as intended. This phase also verify that the system can work on different such as Android and different web browsers. System weaknesses will also be identified and pinpointed in this phase for security purposes. The beta testing phase also allows for the researchers to gather feedback and recommendations that can help to improve the system.

### **3.5.3. ISO 9126**

This international standard will be used to evaluate the quality of the system. The researchers decided that ISO 9126 is relevant and useful for testing and understanding the quality of the system. The following are characteristics that will be tested with the standard in mind:

- Functionality - The researchers will make sure the system can fulfill the necessary modules as well as requirements in line with the objectives. The system's accuracy and security will also be tested.
- Reliability - The system should be stable under normal operating conditions and has high fault tolerance to ensure that the system can run in

long periods of time. In the cases of crashes and other failures, the system should be able to recover well.

- Usability - All users should find the system simple to use and understandable. This portion of the test will concentrate on the user interface and user experience.
- Efficiency - The system should be able to respond timely and can process modules without difficulty. The system should also be able to utilize resources efficiently.
- Maintainability - To ensure long-term functionality and future updates, the system needs to be scalable and maintainable.
- Portability - the system should be adaptable so that it can work for different android phones.

## Chapter 4

### **RESULTS AND DISCUSSION**

This chapter presents a thorough analysis and interpretation of the collected data, including test results and evaluations conducted for the Commuter, Super Admin, Admin, and IT Specialist roles. The assessment aims to evaluate the proposed system using the ISO 9126 Software Quality Model.

#### **4.1 Presentation of Results**

The research gathered both quantitative and qualitative data, which were used in the statistical analysis and presentation of findings. A system evaluation survey was developed for different user groups, including commuters, administrators, and IT experts. The survey was divided into two sections: a Technical Survey Questionnaire for IT experts

and administrators, and a Non-Technical Survey Questionnaire for commuters. These

questionnaires served as the basis for assessing the proposed system's quality using the ISO 9126 Software Quality Model, with a focus on functionality, reliability, usability, performance, and supportability.

**Table 5: Distribution of Respondents**

Respondents	Sample Size	Percentage
Commuter (Non - Technical)	100	80%
Administrators (Technical)	5	10%
IT Experts (Technical)	5	10%
Total	110	100%

In Table 5, sixty (100) commuters responded to the system evaluation survey questionnaire feedback form. Among these individuals, there are five (5) admins, and ten (5) IT experts.

**Table 6: Interpretation Table for Survey Questionnaire Results**

Scale	Range	Interpretation
5	5.00 - 4.00	Strongly Agree
4	3.99 - 3.00	Agree
3	2.99 - 2.00	Neutral
2	1.99 - 1.00	Disagree
1	1.00 - 0.00	Strongly Disagree

In Table 6, the proponents conducted the system evaluation using a 5-point Likert scale for the respondents' evaluation sheet, as shown in the Table. The scale ranges from five (5) to one (1), with five (5) being the highest, labeled as "Strongly Agree," four (4) as "Agree," three (3) as "Neutral," two (2) as "Disagree," and one (1) as "Strongly Disagree."

#### 4.1.1. Test Case Results

**Table 7: Test Case for registration, login, and buying ticket**

<b>Project Name</b>	<b>TRANSITEASE: AN ONLINE TICKETING MANAGEMENT SYSTEM WITH MOBILE APPLICATION FOR LRT-1</b>			

<b>Test Case Scenario ID</b>	TC_ICOMM	<b>Tester Name</b>	registration, login, and buy ticket modules
<b>Test Case Description</b>	<b>PROCESS OF REGISTRATION AND LOGIN BUYING TICKET</b>	<b>Tester Name</b>	<b>RAFAEL ROXAS</b>
<b>Test Priority</b>	<b>HIGH</b>	<b>Date Tested</b>	<b>15/11/2024</b>
<b>Test Data</b>		<b>Test Result</b>	<b>PASS</b>

Test Case ID	Test Scenario	Pre-Condition	Test Step	Expected Result	Actual Result	Status (Pass/Fail)
TC_ICOMM_01	Verify registration	Enter valid input	Register the correct email and	Redirect to login page	As Expected	PASS

			password			
<b>TC_ICOM M_02</b>	Going back to log in page	Enter valid input	Input the correct email and password	Redirected to the app homepage	As Expected	PASS
<b>TC_ICOM M_03</b>	Purchasing ticket	Navigate as Commuter	Input the station	Redirect to payment	As Expected	PASS
<b>TC_ICOM M_04</b>	Purchasing Ticket	Navigate as Admin	Input the station	Redirect to payment	As Expected	PASS
<b>TC_ICOM M_04</b>	Getting the OTP	Navigate as	Entering the OTP	Redirected to NFC Card	As Expected	PASS

		Commute r					
<b>TC_ICOM M_05</b>	<b>Getting the OTP</b>	<b>Navigate as Admin</b>	<b>Enteri ng the OTP</b>	<b>Redirecete d to NFC Card</b>	<b>As Expect ed</b>	<b>PASS</b>	
<b>TC_ICOM M_05</b>	<b>An Navigati on Page</b>	<b>Navigate as Customer User</b>	<b>Click Neares t Station</b>	<b>Redirecete d to Maps</b>	<b>As Expect ed</b>	<b>PASS</b>	
<b>TC_ICOM M_08</b>	<b>Look at the nearest station in the Goople maps</b>	<b>Navigate as Commute r</b>	<b>Click the route navigat ion</b>	<b>Redirecete d to Google Maps</b>	<b>As Expect ed</b>	<b>PASS</b>	
			<b>Hover mouse in lower right</b>				

			Press “View Larger in map”				
TC_ICOM M_08	Clicking route navigati on	Navigate as Commute r	Checki ng the crowd volume	Redirecte d to Google Maps	As Expect ed	PASS	

TC_RESINF O_09	Redirect to TransitE ase Homepa ge	Navigate as Commute r	Click Annou nceme nts	Automati c email send to TransitEa se	As Expect ed	PASS
TC_RESINF O_09	Redirect to TransitE ase homepa ge	Navigate as Customer User	Click Annou nceme nts	Automati cally the reports are posted in the announce ments	As Expect ed	PASS

TC_ICOM	Redirect to TransitE home page	Select route and buy sjt	Load the sjt using payment and fill up the credentials	Automatically that the NFC device is with sufficient amount	As Expected	PASS
M_10				Loaded and the sjt and receive a an otp from the email		
				Click the mobile		

			number			
<b>TC_ICOM M_10</b>	<b>Redirect to TransitE ase homepa ge</b>	<b>Select route and buy sjt</b>	<b>Load the sjt using paymo ngo and fill up the credent ials</b>	<b>Will tap the mobile phone to NFC device with insufficie nt balance</b>	<b>Not as Expect ed</b>	<b>PASS</b>

			<b>Click the mobile numbe r</b>				
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Table 7 outlines a set of test cases for an application, focusing on user navigation and functionality verification. Each test case includes an ID, scenario description, pre-condition, steps to execute, expected result, actual result, and status. The tests cover actions such as navigating to the app homepage, accessing various pages—such as Registration, Route Navigation, and Ticket prices—interacting with elements, and verifying redirection and functionality for both admin and customer users. All test cases have passed, indicating that the website performs as expected under the specified conditions.

**Table 8: Test Case for account module**

<b>Project Name</b>	<b>TRANSITEASE: AN ONLINE TICKETING MANAGEMENT SYSTEM WITH MOBILE APPLICATION FOR LRT-1</b>
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<b>Test Case Scenario ID</b>	TC_ACCMAN	<b>Tester Module Name</b>	<b>ACCOUNT Module</b>
<b>Test Case Description</b>	<b>TO TEST COMMUTER'S VALIDATION</b>	<b>Tester Name</b>	<b>RAFAEL ROXAS</b>
<b>Test Priority</b>	<b>HIGH</b>	<b>Date Tested</b>	<b>15/11/2024</b>
<b>Test Data</b>		<b>Test Result</b>	<b>PASS</b>

Test Case ID	Test Scenario	Pre-Condition	Test Step	Expected Result	Actual Result	Status (Pass/Fail)
<b>TC_ACCMA N_01</b>	Email Field	Default Login	Input details on Email Field Tab	The user should be able to fill out the email field.	As Expected	<b>PASS</b>

<b>TC_ACCMA N_02</b>	Password Field	Default Login	Input Password	The user should be able to fill out the password field.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_03</b>	Password Toggle Button	Default Login	Click on eye toggle button	The user should be able to toggle visibility of the password .	As Expected	<b>PASS</b>
<b>TC_ACCMA N_04</b>	Remember Me Checkbox	Default Login	Click on checkbox	The user should be able to click on the "Remember Me"	As Expected	<b>PASS</b>

				checkbox option.		
<b>TC_ACCMA N_05</b>	Forgot Password	Default Login	Click on 'Forgot Password ?'	The user should be able to click on the "Forgot Password" link.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_06</b>	Login Form	Default Login	Click the Login button	The user should be able to submit the login form.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_07</b>	OTP from TransitEase	Default Login	Check on the inputted email for OTP	The user should receive an OTP from	As Expected	<b>PASS</b>

				TransitEa se in their email.		
<b>TC_ACCMA N_08</b>	OTP for Email	Default Login	Input the OTP	The user should be able to fill out the OTP and successfu lly log in.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_09</b>	The user fills out the first name, middle initial and last name fields.	Registrat ion	Input details on the name tabs	The user should be able to fill out the fields and validate.	As Expected	<b>PASS</b>

<b>TC_ACCMA N_10</b>	The user fills out their home address.	Registration	Input details on address tab	The user should be able to fill out the fields and validate.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_11</b>	The user fills out the email field.	Registration	Input details on email tab	The user should be able to fill out the email field and must validate the correct email format.	As Expected	<b>PASS</b>

<b>TC_ACCMA N_12</b>	The user fills out the phone number field.	Registration	Input details on phone number tab	The user should be able to fill out phone number field and must accept only numeric input	As Expected	<b>PASS</b>
<b>TC_ACCMA N_13</b>	The user fills out the password field with specified requirements.	Registration	Input desired password	The user should be able to fill out the password field with specified requirements.	As Expected	<b>PASS</b>

<b>TC_ACCMA N_14</b>	The user fills out the confirm password field matching the password.	Registration	Input desired matching password	The user should be able to fill out the confirm password field matching the password.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_15</b>	The user clicks and views the terms and conditions and	Registration	Click on the Register	Will redirect to the homepage	As Expected	<b>PASS</b>

	privacy policy.					
<b>TC_ACCMA N_16</b>	The user registers .	Registration	Click 'Register' Button	The user should be able to register.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_17</b>	The user receives an OTP from in their email.	Registration	Check on the inputted email for OTP	The user should receive an OTP from email.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_18</b>	The user fills out the OTP.	Registration	Input the OTP on the OTP Field	The user should be able to fill out the OTP.	As Expected	<b>PASS</b>
<b>TC_ACCMA N_19</b>	The user returns to the	Registration	Click OK	The user should be redirected back to	As Expected	<b>PASS</b>

	login page.			the login page after registration.		
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Table 8 outlines test cases for user account management functionalities on a application, focusing on email updates, changes to email, password changes, viewing tickets, and logging out. Each test case includes an ID, scenario description, pre-condition, steps to execute, expected result, actual result, and status. All test cases have passed, indicating that the user account management features are functioning as expected.

**Table 9: Test Case for Payment module**

<b>Project Name</b>	<b>TRANSITEASE: AN ONLINE TICKETING MANAGEMENT SYSTEM WITH MOBILE APPLICATION FOR LRT-1</b>
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<b>Test Case Scenario ID</b>	<b>TC_PAYMON</b>	<b>Tester Name</b>	<b>PAYMENT Module</b>
<b>Test Case Description</b>	<b>TESTING PAYMENT MODULE</b>	<b>Tester Name</b>	<b>RAFAEL ROXAS</b>
<b>Test Priority</b>	<b>HIGH</b>	<b>Date Tested</b>	<b>15/11/2024</b>
<b>Test Data</b>		<b>Test Result</b>	<b>PASS</b>

Test Case ID	Test Scenario	Pre-Condition	Test Step	Expected Result	Actual Result	Status (Pass/Fail)
<b>TC_PAYM ON_01</b>	Select Route and Buy SJT	Registered Commuter & SJT	Complete Purchasing in 3 steps  Choose your destination or the	Will proceed to the payment(paymongo) and filling up the credentials	As Expected	<b>PASS</b>

			nearest stationn	Receiving an OTP from the		
			Click select	email The NFC card icon will appear		
<b>TC_PAYM ON_02</b>	Select Route and Buy SJT	Registered Admin & SJT	Complete Purchasing in 3 steps	Will proceed to the payment(paymongo) and filling up the credentials	As Expected	<b>PASS</b>
			Choose your destination or the	Receiving an OTP		

			nearest stationn	rom the email The NFC card icon will appear		
<b>TC_PAYM ON_02</b>	Loaded SJT using paymong o	Will tap the phone to the nfc device with sufficient amount	Will consume the amount in mobile phone	The NFC device will detect the purchased sjt ticket	As Expected	<b>PASS</b>

Table 9 outlines test cases for purchasing single journey ticket. Each test case includes an

ID, scenario description, pre-condition, steps to execute, expected result, actual result,

and status. The tests cover actions such as selecting check-in and check-out dates, agreeing to terms and conditions, choosing available rooms or venues, entering personal details, and proceeding to payment. All test cases have passed, indicating that the purchasing sjt features are functioning as expected.

## **System Evaluation Results**

### **Customer's System Evaluation Mean Summary**

The data collected and analyzed reflects the overall commuter experience. The goal of evaluating the system was achieved with the participation of (100) commuters.

#### **Legend:**

**SA = Strongly Agree**

**A = Agree**

**N = Neutral**

**D = Disagree**

**SD = Strongly Disagree**

**Table 10: Functionality of Commuter's System Evaluation Mean Summary**

<b>Statement</b>	<b>(5)</b>	<b>(4)</b>	<b>(3)</b>	<b>(2)</b>	<b>(1)</b>	<b>Frequency</b>	<b>Mean</b>	<b>Response</b>
I was able to use the mobile app payment with ease.	67	39	4	0	0	110	22.0	Strongly Agree
The use of NFC in loading Single Journey Tickets makes my LRT-1 commuting experience more convenient.	51	49	9	1	0	110	22.0	Strongly Agree
The payment system through NFC meets my daily	61	43	6	0	0	110	22.0	Strongly Agree

commuting needs.								
I feel confident in using NFC for payment without needing assistance from station staff.	65	40	5	0	0	110	22.0	Strongly Agree
NFC payment reduce the time I spend in single journey ticket lines.	71	36	3	0	0	110	22.0	Strongly Agree
The updates of crowd volume provide me with the information I need to plan	63	39	8	0	0	110	22.0	Strongly Agree

my journey effectively.								
I can rely on the app to give accurate updates on the volume of commuters at each station.	65	39	5	1	0	110	22.0	Strongly Agree
The updates of crowd help me avoid overcrowded stations effectively.	68	36	6	0	0	110	22.0	Strongly Agree
The announcement module provides relevant and timely	63	40	7	0	0	110	22.0	Strongly Agree





Table 10 reflects the results of the Customer Non-Technical Survey Questions related to functionality. Statement 1 received an average rating of 22.0, statement 2 had a rating of 22.0, statement 3 received a rating of 22.0, statement 4 received a rating of 22.0, statement 5 received a rating of 22.0, statement 6 received a rating of 22.0, and statement 7 received a rating of 22.0, statement 8 received a rating of 22.0, statement 9 received a rating of 22.0, and statement 10 received a rating of 22.0, statement 11 received a rating of 22.0, statement 12 received a rating of 22.0, and statement 13 received a rating of 22.0 all with a response of "Strongly Agree."

**Table 11: Reliability of Commuter's System Evaluation Mean Summary**

Statement	(5)	(4)	(3)	(2)	(1)	Frequency	Mean	Response
The app's payment system is reliable and rarely fails during NFC	58	42	10	0	0	110	22.0	Strongly Agree

transaction s.								
I am confident that my payments will be processed successfull y without delays.	43	53	14	0	0	110	22.0	Agree
The app works consistenl y, even during high-volu me commutin g hours.	55	42	12	1	0	110	22.0	Strongly Agree

The app consistently provides updates on crowd volume without failure.	56	45	8	0	1	110	22.0	Strongly Agree
The crowd volume updates will reflect the actual crowd levels at each station.	57	44	8	1	0	110	22.0	Strongly Agree
The information provided about commuter	63	38	9	0	0	110	22.0	Strongly Agree

volume is updated regularly and is not outdated.								
The announcement module consistently delivers accurate information without errors.	59	40	10	1	0	110	22.0	Strongly Agree
The announcements I receive reflect the most current	60	41	9	0	0	110	22.0	Strongly Agree

information available.								
I have not experienced any significant delays in receiving important announcements through the app.	57	45	8	0	0	110	22.0	Strongly Agree
The announcement module operates reliably, even during	58	43	9	0	0	110	22.0	Strongly Agree

peak commuting times.								
The feedback module consistently accepts my submissions without errors or issues.	64	37	9	0	0	110	22.0	Strongly Agree
I trust that the feedback I provide will be reviewed and considered by the	53	47	10	0	0	110	22.0	Strongly Agree

TransitEase team.								
The feedback module is available whenever I need to submit my comments or concerns.	58	44	7	1	0	110	22.0	Strongly Agree
I have not encountered any technical issues while using the feedback module.	62	39	8	1	0	110	22.0	Strongly Agree

Table 11 reflects the results of the Customer Non-Technical Survey Questions related to functionality. Statement 1 received an average rating of 22.0, statement 2 had a rating of 22.0, statement 3 received a rating of 22.0, statement 4 received a rating of 22.0, statement 5 received a rating of 22.0, statement 6 received a rating of 22.0, and statement 7 received a rating of 22.0, statement 8 received a rating of 22.0, statement 9 received a rating of 22.0, and statement 10 received a rating of 22.0, statement 11 received a rating of 22.0, statement 12 received a rating of 22.0, statement 13 received a rating of 22.0, and statement 14 received a rating of 22.0 with a response of "Agree" and "Strongly Agree."

**Table 12: Usability of Commuter's System Evaluation Mean Summary**

Statement	(5)	(4)	(3)	(2)	(1)	Frequency	Mean	Response
The payment process using NFC is easy to	73	33	4	0	0	110	22.0	Strongly Agree

understand and use.								
I can easily fill the requireme nts of paymongo to process the payment.	42	57	11	0	0	110	22.0	Agree
I feel comfortabl e using the TransitEas e app without any help or guidance.	49	49	12	0	0	110	22.0	Tie

The interface for payment is intuitive and doesn't require too many steps.	63	37	10	0	0	110	22.0	Strongly Agree
I find it easy to access the crowd volume updates within the TransitEas e app.	67	33	10	0	0	110	22.0	Strongly Agree
The interface displaying	62	37	11	0	0	110	22.0	Strongly Agree

commuter volume information is intuitive.								
I can easily understand the information provided about crowd volume without needing help.	67	36	7	0	0	110	22.0	Strongly Agree
The crowd volume presented in a clear format that	62	43	5	0	0	110	22.0	Strongly Agree

makes it easy to compare station volumes.								
I find it easy to navigate the announcement module within the TransitEase app.	62	38	9	1	0	110	22.0	Strongly Agree
The interface for viewing announcements is clear and	60	37	12	1	0	110	22.0	Strongly Agree

easy to understand .								
I can easily find specific announcements relevant to my commute without assistance.	60	44	6	0	0	110	22.0	Strongly Agree
The notifications for announcements are easy to notice.	67	35	8	0	0	110	22.0	Strongly Agree

I find the feedback module easy to navigate and use.	67	35	7	1	0	110	22.0	Strongly Agree
The process of submitting feedback is straightforward.	67	35	8	0	0	110	22.0	

Table 12 reflects the results of the Customer Non-Technical Survey Questions related to functionality. Statement 1 received an average rating of 22.0, statement 2 had a rating of 22.0, statement 3 received a rating of 22.0, statement 4 received a rating of 22.0, statement 5 received a rating of 22.0, statement 6 received a rating of 22.0, and statement 7 received a rating of 22.0, statement 8 received a rating of 22.0, statement 9 received a rating of 22.0, and statement 10 received a rating of 22.0, statement 11 received a rating of 22.0, statement 12 received a rating of 22.0, statement 13 received a rating of 22.0, and statement 14 received a rating of 22.0 with a response of "Tie", "Agree" and "Strongly

Agree."

**Table 13: Efficiency of Commuter's System Evaluation Mean Summary**

Statement	(5)	(4)	(3)	(2)	(1)	Frequency	Mean	Response
The time it takes to complete a payment using NFC is acceptable .	68	38	4	0	0	110	22.0	Strongly Agree
The payment system allows me to save time when purchasing single	46	58	6	0	0	110	22.0	Agree

journey tickets compared to traditional method.								
I am satisfied with the speed of processing NFC payments through the app.	56	45	9	0	0	110	22.0	Strongly Agree
The app operates smoothly and doesn't slow down during	63	36	11	0	0	110	22.0	Strongly Agree

payment transaction s.								
The crowd volume load quickly within the app without significant delays.	63	37	10	0	0	110	22.0	Strongly Agree
The crowd volume provide timely informatio n that influences my travel decisions	61	41	7	1	0	110	22.0	Strongly Agree

effectively .								
The app operates smoothly when retrieving crowd volume informatio n.	59	43	8	0	0	110	22.0	Strongly Agree
The announce ment module loads quickly, allowing me to access informatio	64	38	8	0	0	110	22.0	Strongly Agree

n without delays.								
The announcements are concise and provide the necessary information without excessive detail.	64	39	7	0	0	110	22.0	Strongly Agree
I feel that the announcement module provides timely information	63	42	5	0	0	110	22.0	Strongly Agree

n that helps me make quick decisions during my commute.								
The feedback module processes my submissions quickly without significant delays.	66	36	8	0	0	110	22.0	Strongly Agree
I can provide feedback efficiently without	72	29	9	0	0	110	22.0	Strongly Agree

taking too much time to complete the form.							
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Table 13 reflects the results of the Customer Non-Technical Survey Questions related to functionality. Statement 1 received an average rating of 22.0, statement 2 had a rating of 22.0, statement 3 received a rating of 22.0, statement 4 received a rating of 22.0, statement 5 received a rating of 22.0, statement 6 received a rating of 22.0, and statement 7 received a rating of 22.0, statement 8 received a rating of 22.0, statement 9 received a rating of 22.0, and statement 10 received a rating of 22.0, with a responses of “Agree” and “Strongly Agree”

**Table 14: Maintainability of Commuter’s System Evaluation Mean Summary**

Statement	(5)	(4)	(3)	(2)	(1)	Frequency	Mean	Response
I find that the app is regularly updated to fix issues	68	35	7	0	0	110	22.0	Strongly Agree

and improve the payment system.								
If I encounter an issue, it's resolved quickly with an app update or fix.	44	53	13	0	0	110	22.0	Agree
The payment system is regularly improved based on	55	44	10	0	1	110	22.0	Strongly Agree

user feedback.								
I am confident that if any new technologies (e.g., new payment methods) are introduced, the app will be updated to support them.	61	41	8	0	0	110	22.0	Strongly Agree
The real-time volume update	64	42	4	0	0	110	22.0	Strongly Agree

	feature is flexible enough to adapt to changes in commuting patterns (e.g., during holidays or events).							
The announcement module is regularly updated to ensure it remains relevant and accurate.	66	36	8	0	0	110	22.0	Strongly Agree

The announcement module is flexible enough to adapt to changes in the commuting environment (e.g., emergencies, service changes).	63	38	9	0	0	110	22.0	Strongly Agree
The feedback module is regularly updated to improve	62	40	8	0	0	110	22.0	Strongly Agree

its functionality based on user input.								
I notice that the feedback module evolves based on user feedback and app performance.	64	37	9	0	0	110	22.0	Strongly Agree
Any issues I encounter with the feedback module	65	34	11	0	0	110	22.0	Strongly Agree

are resolved promptly through app updates.								
The feedback module adapts well to changes in the app's features and user needs.	67	37	6	0	0	110	22.0	Strongly Agree

Table 14 reflects the results of the Customer Non-Technical Survey Questions related to functionality. Statement 1 received an average rating of 22.0, statement 2 had a rating of 22.0, statement 3 received a rating of 22.0, statement 4 received a rating of 22.0, statement 5 received a rating of 22.0, statement 6 received a rating of 22.0, and statement 7 received a rating of 22.0, statement 8 received a rating of 22.0, statement 9 received a

rating of 22.0, and statement 10 received a rating of 22.0, and statement 11 received a rating of 22.0 with a responses of “Agree” and “Strongly Agree”

**Table 15: Portability of Commuter’s System Evaluation Mean Summary**

Statement	(5)	(4)	(3)	(2)	(1)	Frequency	Mean	Response
The TransitEas e app works well across different mobile devices (e.g., smartphones, tablets).	66	35	9	0	0	110	22.0	Strongly Agree
The payment system performs	43	55	12	0	0	110	22.0	Agree

consistentl y, regardless of the mobile device I use.								
The crowd volume are accessible on different mobile devices.	59	44	6	1	0	110	22.0	Strongly Agree
I can access the crowd volume feature without issues	67	38	5	0	0	110	22.0	Strongly Agree

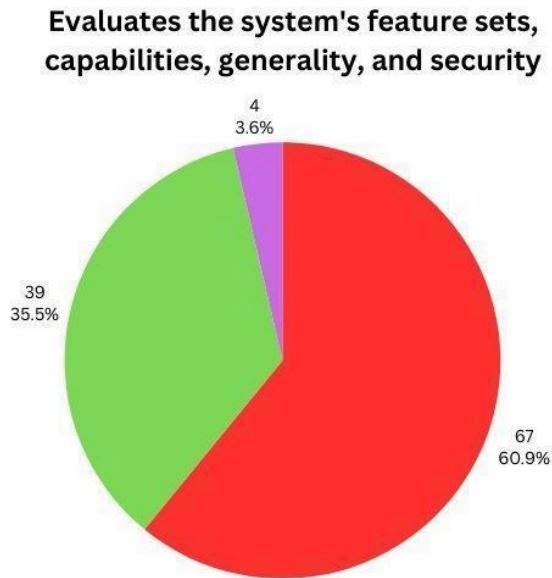
regardless of my location.								
The announce ment  module is accessible on various android devices.	64	37	9	0	0	110	22.0	Strongly Agree
The feedback module is accessible on various android devices without issues.	63	34	12	1	0	110	22.0	Strongly Agree

I can submit feedback from different locations without experiencing problems.	63	34	11	2	0	110	22.0	Strongly Agree
The feedback module functions consistently on Android.	62	42	5	0	1	110	22.0	Strongly Agree

Table 15 reflects the results of the Customer Non-Technical Survey Questions related to functionality. Statement 1 received an average rating of 22.0, statement 2 had a rating of 22.0, statement 3 received a rating of 22.0, statement 4 received a rating of 22.0, statement 5 received a rating of 22.0, statement 6 received a rating of 22.0, statement 7

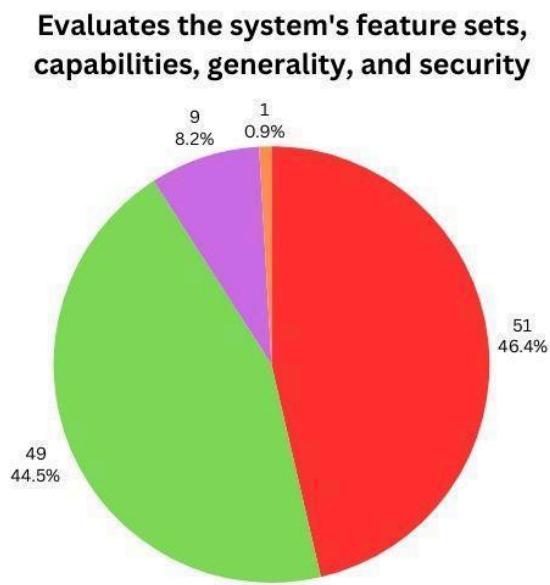
received a rating of 22.0, and statement 8 received a rating of 22.0 with a responses of “Agree” and “Strongly Agree”

The system evaluation survey questionnaire for customers consists of 69 questions or statements across 5 components. These components are Functionality (13 statements), Reliability (11 statements), Usability (14 statements), Efficiency (12 statements), Maintainability (11 statements), and Portability (8 statements). In total, forty (110) responses were collected for each statement. The average for each statement was calculated and then combined to determine the overall average for the entire technical system evaluation.



**Figure 52. Commuter Response to System in Functionality - Statement 1**

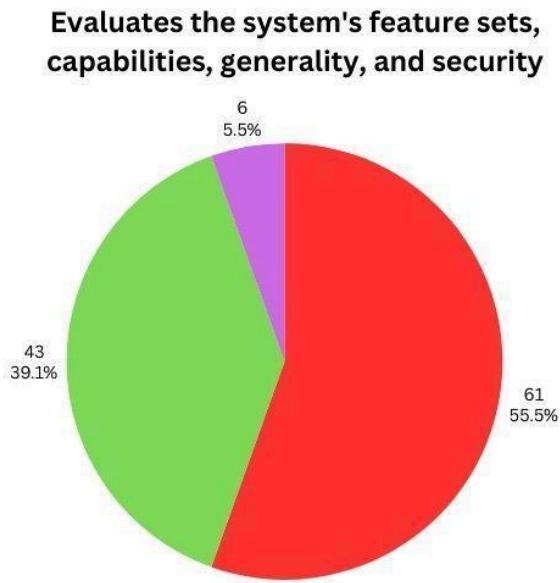
Figure 52 indicates that the majority of respondents (60.9%) strongly agree that they are able to use the mobile app payment with ease. An additional (35.5%) agree with this statement, and (3.6%) is neutral making it clear that almost all users find the system to be user-friendly.



**Figure 53. Commuter Response to System in Functionality - Statement 2**

Figure 53 shows that (46.4%) of respondents strongly agree that the information provided about NFC in loading Single Journey Tickets makes my LRT-1 commuting

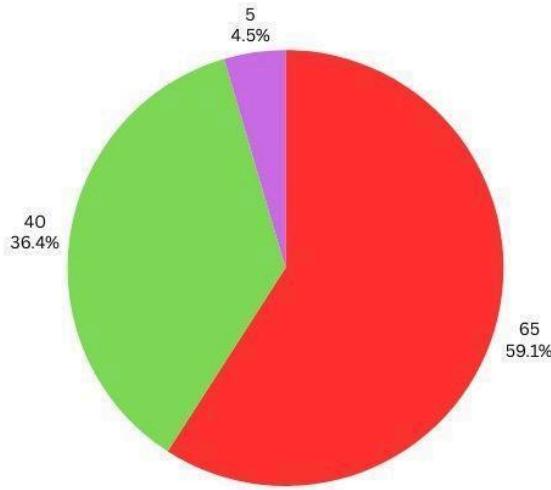
experience more convenient. An additional (44.5%) agree with this statement, and (8.2%) answered neutral, only (0.9%) answered disagree in this statement.



**Figure 54. Commuter Response to System in Functionality - Statement 3**

Figure 54 shows that (55.5%) of the respondents answered strongly agree on the payment system through NFC meets my daily commuting needs. An additional (39.9%) agree with this statement, and (5.5%) responded neutral in this statement.

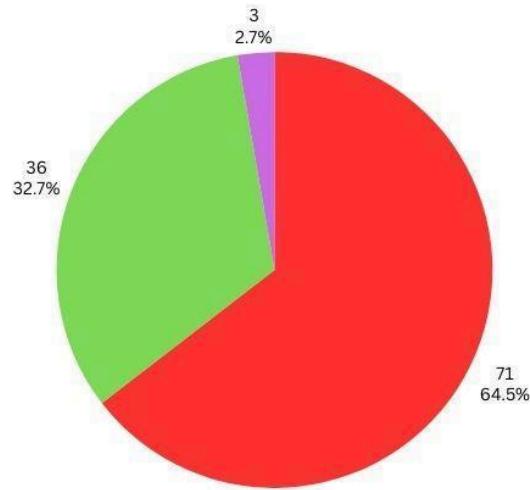
**Evaluates the system's feature sets, capabilities, generality, and security**



**Figure 55. Commuter Response to System in Functionality - Statement 4**

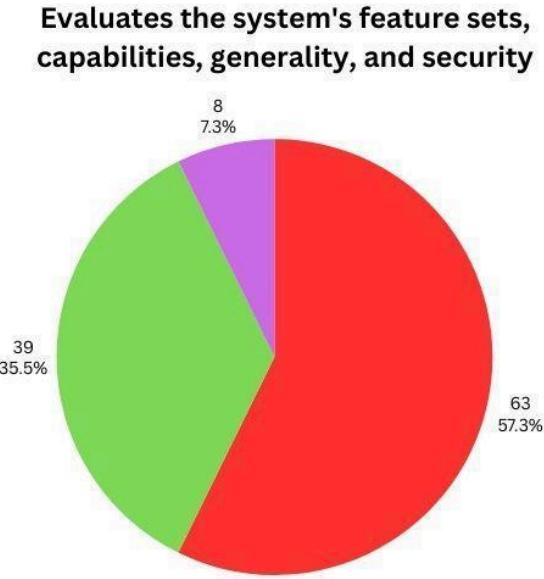
Figure 55 shows that (59.1%) of the respondents feel confident in using NFC for payment without needing assistance from station staff. An additional (36.4%) of the respondents answered agree, and (4.5%) answered neutral in using NFC for payment without needing assistance from station staff.

**Evaluates the system's feature sets, capabilities, generality, and security**



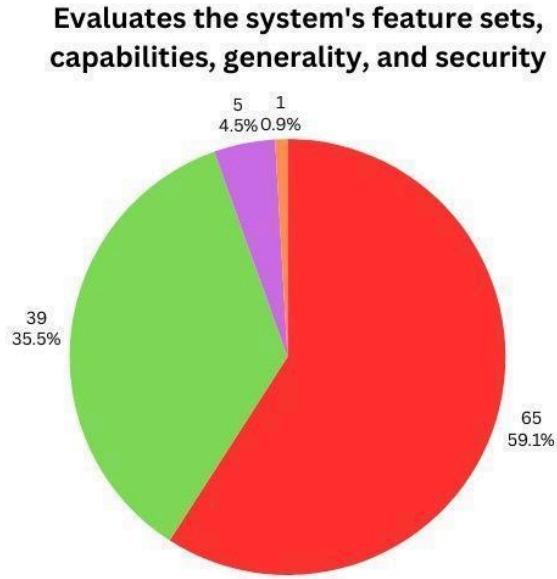
**Figure 56. Commuter Response to System in Functionality - Statement 5**

Figure 56 shows that (64.5%) of the respondents answered NFC payment reduce the time they spend in single journey ticket lines. An additional (32.7%) of the respondents answered agree, and (2.7%) disagreed in this statement NFC payment reduce the time they spend in single journey ticket lines.



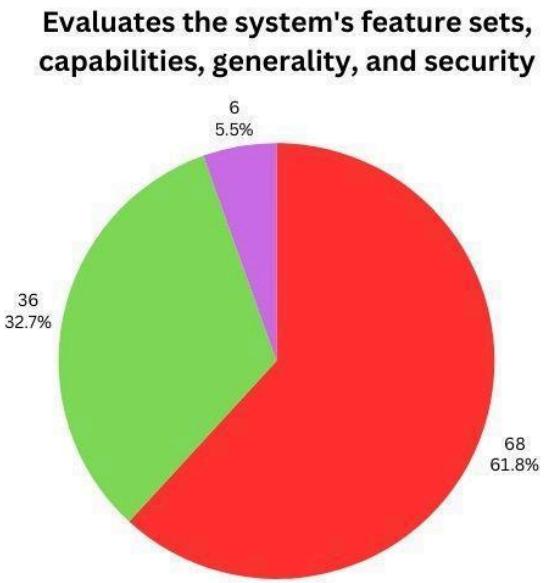
**Figure 57. Commuter Response to System in Functionality - Statement 6**

Figure 57 shows that (57.3%) of the respondents answered strongly agree in the statement updates of crowd volume provide me with the information they need to plan in their journey effectively. An additional (35.5%) of the respondents answered agree in this statement, and (7.3%) answered neutral, they found the application more convenient in knowing the crowd status of each and every station.



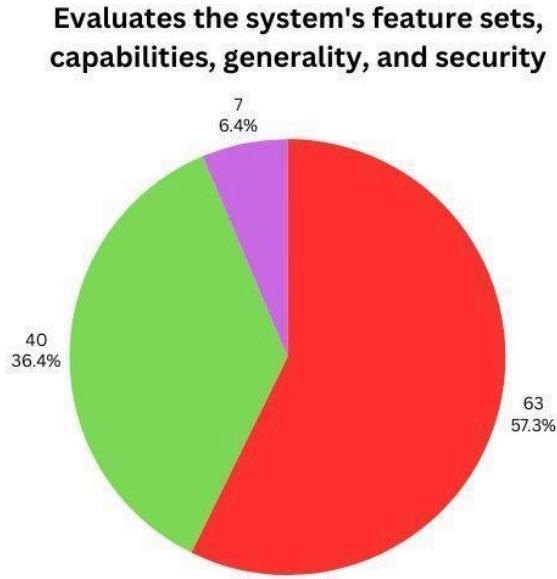
**Figure 58. Commuter Response to System in Functionality - Statement 7**

Figure 58 shows that (59.1%) of the respondents answered strongly agree in this statement. It shows that they can rely on the app to give accurate updates on the volume of commuters at each station. An additional (35.5%) of the respondents answered agree in this statement, and (4.5%) of the respondents answered neutral in this statement, only (0.9%) of the respondents disagreed in this statement.



**Figure 59. Commuter Response to System in Functionality - Statement 8**

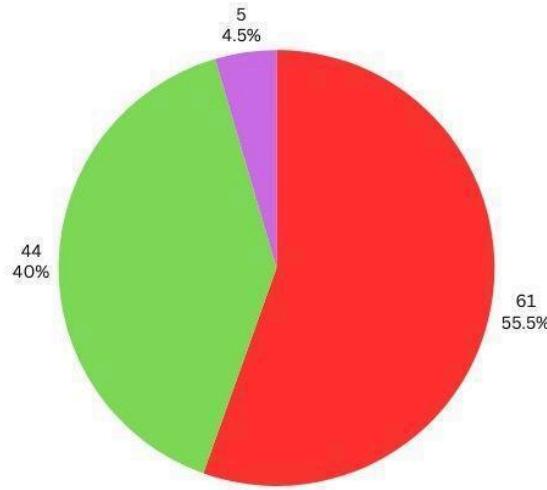
Figure 59 shows that (61.8%) of the respondents answered strongly agree it shows that updates of crowd help them avoid overcrowded stations effectively. An additional (32.7%) of the respondents answered agree, and (5.5%) answered neutral in this statement.



**Figure 60. Commuter Response to System in Functionality - Statement 9**

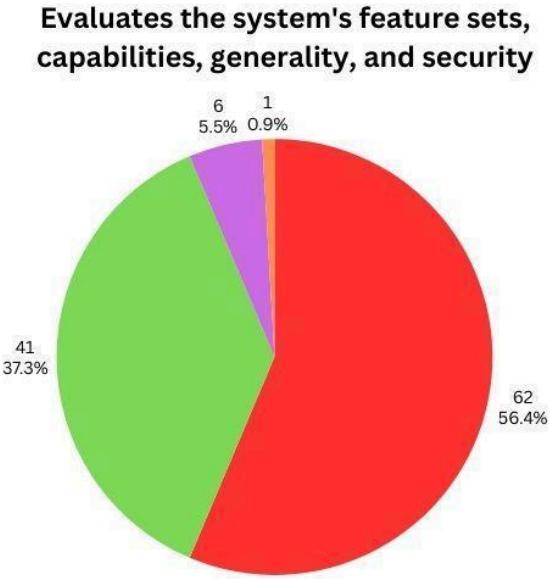
Figure 60 shows that (57.3%) of the respondents answered strongly agree in this statement they found the module relevant and timely information that is useful during their commute. An additional (36.4%) of the respondents answered agree, and (6.4%) of the respondents answered neutral in this statement.

**Evaluates the system's feature sets, capabilities, generality, and security**



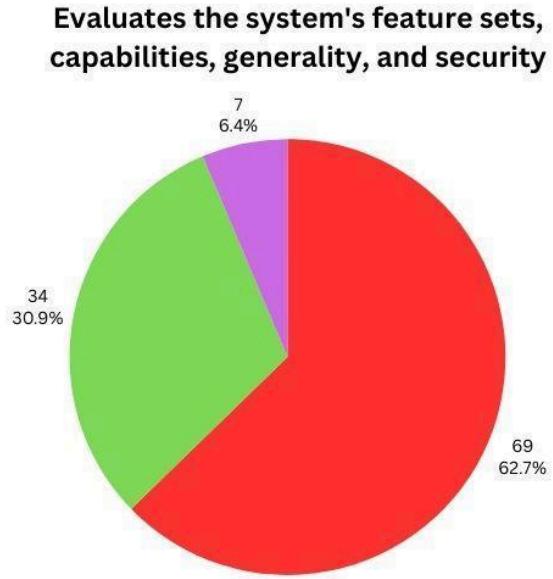
**Figure 61. Commuter Response to System in Functionality - Statement 10**

Figure 61 shows that (55.5%) of the respondents answered strongly agree in this statement shows that they can easily can easily notice announcements through the TransitEase app. An additional (40%) of the respondents answered agree, and (4.5%) of the respondents answered neutral in this statement.



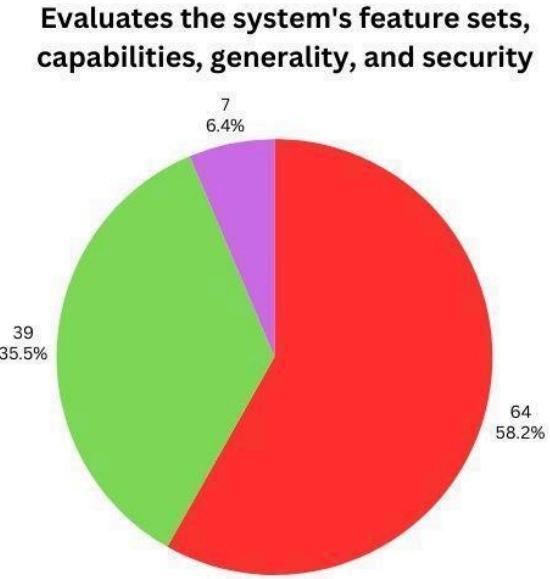
**Figure 62. Commuter Response to System in Functionality - Statement 11**

Figure 62 shows that (56.4%) of the respondents answered strongly agree in this statement, they can see announcements cover a wide range of topics that are important for their travel experience. An additional (37.3%) of the respondents answered agree in this statement, and (5.5%) answered neutral in this statement, only (0.9%) of the respondents answered disagree in this statement.



**Figure 63. Commuter Response to System in Functionality - Statement 12**

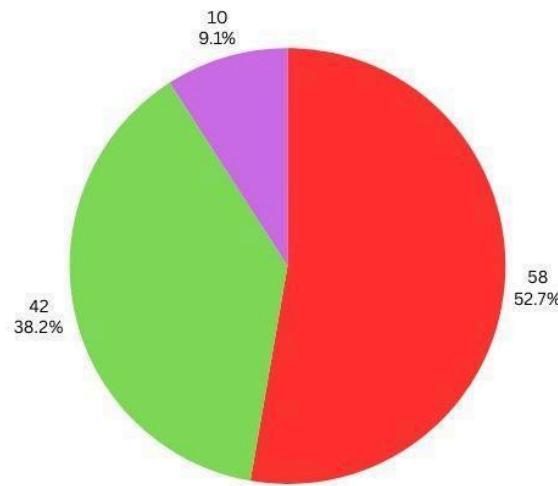
Figure 63 shows that (62.7%) of the respondents answered strongly agree in this statement they can see announcement module integrates well with other features of the TransitEase app. An additional (30.9%) of the respondents answered agree in this statement, and (6.4%) of the respondents answered neutral in this statement.



**Figure 64. Commuter Response to System in Functionality - Statement 13**

Figure 64 shows that (58.2%) of the respondents answered strongly agree in this statement they can see the feedback module allows them to easily submit their suggestions or concerns regarding the app's features. An additional (35.5%) of the respondents answered agree, and (6.4%) of the respondents answered neutral in this statement.

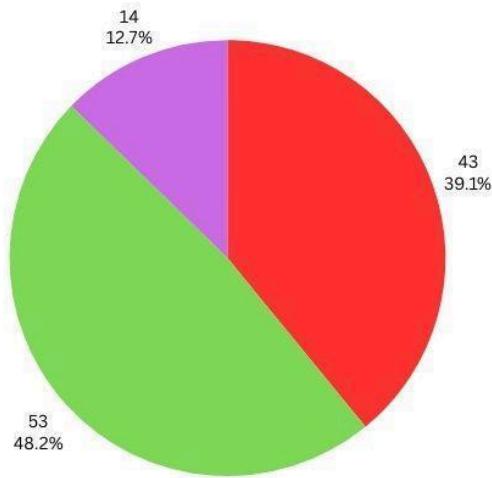
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 65. Commuter Response to System in Reliability - Statement 1**

Figure 65 shows that (52.7%) of the respondents answered strongly agree in this statement they can see the app's payment system is reliable and rarely fails during NFC transactions. An additional (38.2%) of the respondents answered agree, and (9.1%) of the respondents answered neutral in this statement.

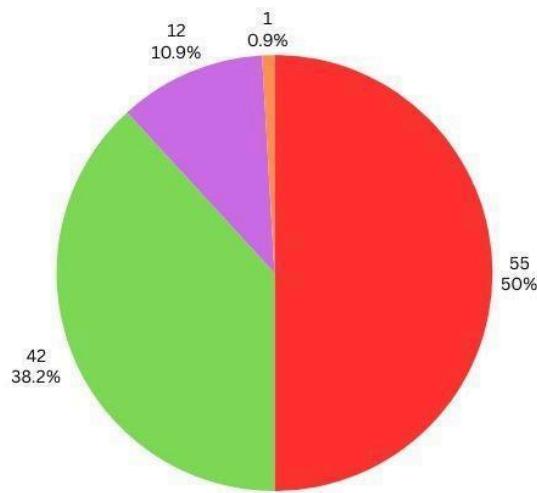
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 66. Commuter Response to System in Reliability - Statement 2**

Figure 66 shows that (48.2%) of the respondents answered agree in this statement they are quite confident that their payments will be processed successfully without delays. An additional (39.1%) of the respondents answered strongly agree, and (12.7%) of the respondents answered neutral in this statement.

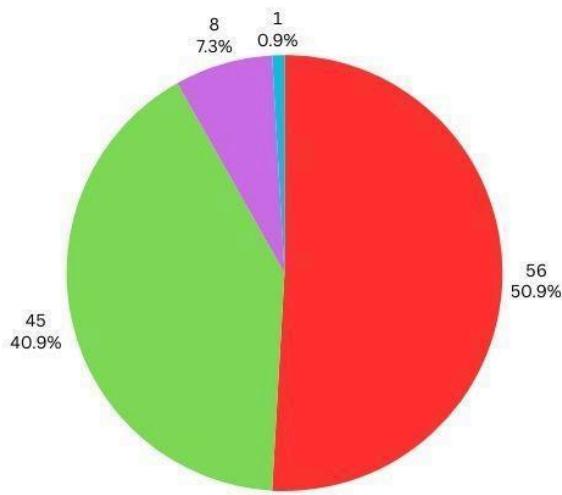
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 67. Commuter Response to System in Reliability - Statement 3**

Figure 67 shows that (50%) of the respondents answered strongly agree in this statement clearly shows that the app works consistently, even during high-volume commuting hours. An additional (38.2%) of the respondents answered agree, and (10.9%) of the respondents answered neutral, and (0.9%) of the respondents answered disagree in this statement.

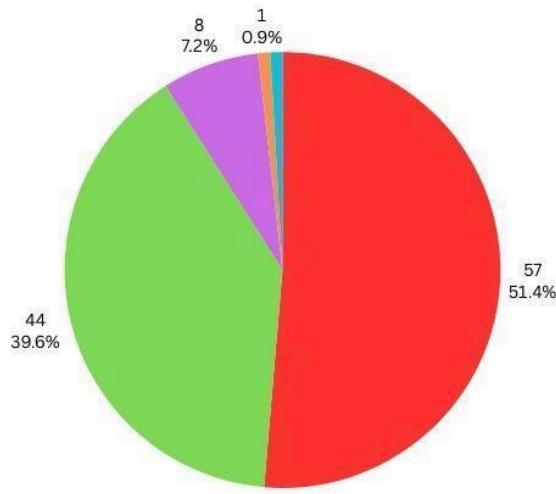
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 68. Commuter Response to System in Reliability - Statement 4**

Figure 68 shows that (50.9%) of the respondents answered strongly agree in this statement clearly shows that the app consistently provides updates on crowd volume without failure. An additional (40.9%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral, and (0.9%) of the respondents answered strongly disagree in this statement.

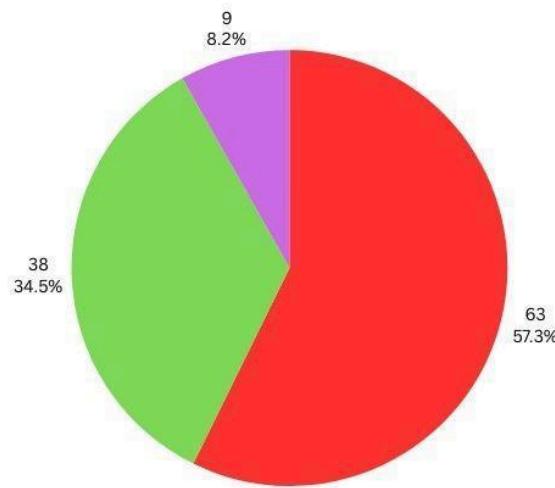
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 69. Commuter Response to System in Reliability - Statement 5**

Figure 69 shows that (51.4%) of the respondents answered strongly agree in this statement clearly shows that the crowd volume updates will reflect the actual crowd levels at each station and it is more convenient on them. An additional (39.6%) of the respondents answered agree, and (7.2%) of the respondents answered neutral, and only (0.9%) of the respondents answered disagree in this statement.

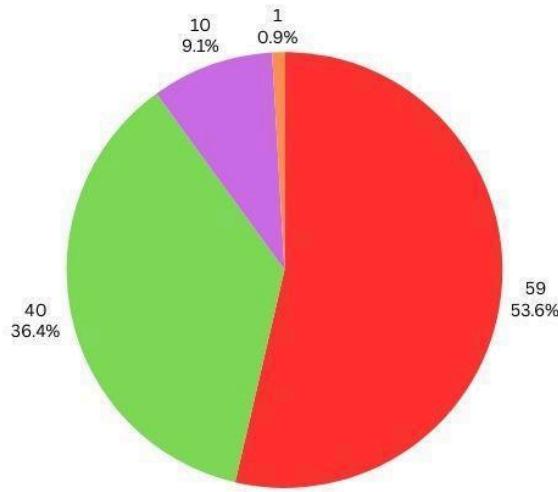
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 70. Commuter Response to System in Reliability - Statement 6**

Figure 70 shows that (57.3%) of the respondents answered strongly agree in this statement clearly shows that the information provided about commuter volume is updated regularly and is not outdated in the application. An additional (34.5%) of the respondents answered agree in this statement, and (8.2%) of the respondents answered neutral in this statement.

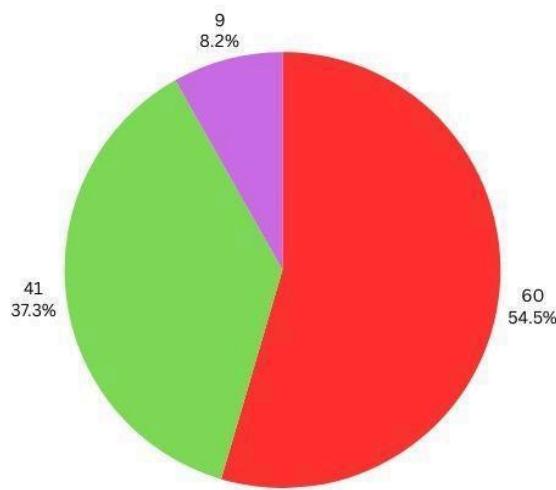
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 71. Commuter Response to System in Reliability - Statement 7**

Figure 71 shows that (53.6%) of the respondents answered strongly agree in this statement clearly shows that the announcement module consistently delivers accurate information without errors in the commuter. An additional (36.4%) of the respondents answered agree in this statement, and (9.1%) of the respondents answered neutral, and only (0.9%) of the respondents answered disagree in this statement.

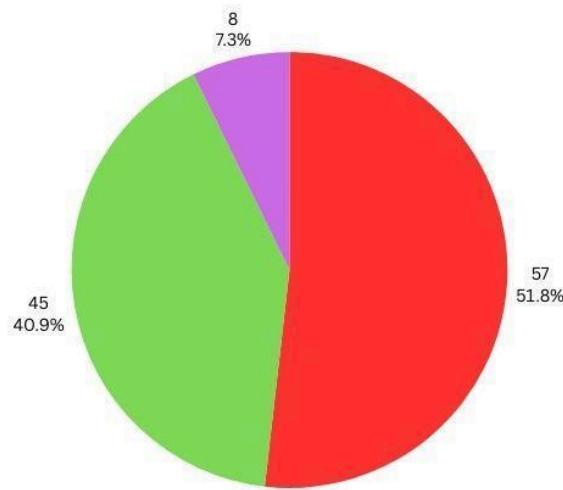
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 72. Commuter Response to System in Reliability - Statement 8**

Figure 72 shows that (54.5%) of the respondents answered strongly agree in this statement clearly shows that the announcements they receive reflect the most current information available. An additional (37.3%) of the respondents answered agree, and (8.2%) of the respondents answered neutral in this statement.

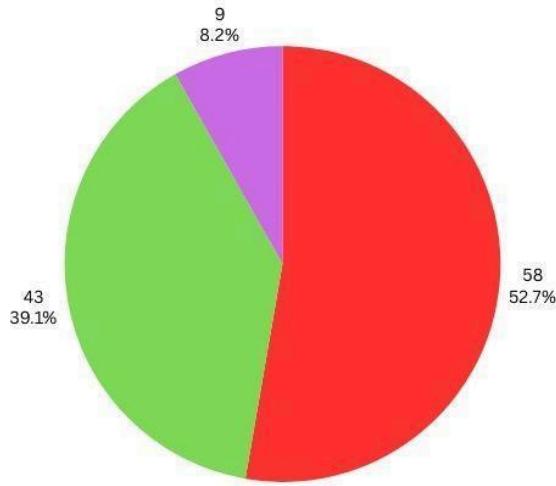
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 73. Commuter Response to System in Reliability - Statement 9**

Figure 73 shows that (51.8%) of the respondents answered strongly agree in this statement clearly shows that they have not experienced any significant delays in receiving important announcements through the app. An additional (40.9%) of the respondents answered agree, and (7.3) of the respondents answered neutral in this statement.

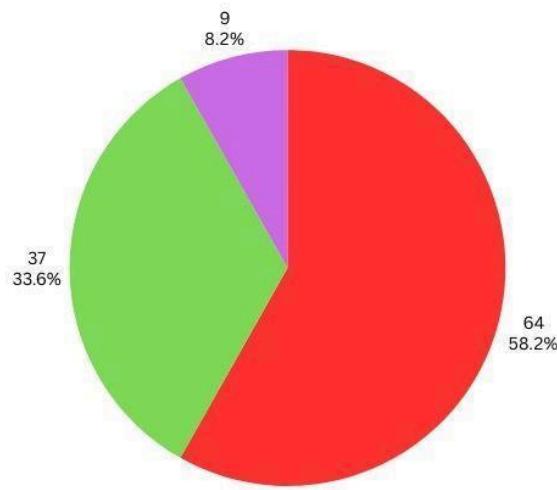
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 74. Commuter Response to System in Reliability - Statement 10**

Figure 74 shows that (52.7%) of the respondents answered strongly agree in this statement clearly shows that the announcement module operates reliably, even during peak commuting times. An additional (39.1%) of the respondents answered agree, and (8.2%) of the respondents answered neutral in this statement.

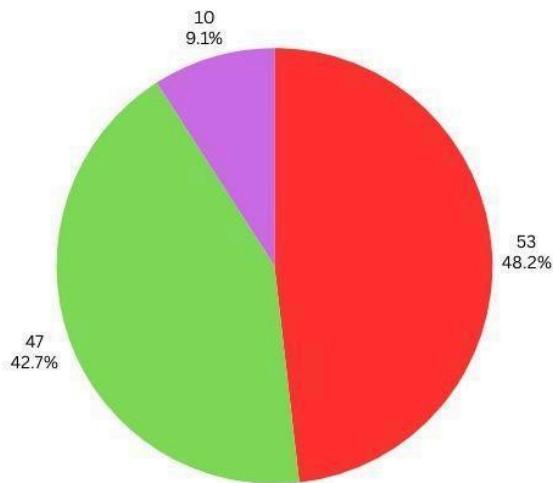
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 75. Commuter Response to System in Reliability - Statement 11**

Figure 75 shows that (58.2%) of the respondents answered strongly agree in this statement clearly shows that the feedback module consistently accepts my submissions without errors or issues. An additional (33.6%) of the respondents answered agree, and (8.2%) of the respondents answered neutral in this statement.

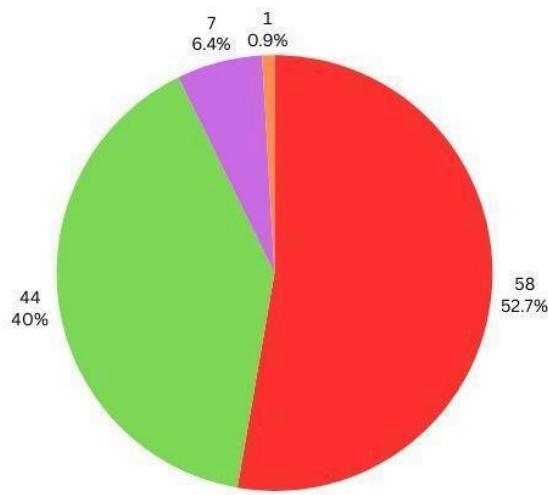
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 76. Commuter Response to System in Reliability - Statement 12**

Figure 76 shows that (48.2%) of the respondents answered strongly agree in this statement it shows that they trust that the feedback they provide will be reviewed and considered by the TransitEase team. An additional (42.7%) of the respondents answered agree in this statement, and (9.1%) of the respondents answered neutral in this statement.

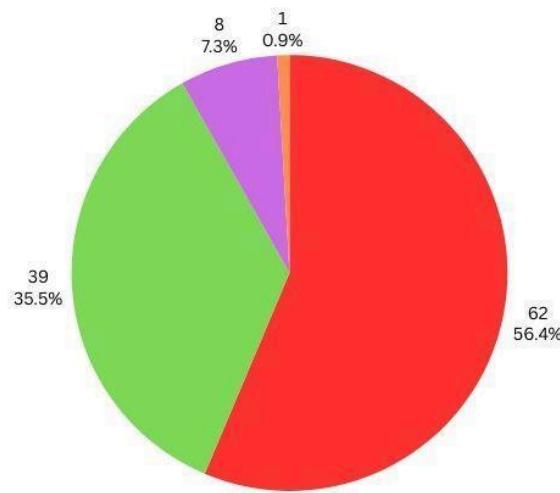
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 77. Commuter Response to System in Reliability - Statement 13**

Figure 77 shows that (52.7%) of the respondents answered strongly agree in this statement it shows that the feedback module is available whenever they need to submit comments or concerns. An additional (40%) of the respondents answered agree, and (6.4%) of the respondents answered neutral, and (0.9%) of the respondents answered disagree in this statement.

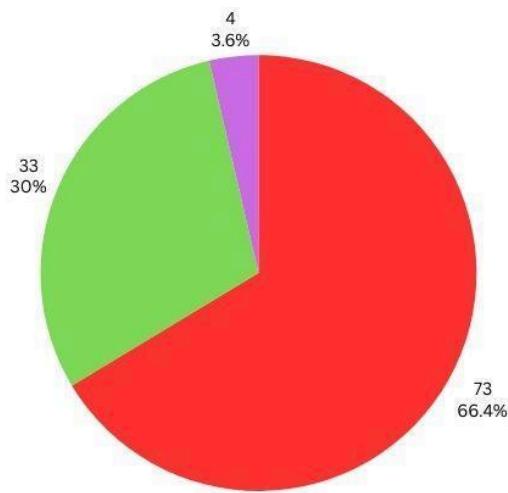
**Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system**



**Figure 78. Commuter Response to System in Reliability - Statement 14**

Figure shows that (56.4%) of the respondents answered strongly agree in this statement it shows they have not encountered any technical issues while using the feedback module. An additional (35.5%) of the respondents answered agree, and (7.3%) of the respondents answered neutral, and (0.9%) of the respondents answered disagree in this statement.

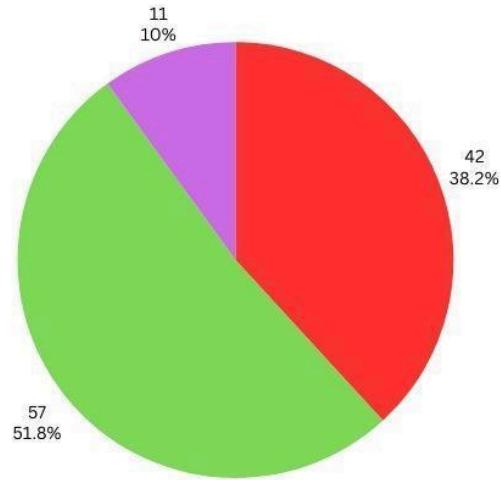
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 79. Commuter Response to System in Usability - Statement 1**

Figure 79 shows that (66.4%) of the respondents answered strongly agree in this statement clearly shows that the payment process using NFC is easy to understand and use. An additional (30%) of the respondents answered agree, and (3.6%) of the respondents answered neutral in this statement.

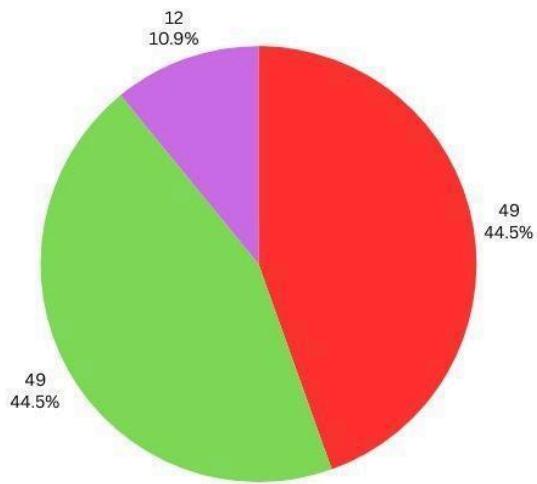
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 80. Commuter Response to System in Usability - Statement 2**

Figure 80 shows that (51.8%) of the respondents answered agree in this statement shows that they can easily fill the requirements of paymongo to process the payment. An additional (38.2%) of the respondents answered strongly agree in this statement, and (10%) of the respondents answered neutral.

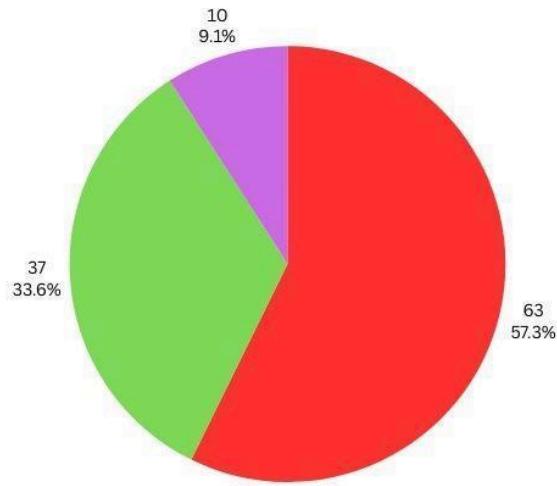
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 81. Commuter Response to System in Usability - Statement 3**

Figure 80 shows that (44.5%) of the respondents answered the strongly agree and agree clearly shows that the answers tied it shows that they feel comfortable using the TransitEase app without any help or guidance. An additional (10.9%) of the respondents answered neutral in this statement.

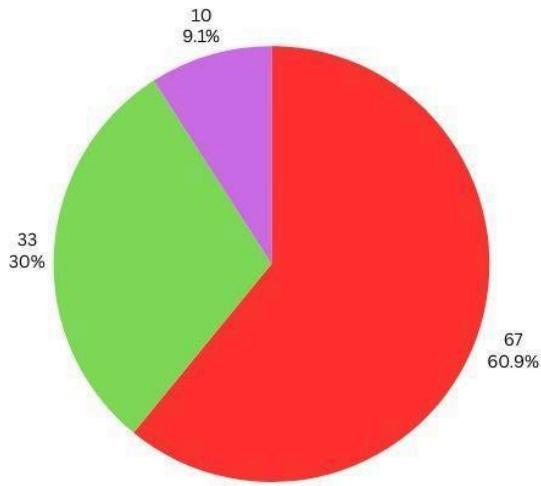
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 82. Commuter Response to System in Usability - Statement 4**

Figure 82 shows that (57.3%) of the respondents answered strongly agree in this statement clearly shows that the interface for payment is intuitive and doesn't require too many steps so it's less hassle for the commuter. An additional (33.6%) of the respondents answered agree in this statement, and (9.1%) of the respondents answered neutral.

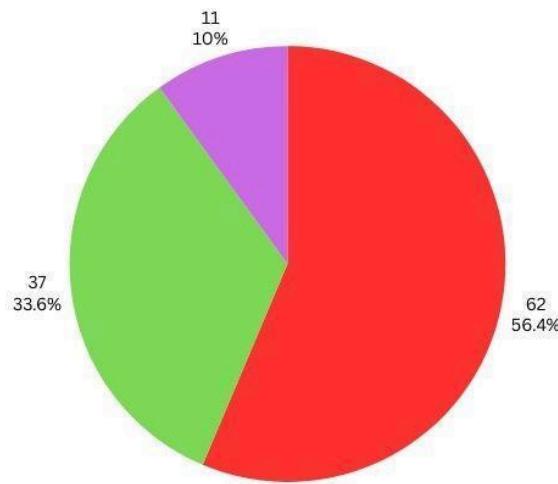
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 83. Commuter Response to System in Usability - Statement 5**

Figure 83 shows that (60.9%) of the respondents answered strongly agree in this statement clearly shows that they find it easy to access the crowd volume updates within the TransitEase app. An additional (30%) of the respondents answered agree, and (9.1%) of the respondents answered neutral in this statement.

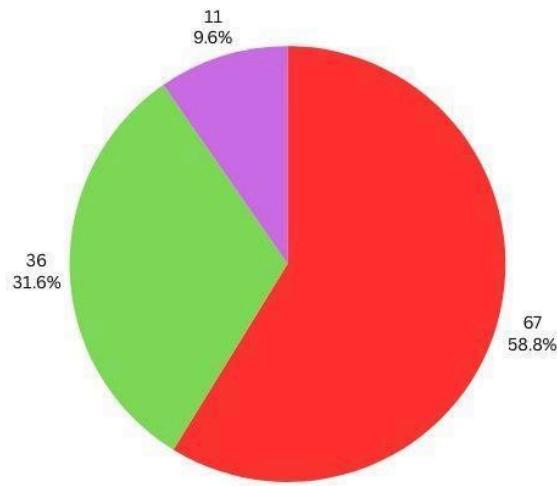
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 84. Commuter Response to System in Usability - Statement 6**

Figure 84 shows that (56.4%) of the respondents answered strongly agree in this statement shows that the interface displaying commuter volume information is intuitive so it's more convenient to them commuter's. An additional (33.6%) of the respondents answered agree in this statement, and (10%) of the respondents answered neutral in this statement.

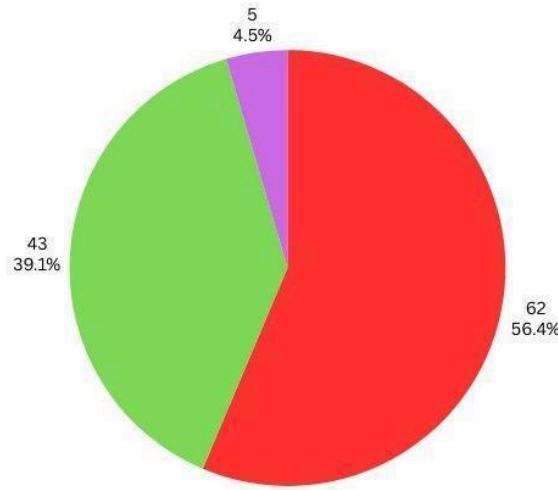
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 85. Commuter Response to System in Usability - Statement 7**

Figure 85 shows that (58.8%) of the respondents answered strongly agree in this statement clearly shows that they can easily understand the information provided about crowd volume without needing help. An additional (31.6%) of the respondents answered agree, and (9.6%) of the respondents answered neutral.

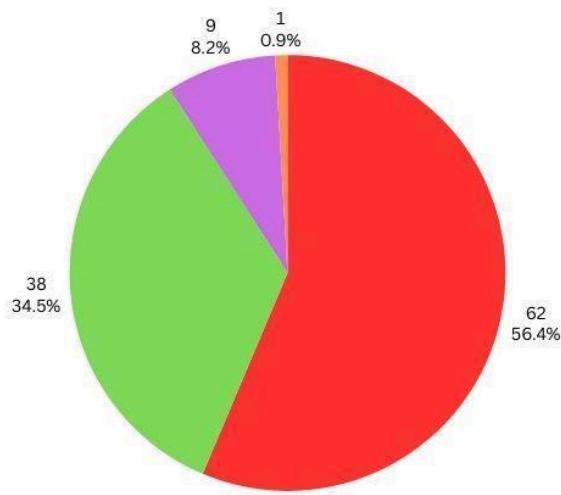
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 86. Commuter Response to System in Usability - Statement 8**

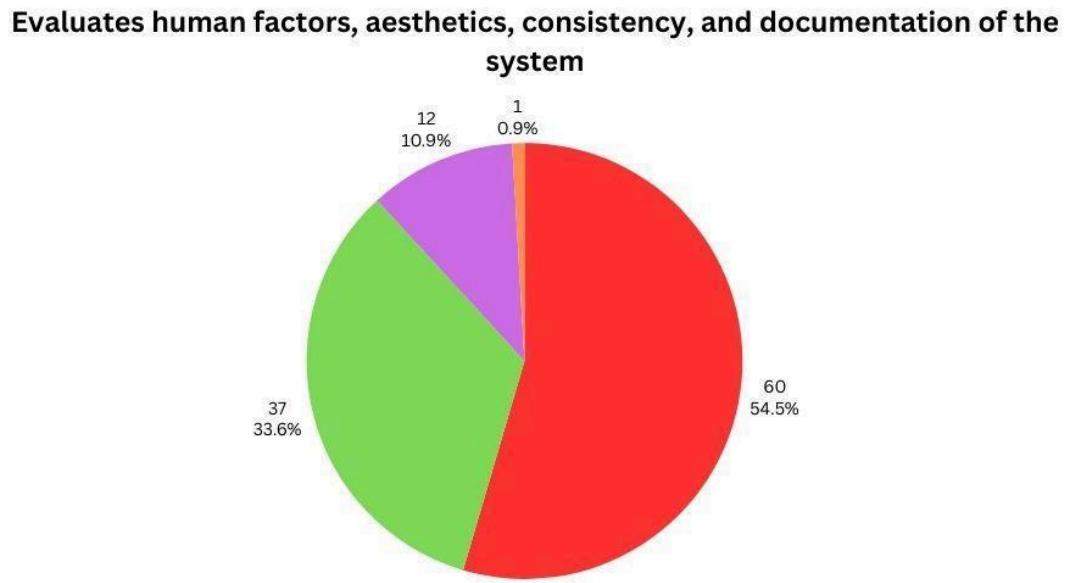
Figure 86 shows that (56.4%) of the respondents answered strongly agree in this statement clearly shows that the crowd volume presented in a clear format that makes it easy to compare station volumes. An additional (39.1%) of the respondents answered agree, and (4.5%) of the respondents answered neutral in this statement.

**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 87. Commuter Response to System in Usability - Statement 9**

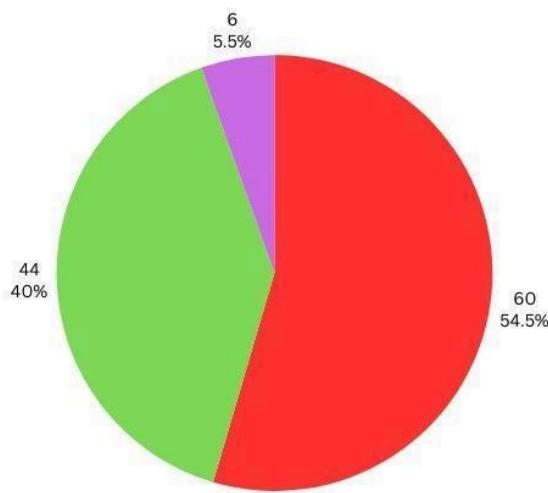
Figure 87 shows that (56.4%) of the respondents answered strongly agree in this statement shows that they find it easy to navigate the announcement module within the TransitEase app. An additional (34.5%) of the respondents answered agree in this statement, and (8.2%) answered neutral, and only (0.9%) of the respondents answered disagree.



**Figure 88. Commuter Response to System in Usability - Statement 10**

Figure 88 shows that (54.5%) of the respondents answered strongly agree in this statement it shows that the interface for viewing announcements is clear and easy to understand by the user. An additional (33.6%) of the respondents answered agree, and (10.9%) of the respondents answered neutral in this statement, and (0.9%) of the respondents answered disagree.

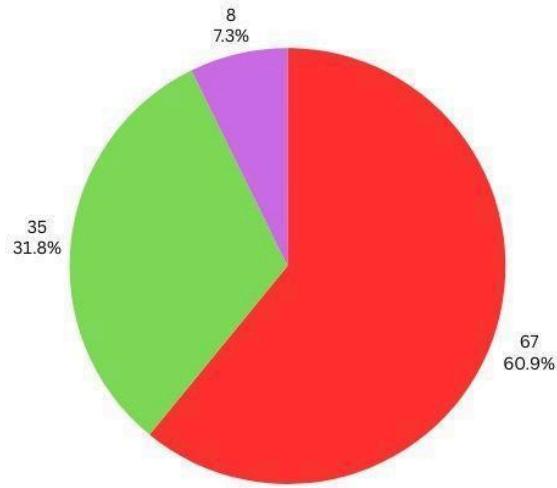
**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 89. Commuter Response to System in Usability - Statement 11**

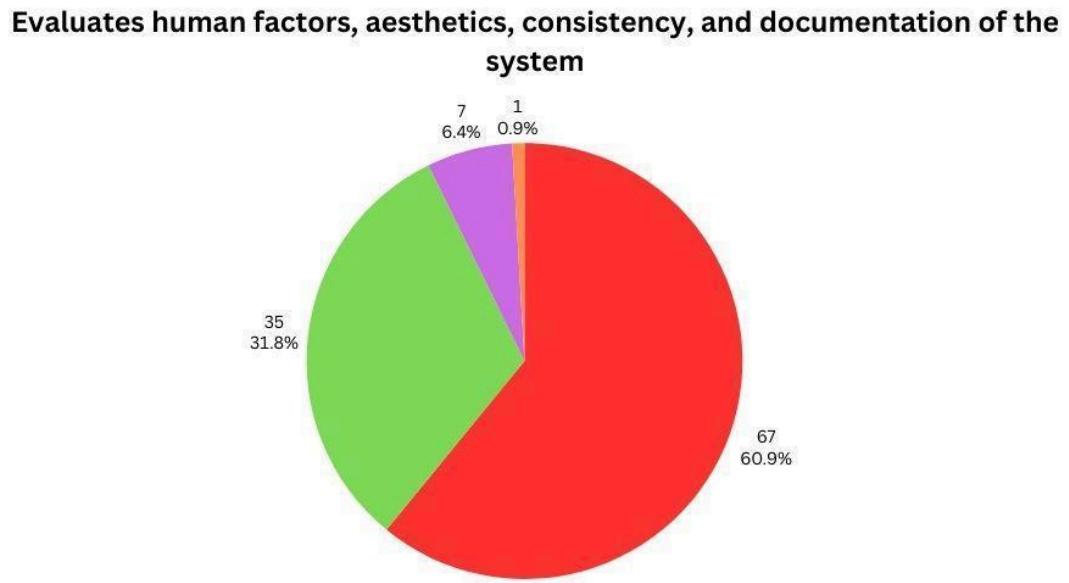
Figure 89 shows that (54.5%) of the respondents answered strongly agree in this statement it clearly shows that they can easily find specific announcements relevant to their commute without assistance. An additional (40%) of the respondents answered agree in this statement, and (5.5%) of the respondents answered neutral.

**Evaluates human factors, aesthetics, consistency, and documentation of the system**



**Figure 90. Commuter Response to System in Usability - Statement 12**

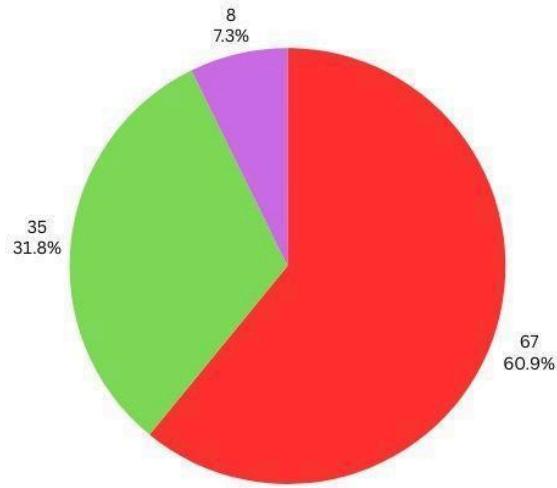
Figure 90 shows that (60.9%) of the respondents answered strongly agree in this statement clearly shows that the notifications for announcements are easy to notice by the user. An additional (31.8%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral.



**Figure 91. Commuter Response to System in Usability - Statement 13**

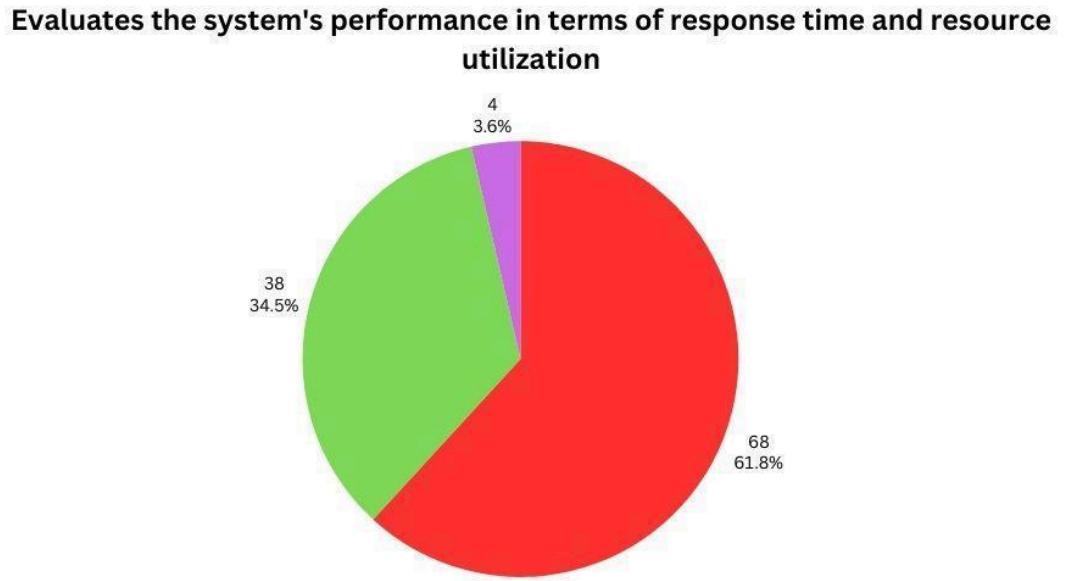
Figure 91 shows that (60.9%) of the respondents answered strongly agree in this statement it clearly shows that they find the feedback module easy to navigate and use. An additional (31.8%) of the respondents answered agree in this statement, and (6.4%) of the respondents answered neutral in this statement, and (0.9%) of the respondents answered disagree in this statement.

**Evaluates human factors, aesthetics, consistency, and documentation of the system**



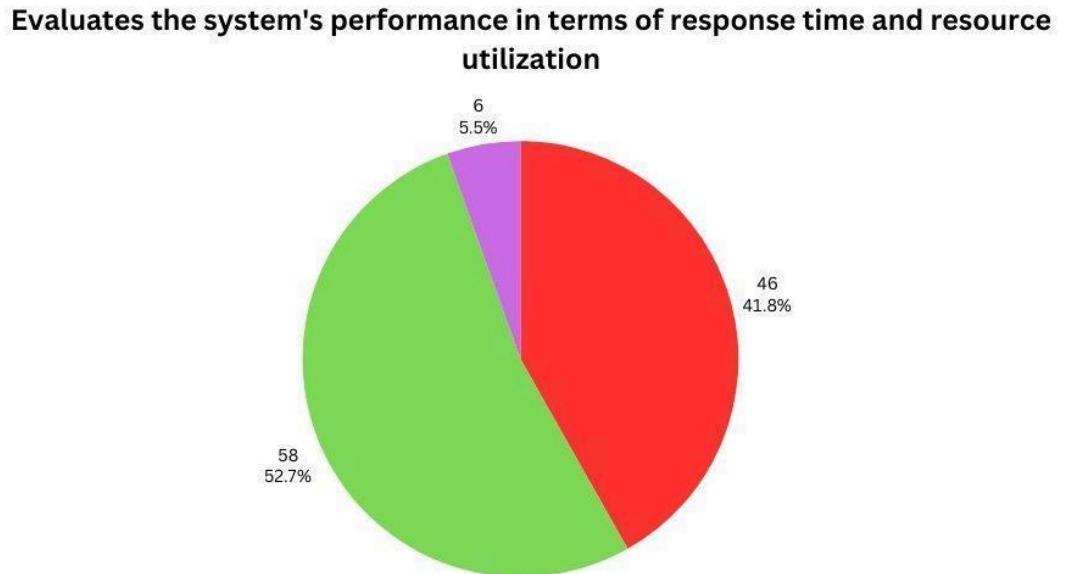
**Figure 92. Commuter Response to System in Usability - Statement 14**

Figure 92 shows that (60.9%) of the respondents answered strongly agree in this statement it clearly shows that the process of submitting feedback is straightforward. An additional (31.8%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral.



**Figure 93. Commuter Response to System in Efficiency - Statement 1**

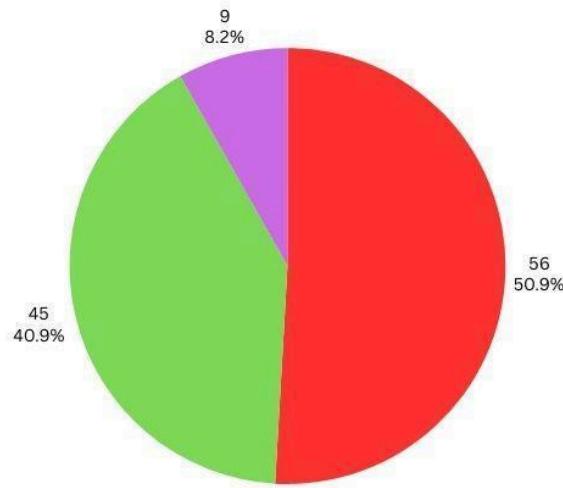
Figure 93 shows that (61.8%) of the respondents answered strongly agree in this statement clearly shows that the time it takes to complete a payment using NFC is acceptable. An additional (34.5%) of the respondents answered agree, and (3.6%) of the respondents answered neutral in this statement.



**Figure 94. Commuter Response to System in Efficiency - Statement 2**

Figure 94 shows that (52.7%) of the respondents answered agree in this statement clearly shows that the payment system allows them to save time when purchasing single journey tickets compared to traditional method. An additional (41.8%) of the respondents answered strongly agree in this statement, and (5.5%) of the respondents answered neutral in this statement.

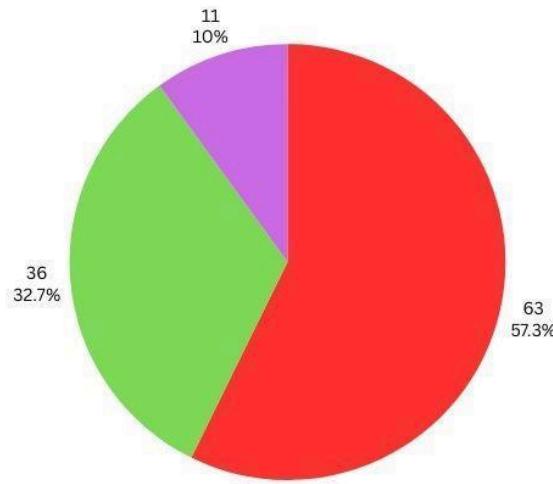
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 95. Commuter Response to System in Efficiency - Statement 3**

Figure 95 shows that (50.9%) of the respondents answered strongly agree in this statement it clearly shows that they are satisfied with the speed of processing NFC payments through the app. An additional (40.9%) of the respondents answered agree in this statement, and (8.2%) of the respondents answered neutral in this statement.

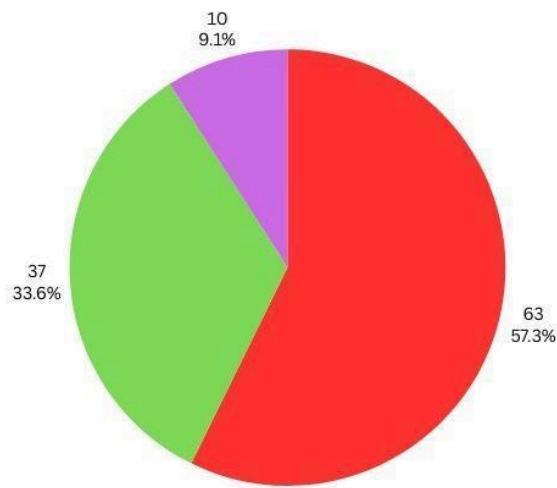
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 96. Commuter Response to System in Efficiency - Statement 4**

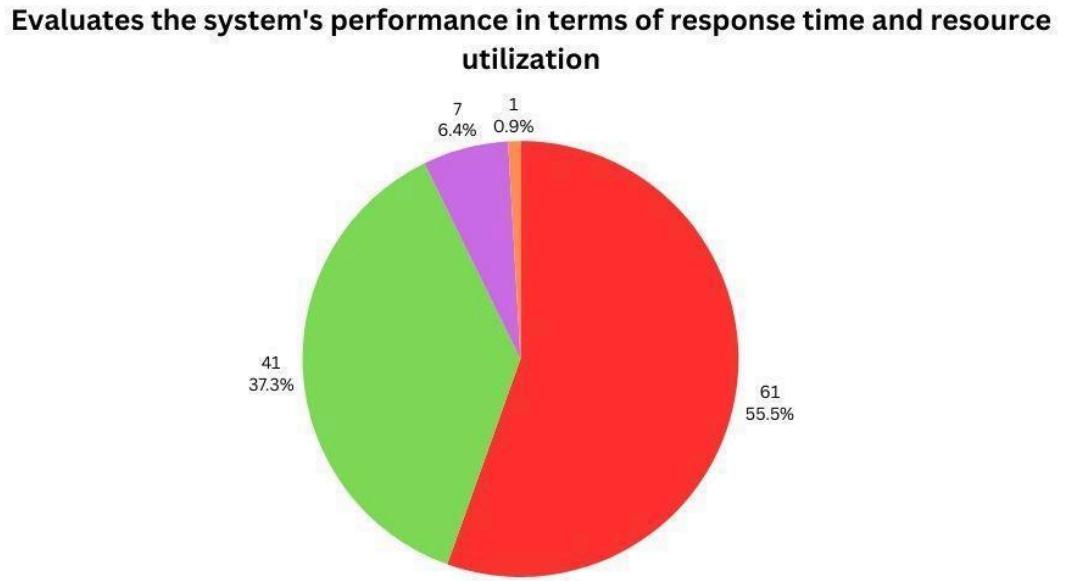
Figure 96 shows that (57.3%) of the respondents answered strongly agree in this statement clearly shows that the app operates smoothly and doesn't slow when the commuter uses the app. An additional (32.7%) of the respondents answered agree in this statement, and (10%) of the respondents answered neutral in this statement.

**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 97. Commuter Response to System in Efficiency - Statement 5**

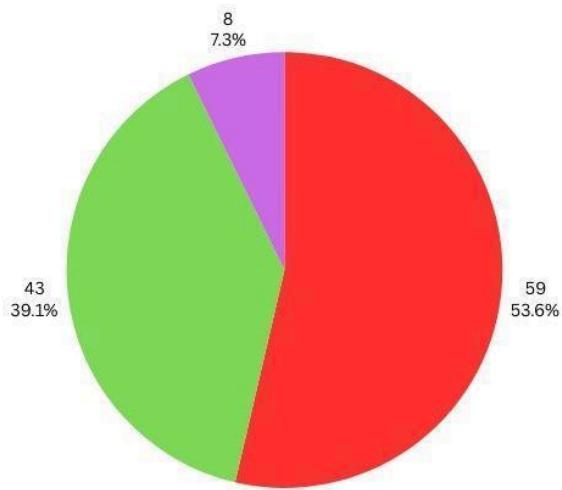
Figure 97 shows that (57.3%) of the respondents answered strongly agree in this statement it shows that the crowd volume load quickly within the app without significant delays. An additional (33.6%) of the respondents answered agree in this statement, and (9.1%) of the respondents answered neutral.



**Figure 98. Commuter Response to System in Efficiency - Statement 6**

Figure 98 shows that (55.5%) of the respondents answered strongly agree in this statement clearly shows that the crowd volume provide timely information that influences my travel decisions effectively. An additional (37.3%) of the respondents answered agree in this statement, and (6.4%) of the respondents answered neutral in this statement, and only (0.9%) of the respondents answered disagree.

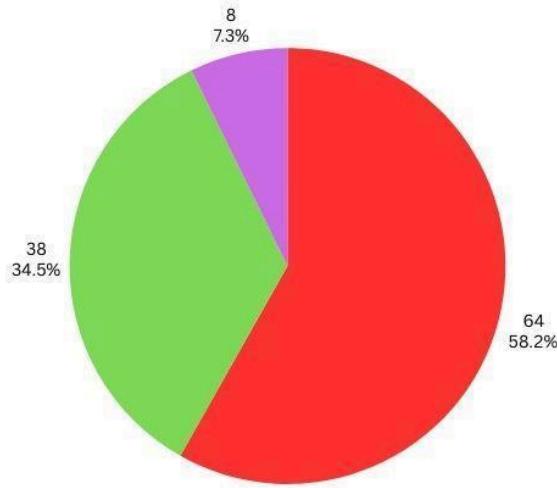
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 99. Commuter Response to System in Efficiency - Statement 7**

Figure 99 shows that (53.6%) of the respondents answered strongly agree in this statement clearly shows that the app operates smoothly when retrieving crowd volume information. An additional (39.1%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral.

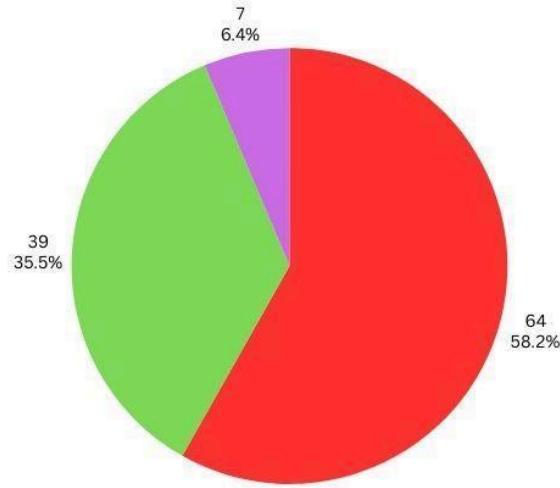
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 100. Commuter Response to System in Efficiency - Statement 8**

Figure 100 shows that (58.2%) of the respondents answered strongly agree in this statement clearly shows that the announcement module loads quickly, allowing them to access information without delays. An additional (34.5%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral.

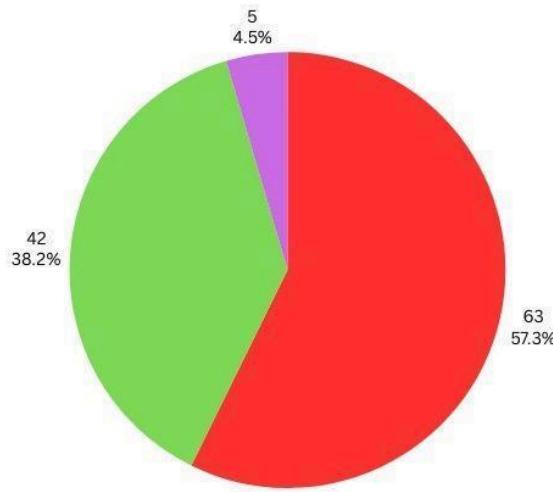
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 101. Commuter Response to System in Efficiency - Statement 9**

Figure 101 shows that (58.2%) of the respondents answered strongly agree in this statement clearly shows that the announcements are concise and provide the necessary information without excessive detail. An additional (35.5%) of the respondents answered agree in this statement, and (6.4%) of the respondents answered neutral.

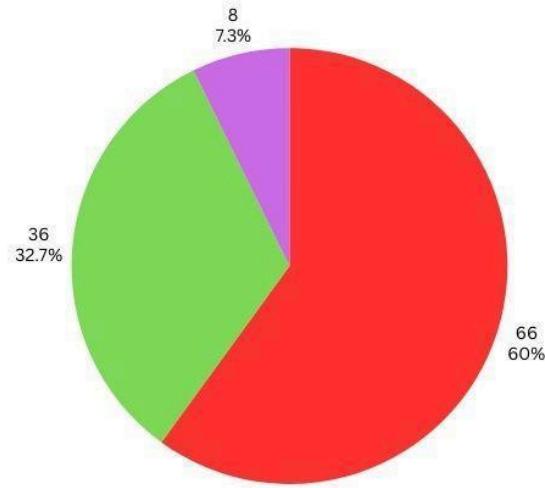
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 102. Commuter Response to System in Efficiency - Statement 10**

Figure 102 shows that (57.3%) of the respondents answered strongly agree in this statement clearly shows that they feel that the announcement module provides timely information that helps them make quick decisions during their commute. An additional (38.2%) of the respondents answered agree in this statement, and (4.5%) of the respondents answered neutral.

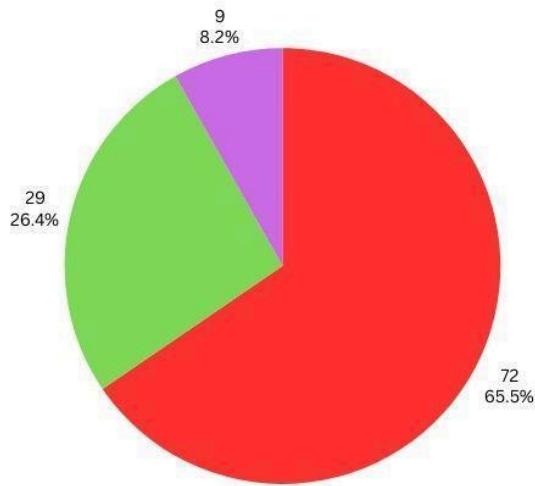
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 103. Commuter Response to System in Efficiency - Statement 11**

Figure 103 shows that (60%) of the respondents answered strongly agree in this statement clearly shows that the feedback module processes there submissions quickly without significant delays. An additional (32.7%) of the respondents answered agree, and (7.3%) of the respondents answered neutral in this statement.

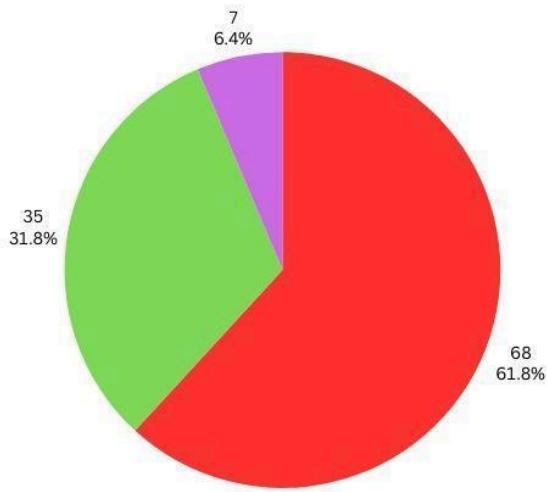
**Evaluates the system's performance in terms of response time and resource utilization**



**Figure 104. Commuter Response to System in Efficiency - Statement 12**

Figure 104 shows that (65.5%) of the respondents answered strongly agree in this statement it shows that the application can provide feedback efficiently without taking too much time to complete the form. An additional (26.4%) of the respondents answered agree in this statement, and (8.2%) of the respondents answered neutral.

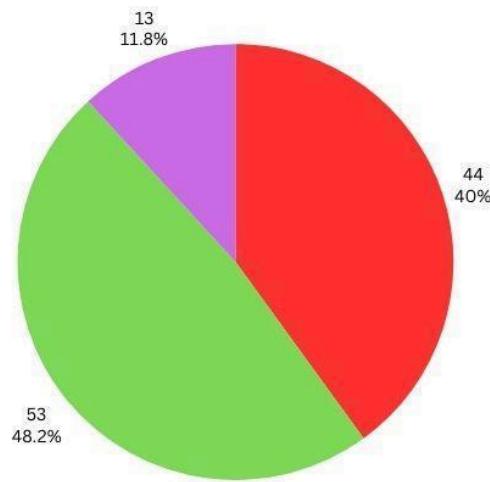
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 105. Commuter Response to System in Maintainability - Statement 1**

Figure 105 shows that (61.8%) of the respondents answered strongly agree in this statement it shows that they find that the app is regularly updated to fix issues and improve the payment system. An additional (31.8%) of the respondents answered agree in this statement, and (6.4%) of the respondents answered neutral.

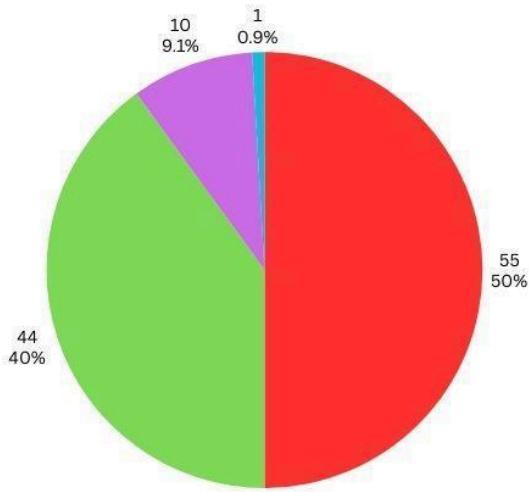
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 106. Commuter Response to System in Maintainability - Statement 2**

Figure 106 shows that (48.2%) of the respondents answered agree in this statement it shows clearly that If they encounter an issue, it's resolved quickly with an app update or fix. An additional (40%) of the respondents answered strongly agree in this statement, and (11.8%) of the respondents answered neutral.

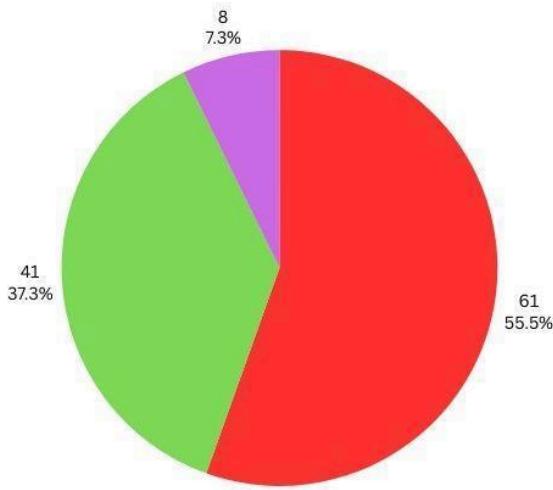
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 107. Commuter Response to System in Maintainability - Statement 3**

Figure 107 shows that (50%) of the respondents answered strongly agree in this statement it clearly shows that the payment system is regularly improved based on user feedback. An additional (40%) of the respondents answered agree, and (9.1%) of the respondents answered neutral in this statement, and only (0.9%) of the respondents answered strongly disagree.

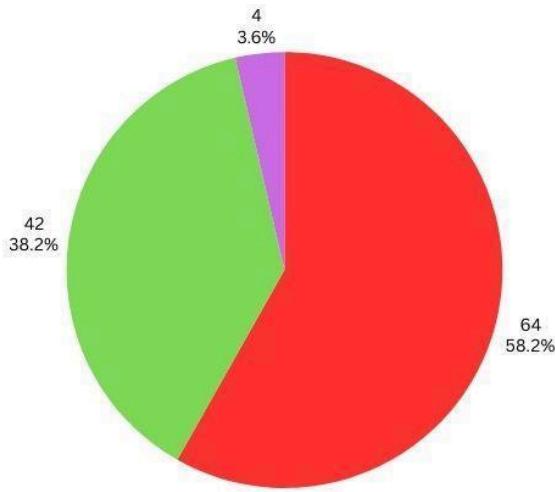
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 108. Commuter Response to System in Maintainability - Statement 4**

Figure 108 shows that (55.5%) of the respondents answered strongly agree in this statement it clearly shows that they are confident that if any new technologies (e.g., new payment methods) are introduced, the app will be updated to support them. An additional (37.3%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral.

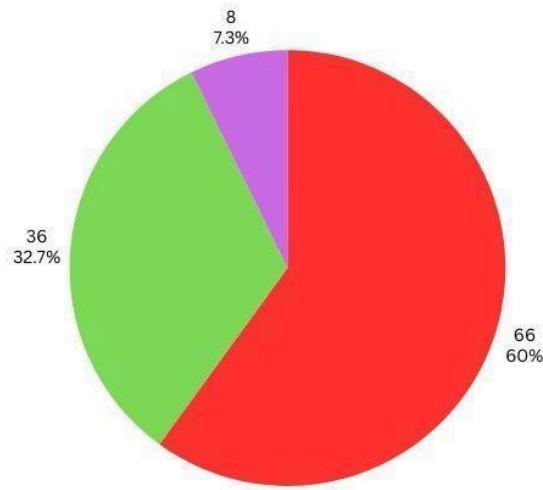
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 109. Commuter Response to System in Maintainability - Statement 5**

Figure 109 shows that (58.2%) of the respondents answered strongly agree in this statement clearly shows that the real-time volume update feature is flexible enough to adapt to changes in commuting patterns in the application. An additional (38.2%) of the respondents answered agree in this statement, and (3.6%) of the respondents answered neutral.

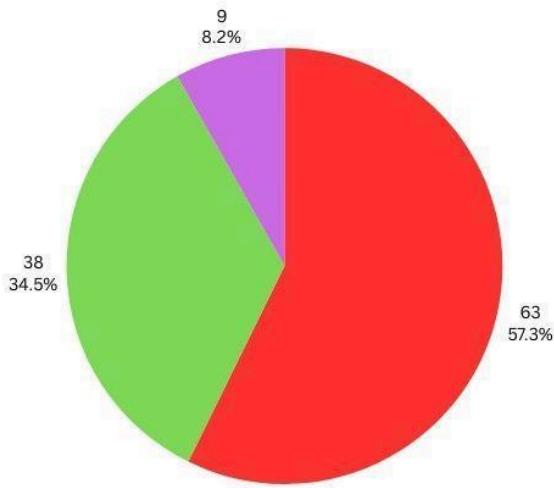
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 110. Commuter Response to System in Maintainability - Statement 6**

Figure 110 shows that (60%) of the respondents answered strongly agree in this statement clearly shows that the announcement module is regularly updated to ensure it remains relevant and accurate in using the application. An additional (32.7%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral.

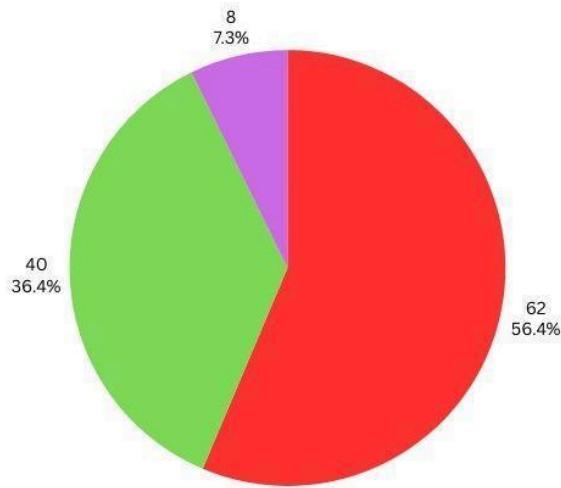
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 111. Commuter Response to System in Maintainability - Statement 7**

Figure 111 shows that (57.3%) of the respondents answered strongly agree in this statement it clearly shows that the announcement module is flexible enough to adapt to changes in the commuting environment. An additional (34.5%) of the respondents answered agree in this statement, and (8.2%) of the respondents answered neutral.

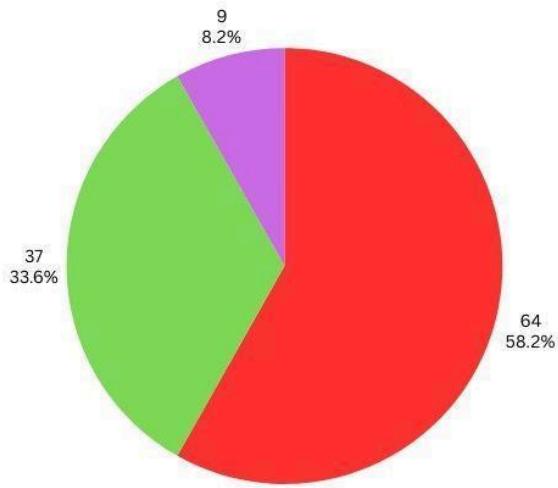
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 112. Commuter Response to System in Maintainability - Statement 8**

Figure 112 shows that (56.4%) of the respondents answered strongly agree in this statement clearly shows that the feedback module is regularly updated to improve its functionality based on user input. An additional (36.4%) of the respondents answered agree in this statement, and (7.3%) of the respondents answered neutral.

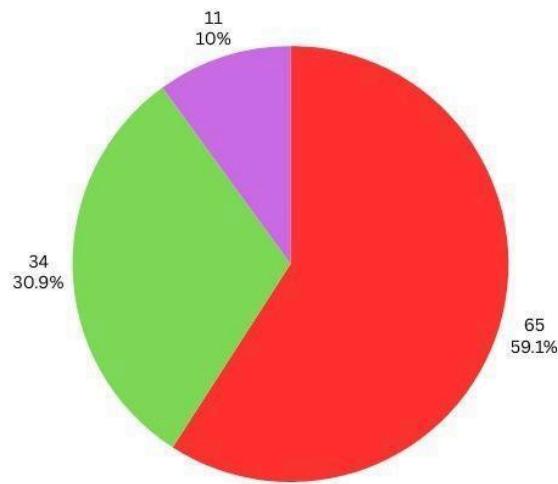
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 113. Commuter Response to System in Maintainability - Statement 9**

Figure 113 shows that (58.2%) of the respondents answered strongly agree in this statement clearly shows that they notice that the feedback module evolves based on user feedback and app performance. An additional (33.6%) of the respondents answered agree in this statement, and (8.2%) of the respondents answered neutral.

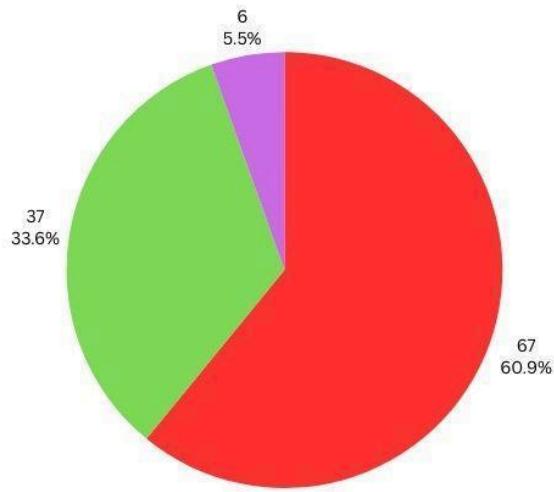
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 114. Commuter Response to System in Maintainability - Statement 10**

Figure 114 shows that (59.1%) of the respondents answered strongly agree in this statement it shows that any issues they encounter with the feedback module are resolved promptly through app updates. An additional (30.9%) of the respondents answered agree in this statement, and (10%) of the respondents answered neutral.

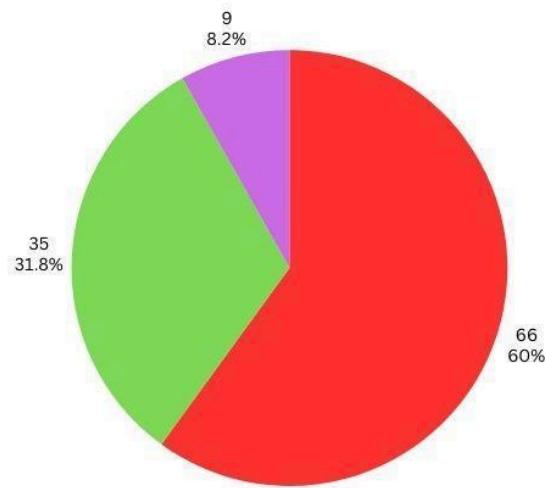
**Evaluates the system's ability to be updated and enhanced over time**



**Figure 115. Commuter Response to System in Maintainability - Statement 11**

Figure 115 shows that (60.9%) of the respondents answered strongly agree in this statement it clearly shows that the feedback module adapts well to changes in the app's features and user needs. An additional (33.6%) of the respondents answered agree in this statement, and (5.5%) of the respondents answered neutral.

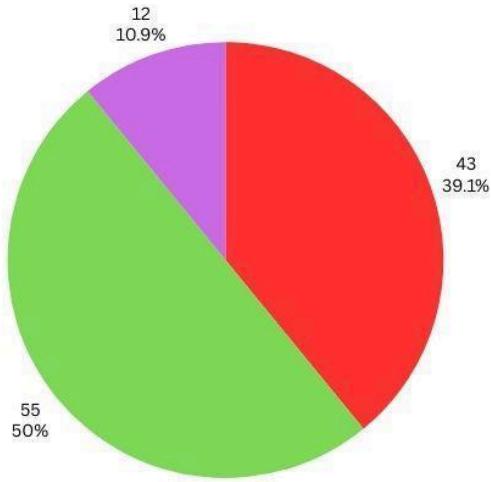
**Evaluates the system's ability to function across various platforms and devices**



**Figure 116. Commuter Response to System in Portability- Statement 1**

Figure 116 shows that (60%) of the respondents answered strongly agree in this statement it clearly shows that app works well across different mobile devices (e.g., smartphones, tablets). An additional (31.8%) of the respondents answered agree in this statement, and (8.2%) of the respondents answered neutral in this statement.

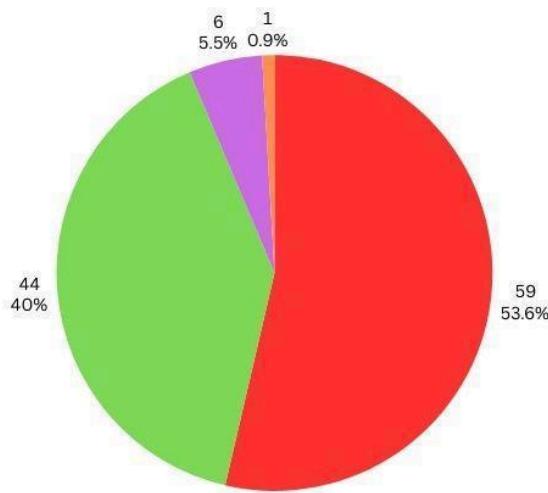
**Evaluates the system's ability to function across various platforms and devices**



**Figure 117. Commuter Response to System in Portability- Statement 2**

Figure 117 shows that (50%) of the respondents answered agree in this statement clearly shows that the payment system performs consistently, regardless of the mobile device they use. An additional (39.1%) of the respondents answered strongly agree in this statement, and (10.9%) of the respondents answered neutral.

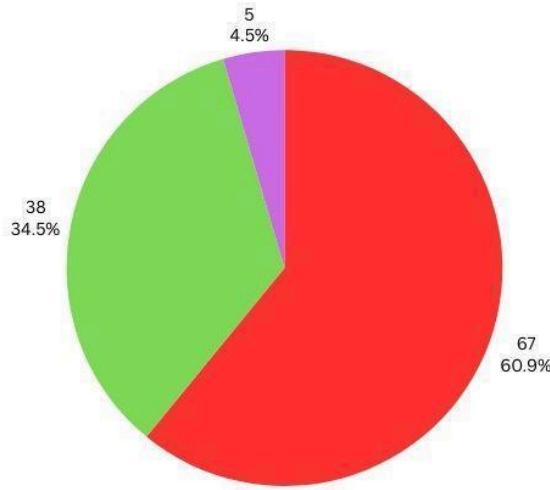
**Evaluates the system's ability to function across various platforms and devices**



**Figure 118. Commuter Response to System in Portability- Statement 3**

Figure 118 shows that (53.9%) of the respondents answered strongly agree in this statement it clearly shows that the crowd volume are accessible on different mobile devices. An additional (40%) of the respondents answered agree in this statement, and (5.5%) of the respondents answered neutral in this statement, and only (0.9%) of the respondents answered disagree in this statement.

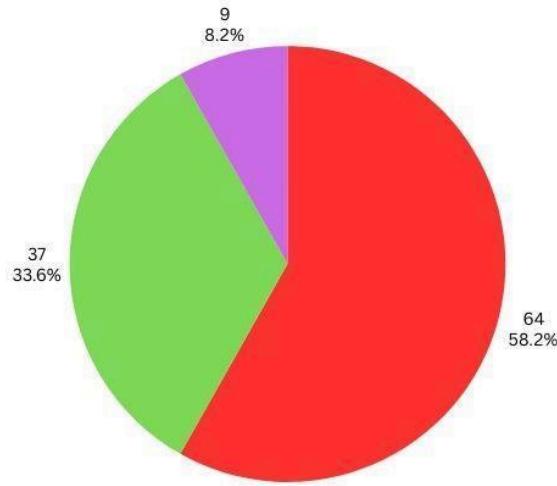
**Evaluates the system's ability to function across various platforms and devices**



**Figure 119. Commuter Response to System in Portability- Statement 4**

Figure 119 shows that (60.9%) of the respondents answered strongly agree in this statement it shows that they can access the crowd volume feature without issues regardless of there location. An additional (34.5%) of the respondents answered agree in this statement, and (4.5%) of the respondents answered neutral.

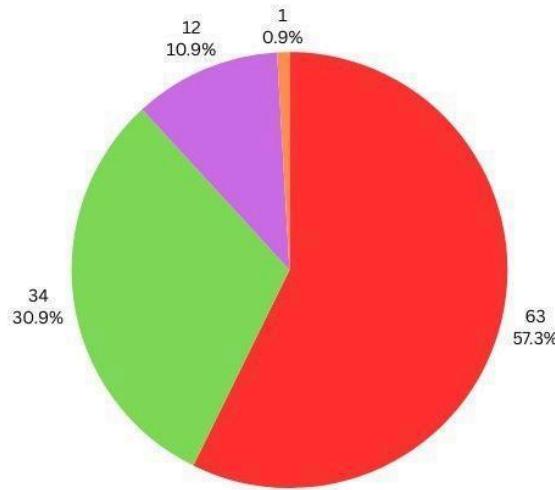
**Evaluates the system's ability to function across various platforms and devices**



**Figure 120. Commuter Response to System in Portability- Statement 5**

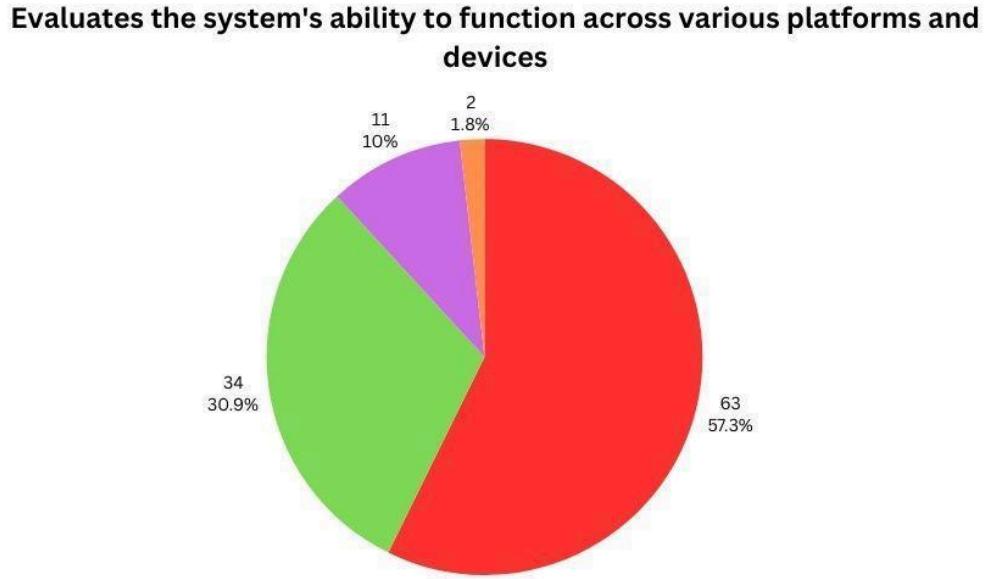
Figure 120 shows that (58.2%) of the respondents answered strongly agree in this statement it clearly shows that the announcement module is accessible on various android devices. An additional (33.6%) of the respondents answered agree in this statement, and (8.2%) of the respondents answered neutral in this statement.

**Evaluates the system's ability to function across various platforms and devices**



**Figure 121. Commuter Response to System in Portability- Statement 6**

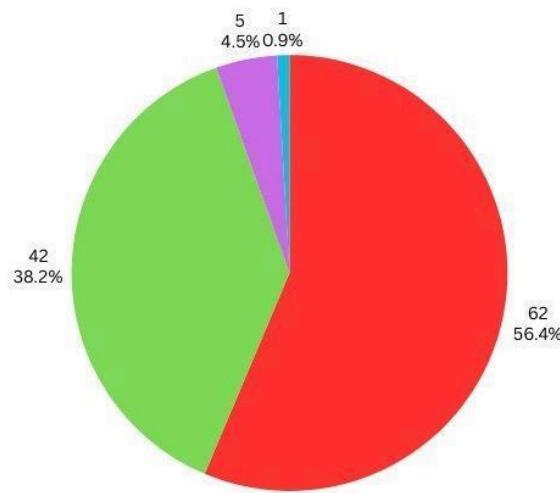
Figure 121 shows that (57.3%) of the respondents answered strongly agree in this statement it clearly shows that the feedback module is accessible on various android devices without issues. An additional (30.9%) off the respondents answered agree in this statement, and (10.9%) of the respondents answered neutral, and only (0.9%) of the respondents answered disagree in this statement.



**Figure 122. Commuter Response to System in Portability- Statement 7**

Figure 122 shows that (57.3%) of the respondents answered strongly agree in this statement it clearly shows that they can submit feedback from different locations without experiencing problems while using the application. An additional (30.9%) of the respondents answered agree in this statement, and (10%) of the respondents answered neutral, and only (1.8%) of the respondents answered disagree in this statement.

**Evaluates the system's ability to function across various platforms and devices**



**Figure 123. Commuter Response to System in Portability- Statement 8**

Figure 123 shows that (56.4%) of the respondents answered strongly agree in this statement it clearly shows that the feedback module functions consistently on Android. An additional (38.2%) of the respondents answered agree in this statement, and (4.5%) of the respondents answered neutral, and only (0.9%) of the respondents answered strongly disagree in this statement.

## **Summary of Findings**

### **Commuter's System Evaluation Result Summary**

<b>Component</b>	<b>Weighted Mean</b>	<b>Responses</b>
Functionality	22.0	Strongly Agree
Usability	22.0	Strongly Agree
Reliability	22.0	Strongly Agree
Efficiency	22.0	Strongly Agree
Maintainability	22.0	Strongly Agree
Portability	22.0	Strongly Agree
<b>Total</b>	<b>22.0</b>	<b>Strongly Agree</b>

## Chapter 5

### **CONCLUSION**

This chapter provides a summary of the project titled “TransitEase: An Online Ticketing Management System with Mobile Application for LRT-1.” It discusses the objectives and survey results.

The TransitEase system was developed to solve issues in commuting, such as long queues, overcrowding, and slow ticketing processes. By using NFC payment systems, real-time crowd monitoring, and feedback features, the system aims to improve the travel experience for commuters while supporting administrators in better managing station operations. The system was tested using the ISO 9126 Software Quality Model and received high ratings for functionality, reliability, usability, efficiency, maintainability, and portability. The system's key strengths were identified through feedback from commuters, IT experts, and administrators.

For commuters, the system proved to be easy to use and effective. Based on survey results, commuters strongly agreed that the NFC saved time, and they commended the real-time crowd monitoring feature for helping them avoid crowded stations. Many commuters also found the announcements helpful and the app's interface simple to understand. These features made commuting more convenient and reduced the usual stress during peak hours.

IT experts evaluated the system and confirmed that it performed well in all technical aspects. They strongly agreed that the system was reliable, with minimal errors during transactions and consistent performance even during high-volume use. The NFC integrations worked smoothly, and the app was secure and easy to maintain. IT experts also noted that the feedback and announcement modules operated as expected, ensuring commuters received timely and accurate updates.

For administrators, the system simplified their work by automating many tasks, such as monitoring commuter activity and managing ticket sales. They strongly agreed that the system's reporting features were helpful in managing operations. Real-time crowd volume data allowed them to adjust operations quickly, improving station flow and reducing congestion. Administrators also found the content management system easy to use for updating announcements and responding to commuter feedback.

Overall, TransitEase successfully addressed the challenges faced by LRT-1 commuters and operators. The system improved efficiency, reduced wait times, and provided commuters with real-time updates, ensuring a smoother travel experience. High ratings from all user types demonstrate the system's success and potential as a long-term solution for managing public transportation.

## **Chapter 6**

### **Recommendations**

The TransitEase project shows great potential to improve the commuting experience for Light Rail Transit (LRT-1) passengers by making ticketing easier, providing real-time updates, and monitoring crowds. However, to make the system even better and easier to use, there are more improvements that can be considered. This chapter presents

recommendations to expand the system's features, strengthen user security, and make it more accessible. By following these suggestions, TransitEase can serve more users and provide a smoother, safer, and more enjoyable transit experience.

### **1.) Expanded Payment Options**

Currently, TransitEase integrates PayMongo for third-party payments, which only allows transactions via GCash. Expanding payment options to include additional methods such as credit and debit cards, other digital wallets, and direct bank transfers would greatly enhance the customer experience by making it easier and more convenient. This improvement would cater to a wider range of user preferences, making the system more accessible to all customers.

### **2.) Biometric Authentication for Better Security**

Implementing biometric authentication, such as fingerprint recognition or Face ID, can make the app more secure. This would add an extra layer of protection when opening the application. It could also be used for payment transactions to ensure that only authorized users can make payments.

### **3.) ID Registration for Student's and PWD**

To improve the implementation of the "ID Registration for Students and Persons with Disabilities (PWD)" system, in the system TransitEase it is recommended to enhance the

user interface for better accessibility, ensure compliance with data privacy regulations, and integrate features that facilitate seamless online registration and verification. Additionally, providing user training and technical support can help maximize the system's effectiveness and usability.

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## **APPENDICES**

**APPENDIX A**  
**Communication Letter**

We are writing to request permission to conduct an interview with you as part of our team's capstone project titled "TransitEase: An Online Ticket Management System with Mobile Application for LRT-1". We are third-year students pursuing a Bachelor of Science in Information Technology with specialization in Web and Mobile Application at FEU Institute of Technology.

In order to improve the rail transportation experience for both domestic and international customers and to streamline LRT and MRT business operations, our project intends to develop an application of web and mobile rail transport management with crowd control system. We think that your experience as an experienced LRT1 supervisor will be very helpful in helping our project succeed.

This interview will mainly focus on gather your perspective on LRT crowd control system and challenges on how technology can effectively address them. Your valuable input will greatly assist us in refining our project.

We assure you that all information shared will be treated with utmost confidentiality and used solely for academic purposes. The interview can be conducted at your convenience in person, and will last approximately 5-10 minutes.

Thank you for considering our request. We eagerly anticipate your response and hope for the opportunity to benefit from your expertise.

Best Regards,

**Members:**

  
Carena, Andrei Julio D.

  
Cheng, Reignald P

  
Sosa, Theo Wilfred D.

  
Yabut, Brian Jonathan V.

**APPENDIX B**  
**Transcript of Interview**

## **TRANSCRIPT OF INTERVIEW – DEVOPS**

**March 11, 2024**

This interview was conducted in Manila, Philippines at LRT-1.

**Interviewer:** meron bang problema sa pagpila or pagbili ng single journey ticket? ano yung mga reasons sa pagpapabagal ng daloy ng passenger?

**Interviewee:** yes, meron silang complains yun yung mga common reasons kung bakit nadelay o kung bakit humahaba yung pila.

**Interviewer:** may problem bang naeencounter sa mga single journey ticket users? kung meron ano sa tingin ng mga cashier yung nag cause ng mahabang pila at matagal na pag-usad ng sa pagbili ng single journey ticket?

**Interviewee:** kapag ka defective yung single journey ticket or kapag na-double tap sa gate so hindi makapasok yung passenger sa gate babalik siya ulit sa teller, pwede naman sumingit pero it can cause inconvenience sa ibang passengers na naka pila.

**Interviewer:** mas makakatulong ba na may single journey ticket vending machines sa stations aside sa mga beep card users to lessen crowd congestion?

**Interviewee:** yes, kasi bukod sa teller isa rin yung ticket booth machine natin sa pwedeng pag bilhan pero mas maganda rin kung may beep card kasi online maloloadan hindi mo na kailangan pumila

**Interviewer:** Makakatulong din ba kung mas madaming turnstile ang scan to pay tulad ng maya?

**Interviewee:** Yes, kaya lang kasi sa ngayon nagkakaroon ng error pa yung mga passengers din kasi nga pagka yung qr hindi nabasa eh maiiksi ang pasensya ng mga passengers natin.

INGLE JOURNEY TICKETS  
PABAGAL NG DALOY NG  
OR PAG BILI NG SINGLE

journey ticket. Bole

sa ating karamihan, ang karaniwong dahil sa pagbago ng daloy ng pasahero ay ang madalas kahirapan ng teller or cashier. Magsurili sa mga binabayad ng pasahero. Ito pa ng santi ay ang di pagkaintindihan ng mga pasahero at cashier.

2. MAY PROBLEM BANG NAEOUNTER SA MGA SINGLE JOURNEY TICKET USERS? KUNG MERON ANO SA TINGIN NG MGA CASHIER YUNG NAGCACUSE NG MAHABANG PILA AT MATAGAL NA PAG-USAD NG SA PAGBILI NG SINGLE JOURNEY TICKET?

Come answer sa first question

3. MAS MAKAKATULONG BA NA MAY SINGLE JOURNEY TICKET VENDING MACHINES SA STATIONS ASIDE SA MGA BEEP CARD USERS TO LESSEN CROWD CONGESTION?

Hindi, wroong una, ang mga single journey ticket users ang nagsusubhi ng crowd congestion.

4. MAKAKATULONG DIN BA KUNG MAS MADAMING TURNSTILE ANG SCAN TO PAY TULAD NG MAYA?

Makaka tulung ito sa mga taong wifet may kabalamatan at sanay sa paggamit ng teknolohiya, subali't hindi nito naagapan ng ganap ang problema sa mga single ticket journey users.

JOURNEY TICKETS  
BAL NG DALOY NG  
AG BILI NG SINGLE

- a) Minalat na pagcheck ng guardija ng gamit
- b) Tisa ang turnstiles para sa pasukan at labasan.
- c) Problema ba ilang turnstiles na di agorang nagkuha ng ticket.

2. MAY PROBLEM BANG NAEENCOUNTER SA MGA SINGLE JOURNEY TICKET USERS? KUNG MERON ANO SA TINGIN NG MGA CASHIER YUNG NAGCACUSE NG MAHABANG PILA AT MATAGAL NA PAG-USAD NG SA PAGBILI NG SINGLE JOURNEY TICKET?

Madalas na, nageError ang SJT, sa biglang dagsa at pagmormordali minsan ay nakakapag tap kaagad ang basinet, kahit di pa lubusang nakaabalbas ang mga pasa unahan. Kapag ganun ay iniwaraan na ang turnstile no yun sa paanakalang di ito nagkuha ng ticket.

3. MAS MAKAKATULONG BA NA MAY SINGLE JOURNEY TICKET VENDING MACHINES SA STATIONS ASIDE SA MGA BEEP CARD USERS TO LESSEN CROWD CONGESTION?

Mainam na may mga vending machines upang maiwasan ang mabigat na pila sa mga teller. Subali't mainam din kung makapagplano na madagdagang ang mga turnstiles. Makakatalong din kung madaling malaman ng mga pasahero kung saan ang banda sa mga labas o sa mga palipot pa lang.

4. MAKAKATULONG DIN BA KUNG MAS MADAMING TURNSTILE ANG SCAN TO PAY TULAD NG MAYA?

Mas maganda na moraminsing pagpipilian ang mga pasahero sa kung anung paraan nila ng pagbabayad. Subali't kagaya ng mga nabanggit na nating sihastigon. Mas maganda kung may karagdagang turnstile, at lohatin ito'y maaaring magbayad na gamit lang ang CP. At mas maganda na may identipikasyon ang pasukan at labasan.

ILI NG SINGLE JOURNEY TICKETS  
PAGPAPABAGAL NG DALOY NG  
AGPILA OR PAG BILI NG SINGLE

JOURNEY TICKETS?

- Oo, may ibang pasahero na hindi alam ang gagawin
- May ibang booth na walang teller. halos lahat ng bumibili ng single journey ~~tickets~~ nasa isang booth lang
- May ibang turnstile na hindi nareread or  
Inaccept ang single journey ticket

2. MAY PROBLEM BANG NAEOUNTER SA MGA SINGLE JOURNEY TICKET USERS? KUNG MERON ANO SA TINGIN NG MGA CASHIER YUNG NAGCACUSE NG MAHABANG PILA AT MATAGAL NA PAG-USAD NG SA PAGBILI NG SINGLE JOURNEY TICKET?

- Yes
- may ibang pasahero na di nagsacabi ng final quantity ng ticket ang bitilhin.
  - kulang sa teller
  - kulang din sa turnstile

3. MAS MAKAKATULONG BA NA MAY SINGLE JOURNEY TICKET VENDING MACHINES SA STATIONS ASIDE SA MGA BEEP CARD USERS TO LESSEN CROWD CONGESTION?

- Yes

4. MAKAKATULONG DIN BA KUNG MAS MADAMING TURNSTILE ANG SCAN TO PAY TULAD NG MAYA?

- Yes

NG SINGLE JOURNEY TICKETS  
GPAPABAGAL NG DALOY NG  
PILA OR PAG BILI NG SINGLE

JOURNEY TICKETS?

Yes, Ang mga pasahero hindi alam kung Paano ang pagbili at paano bumiyte sa puguntahan nito.

2. MAY PROBLEM BANG NAEENCOUNTER SA MGA SINGLE JOURNEY TICKET USERS? KUNG MERON ANO SA TINGIN NG MGA CASHIER YUNG NAGCACAUSE NG MAHABANG PILA AT MATAGAL NA PAG-USAD NG SA PAGBILI NG SINGLE JOURNEY TICKET?

Yes, Hindi alam ng pasahero kung ano ang dapat nila sakyan upang pununta sa kanilang destinasyon.

3. MAS MAKAKATULONG BA NA MAY SINGLE JOURNEY TICKET VENDING MACHINES SA STATIONS ASIDE SA MGA BEEP CARD USERS TO LESSEN CROWD CONGESTION?

Yes, pero dapat ito ay user friendly upang maintindihan ng lahat.

4. MAKAKATULONG DIN BA KUNG MAS MADAMING TURNSTILE ANG SCAN TO PAY TULAD NG MAYA?

Yes, upang hindi humaba ang pila sa isang turnstile, malapit ang QR code upang alternative sa beep card.

LA O PAGBILI NG SINGLE JOURNEY TICKETS  
NSONS SA PAGPAPABAGAL NG DALOY NG  
STION SA PAGPILA OR PAG BILI NG SINGLE

\* yes, may mga stations na walang vending machine kaya need pa nila pumila sa teller para bumili ng ticket manually.

\* May ibaang pasahero na they don't know how to use the vending machine and wala rin nag assist to them.

\* sometimes the turnstile can't read the beep card or SJT properly

2. MAY PROBLEM BANG NAAEOUNTER SA MGA SINGLE JOURNEY TICKET USERS? KUNG MERON ANO SA TINGIN NG MGA CASHIER YUNG NAGCACUSE NG MAHABANG PILA AT MATAGAL NA PAG-USAD NG SA PAGBILI NG SINGLE JOURNEY TICKET?

\* yes, sometimes kapag nagbabuy ka ng SJT and mag pay ka na, there's vending machine na nilalabas yung money.

\* sometimes hand touch din yung screen sa machine.

\* sa mga ticket booth din kulang sa todo.

3. MAS MAKAKATULONG BA NA MAY SINGLE JOURNEY TICKET VENDING MACHINES SA STATIONS ASIDE SA MGA BEEP CARD USERS TO LESSEN CROWD CONGESTION?

\* yes, para mapabilis ang paglabas and pagpusok ng mga pasahero.

4. MAKAKATULONG DIN BA KUNG MAS MADAMING TURNSTILE ANG SCAN TO PAY TULAD NG MAYA?

\* yes, para makatulagan din ang pagpila sa mga ticket booth & vending machine, and mas mabilis makapusok.

## APPENDIX C

### Client Letter

 FEU Institute of Technology  
COLLEGE OF COMPUTER STUDIES DEPARTMENT

Andrei Julio D. Carena  
andreiJulioCarena02@gmail.com  
09156834126

September 30, 2024

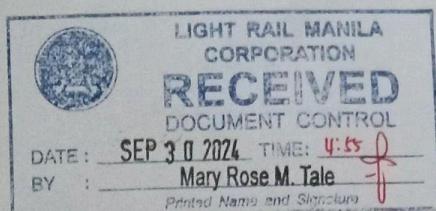
Mr. Enrico R. Benipayo  
General Manager  
Light Rail Manila Corporation (LRMC)

Dear Mr. Enrico R. Benipayo,

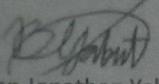
Subject: Request for Permission to Simulate and Test Our System on LRT-1

I am Andrei Julio D. Carena, a 4<sup>th</sup> year student at Far Eastern University Institute of Technology, currently pursuing a degree in Bachelor of Science in Information Technology with a major in Web and Mobile Application. Together with my thesis group members, we are working on a research project titled "TransitEase: An Online Ticket Management System with Mobile Application for LRT-1" as part of our academic requirements.

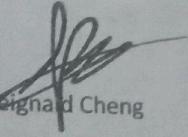
To effectively assess the performance of our system and evaluate its feasibility, we kindly seek permission from LRMC to conduct simulations and testing on the LRT-1 infrastructure. We assure you that our research will be conducted in accordance with your guidelines and regulations, and we will take all necessary precautions to ensure that our activities and we can just use the swing gate not disrupt the normal operations of LRT-1. We are willing to provide the documentation, including our research proposal, objectives, and methodology of our capstone project.

  
LIGHT RAIL MANILA CORPORATION  
**RECEIVED**  
DOCUMENT CONTROL  
DATE : SEP 30 2024 TIME: 14:15  
BY : Mary Rose M. Tale  
Printed Name and Signature

**APPENDIX D**  
**Endorsement Letter**



Brian Jonathan Yabut



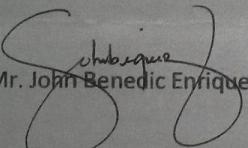
Reginald Cheng

Rafael Roxas

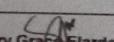
Course Adviser:

Ms. Ma. Corazon Fernando

Project Mentor:



Mr. John Benedict Enriquez

	<b>ENGINEERING DEPARTMENT - LINE-1</b> <b>APPLICATION FOR WORK CLEARANCE</b>		WCCN - <b>11-10-24</b>   <b>1521</b> <small>(Control Center Issued Control Number)</small>																																				
<small>(To be submitted two (2) week prior to actual work schedule. Emergency works may be cleared without accomplishing this form)</small>																																							
<b>Requesting Person:</b> Andrei Julio D. Carena <b>Office:</b> Far Eastern University (FEU)		Date: Nov 5, 2024 Contact No.: 09156834126																																					
<b>Location / Position of Work:</b> Central, Doroteo Jose, and Monumento Stations.																																							
<b>Work Description:</b> 1. Conduct simulations and testing on the LRT-1 infrastructure using the swing gate at Central Terminal Station for the NFC prototype. 2. Take a video of the simulation as a record. 3. Interview 100 passenger respondents using the survey questionnaire at Central, Doroteo Jose, and Monumento Stations.																																							
<small>Pls., coordinate with Station Supervisor &amp; Control Center before said activity / HSEQ Hotline : 0998-990-4737 / OCC Chief Controller Mobile: 0998-845-3818</small>																																							
<b>WORK SCHEDULE:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">Duration</td> <td style="width: 15%;">Start mm</td> <td style="width: 15%;">11</td> <td style="width: 15%;">2024</td> <td style="width: 15%;">Completion mm</td> <td style="width: 15%;">12</td> <td style="width: 15%;">2024</td> </tr> <tr> <td>Working Time</td> <td>Start</td> <td>10:00 AM</td> <td></td> <td>Completion</td> <td>4:00 PM</td> <td></td> </tr> <tr> <td>Working Days</td> <td>Mon mm</td> <td>Tue mm</td> <td>Wed mm</td> <td>Thur mm</td> <td>Fri mm</td> <td>Sat mm</td> </tr> <tr> <td>Track Possession</td> <td><input type="checkbox"/> Full Track Possession <input type="checkbox"/> Partial Track Possession</td> <td colspan="4"><input type="checkbox"/> Station Platform <input type="checkbox"/> Unpaid Area</td> <td></td> </tr> </table>				Duration	Start mm	11	2024	Completion mm	12	2024	Working Time	Start	10:00 AM		Completion	4:00 PM		Working Days	Mon mm	Tue mm	Wed mm	Thur mm	Fri mm	Sat mm	Track Possession	<input type="checkbox"/> Full Track Possession <input type="checkbox"/> Partial Track Possession	<input type="checkbox"/> Station Platform <input type="checkbox"/> Unpaid Area												
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<b>EXISTING SERVICE/S AT RISK:</b> (Check all applicable)																																							
<input type="checkbox"/> Catenary Line	<input type="checkbox"/> Telecommunication	<input type="checkbox"/> Fire Protection	<input type="checkbox"/> LRV																																				
<input type="checkbox"/> Signaling	<input type="checkbox"/> Electrical	<input type="checkbox"/> Water	<input type="checkbox"/> Elevators / Escalators																																				
<input type="checkbox"/> Tracks	<input type="checkbox"/> Rectifier Substation	<input type="checkbox"/> CDA	<input type="checkbox"/> Other (Pls. specify) _____																																				
<input type="checkbox"/> <b>REQUIRED ATTACHMENT FORMS:</b> (Check all applicable)	<input type="checkbox"/> Work Method Statement Plan	<input type="checkbox"/> Certificate of HE Operator	<input type="checkbox"/> Safety Plan																																				
<input type="checkbox"/> Confined Space Permit	<input type="checkbox"/> Gant Chart	<input type="checkbox"/> Certificate of Safety Officer	<input type="checkbox"/> Job Hazard Analysis																																				
<input type="checkbox"/> Hotwork Permit	<input type="checkbox"/> Certificate of Heavy Equipment (HE)	<input type="checkbox"/> Rail Borne Movement Plan	<input type="checkbox"/> Other (Pis. specify) _____																																				
<input type="checkbox"/> Shop Drawings																																							
<b>REQUIRED SAFETY APPARELS / EQUIPMENT:</b> (Check all applicable)																																							
<input type="checkbox"/> Safety Shoes	<input type="checkbox"/> Safety Glass	<input type="checkbox"/> Hardhat	<input type="checkbox"/> Safety Gloves																																				
<input type="checkbox"/> High Visibility Vest	<input type="checkbox"/> Fire Extinguisher	<input type="checkbox"/> Lightings	<input type="checkbox"/> Full Body Harness																																				
<input type="checkbox"/> Face Shield	<input type="checkbox"/> Respirator	<input type="checkbox"/> Dust Mask	<input type="checkbox"/> Barricade/Signage																																				
<input type="checkbox"/> Other (Pis. specify) _____		<input type="checkbox"/> Other (Pis. specify) _____	<input type="checkbox"/> Ear Muff/Plug																																				
<b>WORK REQUIREMENTS</b> (Note: LRCMC reserves the right to stop the work if it sees non-compliance with the requirements listed below).																																							
1. Call Operation Control Center before and after works. (8080 / 8078) 2. Observe "Safety First" Policy in all activities. 3. Wear valid company ID & PPE at all times. 4. Conduct Toolbox Meeting before begins work. 5. Discuss JHA and follow agreed Safety Plan.		6. Always coordinate to concerned LRCMC personnel prior to start of work. 7. Maintain good housekeeping and sanitation. 8. Observe No Smoking Policy in non-designated smoking area. 9. Do not store any flammable liquids or combustible materials. 10. IN CASE OF EMERGENCY CALL 8080 - Operation Control Center																																					
<b>PENALTY CLAUSE:</b> <p>I HEREBY DECLARE THAT THE ABOVE ARE TRUE AND CORRECT AND THAT I WILL ABIDE BY GUIDELINES FOR WORK CLEARANCE TO ALWAYS OBSERVE/COMPLY WITH THE SAFETY, SECURITY AND ENGINEERING STANDARDS. IN THE EVENT THAT DAMAGE TO PROPERTY AND LOSS OF REVENUE SHALL ARISE DUE TO NEGLECT, I AGREE THAT I AND THE ENTITY I REPRESENT SHALL HAVE THE OBLIGATION TO PAY THE AUTHORITY FOR DAMAGE IN AN AMOUNT TO BE DETERMINED BY LRCMC.</p>																																							
Andrei Julio Carena Printed Name		 Student Position																																					
 Mary Grace Elardo Division/Project Manager		ENDORSED BY: Nov. 6, 2024 Date																																					
<b>CONCURRED BY:</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"><b>ROLLING STOCK DEPARTMENT</b></td> <td style="width: 33%;"><b>Signature/Date:</b></td> <td style="width: 33%;"><b>Signature/Date:</b></td> </tr> <tr> <td>Light Maintenance Section:</td> <td colspan="2">HEALTH, SAFETY, ENVIRONMENT &amp; QUALITY</td> </tr> <tr> <td>Heavy Maintenance Section:</td> <td colspan="2">SECURITY DIVISION</td> </tr> <tr> <td>Depot Equipment Section:</td> <td colspan="2">ENGINEERING &amp; SUPPORT:</td> </tr> <tr> <td><b>INFRASTRUCTURE DEPARTMENT</b></td> <td colspan="2">Maintenance Planning Engineer</td> </tr> <tr> <td>Building &amp; Facilities Section:</td> <td colspan="2"></td> </tr> <tr> <td>Track &amp; Civil Work Section:</td> <td colspan="2">OPERATIONS DEPARTMENT</td> </tr> <tr> <td><b>POWER &amp; ELECTRONICS SERVICES DEPARTMENT</b></td> <td colspan="2">Operations Control Center Division</td> </tr> <tr> <td>Laboratory &amp; Repair Section:</td> <td colspan="2">Station Operations Division</td> </tr> <tr> <td>Signaling &amp; Telecom Section:</td> <td colspan="2"></td> </tr> <tr> <td>Power Distribution Section:</td> <td colspan="2"></td> </tr> <tr> <td>Remarks:</td> <td colspan="2"></td> </tr> </table>				<b>ROLLING STOCK DEPARTMENT</b>	<b>Signature/Date:</b>	<b>Signature/Date:</b>	Light Maintenance Section:	HEALTH, SAFETY, ENVIRONMENT & QUALITY		Heavy Maintenance Section:	SECURITY DIVISION		Depot Equipment Section:	ENGINEERING & SUPPORT:		<b>INFRASTRUCTURE DEPARTMENT</b>	Maintenance Planning Engineer		Building & Facilities Section:			Track & Civil Work Section:	OPERATIONS DEPARTMENT		<b>POWER &amp; ELECTRONICS SERVICES DEPARTMENT</b>	Operations Control Center Division		Laboratory & Repair Section:	Station Operations Division		Signaling & Telecom Section:			Power Distribution Section:			Remarks:		
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Laboratory & Repair Section:	Station Operations Division																																						
Signaling & Telecom Section:																																							
Power Distribution Section:																																							
Remarks:																																							
<b>APPROVED BY</b>																																							



LIGHT RAIL  
MANILA  
CORPORATION

## Job Hazard Analysis

Project Name: TransitEase: An Online Ticket Management System with a Mobile Application for LRT-1  
Guests: Andrei Julio Carena, Theo Wilfred Sosa, Reignald Cheng, Brian Jonathan Yabut, Rafael Roxas

Start Date: Nov 11, 2024

Finish Date: Nov 12, 2024

Task to be accomplished (Mga dapat gawin)		
Steps To Take To Complete Task (Mga Hakbang upang makumpleto ang gawain)	Hazards (Mga Panganib)	Required Actions To Eliminate Or Control The Hazard
Use the manual rotating gate at the exit area of Central Terminal for prototype simulation	Foot traffic for existing passengers  May cause inconvenience or delays to existing passengers	Assign team members to guide the existing passengers.  Make sure to stop the activity if observed causing too much delay and foot traffic at the exit area
Record the simulation as part of the documentation.	Foot traffic for existing passengers  May cause inconvenience by Data Privacy Act	Make sure to stop the activity if observed causing too much delay and foot traffic at the exit area  Make sure not to include the existing passenger on the video/documentation
Data gathering using the survey questionnaire to 100 respondents at the unpaid areas of the stations paid and unpaid area at Central, D. Jose and Monumento Stations	Foot traffic at the paid and unpaid areas of the stations  Cause inconvenience to passengers in the platform area	Make sure to stop the activity if observed causing too much delay and foot traffic  Ask for respondent permission to be surveyed.  Will make sure not to compel by force those unwilling respondents



FEU Institute of Technology

INFORMATION TECHNOLOGY DEPARTMENT

ENDORSEMENT FOR ORAL PROPOSAL DEFENSE  
IT Project Management

Date: 2/22/24

To: **Mr. Heintjie Vicente**  
Course Adviser

This is to certify that the group working project entitled:

*TransiTEase: A Rail Transport Management System with Crowd Control for LRT & MRT*

Composed of:

1. Carena, Andrei Julio D.
2. Cheng, Reignald P.
3. Sosa, Theo Wilfred D.
4. Yabut, Brian Jonathan V.

is hereby given approval to defend their project proposal.

  
Mr. John Benedict Enriquez  
Project Adviser

**APPENDIX D**  
**Project Adviser Forms**



JANUARY 12, 2024

**JOHN BENEDIC R. ENRIQUEZ**  
Faculty, College of Computer Studies  
FEU Institute of Technology  
P. Paredes St., Sampaloc, Manila

Dear John Benedic Enriquez,

Good day!

We, the undersigned are students currently enrolled in IT0039 – IT Project Management pursuing a degree in Bachelor of Science in Information Technology with specialization in Web and Mobile Application.

We are writing to humbly request your knowledge, expertise and service to be our project adviser in our capstone project entitled TransiTEase: A Rail Transport Management System with Crowd Control for LRT & MRT. We believed that your capabilities as project adviser will be valuable and will greatly enrich our work of study.

Thank you very much and we are hoping for your kind and favorable approval with this matter.

Respectfully yours,

DevOps

A handwritten signature in black ink, appearing to read "Andrei Julio Carena".

Brian Jonathan Yabut

A handwritten signature in black ink, appearing to read "Brian Jonathan Yabut".

A handwritten signature in black ink, appearing to read "Theo Wilfred Sosa".

A handwritten signature in black ink, appearing to read "Reignald Cheng".

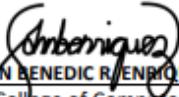
**APPROVAL SHEET**

(For Project Adviser only)

Please Check

APPROVED

DISAPPROVED



JOHN BENEDICT R. ENRIQUEZ

Faculty, College of Computer Studies

*Signature over Printed Name*



# FEU Institute of Technology

## MENTORING COMMITMENT FORM

CCS DEPARTMENT

Term and School Year

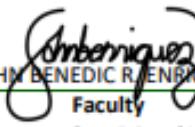
Date: January 12, 2024

I, JOHN BENEDIC R. ENRIQUEZ one of the faculty members of the College of Computer Studies under the IT Department, commits to the group/team as their Project Adviser, at least thirty (30) minutes of my time outside my residency hours starting on **JANUARY 12, 2024**.

Below are the details of my mentoring:

Course Code and Name:	IT0039   IT PROJECT MANAGEMENT
Section:	TW31-32
Course Adviser:	Heintjie Vicente
Term and School Year:	2 <sup>nd</sup> term SY2023-2024
Group/Team Name:	DevOps
Project Title:	TransiTEase: A Rail Transport Management System with Crowd Control for LRT & MRT
Group Members	Carena, Andrei Julio Yabut Brian Jonathan Sosa, Theo Wilfred Cheng, Reignald
Client (Company Name):	
Mentoring Day:	Wednesday
Mentoring Time:	9:00 am – 10:00 am
Mentoring Venue:	

*Note for FEU Tech Associates: By signing in this form, the mentor acknowledges that he will voluntarily perform the mentoring duty outside of his regular working hours. Furthermore, it is understood that any amount to be paid by the College in the performance of this duty shall not be considered a demandable part of the mentor's salary or an established College practice or precedent but merely an act of gratuity on the part of the College which may be discontinued or revised at anytime at the College's sole discretion.*

  
JOHN BENEDIC R. ENRIQUEZ

Faculty

Signature Over Printed Name

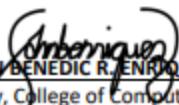


# FEU Institute of Technology

## PROJECT ADVISER ROLES AND RESPONSIBILITIES

1. The project adviser shall monitor the project, requiring the students to report the progress of their project weekly. The project adviser shall meet the group at least thirty (30) minutes in a week.
2. The project adviser shall ensure that the project paper is written in the prescribed format.
3. The project adviser shall give suggestions and comments on how the project could be strengthened. In doing so, the project adviser shall guide the development of the project towards the betterment of its output, and not just a defense-oriented one.
4. The project adviser shall rate each student according to the student's participation / performance in the project as determined from the regular consultation meeting. This shall constitute ten percent (10%) of the students' final course grade.
5. The project adviser shall examine the project output and certify that the project is ready and complete for ORAL defense by conducting a mock defense.
6. The project adviser shall ensure that four (4) copies of the complete project documents are submitted on time and that each one is readable and presentable. (Three copies for the head panel and members)
7. During the ORAL DEFENSE:
  - a. The project adviser may be present during the project defense to give moral support to the mentees.
  - b. The project adviser may provide final statements in the absence of the students after the oral presentation and before the deliberation of the final verdict by the panel committee.
  - c. The project adviser shall leave the room during the deliberation of the final verdict and may be present upon the announcement of the final verdict of the defense.

*I am stating that I have taken time to read and understand the guidelines and roles of a Project Adviser. By signing this document, I fully acknowledge and agree as to the contents of this document and I indicate that I have the capacity of doing my job as a Project Adviser of DevOps group.*

  
JOHN BENEDICT R. ENRIQUEZ  
Faculty, College of Computer Studies  
Signature Over Printed Name

JANUARY 12, 2024

Date

September 11, 2024

**JOHN BENEDIC R. ENRIQUEZ**  
Faculty, College of Computer Studies  
FEU Institute of Technology  
P. Paredes St., Sampaloc, Manila

Dear John Benedict Enriquez,

Good day!

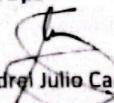
We, the undersigned are students currently enrolled in IT0027 – IT Capstone Project 1 pursuing a degree in Bachelor of Science in Information Technology with specialization in Web and Mobile Application.

We are writing to humbly request your knowledge, expertise and service to be our project adviser in our capstone project entitled TransiTEase: An Online Ticket Management System with Mobile Application for LRT-1. We believed that your capabilities as project adviser will be valuable and will greatly enrich our work of study.

Thank you very much and we are hoping for your kind and favorable approval with this matter.

Respectfully yours,

DevOps

  
Andrei Julio Carena

  
Theo Wilfred Sosa

  
Brian Jonathan Yabut

  
Reginald Cheng

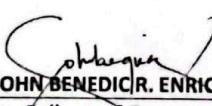
**APPROVAL SHEET**

(For Project Adviser only)

Please Check

APPROVED

DISAPPROVED

  
JOHN BENEDICT R. ENRIQUEZ  
Faculty, College or Computer Studies  
*Signature over Printed Name*



FEU Institute of Technology

MENTORING COMMITMENT FORM

CCS DEPARTMENT

1<sup>st</sup> Term 2024

Date: September 7,  
2024

I, JOHN BENEDIC R. ENRIQUEZ one of the faculty members of the College of Computer Studies under the IT Department, commits to the group/team as their Project Adviser, at least thirty (30) minutes of my time outside my residency hours starting on April 22, 2024.

Below are the details of my mentoring:

Course Code and Name:	IT0027   IT CAPSTONE PROJECT 1
Section:	TB391
Course Adviser:	Ma. Corazon Fernando
Term and School Year:	1 <sup>st</sup> term SY2024
Group/Team Name:	DevOps
Project Title:	TransitEase: An Online Ticket Management System with Mobile Application for LRT-1
Group Members	Carena, Andrei Julio Yabut Brian Jonathan Sosa, Theo Wilfred Cheng, Reignald
Client (Company Name):	
Mentoring Day:	W
Mentoring Time:	11:00 AM
Mentoring Venue:	ICARE

Note for FEU Tech Associates: By signing in this form, the mentor acknowledges that he will voluntarily perform the mentoring duty outside of his regular working hours. Furthermore, it is understood that any amount to be paid by the College in the performance of this duty shall not be considered a demandable part of the mentor's salary or an established College practice or precedent but merely an act of gratuity on the part of the College which may be discontinued or revised at anytime at the College's sole discretion.

JOHN BENEDIC R. ENRIQUEZ  
Faculty

Signature Over Printed Name

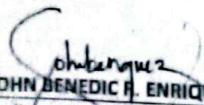


# FEU Institute of Technology

## PROJECT ADVISER ROLES AND RESPONSIBILITIES

1. The project adviser shall monitor the project, requiring the students to report the progress of their project weekly. The project adviser shall meet the group at least thirty (30) minutes in a week.
2. The project adviser shall ensure that the project paper is written in the prescribed format.
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  - b. The project adviser may provide final statements in the absence of the students after the oral presentation and before the deliberation of the final verdict by the panel committee.
  - c. The project adviser shall leave the room during the deliberation of the final verdict and may be present upon the announcement of the final verdict of the defense.

I am stating that I have taken time to read and understand the guidelines and roles of a Project Adviser. By signing this document, I fully acknowledge and agree as to the contents of this document and I indicate that I have the capacity of doing my job as a Project Adviser of DevOps group.

  
JOHN BENEDICT R. ENRIQUEZ

Faculty, College of Computer Studies  
Signature Over Printed Name

September 7, 2024

Date

**APPENDIX E**  
**Progress Reports**



## PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0039**. This will be submitted weekly to monitor and reassess the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
2. Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.

PART A: BEING COMPLETED BY THE GROUP			
Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology with specialization in Web and Mobile Application</b>		
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Reignald	Term: [ ] 1 <sup>st</sup> [✓] 2 <sup>nd</sup> [ ] 3 <sup>rd</sup>	Academic Year: 2023-2024	
Mentoring Day: Wednesday Mentoring Time: 9:00am-10:00am Mentoring Venue: F1505	Reporting Date: Jan. 17, 2024	Reporting Week: 1 <sup>st</sup> week	
Title of the Project: <b>TransiT Ease: A Rail Transport Management System with Crowd Control for LRT &amp; MRT</b>			

PART B: LIST OF ACTIVITIES DONE (list and describe each activities in detail)			
Date	Activity	Remarks	
January 17, 2024	Consultation of Chapter 1 and revision of project context.	Done	checked
January 18, 2024	Conducting an interview who are using LRT or MRT on FEU TECH students and other commuters.	Done	checked
January 19, 2024	Revision of Problem Definition and Fishbone Diagram	Done	checked
January 20, 2024	Revision of General and Specific Objectives	Done	checked
January 21, 2024	Reworking the design of Conceptual Framework and revision of definition of terms	Done	checked

PART C: GRADE COMMITTED BY THE MENTOR				
Grade Legend (To be used by the Mentor in grading student's activity)		95 - 100: Excellent	89 - 94: Very Good	83 - 88: Good
		77 - 82: Fair	70 - 76: Poor	69 below: Inadequate
Member's Name:	Assigned Task (50)	Participation (30)	Attendance (20)	TOTAL
1. Carena, Andrei Julio	50	20	20	100
2. Yabut, Brian Jonathan	50	20	20	100
3. Sosa, Theo Wilfred	50	30	20	100
4. Cheng, Reignald	50	20	20	100

*John Benedict R. Enriquez*  
 JOHN BENEDICT R. ENRIQUEZ  
 Project Adviser  
 Signature Over Printed Name

January 31, 2024  
 Date



## PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0039**. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
2. Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.

PART A: TO BE COMPLETED BY THE GROUP			
Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology with specialization in Web and Mobile Application</b>		
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Reignald Mentoring Day: Wednesday Mentoring Time: 9:00am-10:00am Mentoring Venue: F1505	Term: [ ] 1 <sup>st</sup> [✓] 2 <sup>nd</sup> [ ] 3 <sup>rd</sup>	Academic Year: 2023-2024	
	Reporting Date: <b>January 22, 2024</b>	Reporting Week: 2 <sup>nd</sup> week	
Title of the Project: <b>TransiTEase: A Rail Transport Management System with Crowd Control for LRT &amp; MRT</b>			

PART B: LIST OF ACTIVITIES DONE (List and describe each activity in detail)		
Date	Activity	Remarks
January 22, 2024	Polishing revised chapter 1	Done
January 23-27, 2024	Searching for RRLs	Ongoing

checked

Grade Legend (To be used by the Mentor in grading student's activity)				
95 – 100: Excellent	89 – 94: Very Good	83 – 88: Good	77 – 82: Fair	70 – 76: Poor
69 below: Inadequate				
Member's Name:	Assigned Task (50)	Participation (30)	Attendance (20)	TOTAL
1. Carena, Andrei Julio	50	30	20	100
2. Yabut, Brian Jonathan	50	30	20	100
3. Sosa, Theo Wilfred	50	30	20	100
4. Cheng, Reignald	50	30	20	100

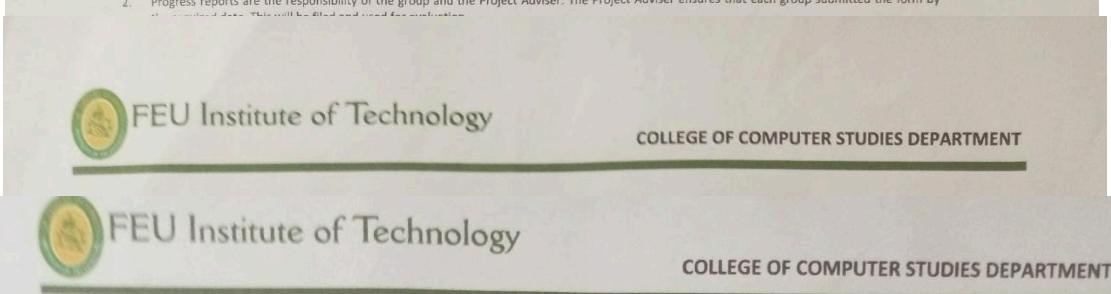
JOHN BENEDICT ENRIQUEZ  
 Project Adviser  
 Signature Over Printed Name

Feb. 7, 2024  
 Date



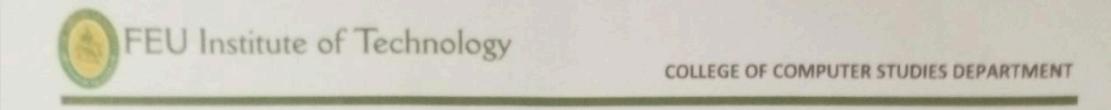
### PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0039**. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
2. Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.



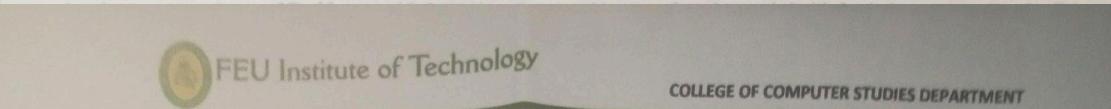
### PROGRESS REPORT

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### PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0039**. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.



### PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0027**. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
2. Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.

PART A: TO BE COMPLETED BY THE GROUP		
Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology with specialization in Web and Mobile Application</b>	
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Regnald	Term: <input checked="" type="checkbox"/> 1 <sup>st</sup> [ <input type="checkbox"/> 2 <sup>nd</sup> [ <input type="checkbox"/> 3 <sup>rd</sup> ] ]	Academic Year: 2024
Mentoring Day: Wednesday Mentoring Time: 11:00am-12:00pm Mentoring Venue: iCARE	Reporting Date: <b>September 25, 2024</b>	Reporting Week: <b>1<sup>st</sup> week</b>
Title of the Project: <b>TransiTEase: An Online Ticket Management System with Mobile Application for LRT-1</b>		

PART B: LIST OF ACTIVITIES DONE (List and describe each activities in detail)		
Date	Activity	Remarks
September 16, 2024	Uploaded the php file of mobile application to hostinger	checked
September 16, 2024	Updated the old code to the new code which connects to hostinger	checked
September 17, 2024	Validation of registration and login in the mobile application	checked
September 18, 2024	Testing of payment gateway integration	in progress



## PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0027**. This will be submitted weekly to monitor and reassess the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
2. Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.

Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology with specialization in Web and Mobile Application</b>	
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Reignald	Term: [✓] 1 <sup>st</sup> [ ] 2 <sup>nd</sup> [ ] 3 <sup>rd</sup>	Academic Year: 2024
Mentoring Day: Wednesday Mentoring Time: 11:00am-12:00pm Mentoring Venue: iCARE	Reporting Date: October 2, 2024	Reporting Week: 2 <sup>nd</sup> week
Title of the Project: <b>TransiTEase: An Online Ticket Management System with Mobile Application for LRT-1</b>		

Date	Activity	Remarks
September 30, 2024	Went to LRMC to submit client letter and get signed	checked
September 30, 2024 – October 1, 2024	Start coding payment module	checked
October 1, 2024	Created test case scenarios of the application	checked
September 31, 2024	Create a draft survey	checked
September 31, 2024	Created sample survey questionnaire in google forms	checked

SIGHTS AND DISCUSSIONS BY THE MENTOR:

Grade Legend (To be used by the Mentor in grading student's activity)  
95 – 100: Excellent    89 – 94: Very Good    83 – 88: Good

Member's Name:	Assigned Task (50)	77 – 82: Fair		70 – 76: Poor		69 below: Inadequate	
		Participation (30)	Attendance (20)	TOTAL			
1. Carena, Andrei Julio	50	30	20	100			
2. Yabut, Brian Jonathan	50	30	20	100			
3. Sosa, Theo Wilfred	50	30	20	100			
4. Cheng, Reignald	50	30	20	100			
5. Roxas, Rafael	0	0	0	0			

MR. JOHN BENEDICT ENRIQUEZ  
Project Adviser  
Signature Over Printed Name

October 2, 2024  
Date



## PROGRESS REPORT

- Progress reports are required for students taking the course **IT0027**. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
- Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.

Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology with specialization in Web and Mobile Application</b>	
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Reignald 5. Roxas, Rafael	Term: [✓] 1 <sup>st</sup> [ ] 2 <sup>nd</sup> [ ] 3 <sup>rd</sup>	Academic Year: 2024
Mentoring Day: Wednesday Mentoring Time: 11:00am-12:00pm Mentoring Venue: iCARE	Reporting Date: <b>October 9, 2024</b>	Reporting Week: 3 <sup>rd</sup> week
Title of the Project: <b>TransitEase: An Online Ticket Management System with Mobile Application for LRT-1</b>		

Date	Activity	Remarks
October 6, 2024	Creating discount card for student, pwd, and senior citizen	checked
October 8, 2024	Submitted and complied requirements to client	checked
October 8, 2024	Finalizing survey questionnaire in google forms	checked
October 8, 2024	Updated the Project Development Checklist	checked

Grade Legend (To be used by the Mentor in grading student's activity)		77 - 82: Fair	70 - 76: Poor	69 below: Inadequate
Member's Name:	Assigned Task (50)	Participation (30)	Attendance (20)	TOTAL
1. Carena, Andrei Julio	50	30	20	100
2. Yabut, Brian Jonathan	50	30	20	100
3. Sosa, Theo Wilfred	50	30	20	100
4. Cheng, Reignald	50	30	20	100
5. Roxas, Rafael	50	30	-	80

MR. JOHN BENEDICT ENRIQUEZ  
Project Adviser  
Signature Over Printed Name

October 9, 2024  
Date



## PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0027**. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
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PART A: TO BE COMPLETED BY THE GROUP		
Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology with specialization in Web and Mobile Application</b>	
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Reignald 5. Roxas, Rafael	Term: [✓] 1 <sup>st</sup> [ ] 2 <sup>nd</sup> [ ] 3 <sup>rd</sup>	Academic Year: 2024
Mentoring Day: Wednesday Mentoring Time: 11:00am-12:00pm Mentoring Venue: iCARE	Reporting Date: <b>October 16, 2024</b>	Reporting Week: <b>4<sup>th</sup> week</b>
Title of the Project: <b>TransiTEase: An Online Ticket Management System with Mobile Application for LRT-1</b>		

PART B: LIST OF ACTIVITIES DONE (List and describe each activities in detail)		
Date	Activity	Remarks
October 11, 2024	Updating Mobile application UI	checked
October 11, 2024	Started the calendar module	checked } <i>l</i>
October 14, 2024	Revising chapter 1-3	checked } <i>l</i>

PART C: TO BE COMPLETED BY THE MENTOR				
Member's Name:	Assigned Task (50)	Grade Legend (To be used by the Mentor in grading student's activity)		TOTAL
		95 – 100: Excellent	89 – 94: Very Good	
1. Carena, Andrei Julio	50	30	10	90
2. Yabut, Brian Jonathan	50	30	10	90
3. Sosa, Theo Wilfred	50	30	10	90
4. Cheng, Reignald	50	30	10	90
5. Roxas, Rafael	50	30	10	90

MR. JOHN BENEDICT ENRIQUEZ  
Project Adviser

Signature Over Printed Name

October 16, 2024

Date



## PROGRESS REPORT

- Progress reports are required for students taking the course IT0027. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
- Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.

Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology with specialization in Web and Mobile Application</b>	
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Reignald 5. Roxas, Rafael	Term: [ <input checked="" type="checkbox"/> ] 1 <sup>st</sup> [ <input type="checkbox"/> ] 2 <sup>nd</sup> [ <input type="checkbox"/> ] 3 <sup>rd</sup>	Academic Year: 2024
Mentoring Day: Wednesday Mentoring Time: 11:00am-12:00pm Mentoring Venue: iCARE	Reporting Date: <b>November 6, 2024</b>	Reporting Week: <b>5th week</b>
Title of the Project: <b>TransiTEase: An Online Ticket Management System with Mobile Application for LRT-1</b>		

PART B: LIST OF ACTIVITIES DONE (list and describe each activity in detail)			
Date	Activity	Remarks	
October 21, 2024	Downloaded and start configuring the software that we are going to use in NFC device	checked	
October 23, 2024	coding email verification for payment	checked	} E
October 24, 2024	Start creating draft for chapter 4	checked	

PART C: TO BE COMPLETED BY THE MENTOR				
Grade Legend (To be used by the Mentor in grading student's activity) 95 - 100: Excellent    89 - 94: Very Good    83 - 88: Good    77 - 82: Fair    70 - 76: Poor    69 below: Inadequate				
Member's Name:	Assigned Task (50)	Participation (30)	Attendance (20)	TOTAL
1. Carena, Andrei Julio	50	30	20	100
2. Yabut, Brian Jonathan	50	30	20	100
3. Sosa, Theo Wilfred	50	30	20	100
4. Cheng, Reignald	50	30	20	100
5. Roxas, Rafael	50	30	20	100

*John Benigno*  
MR. JOHN BENEDICT ENRIQUEZ

Project Adviser  
Signature Over Printed Name

November 6, 2024

Date



## PROGRESS REPORT

1. Progress reports are required for students taking the course **IT0027**. This will be submitted weekly to monitor and reassure the academic progress of each group, that the project is going smoothly, and that it will be completed on the expected date.
2. Progress reports are the responsibility of the group and the Project Adviser. The Project Adviser ensures that each group submitted the form by the required date. This will be filed and used for evaluation.

## PART A: TO BE COMPLETED BY THE GROUP

Group Name: DevOps	Program: <b>Bachelor of Science in Information Technology</b> with specialization in Web and Mobile Application	
Member's Name: 1. Carena, Andrei Julio 2. Yabut, Brian Jonathan 3. Sosa, Theo Wilfred 4. Cheng, Reignald 5. Roxas, Rafael	Term: [✓] 1 <sup>st</sup> [ ] 2 <sup>nd</sup> [ ] 3 <sup>rd</sup>	Academic Year: 2024
Mentoring Day: Wednesday Mentoring Time: 11:00am-12:00pm Mentoring Venue: ICARE	Reporting Date: <b>November 6, 2024</b>	Reporting Week: <b>6th week</b>
Title of the Project: <b>TransitEase: An Online Ticket Management System with Mobile Application for LRT-1</b>		

## PART B: LIST OF ACTIVITIES DONE (List and describe each activities in detail)

Date	Activity	Remarks
October 21, 2024	Downloaded and start configuring the software that we are going to use in NFC device	checked
October 23, 2024	coding email verification for payment	checked } 1/3
October 24, 2024	Start creating draft for chapter 4	checked } 2/3

## PART C: TO BE COMPLETED BY THE MENTOR

Grade Legend (To be used by the Mentor in grading student's activity)  
 95 – 100: Excellent    89 – 94: Very Good    83 – 88: Good

77 – 82: Fair

70 – 76: Poor

69 below: Inadequate

Member's Name:	Assigned Task (50)	Participation (30)	Attendance (20)	TOTAL
1. Carena, Andrei Julio	50	30	20	100
2. Yabut, Brian Jonathan	50	30	20	100
3. Sosa, Theo Wilfred	50	30	20	100
4. Cheng, Reignald	50	30	20	100
5. Roxas, Rafael	50	30	20	100

MA. JOHAN BENEDICT ENRIQUEZ  
Project Adviser

Signature Over Printed Name

November 6, 2024

Date

**APPENDIX F**

**Project development Checklist**



## IT PROJECT MANAGEMENT DEVELOPMENT CHECKLIST

Group Name	DevOps
Project Title	TransitEase: A Rail Transport Management System with Crowd Control for LRT & MRT
Group Members	<b>1. Carena, Andrei Julio D.</b> <b>2. Cheng, Reignald P.</b> <b>3. Sosa, Theo Wilfred D.</b> <b>4. Yabut, Brian Jonathan V.</b>
Client Name	
Client Details	

## DOCUMENT

SPECIFIC MODULES / TASKS	Percentage	Remarks
<b>Preliminaries</b> <ul style="list-style-type: none"><li>● Title Page</li><li>● Copyright Page</li><li>● Approval and Acceptance Sheet</li><li>● Acknowledgement</li><li>● Table of Contents</li><li>● List of Tables</li><li>● List of Figures</li><li>● List of Abbreviation</li><li>● Abstract</li></ul>	(8%)	
1.1 Purpose and Description	0.5%	OK
1.2 Project Context	0.5%	OK
1.3 Objectives	1%	OK
1.4 Scope and Limitation	1%	OK
1.5 Significance of the Study	1%	OK
1.6 Conceptual Framework (IPO Model)	1%	OK
1.7 Definition of Terms	1%	OK
<b>Chapter 1 – Introduction</b> <ul style="list-style-type: none"><li>1.1 Purpose and Description</li><li>1.2 Project Context</li><li>1.3 Objectives</li><li>1.4 Scope and Limitation</li><li>1.5 Significance of the Study</li><li>1.6 Conceptual Framework (IPO Model)</li><li>1.7 Definition of Terms</li></ul>	(8%)	
1.1 Related Literature	1%	OK
1.2 Related Studies	1%	OK
1.3 Related Systems	1%	OK
1.4 Synthesis	1%	OK
<b>Chapter 2</b> <ul style="list-style-type: none"><li>1.1 Related Literature</li><li>1.2 Related Studies</li><li>1.3 Related Systems</li><li>1.4 Synthesis</li></ul>	(8%)	
<b>Chapter 3</b> <ul style="list-style-type: none"><li>1.1 Requirements Analysis<ul style="list-style-type: none"><li>1.1.1 Operational Feasibility (FDD)</li><li>1.1.2 Technical Feasibility<ul style="list-style-type: none"><li>1.1.2.1 Hardware Requirements</li><li>1.1.2.2 Software Requirements</li></ul></li></ul></li></ul>	(26%)	
1.1 Requirements Analysis <ul style="list-style-type: none"><li>1.1.1 Operational Feasibility (FDD)</li><li>1.1.2 Technical Feasibility<ul style="list-style-type: none"><li>1.1.2.1 Hardware Requirements</li><li>1.1.2.2 Software Requirements</li></ul></li></ul>	1%	OK
	1%	OK
	1%	OK
	1%	OK

1.1.3 Schedule Feasibility	1%	OK
1.1.4 Economic Feasibility	1%	OK
<b>1.2 Project Design</b>		
1.2.1 System Architecture	1%	OK
1.2.2 Context Diagram (DFD Level 0)	1%	OK
1.2.3 Data Flow Diagram Level 1	1%	OK
1.2.4 Child Diagram	1%	OK
1.2.5 Use CASE Diagram	1%	OK
1.2.6 Activity Diagram	1%	OK
1.2.7 Sequence Diagram	1%	OK
1.2.8 System Flowchart	1%	OK
1.2.9 Entity Relationship Diagram	1%	OK
1.2.10 User Interface Design	1%	OK
<b>1.3 Project Development Model</b>		
1.3.1 Sprint Goal	1%	OK
1.3.2 Sprint Backlog	1%	OK
<b>1.4 Software Testing</b>		
1.4.1 Alpha Testing	1%	OK
1.4.2 Beta Testing	1%	OK
1.4.3 User Acceptance Testing	1%	OK
<b>1.5 Data Gathering</b>	1%	OK
<b>1.6 Sampling Technique</b>	1%	OK
<b>1.7 Respondents of the Study</b>	1%	OK
<b>1.8 Statistical Treatment</b>	1%	OK
1.8.1 Survey Analysis	1%	OK
<b>BIBLIOGRAPHY &amp; APPENDICES</b>	(10%)	
<b>Bibliography</b>	1%	OK
<b>Appendices</b>		
• APPENDIX A Communication Letters	1%	OK
• APPENDIX B Transcript of Interview	1%	OK
• APPENDIX C User Interface Design	1%	OK
• APPENDIX D Endorsement Letter	1%	OK
• APPENDIX E Project Adviser Forms	1%	OK
• APPENDIX F Progress Reports	1%	OK
• APPENDIX G Project Development Checklist	1%	OK
• APPENDIX H Title Defense Grade Sheet	1%	OK
• APPENDIX I Curriculum Vitae	1%	OK
	100%	60% as of February 25, 2024

## WEB

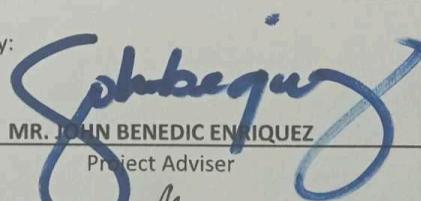
SPECIFIC MODULES / TASKS	Percentage	Remarks
<b>Module 1: Account Registration Module</b>	(14%)	
1.1 User Registration Account	3.5%	OK

1.1.1 Account Information (User & Password)	3.5%	OK
1.1.2 Contact Details (Number & Email)	3.5%	OK
1.1.3 Identification and Verification	3.5%	OK
<b>Module 2: Accounts Module</b>	<b>(21%)</b>	
2.1 User Accounts	3%	OK
2.1.1 User Dashboard	2%	OK
2.1.2 Notifications	2%	OK
2.1.3 User Profile	2%	OK
2.1.4 Login and Logout	2%	OK
2.2 Admin Login	2%	OK
2.2.1 Admin/Employee Dashboard	2%	OK
2.2.2 Notifications	2%	OK
2.2.3 Admin Profile	2%	OK
2.2.4 Login and Logout	2%	OK
<b>Module 3: User Dashboard Module</b>	<b>(31%)</b>	
2.1 Check Crowd	3.4%	OK
2.2 Top-up Balance	3.4%	OK
2.3 Train Status	3.4%	OK
2.4 Route Status	3.4%	OK
2.5 Access Settings	3.4%	OK
2.6 Real-time Schedule	3.4%	OK
2.7 View Notification	3.4%	OK
2.8 View Calendar	3.4%	OK
2.9 Feedback	3.4%	OK
<b>Module 4: Admin Dashboard Module</b>	<b>(17%)</b>	
2.10 Add Employee Accounts	2%	OK
2.11 Manage Employee Accounts	1%	OK
2.12 Manage User Accounts	1%	OK
2.13 View Feedback and Reports	1%	OK
2.14 Manage Announcements	1%	OK
<b>Module 5: Employee Dashboard Module</b>	<b>(17%)</b>	
2.15 Update Calendar	2%	OK
2.16 Update Train Settings	1%	OK
2.17 Manage Announcements	1%	OK
2.18 View Feedback and Reports	1%	OK
2.19 Manage Crowd Status	1%	OK
	100 %	

## MOBILE

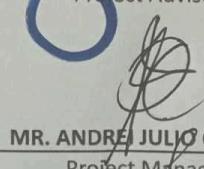
SPECIFIC MODULES / TASKS	Percentage	Remarks
<b>Module 1: Account Registration Module</b>	<b>(21%)</b>	
1.2 User Registration Account	6%	
1.2.1 Account Information (User & Password)	5%	OK
1.2.2 Contact Details (Number & Email)	5%	OK
1.1.1 Identification and Verification	5%	OK
<b>Module 2: Accounts Module</b>	<b>(32%)</b>	
2.3 User Accounts	4%	OK
2.3.1 User Dashboard	3%	OK
2.3.2 Notifications	3%	OK
2.3.3 User Profile	3%	OK
2.3.4 Login and Logout	3%	OK
2.4 Admin Login	4%	OK
2.4.1 Admin/Employee Dashboard	3%	OK
2.4.2 Notifications	3%	OK
2.4.3 Admin Profile	3%	OK
2.1.1 Login and Logout	3%	OK
<b>Module 3: User Dashboard Module</b>	<b>(47%)</b>	
2.20 Check Crowd	5.22%	OK
2.21 Top-up Balance	5.22%	OK
2.22 Train Status	5.22%	OK
2.23 Route Status	5.22%	OK
2.24 Access Settings	5.22%	OK
2.25 Real-time Schedule	5.22%	OK
2.26 View Notification	5.22%	OK
2.27 View Calendar	5.22%	OK
2.28 Feedback	5.22%	OK
	<b>100%</b>	100%

Approved by:

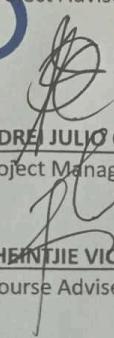


MR. JOHN BENEDICT ENRIQUEZ  
Project Adviser

Noted by:



MR. ANDRE JULIO CARENA  
Project Manager



MR. HENRY VICENTE  
Course Adviser

**APPENDIX G**  
**Title Defense Grade Sheet**



## FEU INSTITUTE OF TECHNOLOGY

### Title Proposal Presentation Summary Form 1<sup>st</sup> Term S.Y. 2023-2024

COURSE / SECTION / Group Name <b>GROUP NAME HERE</b> DCE OYS		
Name of the Proponents (SURNAME, FIRSTNAME, M.I.) 1. Cheng, Reginald 2. Carreña, Andrei 3. 4. Sosa, Trico 5. Yabut, Bridn		
COURSE	DATE	VENUE

Summary of Proposed Titles:	Accepted	Not Accepted
1. TransitEase	✓	
2.		
3.		
4.		
5.		

#### REMARKS/COMMENTS:

TITLE: TransitEase: A Rail Transport Management System w/  
Crowd Control for LRTA & MRT

- use NFC to pay
- mobile app payment
- Notify commuters of platform changes and service updates/notifications
- Crowd management
- view status of LRT and MRT stations (crowd status)
- predictive analytics to estimate rush hour traffic/suggest alternative to avoid congestion
- justification for using public transport
- real time commuter updates



## FEU INSTITUTE OF TECHNOLOGY

### ADVISORY/PANEL COMMITTEE

PRINTED NAME	SIGNATURE
1. NAMIA VICKY SOLON	
2. Jay-av P. Lalath	
3. JOSEPH Q. CANEDA	
4.	
5.	

Noted by:

Mr. Heintje N. Vicente  
Course Adviser

Accepted by:

Dr. Roman M. De Angel  
IT Director

Approved by:

Dr. Ace C. Lagman  
Senior Director for Computer Studies



**FEU INSTITUTE OF TECHNOLOGY**

**TITLE PROPOSAL DEFENSE GRADESHEET**

1<sup>st</sup> Term Academic Year 2023-2024

**CCS0028 System Analysis and Design**

Group Name <i>Design</i>	Name of the proponents (SURNAME FIRSTNAME M.I.) 1. <u>Soriano, Andri Solis P.</u> 2. <u>Lalata, Bryan Jonathan V.</u> 3. <u>Esca, Jules Wilfred R.</u>	4. <u>Cheng, Reignold Zachary P.</u> 5. _____	
COURSE <b>BSIT - WMA</b>		DATE / TIME <b>18-27 / 9-11 am</b>	VENUE <b>F1403</b>

TITLE DEFENSE CRITERIA (70%)							
Criteria	Weight	5	4	3	2	1	Points
CONTEXT RELEVANCE TO THE FIELD OF STUDY	x 5	Provided a highly critical projects context that provides a potentially relevant investigation	Delivered a good content that provides potentially relevant investigation	Provided an accessible project content worthy of research	Presented project content somewhat related to the field of study	Project content presented is not relevant to the field of study	
CONCEPT & IDEAS	x 8	Presented project concepts are excellent	Presented project concepts are good	Projects concepts are accessible	Project concepts are average with some recommendation	Project concepts lack substantial details	
FEASIBILITY	x 7	Project concepts are attainable, measurable and presented with complete evidences	Presented project concepts are attainable, measurable but presented with almost complete evidences	Presented project concepts are either attainable or measurable with some evidences	Presented project concepts are either attainable or measurable with few evidences	The project concepts presented are not feasible	
<b>TOTAL</b>	<b>100</b>						<b>f</b>

INDIVIDUAL GRADE (30%)		Weight used	PROFOUNDERS				
Criteria			1	2	3	4	5
1. The presenter is knowledgeable of the materials or matter he/she discussed.	(30)						
2. The presenter answers questions directly and did not digress from the focus of the query.	(30)						
3. The presenter maintains a comfortable and reasonable pace during his/her delivery.	(20)						
4. The presenter's voice is well-modulated and can be heard throughout the room.	(10)						
5. The presenter is neatly groomed and properly attired.	(10)						
<b>TOTAL</b>	<b>100</b>		<b>80</b>	<b>75</b>	<b>80</b>	<b>75</b>	<b>74</b>

*Jayvee P. Lalata*  
Panel  
(Signature over Printed Name)



# FEU INSTITUTE OF TECHNOLOGY

## TITLE PROPOSAL DEFENSE GRADESHEET

1<sup>st</sup> Term Academic Year 2023-2024

### CCS0028 System Analysis and Design

Group Name Dev Ops		
Name of the Proponents (SURNAME, FIRSTNAME, M.I.)		
1. Carena, Andrei Julio P.	4. Cheng, Reginald Zachary P.	
2. Yabut, Brian Jonathon V.	5. _____	
3. Sosa, Tyler Wilfred R.		
COURSE BSIT - WMA	DATE / TIME 10-27/9-11 am	VENUE F1403

TITLE DEFENSE CRITERIA (70%)							
Criteria	Weight	5	4	3	2	1	Points
CONTEXT RELEVANCE TO THE FIELD OF STUDY	X 5	Provided a highly critical projects context that provides a potentially relevant investigation	Delivered a good context that provides potentially relevant investigation	Provided an acceptable project context worthy of research	Presented project context somewhat related to the field of study	Project context presented is not relevant to the field of study	
CONCEPT & IDEAS	X 8	Presented project concepts are excellent	Presented project concepts are good	Projects concepts are acceptable	Project concepts are average with some recommendation	Project concepts lack substantial details.	
FEASIBILITY	X 7	Project concepts are attainable, measurable and presented with complete evidences	Presented project concepts are attainable, measurable but presented with almost complete evidences	Presented project concepts are either attainable or measurable with some evidences	Presented project concepts are either attainable or measurable with few evidences	The project concepts presented are not feasible	
TOTAL	100						

INDIVIDUAL GRADE (30%)		Weight (pts)	PROPONENTS				
Criteria			1	2	3	4	5
1. The presenter is knowledgeable of the materials or matter he/she discussed.		(30)					
2. The presenter answers questions directly and did not digress from the focus of the query.		(30)					
3. The presenter maintains a comfortable and reasonable pace during his/her delivery.		(20)					
4. The presenter's voice is well-modulated and can be heard throughout the room.		(10)					
5. The presenter is neatly groomed and properly attired.		(10)					
TOTAL	100		85	80	88	80	

Maria Lourdes Soriano  
Panel  
(Signature over Printed Name)



**FEU INSTITUTE OF TECHNOLOGY**

**TITLE PROPOSAL DEFENSE GRADESHEET**  
1<sup>st</sup> Term Academic Year 2023-2024

**CCS0028 System Analysis and Design**

Group Name <b>DevOps</b>			
Name of the Proponents (SURNAME, FIRSTNAME, M.I.)			
1. <u>Carena, Angel Julio D.</u> 2. <u>Yabut, Brian Jonathan V.</u> 3. <u>Sosa, Theo Wilfred R.</u> 4. <u>Cheng, Reginald P.</u> 5. _____			
COURSE <b>BSIT WMA</b>			
		DATE / TIME <b>10/27/23 / 9:30</b>	VENUE

TITLE DEFENSE CRITERIA (70%)								
Criteria	Weight	5	4	3	2	1	Points	
CONTEXT RELEVANCE TO THE FIELD OF STUDY	X 5	Provided a highly critical projects context that provides a potentially relevant investigation	Delivered a good context that provides potentially relevant investigation	Provided an acceptable project context worthy of research	Presented project context somewhat related to the field of study	Project context presented is not relevant to the field of study		
CONCEPT & IDEAS	X 8	Presented project concepts are excellent	Presented project concepts are good	Projects concepts are acceptable	Project concepts are average with some recommendation	Project concepts lack substantial details.		
FEASIBILITY	X 7	Project concepts are attainable, measurable and presented with complete evidences	Presented project concepts are attainable, measurable but presented with almost complete evidences	Presented project concepts are either attainable or measurable with some evidences	Presented project concepts are either attainable or measurable with few evidences	The project concepts presented are not feasible		
<b>TOTAL</b>	<b>100</b>						<b>85</b>	

INDIVIDUAL GRADE (30%)		Weight (pts)	PROPOONENTS				
Criteria			1	2	3	4	5
1. The presenter is knowledgeable of the materials or matter he/she discussed.		(30)					
2. The presenter answers questions directly and did not digress from the focus of the query.		(30)					
3. The presenter maintains a comfortable and reasonable pace during his/her delivery.		(20)					
4. The presenter's voice is well-modulated and can be heard throughout the room.		(10)					
5. The presenter is neatly groomed and properly attired.		(10)	10	10	10	10	
<b>TOTAL</b>	<b>100</b>		<b>90</b>	<b>90</b>	<b>90</b>	<b>90</b>	

JOSEPH J. CALEDA

Panel  
(Signature over Printed Name)

**APPENDIX H**  
**Project Management Comment Sheet**

## PROJECT INFORMATION

GROUP NAME

**DevOps**

PROJECT TITLE

**TransitEase: A Rail Transport Management System with Crowd Control for LRT & MRT**

ORAL DEFENSE DATE | TIME | VENUE

**February 29, 2024 | 10:00 am | F1504**

## COMMENTS:

- Conduct further interview w/ your client to delve deeper w/ the existing process for you to find out what's really are the problems + what to solve.
- Crowd (Management)- control is not possible
- Next time, make sure to understand fully what's really there.
- prep your proposed title means.
- redo the documents.
- Problems presented on the fishbone diagram should be based on the tool.

  
Ms. Maria Vicky S. Solomo

Panel Member

(Signature over Printed Name)

2/29/24

PROJECT INFORMATION

GROUP NAME

DevOps

PROJECT TITLE

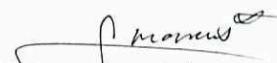
TransiTEase: A Rail Transport Management System with Crowd Control for LRT & MRT

ORAL DEFENSE DATE | TIME | VENUE

February 29, 2024 | 10:00 am | F1504

COMMENTS:

- Identify the data build up of the entities within the system.
  - Trains
  - Schedules
  - station status (flag with context colors)

  
Mr. Marcus Jonas Curioso

Panel Member

(Signature over Printed Name)

## PROJECT INFORMATION

GROUP NAME

**DevOps**

PROJECT TITLE

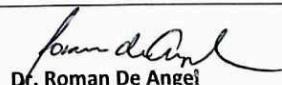
**TransitEase: A Rail Transport Management System with Crowd Control for LRT & MRT**

ORAL DEFENSE DATE | TIME | VENUE

February 29, 2024 | 10:00 am | F1504

## COMMENTS:

- Change title
- Conduct further interview
- Focus on LRT 1
- Check your objectives
- Revisit your ishikawa diagram
- Check your chapter 3 diagrams (DFD and lower level)
- Change activity diagram use swimlane

  
Dr. Roman De Angel

Panel Chair

(Signature over Printed Name)

**APPENDIX I**  
**Survey Questionare**

## TransitEase Survey

### Technical - Super Admin & IT Specialist

Instructions: Please answer the question as completely, honestly and accurately as you can. Mark your answers by clicking the answer corresponding to each criterion set forth in the instrument.

#### LEGEND:

- 5 - Strongly Agree
- 4 - Agree
- 3 - Neutral
- 2 - Disagree
- 1 - Strongly Disagree

#### Functionality

(Evaluates the system's feature sets, capabilities, generality, and security)

5 - Strongly Agree    4 - Agree    3 - Neutral    2 - Disagree    1 - Strongly Disagree

The NFC payment integration provides all necessary APIs and documentation for seamless implementation and operation.

The admin panel allows me to easily manage and configure the NFC payment integration.

I can efficiently monitor all NFC transactions processed through the system.

The NFC payment module provides clear reporting on transaction success and failures.

#### Reliability

(Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system)

5 - Strongly Agree    4 - Agree    3 - Neutral    2 - Disagree    1 - Strongly Disagree

The NFC payment system demonstrates high reliability in transaction processing, with minimal failure rates.

The NFC payment system consistently processes transactions without errors.

Can trust that the data regarding NFC transactions is accurate and up-to-date.

I have not experienced significant downtime or errors when processing NFC payments.

Usability (Evaluates human factors, aesthetics, consistency, and documentation of the system)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The administrative interface for NFC payments is designed with user experience best practices, ensuring intuitive interaction.	<input type="radio"/>				
The admin interface for managing NFC payments is intuitive	<input type="radio"/>				
I can quickly access relevant features for NFC payment management without confusion.	<input type="radio"/>				
I feel confident in using the NFC payment functionalities	<input type="radio"/>				

Efficiency (Evaluates the system's performance in terms of response time and resource utilization)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The NFC payment processing system operates efficiently, minimizing resource consumption during peak usage.	<input type="radio"/>				
The NFC payment system processes transactions quickly, minimizing wait times for users.	<input type="radio"/>				
I can manage and configure the NFC payment settings with minimal time and effort.	<input type="radio"/>				

Maintainability (Evaluates the system's ability to be updated and enhanced over time)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The NFC payment system is designed for straightforward updates, allowing for rapid integration of new features.	<input type="radio"/>				
The NFC payment module is regularly updated to improve functionality and security.	<input type="radio"/>				
I can easily implement changes to the NFC payment settings	<input type="radio"/>				
The NFC payment module adapts well to new payment methods or technologies when integrated.	<input type="radio"/>				

Portability (Evaluates the system's ability to function across various platforms and devices)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The NFC payment solution is operable across android device without compatibility issues.	<input type="radio"/>				
The NFC payment integration is accessible across various devices used by admins.	<input type="radio"/>				
Can easily access the NFC payment management features from a web interface	<input type="radio"/>				
The NFC payment module adapts well to new payment methods or technologies when integrated.	<input type="radio"/>				

**Non-Technical - Admin**

**Instructions:** Please answer the question as completely, honestly and accurately as you can. Mark your answers by clicking the answer corresponding to each criterion set forth in the instrument.

**LEGEND:**

- 5 - Strongly Agree
- 4 - Agree
- 3 - Neutral
- 2 - Disagree
- 1 - Strongly Disagree

Functionality (Evaluates the system's feature sets, capabilities, generality, and security)					Reliability (Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system)				
5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The admin panel allows me to easily manage and configure the NFC payment integration.	I can efficiently monitor all NFC transactions processed through the system.	The NFC payment module provides clear reporting on transaction success and failures.	I can easily set parameters (e.g., limits, transaction types) for the NFC payment functionality.		The NFC payment system consistently processes transactions without errors.	Can trust that the data regarding NFC transactions is accurate and up-to-date.	I have not experienced significant downtime or errors when processing NFC payments.	The NFC payment functionality operates reliably during peak usage times.	

Usability (Evaluates human factors, aesthetics, consistency, and documentation of the system)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The admin interface for managing NFC payments is intuitive.	<input type="radio"/>				
I can quickly access relevant features for NFC payment management without confusion.	<input type="radio"/>				
I feel confident in using the NFC payment functionalities.	<input type="radio"/>				
I can efficiently access real-time commuter volume data without encountering usability issues.	<input type="radio"/>				

Efficiency (Evaluates the system's performance in terms of response time and resource utilization)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The NFC payment system processes transactions quickly, minimizing wait times for users.	<input type="radio"/>				
I can manage and configure the NFC payment settings with minimal time and effort.	<input type="radio"/>				
The system handles multiple NFC transactions simultaneously without performance degradation.	<input type="radio"/>				
The reports generated regarding NFC transactions are produced promptly and accurately.	<input type="radio"/>				

Maintainability (Evaluates the system's ability to be updated and enhanced over time)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The NFC payment module is regularly updated to improve functionality and security.	<input type="radio"/>				
I can easily implement changes to the NFC payment settings.	<input type="radio"/>				
The NFC payment module adapts well to new payment methods or technologies when integrated.	<input type="radio"/>				
I can easily implement changes to the real-time commuter volume tracking based on operational needs.	<input type="radio"/>				

Portability (Evaluates the system's ability to function across various platforms and devices)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The NFC payment integration is accessible across various devices used by admins.	<input type="radio"/>				
Can easily access the NFC payment management features from a web interface.	<input type="radio"/>				
I can effectively monitor real-time commuter volumes from various locations and devices.	<input type="radio"/>				
The announcement module is accessible from different platforms, ensuring broad functionality.	<input type="radio"/>				

**Instructions:** Please answer the question as completely, honestly and accurately as you can. Mark your answers by clicking the answer corresponding to each criterion set forth in the instrument.

**LEGEND:**

- 5 - Strongly Agree
- 4 - Agree
- 3 - Neutral
- 2 - Disagree
- 1 - Strongly Disagree

**Usability**  
(Evaluates human factors, aesthetics, consistency, and documentation of the system)

	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The payment process using NFC is easy to understand and use.	<input type="radio"/>				
I can easily fill the requirements of paymongo to process the payment.	<input type="radio"/>				
I feel comfortable using the TransitEase app without any help or guidance.	<input type="radio"/>				
The interface for payment is intuitive and doesn't require too many steps.	<input type="radio"/>				

**Functionality**  
(Evaluates the system's feature sets, capabilities, generality, and security)

	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
I was able to use the mobile app payment with ease.	<input type="radio"/>				
The use of NFC in loading Single Journey Tickets makes my LRT-1 commuting experience more convenient.	<input type="radio"/>				
The payment system through NFC meets my daily commuting needs.	<input type="radio"/>				
I feel confident in using NFC for payment without needing assistance from station staff.	<input type="radio"/>				

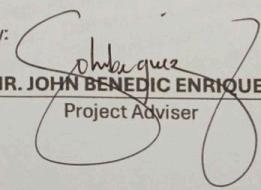
**Reliability**  
(Evaluates the frequency or severity of failures, recoverability, predictability, accuracy, and mean time to failure of the system)

	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The app's payment system is reliable and rarely fails during NFC transactions.	<input type="radio"/>				
I am confident that my payments will be processed successfully without delays.	<input type="radio"/>				
The app works consistently, even during high-volume commuting hours.	<input type="radio"/>				
The app consistently provides updates on crowd volume without failure.	<input type="radio"/>				

**Efficiency**  
(Evaluates the system's performance in terms of response time and resource utilization)

	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
The time it takes to complete a payment using NFC is acceptable.	<input type="radio"/>				
The payment system allows me to save time when purchasing single journey tickets compared to traditional method.	<input type="radio"/>				
I am satisfied with the speed of processing NFC payments through the app.	<input type="radio"/>				
The app operates smoothly and doesn't slow down during payment transactions.	<input type="radio"/>				

Main Maintainability (Evaluates the system's ability to be updated and enhanced over time)						Portability (Evaluates the system's ability to function across various platforms and devices)					
	5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree		5 - Strongly Agree	4 - Agree	3 - Neutral	2 - Disagree	1 - Strongly Disagree
I find that the app is regularly updated to fix issues and improve the payment system.	<input type="radio"/>	The TransitEase app works well across different mobile devices (e.g., smartphones, tablets).	<input type="radio"/>								
If I encounter an issue, it's resolved quickly with an app update or fix.	<input type="radio"/>	The payment system performs consistently, regardless of the mobile device I use.	<input type="radio"/>								
The payment system is regularly improved based on user feedback.	<input type="radio"/>	The crowd volume are accessible on different mobile devices	<input type="radio"/>								
I am confident that if any new technologies (e.g., new payment methods) are introduced, the app will be updated to support them.	<input type="radio"/>	I can access the crowd volume feature without issues regardless of my location.	<input type="radio"/>								

Approved by:  
  
**MR. JOHN BENEDICT ENRIQUEZ**  
 Project Adviser

Noted by:  
  
**MR. ANDREI JULIO CARENA**  
 Project Manager

**APPENDIX J**  
**Curriculum Vitae**



## ANDREI JULIO D. CARENA

Bachelor of Science in Information Technology  
with Specialization in Web and Mobile Application

### Objective

To obtain an Intern position as an IT developer within a dynamic and forward-thinking company. Dedicated to delivering high-quality software solutions, I aim to contribute to the success of the organization by collaborating with teams, emerging technologies, and producing efficient and scalable applications. Alongside my good communication, organizing and planning skills to contribute to the attainment of the company's goals

### Accomplished Projects

- TransiTEase: a Rail Transport Management System with Crowd Control for LRT & MRT by DevOps | Researcher, Lead Front-End Developer | **Lead Programmer**
- JollimcDo: Discover the ultimate culinary fusion with JollimcDo, the innovative website uniting the iconic flavors of Jollibee and McDonald's in one convenient platform. | **Lead Programmer**
- TaskHub: Your Ultimate To-Do List Buddy! Designed exclusively for students, TaskHub is a dynamic task management app built with PHP and CodeIgniter. | **Lead Developer, Lead-Designer**
- Boss Liam's iPhone Store: an innovative E-Commerce Platform for iPhones using PHP. | **Lead Programmer**

### Education

#### BS in Information Technology with Specialization in Web and Mobile Application (BS IT-WMA)

FEU Institute of Technology  
P. Paredes St., Sampaloc, Manila  
Expected Graduation - 2025

#### High School

Lyceum of Alabang  
KM 30 National Road, Tunasan Muntinlupa City  
2019

### Personal Information

Address	:	KS8 Blk4 Lot16 Lancaster New City, General Trias Cavite
Mobile	:	+639 15 683 4126
E-mail	:	andrei.juliocarena02@gmail.com
Birthday	:	February 21, 2002
Father	:	Anacleto M. Carena Jr.
Mother	:	Julita D. Carena

### Hardware and Software Proficiency

C++  
Java  
Python  
Visual Studio Code  
MySQL  
PHP  
Kotlin  
Xcode  
Swift  
Code Igniter  
Adobe Photoshop

### Awards

Dean's Lister, 2TSY2122  
CCSMA - 2022

Top Performing Student FEU –  
Tech – 2021

### Certifications

CCNA® Certificate of Course  
Completion: Introduction to  
Networks 2023

CCNA® Certificate of Course  
Completion: Switching, Routing,  
and Wireless Essentials 2023

CCNA® Certificate of Course  
Completion: Enterprise  
Networking, Security, and  
Automation 2023

Certipoint® Certified: Information  
Technology Specialist in  
Networking 2023

EdITH® Certificate of  
Participation: Spying the  
Spectrum: Software-Defined  
Radio (SDR) Hackathon 2023

### Organizations

Member, Alliance of Information  
Technology Students | 2022 –  
2023

### Other Interests

Video Editing  
Data Management  
Digital Art  
Gaming



FO-ACAD-HSC-002/15AUG2019/REV.1



## REIGNALD ZACHARY P. CHENG

BS in Information Technology

with Specialization in Web and Mobile Application

### Objective

To develop a challenging role as a web and mobile app developer, using my skills in front-end and back-end development to design, develop and implement innovative solutions. Focusing on user experience and operational excellence, my goal is to build amazing web and mobile applications that not only meet but exceed customer expectations.

### Accomplished Projects

- ConvertIT: a real-time currency converter application for iOS | **Project Manager**
- TransitEase: a Rail Transport Management System with Crowd Control for LRT & MRT by DevOps| **Backend Developer**
- StuddyBuddy : an application for academics designed for web and mobile | **Lead Developer**

### Education

**BS in Information Technology with  
Specialization in Web and Mobile Application (BS IT-WMA)**

FEU Institute of Technology  
P. Paredes St., Sampaloc, Manila  
Expected Graduation - 2025

### High School

FEU High School  
Nicanor Reyes St. Sampaloc, Manila  
2019

### Personal Information

Address	:	147 Gospel St. Saint Gregory Village, Cainta, Rizal
Mobile	:	+639 39 390 5864
E-mail	:	reignald.zachary@gmail.com
Birthday	:	February 9, 2002
Father	:	Reginald S. Cheng
Mother	:	Belinda P. Cheng

### Hardware and Software Proficiency

C++

HTML

Java

Kotlin

Python

Swift

Codeigniter

Xcode

Android Studio

### Awards

Participant, IT Olympics 2023-2024

Top 16, Alliance Games, 2021

### Certifications

CCNA® Certificate of Course

Completion: Introduction to Networks 2023

CCNA® Certificate of Course

Completion: Switching, Routing, and Wireless Essentials 2023

CCNA® Certificate of Course

Completion: Enterprise Networking, Security, and Automation 2023

Certiport® Certified: Information Technology Specialist in

Networking 2023

### Organizations

Player, FIT iTamaraw Esports Club | 2021 – Present

### Other Interests

Gaming

Webtoons and Animations



Competitive e-Sports

Cooking



**THEO WILFRED D. SOSA**  
**BS in Information and Technology**  
with Specialization in **Web and Mobile Application**

### Objective

To obtain an internship as an IT developer at an innovative, thriving organization. I want to help the company achieve its objectives by using my expertise in web development, software development, and programming. I want to use my technical knowledge to develop cutting-edge software solutions that will aid the company in achieving its goals.

### Accomplished Projects

- [TransitEase](#): a Rail Transport Management System with Crowd Control for LRT & MRT by DevOps | **Researcher, Lead Mobile Developer**
- [TaskHub](#): Your Ultimate To-Do List Buddy! Designed exclusively for students, TaskHub is a dynamic task management app built with PHP and CodeIgniter. | **Back-End Developer**
- [Boss Liam's iPhone Store](#): an innovative E-Commerce Platform for iPhones using PHP. | **Developer, Designer, Database Developer**

### Education

**BS in Information Technology with  
Specialization in Web and Mobile Application (BS IT-WMA)**

FEU Institute of Technology  
P. Paredes St., Sampaloc, Manila  
Expected Graduation - 2025

### High School

Holy Trinity Academy  
Calabash Rd., Sampaloc Manila  
2019

### Personal Information

Address	:	1757 J Fajardo cor. Vicente Cruz Sampaloc Manila
Mobile	:	+63 9186279823
E-mail	:	theososa30@gmail.com
Birthday	:	December 30, 2002
Father	:	Francisco M. Sosa III
Mother	:	Rechilda D. Sosa

### Hardware and Software Proficiency

Xcode  
Kotlin  
Adobe Photoshop  
Microsoft Word  
Microsoft PowerPoint  
C++  
Java  
MySQL  
PHP  
Code Igniter  
Visual Studio Code  
Android Studio

### Certifications

Cisco® CCNA: Enterprise Networking, Security, and Automation Dec 2023  
Cisco® CCNA: Switching, Routing, and Wireless Essentials July 2023  
Certipoint® IT Specialist – Networking July 2023  
Cisco® CCNA: Introduction to Networks March 2023

### Organizations

Member, Alliance of Information Technology Students (AITs)|  
2021 – Present

### Other Interests

Gaming  
Digital Art  
Hockey



FO-ACAD-HSC-002/15AUG2019/REV.1



## BRIAN JONATHAN V. YABUT

**BS in Information and Technology**  
with Specialization in **Web and Mobile Application**

### Objective

I am looking for an internship as a Web Developer or IT specialist. My aim is to utilize my knowledge of web development, software development, and programming to support the company's goals. I hope to leverage my technical expertise to create innovative software solutions that can help the organization achieve its objectives.

### Accomplished Projects

- [TransitEase](#): a Rail Transport Management System with Crowd Control for LRT & MRT by DevOps | **Researcher, Lead Front-End Developer**
- [JollMcDo](#): Discover the ultimate culinary fusion with Jollibee and McDonald's in one convenient platform. | | **Lead Developer, Lead-Designer**
- [TaskHub](#): Your Ultimate To-Do List Buddy! Designed exclusively for students, TaskHub is a dynamic task management app built with PHP and CodeIgniter. | **Lead Front-End Developer**
- [Boss Liam's iPhone Store](#): an innovative E-Commerce Platform for iPhones using PHP. | **Lead Developer, Lead Designer, Lead Database Developer**

### Education

#### BS in Information Technology with Specialization in Web and Mobile Application (BS IT-WMA)

FEU Institute of Technology  
P. Paredes St., Sampaloc, Manila  
Expected Graduation - 2025

#### High School

St. Mary's Academy of Caloocan City  
Madre Ignacia Building, 12th Ave, Grace Park East, Caloocan City  
2019

### Personal Information

Address	:	104 Quezon St. 6 <sup>th</sup> Avenue Caloocan City
Mobile	:	+63 956 025 5905 (Touch Mobile)
E-mail	:	brianyabut02@gmail.com
Birthday	:	September 08, 2002
Father	:	Alfonso L. Yabut Jr.
Mother	:	Ana Rose V. Yabut

### Hardware and Software Proficiency

*Adobe Premier*  
*Adobe Photoshop*  
*Microsoft Word*  
*Microsoft Excel*  
*Microsoft PowerPoint*  
*C++*  
*Java*  
*Kotlin*  
*Xcode*  
*MySQL*  
*PHP*  
*Code Igniter*  
*Visual Studio Code*  
*Android Studio*

### Awards

*Spying the Spectrum: Software-Defined Radio (SDR) Hackathon - Best Idea Nov 2023*  
*2TSY2122 CCSMA Dean's Lister (Bronze) March 2022*

### Certifications

*Cisco® CCNA: Enterprise Networking, Security, and Automation Dec 2023*  
*Cisco® CCNA: Switching, Routing, and Wireless Essentials July 2023*  
*Certiport® IT Specialist – Networking July 2023*  
*Cisco® CCNA: Introduction to Networks March 2023*

### Organizations

*Member, Alliance of Information Technology Students (AITS)| 2021 – Present*

*Varsity, FIT iTamaraws Esports Club (TEC)| 2021 – Present*

### Other Interests

Gaming  
Digital Art  
Video Editing





# RAFAEL BEN EDWARD C. ROXAS

BS IN INFORMATION AND TECHNOLOGY WITH  
SPECIALIZATION IN WEB AND MOBILE APPLICATION

## OBJECTIVES

I am seeking an internship as a Web Developer or IT Specialist to apply my skills in web and software development, as well as programming. My goal is to contribute to the company's success by leveraging my technical expertise to develop innovative solutions that align with its objectives.

## ACCOMPLISHED PROJECT

- TransitEase: A Rail Transport Management System with Crowd Control for LRT & MRT by DevOps | Web Designer
- CARBNB: An Online Car Rental Management System with Mobile Application by EPIC | Back-End Programmer

## CERTIFICATIONS

- Cisco CCNA: Enterprise Networking, Security, and Automation Dec 2023
- Cisco CCNA: Switching, Routing, and Wireless Essentials July 2023
- Certiport IT Specialist - Networking July 2023
- Cisco CCNA: Introduction to Networks March 2023

## EXPERTISE

- Management Skills
- Creativity
- Digital Marketing
- Web Designing

## LANGUAGE

- English
- Tagalog

## EDUCATION

### FEU Institute of Technology

Bachelor of Science in Information and Technology  
with Specialization in Web and Mobile Application

Expected Graduation - 2025

### FEU ALABANG

Science, Technology, Engineering and Mathematics  
2019-2021

## SKILLS SUMMARY

- Xcode
- Php
- CodeIgniter
- Android Studio
- Visual Studio Code
- C++
- JAVA
- Kotlin