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SOFTWARE REQUIREMENT SPECIFICATIONS

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1.0 Introduction

The purpose of Software Requirements Specification (SRS) is to **analyze and describe the enhancements proposed for POS Malaysia mobile application**. The proposed innovative modifications include enhancing the account verification process by adding an OTP authentication system, improving the Rate Calculator that access with location and parcel dimension fields and making the account function accessible from the main page with essential features such as a “profile” icon to change passwords, update profile pictures, delete account and more. This Document covers the requirements for modifying POS Malaysia mobile applications to enhance operational efficiency, streamline processes and improve user satisfaction.

1.1 Background Study

POS Malaysia Berhad, also known as POS Malaysia, is the national postal service provider and the sole licensee for universal postal services in the country with history dating back to early 1800s. With a history spanning over 200 years, the company has expanded beyond traditional mail and package delivery to include retail, logistics, and aviation products and services (POS Malaysia, n.d.). It has also transitioned from a postal firm to a package delivery company that also distributes mail. POS Malaysia has the greatest last-mile reach, delivering to over 10 million locations around the country. It also has a network of over 3,500 touchpoints spread around the country, offering Malaysians the most complete retail network. It is also the parent company of Pos Laju.

POS Malaysia mobile application was first released on 13 May 2016 and has since expanded to provide digital services to incorporate digitalization and provide users the option to choose both online and over the counter postal services. Over the years, they have acquired more than 1 million downloads of their application. They require an operating system of at least Android 8.0 and iOS 13.0 (see Appendix A). Their mobile app allows users to access new integrated features such as Send Parcel, Outlet Finder, E-Consignment, Track and Trace, and others. Future additional features also include financing, remittance, and will management (The Malaysian Reserve, 2024).

Though POS Malaysia mobile application offers numerous helpful features, there are several areas for improvement. These include the **unstable account verification process**, **lack of location and dimension filtering** in shipping rate calculator, and **limited account management functions**. Despite that, POS Malaysia offers cheaper price range compared to others, making it the preferred postal service for many users. Therefore, we have analyzed the issues and proposed modifications to enhance the system.

1.1.1 What Kind of System

The current version of POS Malaysia app is 20.4.26, last updated on 24 April 2024 (see Appendix B). Our proposed POS Malaysia enhanced mobile application is designed to enhance user experiences. The modified systems focus on optimizing account verification process, rate calculation filters, and account management.

1. **Authenticating account with OTP (One-Time Password) Authentication System**
    - OTP simplifies the verification process by using phone numbers to retrieve the OTP verification code.
    - It enhances and strengthens the security system by ensuring only the registered phone number or the authorized user can access their account.
    - It provides a quicker process to access or verify accounts.

2. **Including Location and Dimension Filters to the Rate Calculator**
    - 3333

3. **Allowing Users More Flexibility in Account Management**
    - “My Profile” page to be added to the main page for quicker and direct access.
    - Users will be able to change passwords and update profile picture functions easily.

1.1.2 Who Needs the System

The enhanced POS Malaysia mobile application is designed to meet the needs of the primary target audience, which includes but is not limited to:

1. **Individual Consumers**
    - Access to the mobile app with simplified account verification, accurate rate calculation and functioning account management for profile updates will enhance customer usability, thereby increasing customer satisfaction.
    - Personalized delivery preferences in rate calculator, such as preferred delivery times and locations, enhance convenience.

- User-friendly interface and intuitive navigation make the app accessible to users of all tech proficiency levels.

2. Business Consumers

- Efficient and secure postal services, precise estimations of costs and simplified shipment operations will allow business consumers to make well-informed decisions.
- Access to a network of drop-off points and extended pick-up hours to accommodate business schedules.

1.1.3 Why They Need the System

The improved mobile application of POS Malaysia overcomes problems that affect operational effectiveness and user experience. The enhanced modified system improves user satisfaction by simplifying and controlling the OTP authentication verification procedure for a more seamless authentication experience. OTP authentications shorten the response time and frustration by **providing a safe and quick method to verify accounts** with just a registered number, as opposed to the problematic camera initialization authentication process the POS Malaysia currently implements. Besides, application accessibility is improved by ensuring all the functions and features are readily accessed with quicker loading times. By implementing the proposed systems, POS Malaysia can ensure a secure and user-friendly application which ultimately enhancing

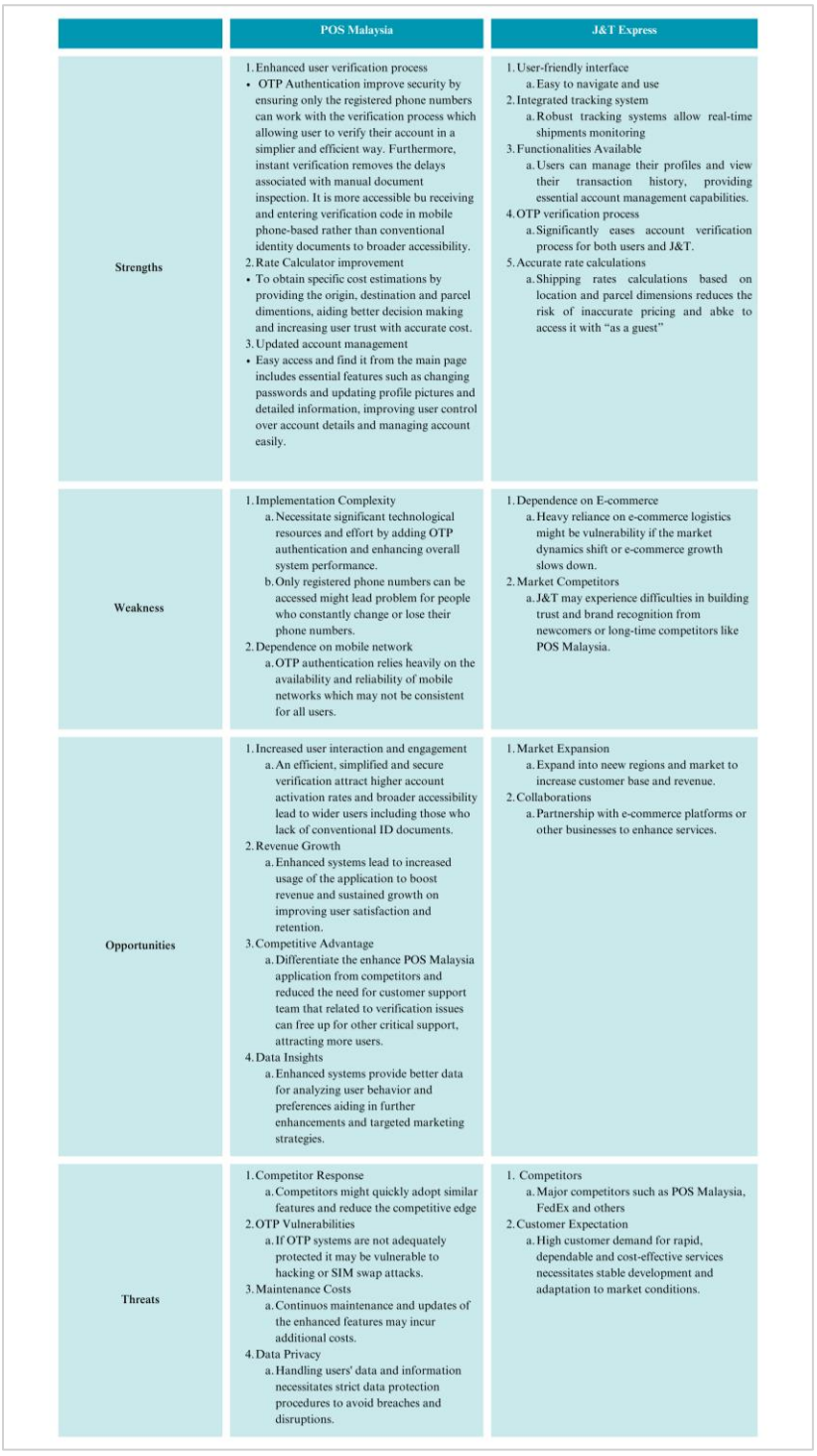
user satisfaction. Rate calculator enhancement will provide **accurate shipping cost estimation** as user can input detailed information about the dimensions, origins, and destinations. This feature helps users avoid unexpected prices and charges, enabling better planning for shipments, which leads to an efficient and satisfactory shipping experience that will ultimately increase the use of POS Malaysia mobile app. Moreover, a user-friendly account management system makes it **easier for users to access and manage their own account by updating and viewing it**. More control over their personal information is given to users by including easily accessible features like password changes, profile photo updates, and account deletions. Simplified accounts result in a more streamlined and enjoyable user experience and update their information securely by reducing the risk of unauthorized accounts.

1.1.4 How the Proposed System can Improve Their Activities

Based on the POS Malaysia mobile application, we find that the user verification process is unstable and complicated. New users meet a significant barrier on uploading and taking pictures of their MYCard/Passport/MYTentera cards which makes them inability to make payments or shipments and it is hard to access other full range of services (see Appendix C). Furthermore, Customers Service Support increases burden by receiving users' difficulties on the verification process which effects the efficiency of the customer support team by handling other major issues. Therefore, OTP verification implementation helps to deal with this problem. OTP system sends an OTP code to users' registered phone number to simplify the process and **creates a more secure verification process, reducing the risk of unauthorized access and enhancing overall trust**. Besides, the absence of dimension filters and location in the rate calculator leads to inaccurate cost estimations as the system does not allow origin and destination locations specification and parcel dimensions for domestic shipping. The enhanced rate calculator includes detailed fields of location position and parcel dimensions to **ensure a precise cost estimation**, helping users to plan better and reduce the risk of unexpected costs. Moreover, there are limitations in account management. The account page does not show on the homepage and lacks features and functions including not being able to update their profile picture and are limited to using the initially uploaded picture from their gallery. Additionally, changing passwords is not allowed, posing security risks, and the delete account feature is difficult to find. The improved streamlined account management placed on the home page will allow users to change their password easily and manage other profile settings. "Delete Account" section will also be placed at the "My Account" feature, increasing the overall satisfaction and making **a user-friendly platform**.

1.1.5 An Existing or Similar System Developed for Other Organizations

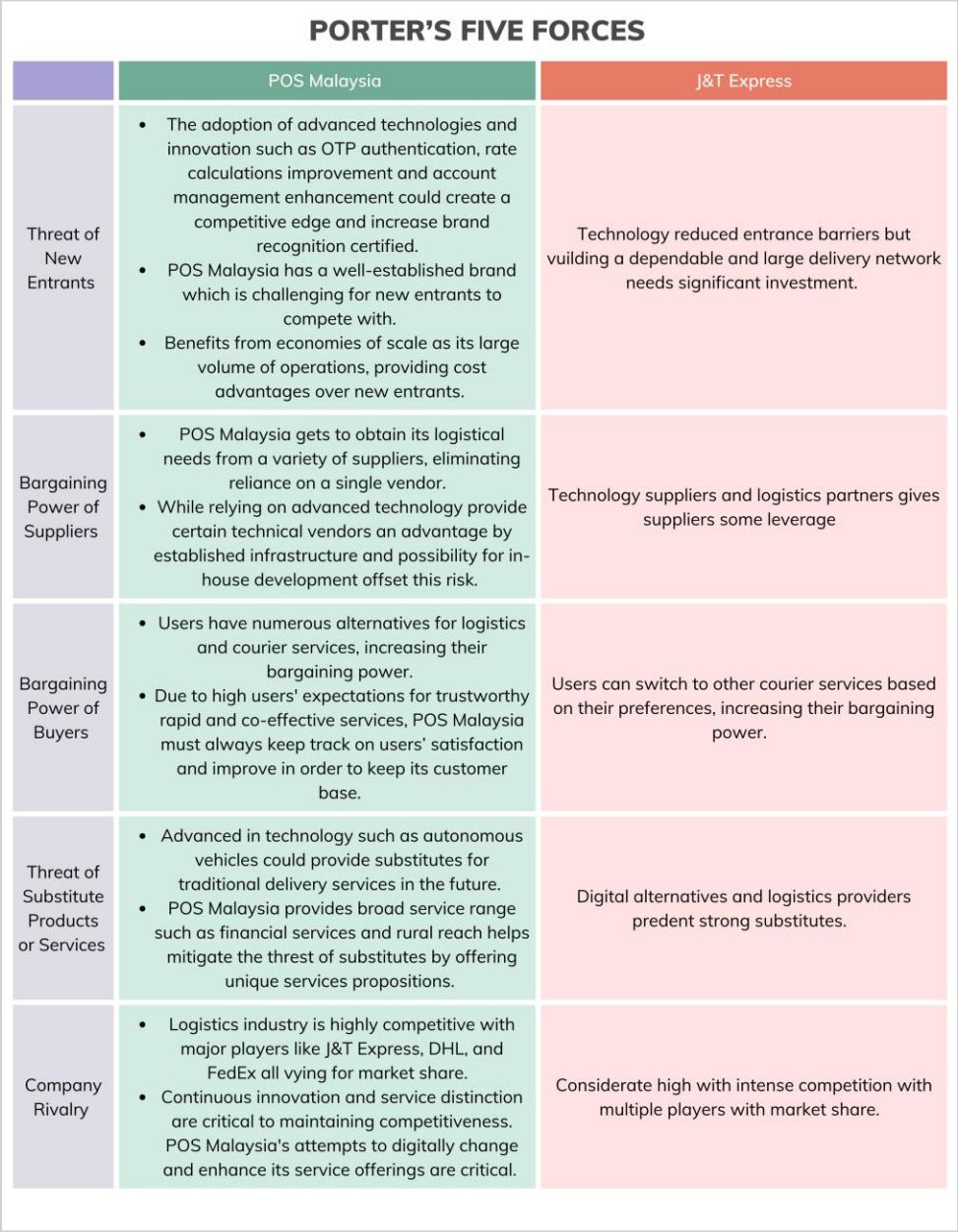
Figure 1 *SWOT Analysis*



	POS Malaysia	J&T Express
Strengths	1. Enhanced user verification process • OTP Authentication improve security by ensuring only the registered phone numbers can work with the verification process which allowing user to verify their account in a simplier and efficient way. Furthermore, instant verification removes the delays associated with manual document inspection. It is more accessible bu receiving and entering verification code in mobile phone-based rather than conventional identity documents to broader accessibility. 2. Rate Calculator improvement • To obtain specific cost estimations by providing the origin, destination and parcel dimentions, aiding better decision making and increasing user trust with accurate cost. 3. Updated account management • Easy access and find it from the main page includes essential features such as changing passwords and updating profile pictures and detailed information, improving user control over account details and managing account easily.	1. User-friendly interface a. Easy to navigate and use 2. Integrated tracking system a. Robust tracking systems allow real-time shipments monitoring 3. Functionalities Available a. Users can manage their profiles and view their transaction history, providing essential account management capabilities. 4. OTP verification process a. Significantly eases account verification process for both users and J&T. 5. Accurate rate calculations a. Shipping rates calculations based on location and parcel dimensions reduces the risk of inaccurate pricing and abke to access it with "as a guest"
Weakness	1. Implementation Complexity a. Necessitate significant technological resources and effort by adding OTP authentication and enhancing overall system performance. b. Only registered phone numbers can be accessed might lead problem for people who constantly change or lose their phone numbers. 2. Dependence on mobile network a. OTP authentication relies heavily on the availability and reliability of mobile networks which may not be consistent for all users.	1. Dependence on E-commerce a. Heavy reliance on e-commerce logistics might be vulnerability if the market dynamics shift or e-commerce growth slows down. 2. Market Competitors a. J&T may experience difficulties in building trust and brand recognition from newcomers or long-time competitors like POS Malaysia.
Opportunities	1. Increased user interaction and engagement a. An efficient, simplified and secure verification attract higher account activation rates and broader accessibility lead to wider users including those who lack of conventional ID documents. 2. Revenue Growth a. Enhanced systems lead to increased usage of the application to boost revenue and sustained growth on improving user satisfaction and retention. 3. Competitive Advantage a. Differentiate the enhance POS Malaysia application from competitors and reduced the need for customer support team that related to verification issues can free up for other critical support, attracting more users. 4. Data Insights a. Enhanced systems provide better data for analyzing user behavior and preferences aiding in further enhancements and targeted marketing strategies.	1. Market Expansion a. Expand into neew regions and market to increase customer base and revenue. 2. Collaborations a. Partnership with e-commerce platforms or other businesses to enhance services.
Threats	1. Competitor Response a. Competitors might quickly adopt similar features and reduce the competitive edge 2. OTP Vulnerabilities a. If OTP systems are not adequately protected it may be vulnerable to hacking or SIM swap attacks. 3. Maintenance Costs a. Continuos maintenance and updates of the enhanced features may incur additional costs. 4. Data Privacy a. Handling users' data and information necessitates strict data protection procedures to avoid breaches and disruptions.	1. Competitors a. Major competitors such as POS Malaysia, FedEx and others 2. Customer Expectation a. High customer demand for rapid, dependable and cost-effective services necessitates stable development and adaptation to market conditions.

Based on this SWOT analysis, it is evident that POS Malaysia can learn from J&T Express and implement an OTP verification system to enhance user convenience during account verification processes (see Appendix C). Similarly, they should emulate J&T Express by prominently featuring the user account access button on the main page. Additionally, adding more detailed filters in their rate calculator will enable POS Malaysia to provide more precise rate estimations, further enhancing user experience. These modifications to the application will undoubtedly propel POS Malaysia ahead of its competition.

Figure 2 *Porter's Five Forces Analysis*



PORTER'S FIVE FORCES

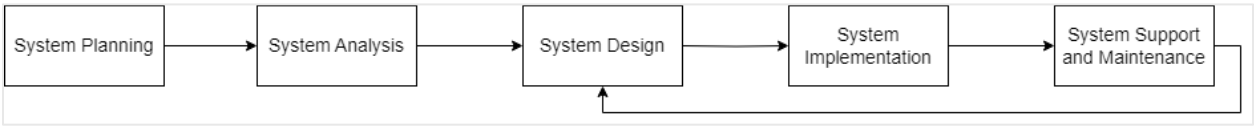
	POS Malaysia	J&T Express
Threat of New Entrants	• The adoption of advanced technologies and innovation such as OTP authentication, rate calculations improvement and account management enhancement could create a competitive edge and increase brand recognition certified. • POS Malaysia has a well-established brand which is challenging for new entrants to compete with. • Benefits from economies of scale as its large volume of operations, providing cost advantages over new entrants.	Technology reduced entrance barriers but vuilding a dependable and large delivery network needs significant investment.
Bargaining Power of Suppliers	• POS Malaysia gets to obtain its logistical needs from a variety of suppliers, eliminating reliance on a single vendor. • While relying on advanced technology provide certain technical vendors an advantage by established infrastructure and possibility for in-house development offset this risk.	Technology suppliers and logistics partners gives suppliers some leverage
Bargaining Power of Buyers	• Users have numerous alternatives for logistics and courier services, increasing their bargaining power. • Due to high users' expectations for trustworthy rapid and co-effective services, POS Malaysia must always keep track on users' satisfaction and improve in order to keep its customer base.	Users can switch to other courier services based on their preferences, increasing their bargaining power.
Threat of Substitute Products or Services	• Advanced in technology such as autonomous vehicles could provide substitutes for traditional delivery services in the future. • POS Malaysia provides broad service range such as financial services and rural reach helps mitigate the threst of substitutes by offering unique services propositions.	Digital alternatives and logistics providers predent strong substitutes.
Company Rivalry	• Logistics industry is highly competitive with major players like J&T Express, DHL, and FedEx all vying for market share. • Continuous innovation and service distinction are critical to maintaining competitiveness. POS Malaysia's attempts to digitally change and enhance its service offerings are critical.	Considerate high with intense competition with multiple players with market share.

To summarise, in the competitive landscape, J&T Express and POS Malaysia both face challenges and opportunities. While technology presents opportunities for innovation, both require significant investment. POS Malaysia benefits from an established brand and economies of scale, while J&T Express faces reduced entrance barriers but needs to build a reliable delivery network. Both companies have multiple suppliers, reducing reliance on a single vendor, but customers have numerous alternatives, increasing their bargaining power. Additionally, advanced technology and digital alternatives pose

substitutes, but POS Malaysia's diverse service range mitigates this. Continuous innovation is vital for both to stay competitive in the dynamic market. Hence, to advance POS Malaysia’s standing in the postal service industry, POS Malaysia can work on enhancing its technological capabilities and investing in a robust delivery network. Additionally, focusing on building partnerships with reliable suppliers and staying ahead of emerging trends in logistics will further strengthen its competitive position.

1.2 Development Methodology (Software Process Model)

Figure 3 *Iterative Software Development Methodology*



The iterative model is a software development methodology that emphasizes the cyclical repetition of various phases. Instead of completing the entire project in one go, the iterative model breaks down the project into smaller, manageable parts or iterations. Each iteration involves the development and refinement of a subset of the final system, allowing for continuous improvement based on user feedback and ongoing testing.

For the POS Malaysia app enhancement project, we are employing the iterative model to ensure that each feature is developed, tested, and refined before moving on to the next. This approach allows for a more flexible and adaptive development process, ensuring that each feature meets user requirements and expectations effectively. The iterative model for the enhanced POS Malaysia app involves repeating cycles of system design, system implementation, and system support and maintenance for each feature, with the sequence of releases being OTP account verification, improved rate calculator, and enhanced account management feature. System planning and system analysis are done once at the beginning.

1.2.1 System Planning

1. Objectives and Goals

The planning phase involves preparation to enhance the existing system by defining the objectives, project scope, its resources, schedule of the project and risk that may be encountered. It ensures the modification aligned with organizational goal. SWOT analysis is performed to provide valuable insights to enhance this process. The purpose of this project is **to modify the account verification process, improve the rate calculator function, and enhance account management functions**. The project scope comprises modifications to the existing account verification process, enhance user convenience in verifying accounts, rate calculating, and updating profiles. Testing should be conducted to ensure the system's functionality and improve the accuracy of rate calculation. An OTP authentication is introduced while removing the current identity card authentication method. A destination location and parcel dimensions option should also be included in the calculator feature. Lastly, this project includes the change password and update profile features in the homepage to enhance flexibility in managing user's profile. When users are allowed to change their password, it helps to secure access to their account and prevent security threats. Therefore, this modification does not only improve the overall user experience, but it also remains as POS Malaysia's competitive advantage.

2. Feasibility Study

A feasibility study evaluates 4 aspects including **technical, operational, economic, and schedule feasibility**. The IT team compares the current technology with the suggested modification and determines the additional features required under the technical feasibility study. Operational feasibility includes evaluating the impact of system modification on the current system, evaluating how well users interact with the modification and how they engage in user engagement. Economic feasibility oversees evaluating net present value, internal rate of return, payback period, and return on investment of the modification. Lastly, schedule feasibility determines the start date, end date, expected time frame, available resources, slack time and risk that could cause delays. These tests help to ensure the proposed modification is worth implementing.

3. Resource Allocation

RM590,300 is allocated in the budget estimation for software development, software tools, infrastructure, equipment, labour cost, training, presentation materials, travel expenses, and contingency, with a 3-month project duration and 5 key milestones including the planning, analysis, design, implementation, and support and security. Five teams are involved in this project which are the team lead to coordinate the whole project, IT development team to design the interface and database, IT operation team helps the development team to design interface in addition with testing the system. IT security team oversees system development and system testing and UI/UX team develop the user interface.

4. Risk Management and Project Plan

Risk management is conducted to identify the risk of losing application function, data, and valuable information. It can also identify the possibility of downtime, performance, and security issues or delays due to miscommunication. In order to mitigate these risks, POS Malaysia can use strategies such as implementing a robust backup procedure, test before launching, and conduct regular briefing. The project plan includes a task breakdown, critical path method schedule table, and Gantt chart to break down the project into smaller and manageable task for scheduling the task to appropriate team members, determine shortest possible project duration and present the overview project status to allow team members to understand the project timeline.

5. Stakeholder Analysis and Approval

Stakeholder analysis is done to identify internal and external stakeholders involved in this project. In this system modification, the project team and IT department are involved, however, application users will also be affected by this modification. Team members must gather stakeholder's requirements and ensure it is understood to reach their expectations. Throughout the project, stakeholders are also being updated regularly to inform about progress. After planning the project, a system request form and business case is sent to the stakeholders to outline the purpose of the modification and detailed information about the system modification. Once approved, the team will proceed to the next task.

1.2.2 System Analysis

1. Purpose and System Overview

The purpose of the analysis phase is to gather requirements for system modification to ensure it meets POS Malaysia's expectations. This phase is important to understand the details that POS Malaysia wants and ensure the feasibility in the proposed modification. It describes the requirements modeling, data and process modeling, and object modeling. Moreover, it also includes the method used to develop the system. The current POS Malaysia mobile application has functions such as rate calculator, parcel tracking, and vehicles insurance renewal. However, there are a few limitations and problems with the current system. The user account verification is overly complex, retaining users to use POS Malaysia's service as verification is needed to use the services. There is no location dimension option for users to calculate the rate and users are unable to manage their profile such as changing password, update their profile due to the lack of account management features. After this modification, the system will remove the identity card authentication method and replace it with OTP authentication method. This improves user experience as it brings convenience to users where they can receive OTPs through their mobile devices. The rate calculator provides a more precise pricing to users to ensure the accuracy of estimated shipping fees.

2. Requirement Modeling

Requirements modeling is an important process to define the functional and non-functional requirements of the system. The output requirements identify what the system should produce. In this modification, the system should produce an OTP to the user's short message service., the rate calculator should generate an accurate shipping fee and the profile page should show confirmation message when the password or profile updates have been done. The input requirements ensure the data from users have to be accepted. In this system, the verification process should accept the OTP number entered by the user, the rate calculator should consider the location and dimension input by the users and account management function should accept the passwords or updated profile

information that the user wants to change. Performance requirements show the expected performance of the system. The system should deliver the OTP to users within a timeframe, rate calculation should be shown within few seconds after the user has input the information. The system should also change password or update profile within few seconds when the user submits. Lastly, the security requirements define the safety measures to protect the system from threats. The OPT number must be set to only-use-once and use within 5 minutes. When user change passwords, it should be ensured that the password is strong for example the password should contains upper and lower case and numerical numbers as a combination.

3. Fact-finding and Team-oriented Methods

Fact-finding is conducted to collect system requirements and problems of the current system. This ensures better understanding of POS Malaysia's business process and requirements for system modification. Discovering the problems found in POS Malaysia was an iterative and interactive process. We used two types of fact finding methods – interview and observation.

To discover how internal stakeholders feel about POS Malaysia's mobile application, an interview with the head of product – Mr Amit Mehta was conducted. We were connected to Mr Amit through Charles Brewer, CEO of POS Malaysia (see Appendix D). After communicating our available time schedules, we finally set a date for the interview (see Appendix E).

Mr Amit was helpful in providing us with insights and opinions on the shortcomings of the application. The following information was concluded from the interview:

Table I *Question and Answer from Interview Session with Amit Mehta*

	Question	Answer
1.	Have you encountered any problems while navigating through the POS Malaysia app?	Yes. The process flow from home page to the

		'Prepaid' page can be further improved.
2.	What are the most common issues or complaints reported by users of the POS Malaysia app?	Most users have trouble navigating through the verification process. Most cannot verify their account. Users also have trouble finding certain services such as insurance and Prepaid services.
3.	What aspects of the mobile app would you suggest that we look into?	The navigation process from 'Prepaid'. It would be great if you could provide a solution that eases user navigation.

Taking Mr Amit's insights and suggestions into consideration, we began our in-depth investigation and analysis of POS Malaysia's mobile application. Though POS Malaysia already has an impressive mobile system, there are several areas where they could improve on to increase user satisfaction while using the app.

Firstly, we observed that the **account verification process** of the application could be improved. A successful account verification is crucial to navigate the app. Currently, the mobile app requires users to take snapshots of their identification cards to verify their account. Camera initialisation is prompted, but ultimately fails. Without verifying their identities, users cannot perform services such as send parcel. This hinders their navigation and decreases user satisfaction. To rectify this problem, we suggest that an OTP verification is used instead. One-Time Password (OTP) verification simplifies the user experience by allowing users to verify their accounts through a familiar and straightforward process. Most users are already accustomed to receiving and entering OTPs sent via SMS or email, making the process intuitive and less intimidating compared to uploading documents. Furthermore, OTP verification eliminates the need for camera access and avoids technical complications related to image capture and upload.

We have also observed that the delivery **rate calculator function lacks filters** such as dimension and location, which significantly hampers its utility and user experience. Without these filters, users cannot accurately estimate shipping costs based on the size

of their parcels or their specific delivery destinations, leading to potential inaccuracies and frustration. This limitation not only reduces user satisfaction but also undermines the reliability of the app's services. To address this issue, we suggest implementing filters for parcel dimensions (height*width*depth, in cm) and delivery locations within the rate calculator. By allowing users to input these critical details, the app can provide more precise and relevant cost estimates, thereby enhancing the overall user experience and ensuring greater trust in the app's functionality.

Lastly, we observed that the mobile application would offer significantly better usability if it included an explicit, **specific account page** where users can manage their accounts, instead of the current setup where these options are hidden in a “delete account” page. This enhancement would provide users with greater control and flexibility over their accounts, improving their overall experience and satisfaction with the app. Allowing users to easily delete their accounts, manage their passwords, and change their profile pictures on a dedicated account page ensures they have the autonomy to manage their personal data, which is crucial for building trust and complying with data privacy standards. Additionally, enabling password management helps users maintain better security by updating passwords as needed, while the option to change profile pictures adds a personal touch, fostering a more engaging and personalized user experience. We suggest redesigning the account management interface to make these features easily accessible and user-friendly, enhancing navigation and overall usability.

The fact-finding process ensured that there is no biased information and communication with stakeholders should not have barriers. Outcomes from these methods include understanding the limitations of the system and gathering the requirements from the stakeholder. Team-oriented methods emphasized how team members collaborate and communicate throughout the whole system modification process. Agile method is used throughout the process. Developers implement OTP authentication function, location and dimension option, and change password and update profile function. Then, the system tester ensures it is reliable, functionable, and its security is strong. When each feature or step is conducted, team members continuously provide feedback and insights to continuously improve to enhance security, user experience and the functionality of the application.

4. System Requirements Checklist

System requirements checklist defines what is necessary to make a successful modification of a system. There are five areas to check which are output, input, process, performance, and controls. Output requirements list the expected results that the system should be after inputting data. Output requirements include OTP authentication, accurate rate calculator, and a manageable user profile. Input requirements include phone number, exact destination location and dimensions of the parcel, and user details or new passwords. This data provided by the users must be correct to produce an output. Moreover, process requirements define the steps to process the inputs to product output. OTP authentication is requested by the user then the system will generate the OTP and send it to the user's phone. Users then enter OTP to verify their account. Regardless of the rate calculator, users must enter the correct location and dimension, then the system will calculate the shipping rates and display it to the users. Finally, users have to enter a new password or user information that they wish to update into the system then the system validates them and updates the user's profile. Performance requirements state how the system performs like OTP should be sent within the specific time and how long the OTP is validated for. The shipping rates are ensured to display within few minutes after the input is sent and the profile should be updated immediately when the user sends the updated information. As a final requirement, the control equipment ensures that the system is reliable and secure. This includes secure generation of OTPs, and it should not validate after 5 minutes. Ensure the input is reasonable to calculate shipping fees and verification should be done before users can update their profile. Strong passwords rules should be implemented to ensure safe access.

5. Setting Priorities

It is important to set priorities for each task based on several factors such as needs, constraints, importance and urgency. Setting priorities has several benefits where it helps to allocate resources to most important requirements first. It also assists the team in planning the project timeline on which requirements should go first. Moreover, prioritizing

the requirements that the stakeholder addresses first could lead to higher satisfaction of stakeholders. It also reduces the risk of missing the business goal or not being able to meet expectations.

Iteration 1: OTP authentication is in the highest priority due to few reasons which is users will not be able to use POS Malaysia's services through the mobile application without account verification. Tasks that relate to OTP authentication should be prioritized first such as implementation of OTP generator and a user interface that supports OTP authentication.

Iteration 2: user account management function is also high in prior to allow users to update their profile and change password, enhance control to their personal data resulting in a better user experience. Tasks related to user account management include designing the interface for users to update their profile and change password and test if users can update their profile seamlessly and passwords are changed immediately.

Iteration 3: Implement location and dimension option in rate calculator function are less important. Location and dimension input functionality is ensured to integrate with the rate calculator function. Task related to this iteration includes modifying the interface by adding these two options, integrating location and dimension inputs with the rate calculator function, and modifying the algorithms to make sure it displays accurate rates to the users.

1.2.3 System Design

1. Modifying Account Verification Process

(a) User Interface Design:

To modify the **account verification process**, the user interface design will include three key screens. The first screen is the Phone Number Input Screen, where users can enter

their phone number in a straightforward manner. Following this, the OTP Entry Screen allows users to input the **OTP** received via SMS, with clear instructions provided to guide them through the process. This screen will also include an option to resend the OTP if needed. Finally, the Verification Success Screen will confirm that the user's account has been successfully verified.

(b) Data Design:

The data design involves updating the existing user table to include additional fields for the phone number and verification status. Additionally, a new OTP table will be created to manage the storage of OTPs. This table will contain fields for the OTP value, the associated phone number, the creation timestamp, and the expiry time.

(c) System Architecture:

The system architecture will include several critical services. First, an OTP Generation Service will generate and store OTPs, linking each OTP to the user’s phone number. Next, an SMS Gateway Integration service will be implemented to send these OTPs via SMS to the user’s phone number. Finally, an OTP Verification Service will be established to verify the OTP entered by the user against the stored value, subsequently updating the user's verification status in the system.

2. Improved Rate Calculator Feature

(a) User Interface Design:

To enhance the **rate calculator** feature, the user interface design will include two primary screens. The first is the **Origin and Destination Input Screen**, where users can specify their shipping locations by entering both the origin and destination details. The second is the Parcel Details Input Screen, where users can input the dimensions of their parcel, including length, width, height, and weight.

(b) Data Design:

The data design for this feature will involve creating two essential tables. The Locations Table will store data related to the origin and destination locations specified by users,

including fields for city, state, and postal code. Additionally, the Parcels Table will be created to store detailed information about parcel dimensions.

(c) System Architecture:

The system architecture will include a Rate Calculation Service, which will act as a microservice dedicated to calculating shipping costs based on the provided origin, destination, and parcel dimensions. This service will be connected to POS Malaysia's pricing database or an external API to retrieve accurate and up-to-date shipping rates.

3. Enhanced Account Management Function

(a) User Interface Design:

To enhance the account management function, the user interface design will feature three main screens. The first is the **Account Management Main Screen**, which will be designed to be easily accessible from the main page of the app. The second screen is the **Password Change Screen**, where users can securely change their password. Lastly, the **Profile Picture Update Screen** will allow users to upload and update their profile picture.

(b) Data Design:

In terms of data design, the User Table will be updated to support these enhanced account management functions. The table will include fields for securely storing user passwords using techniques such as hashing to ensure security. Additionally, it will have a field to store the URL of the user's profile picture.

(c) System Architecture:

The system architecture will incorporate several key services to support the enhanced account management functions. The Account Management Service will be responsible for handling all user account updates, including password changes and profile picture updates. Additionally, a File Storage Service will be integrated to manage the storage of profile pictures securely. This service will handle the upload, storage, and retrieval of profile images.

1.2.4 System Implementation

The implementation phase involves deploying the tested enhancements to the production environment.

1. Modifying Account Verification Process to OTP Authentication

Deployment planning will be critical, scheduling the deployment during off-peak hours to minimize disruption and preparing for a potential rollback if issues arise. The database schema will be updated to store phone numbers and OTP-related information, ensuring seamless data migration. During release management, the new OTP verification feature will be deployed to the production environment, with proper logging and monitoring in place to track OTP requests and authentications. Post-deployment verification will then be conducted to ensure the OTP feature is functioning correctly in the live environment, with continuous monitoring for any immediate issues.

2. Improved Rate Calculator Feature

Deployment planning will focus on minimizing disruptions to current users, with careful scheduling to ensure a seamless transition. A feature toggle will be employed to enable the new rate calculator for a subset of users initially, allowing for performance monitoring and user feedback before a full rollout. Backend services will be updated to handle the new inputs for origin, destination, and parcel dimensions. Post-deployment verification will involve close monitoring of the new rate calculator's performance and accuracy in the live environment, ensuring that users can access and utilize the new features without any issues.

3. Enhanced Account Management Function

During the implementation phase for the enhanced account management function, careful deployment planning will be essential to seamlessly integrate the new features without disrupting existing functionalities. The user interface will be updated to ensure easy

access to the Account Management page from the main page, enhancing user experience and convenience. Backend integration will be crucial to ensure that the necessary services support new functionalities such as password change and profile picture updates. Post-deployment verification will involve monitoring the new account management functionalities for any issues and collecting user feedback to ensure that the changes effectively meet their needs and expectations.

1.2.5 System Support and Security

Ongoing support and improvement for the POS Malaysia app will be provided to ensure the app remains functional and up to date.

1. Modifying Account Verification Process to OTP Authentication

For the modification of the account verification process to OTP authentication, a robust monitoring system will be implemented to continuously track the OTP system's performance and identify any potential issues or security vulnerabilities. Analytics will be utilized to gauge user engagement and success rates with the new verification process, providing valuable insights for further optimization. Additionally, dedicated user support will be provided to address any issues related to OTP authentication promptly. Regular reviews and updates to the OTP system will be conducted to enhance security and functionality, with responsiveness to user feedback driving iterative improvements to the verification process.

2. Improved Rate Calculator Feature

Regarding the improved rate calculator feature, comprehensive monitoring will be essential to track usage patterns and assess the accuracy of the calculator. Feedback and error reports will be actively analyzed to identify areas for enhancement, ensuring that the rate calculator meets users' needs effectively. User support will be readily available to assist individuals encountering difficulties with the new feature. Regular updates to the rate calculator will be conducted to maintain accuracy with current shipping

rates and policies, incorporating improvements based on user feedback to enhance overall usability.

3. Enhanced Account Management Function

For the enhanced account management function, ongoing monitoring will be conducted to evaluate the adoption of the new functionalities. Additionally, thorough monitoring will be implemented to detect any potential security issues or bugs. User support services will be provided to assist individuals encountering challenges with password changes or profile picture updates. Periodic updates to the account management features will be carried out to introduce new functionalities and refine existing ones, with user feedback serving as a valuable guide for prioritizing and implementing these updates.

1.3 Project Milestones and Deliverables

Table II *Project Milestones and Deliverables*

No.	Date/ Week	Milestones	Deliverables
1.	4	Submission of proposal Important milestones:	• Proposal • System Request Form • Business Case

No.	Date/ Week	Milestones	Deliverables
		• Select the target company and system for detailed research and analysis. • Initial meeting with POS Malaysia key stakeholder • Identification of key problems and limitations with the current system	• Production of POS Malaysia's SWOT analysis • Analysis of POS Malaysia's Porters 5 forces
2.	7	Submission of SRS	• Software Development Life Cycle (SDLC) • Gantt chart • PERT/CPM analysis • Functional Requirements • Non-functional requirements
3.	9	Submission of SDD	• Data Flow Diagram • Data Dictionary • Use Case Diagram • Class Diagram • Sequence Diagram • Activity Diagram • State Transition Diagram
4.	10	Submission of STR	• Paper prototype • Heuristic Evaluation • Usability Testing • Digital Mockup • STR Presentation
5.	12	Submission of Final Report and Presentation Video	• Website/ Prototype • Video • Poster

No.	Date/ Week	Milestones	Deliverables
			• Presentation • Final Report

1.4 Project Schedules

1.4.1 Task Breakdown

Table III *Project Task Breakdown*

No.	Tasks	Duration	Predecessor

1.	Forming a group of 5 for mini project	22/4 – 24/4 (3 days)	-
2.	Information Systems Selection – Proposing and Analyzing Companies' Websites and Applications • Identify problems and deficiencies in the existing systems • Identify key stakeholders of each company	1/5 – 2/5 (2 days)	1
3.	Email key stakeholders of each company for collaboration and interview requests	2/5 (1 day)	2
4.	Decide on POS Malaysia as Information Systems Modification Company	3/5 (1 day)	3
5.	Schedule interview to gather more information on the problems of POS	3/5 – 7/5 (5 days)	4
6.	Project Proposal - Prepare systems request form (SRF) and business case by identifying: • Vision, mission, objective of project • Background information of POS Malaysia • Problems from the mobile application • Suggested solutions • Deadlines • Feasibility study	7/5 – 18/5 (12 days)	5
7.	Present Proposal	14/5 (1 day)	6
8.	Submit Proposal	18/5 (1 day)	6
9.	Complete project report – Introduction and Literature Review	13/5 – 24/5 (12 days)	6
10.	Construct software requirement specification (SRS) – Section 1.1 Background study	21/5 – 30/5 (10 days)	6
11.	Construct software requirement specification (SRS) – Section 1.2 Development Methodology	21/5 – 30/5 (10 days)	6

12.	Construct software requirement specification (SRS) – Section 1.3 Project milestones and deliverables	21/5 – 30/5 (10 days)	6
13.	Construct software requirement specification (SRS) – Section 1.4 Project Schedules	21/5 – 30/5 (10 days)	6
14.	Construct software requirement specification (SRS) – Section 2.1 Overall use case diagram	28/5 – 6/6 (10 days)	6
15.	Construct software requirement specification (SRS) – Section 2.2 Details of use case diagram	28/5 – 6/6 (10 days)	6
16.	Construct software requirement specification (SRS) – Section 3.0 Nonfunctional requirements	28/5 – 6/6 (10 days)	6
17.	Construct software requirement specification (SRS) – Section 4.0 requirements reviews	28/5 – 6/6 (10 days)	6
18.	Construct software design document (SDD)– Section 1.0 Context Diagram	28/5 – 6/6 (10 days)	6
19.	Construct software design document (SDD)– Section 2.0 Data Flow Diagram	28/5 – 6/6 (10 days)	6
20.	Construct software design document (SDD)– Section 3.0 ERD Diagram	28/5 – 6/6 (10 days)	6
21.	Construct software design document (SDD)– Section 4.0 Class Diagram	28/5 – 6/6 (10 days)	6
22.	Construct software design document (SDD) – Section 5.0 Sequence Diagram	28/5 – 6/6 (10 days)	6
23.	Construct software design document (SDD) – Section 6.0 State Transition Diagram	28/5 – 6/6 (10 days)	6
24.	Construct software design document (SDD) – Section 7.0 Activity Diagram	28/5 – 6/6 (10 days)	6

25.	Construct software design document (SDD) – Section 8.0 Use Case Diagram	28/5 – 6/6 (10 days)	6
26.	Submit SRS	7/6 (1 day)	10 – 17
27.	Submit SDD	14/6 (1 day)	18 – 25
28.	Construct software test description (STR) – create paper prototype of application solution and obtain heuristic evaluation	17/6 – 24/6 (8 days)	27
29.	Construct software test description (STR) – perform usability testing with target users and gather feedback	24/6 – 30/6 (7 days)	27
30.	Construct software test description (STR) – Develop digital mockup	24/6 – 30/6 (7 days)	27
31.	Document each stage in methodology (design) section	17/6 – 30/6 (14 days)	28 – 30
32.	Present STR and obtain peer feedback	1/7 – 7/7 (7 days)	28 – 30
33.	Project report – document results and discussions (implementation)	1/7 – 7/7 (7 days)	31
34.	Project report – document abstract of report	1/7 – 7/7 (7 days)	9, 31, 33
35.	Submit STR	6/7 (1 day)	32
36.	Develop website/prototype, provide video, and design a poster for modified application	8/7 – 12/7 (5 days)	35
37.	Present functional prototype of enhanced POS mobile application	8/7 – 19/7 (12 days)	36
38.	Finalize report with a conclusion section	8/7 – 19/7 (12 days)	34
39.	Submit Report	15/7 – 20/7 (6 days)	38

1.4.2 CPM Schedule Table

Table IV *Project CPM Schedule Table*

No.	Tasks	Duration (Days)	Predecessor(s)	ES	EF	LS	LF	Slack
1.	Forming a group of 5 for mini project	3	-	0	3	0	3	0
2.	Information Systems Selection – Proposing and Analyzing Companies' Websites and Applications	2	1	3	5	3	5	0
3.	Email key stakeholders of each company for collaboration and interview requests	1	2	5	6	5	6	0
4.	Decide on POS Malaysia as Information Systems Modification Company	1	3	6	7	6	7	0
5.	Schedule interview to gather more information on the problems of POS	5	4	7	12	7	12	0
6.	Project Proposal - Prepare systems request form (SRF) and business case	12	5	12	24	12	24	0
7.	Present Proposal	1	6	24	25	24	25	0
8.	Submit Proposal	1	6	24	25	24	25	0

No.	Tasks	Duration (Days)	Predecessor(s)	ES	EF	LS	LF	Slack
9.	Complete project report – Introduction and Literature Review	12	6	24	36	52	64	28
10.	Construct software requirement specification (SRS) – Section 1.1 Background study	10	6	24	34	24	34	0
11.	Construct software requirement specification (SRS) – Section 1.2 Development Methodology	10	6	24	34	24	34	0
12.	Construct software requirement specification (SRS) – Section 1.3 Project milestones and deliverables	10	6	24	34	24	34	0
13.	Construct software requirement specification (SRS) – Section 1.4 Project Schedules	10	6	24	34	24	34	0
14.	Construct software requirement specification (SRS) – Section 2.1 Overall use case diagram	10	6	24	34	24	34	0
15.	Construct software requirement	10	6	24	34	24	34	0

No.	Tasks	Duration (Days)	Predecessor(s)	ES	EF	LS	LF	Slack
	specification (SRS) – Section 2.2 Details of use case diagram							
16.	Construct software requirement specification (SRS) – Section 3.0 Nonfunctional requirements	10	6	24	34	24	34	0
17.	Construct software requirement specification (SRS) – Section 4.0 requirements reviews	10	6	24	34	24	34	0
18.	Construct software design document (SDD)– Section 1.0 Context Diagram	10	6	24	34	24	34	0
19.	Construct software design document (SDD)– Section 2.0 Data Flow Diagram	10	6	24	34	24	34	0
20.	Construct software design document (SDD)– Section 3.0 ERD Diagram	10	6	24	34	24	34	0
21.	Construct software design document (SDD)– Section 4.0 Class Diagram	10	6	24	34	24	34	0
22.	Construct software design document	10	6	24	34	24	34	0

No.	Tasks	Duration (Days)	Predecessor(s)	ES	EF	LS	LF	Slack
	(SDD) – Section 5.0 Sequence Diagram							
23.	Construct software design document (SDD) – Section 6.0 State Transition Diagram	10	6	24	34	24	34	0
24.	Construct software design document (SDD) – Section 7.0 Activity Diagram	10	6	24	34	24	34	0
25.	Construct software design document (SDD) – Section 8.0 Use Case Diagram	10	6	24	34	24	34	0
26.	Submit SRS	1	10-17	34	35	34	35	0
27.	Submit SDD	1	18-25	34	35	34	35	0
28.	Construct software test description (STR) – create paper prototype of application solution and obtain heuristic evaluation	8	27	35	43	35	43	0
29.	Construct software test description (STR) – perform usability testing with target users and gather feedback	7	27	35	42	36	43	1
30.	Construct software test description (STR) –	7	27	35	42	36	43	1

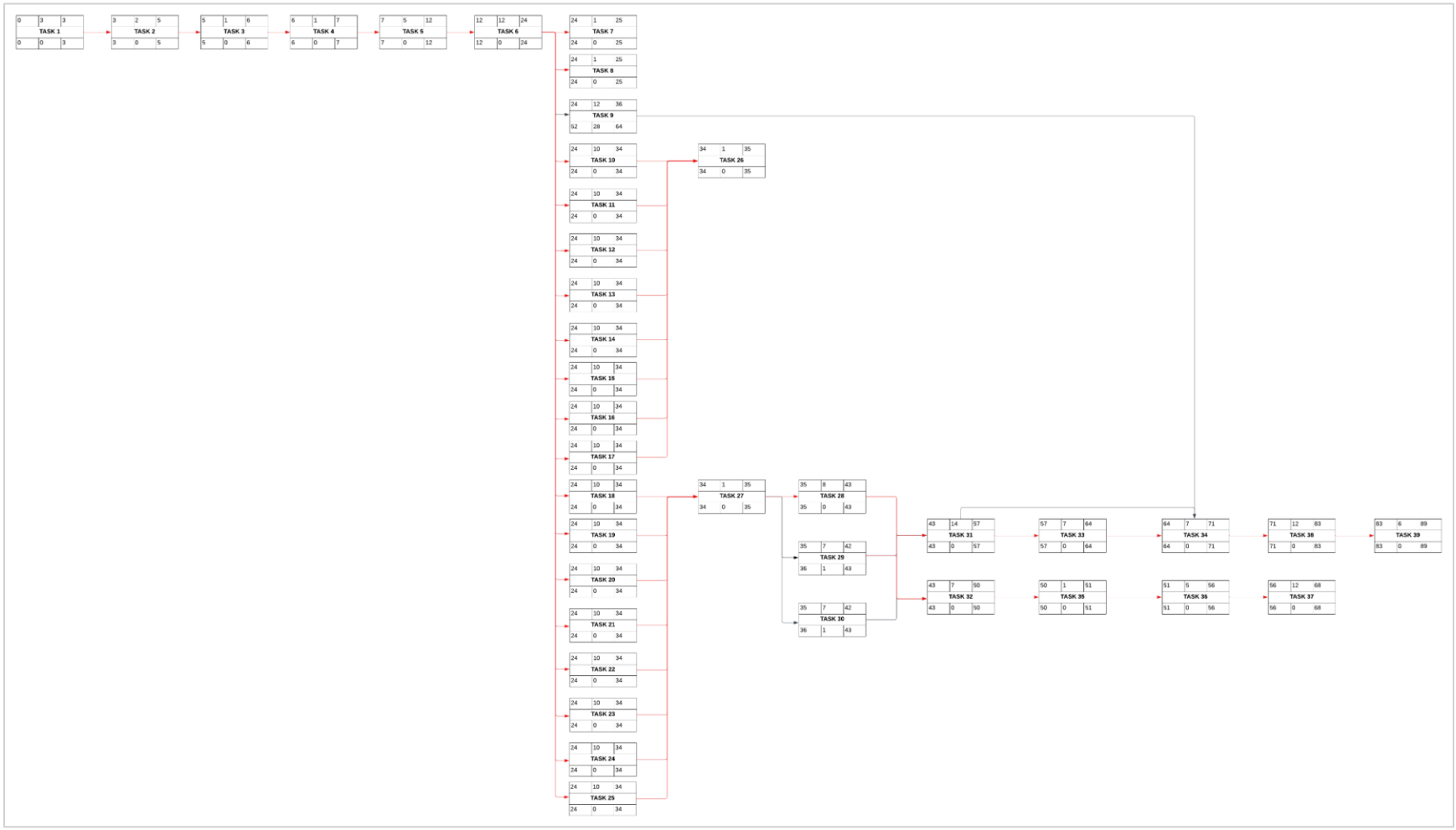
No.	Tasks	Duration (Days)	Predecessor(s)	ES	EF	LS	LF	Slack
	Develop digital mockup							
31.	Document each stage in methodology (design) section	14	28-30	43	57	43	57	0
32.	Present STR and obtain peer feedback	7	28-30	43	50	43	50	0
33.	Project report – document results and discussions (implementation)	7	31	57	64	57	64	0
34.	Project report – document abstract of report	7	9, 31, 33	64	71	64	71	0
35.	Submit STR	1	32	50	51	50	51	0
36.	Develop website/prototype, provide video, and design a poster for modified application	5	35	51	56	51	56	0
37.	Present functional prototype of enhanced POS mobile application	12	36	56	68	56	68	0
38.	Finalize report with a conclusion section	12	34	71	83	71	83	0
39.	Submit Report	6	38	83	89	83	89	0

Critical Path of POS Malaysia Application Modification Project:

1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 10 → 11 → 12 → 13 → 14 → 15 → 16 → 17 →18 → 19 → 20 → 21 → 22 → 23 → 24 → 25 → 26 → 27 → 28 → 31 → 32 → 33 → 34 → 35 → 36 → 37 → 38 → 39 (89 days)

CPM Diagram

Figure 4 *CPM Diagram*



1.4.3 Job Assignments

Table V *Project Job Assignments and Description*

No.	Name	Job	Description
1.	**Lauren Wong Hyun-Ee**	Team Leader / Project Manager	• Lead team, in charge of the project's overall management and coordination. • Assign team members particular tasks and responsibilities in accordance with their areas of expertise and the demands of the project. • Develop and update the project plan, defining the parameters, and setting due dates and milestones. • Liaising with POS Malaysia's stakeholders, including key users and Mr. Amit Mehta, to make sure their needs and expectations are fulfilled. • Oversee the quality of deliverables to ensure they meet defined standards and requirements and implementing risk management strategies to address potential issues.
2.	**Khor Jia Ming**	IT Development Team Lead	• Lead the IT development efforts for the POS Malaysia project. • Coordinate integration activities to guarantee that new features are compatible with the current POS Malaysia mobile application without any issues. To validate that all components work as intended and satisfies user needs, this includes planning and conducting a variety of tests such as unit, integration, performance and system tests. • Supervise the design and execution of the system's modifications such as the new OTP authentication procedure, the better rate calculator, and the improved account management feature. This entails making sure the development team adheres to best practices

			and converting requirements into technical specifications. • Oversee the deployment of new functionalities to the production environment while minimizing user interruption. This includes scheduling deployments, upgrading backend services, and monitoring the system post-deployment to ensure functionality and promptly address any issues that arise. • Ensure the accuracy and currentness of all technical documentation to facilitate future upgrades and maintenance.
3.	**Tai Yong Xuan**	IT Operations Team Lead	• Lead the IT operations team, focusing on the POS Malaysia's mobile application's deployment, maintenance and overall operating effectiveness. • Plan and execute the updates and alterations to the system, ensuring minimal disruption to the existing services. This entails scheduling updates during off-peak times in coordination with other teams and testing deployments in staging environments prior to becoming live. • Maintain and support the system continuously and quickly resolve any problems that may occur. This includes managing incidents and debugging, ensuring that the application remains operational and responsive to user demands. • Monitor system performance with various tools and metrics to guarantee good efficiency and availability. Applying optimizations such as resource allocation, load balancing and performance tuning to sustain peak performance. • Putting strong backup and recovery processes in place and maintaining them to safeguard data integrity. This is to make sure that the data can be promptly recovered in the event of

			breakdown, this entails testing recovery procedures, creating disaster recovery plans and performing routine backups.
4.	**Ooi Shi Qi**	IT Security Team Lead	• Lead the IT security team, responsible for ensuring the POS Malaysia mobile application is secure and reliable. • Evaluate the mobile application for potential threats and vulnerabilities regularly to ensure proactive detection and mitigation of security issues. • In charge of integrating security elements like the OTP authentication system to protect user data and stop illegal access. • Ensure that the system conforms with applicable security guidelines and rules, including local data protection laws, PCI-DSS and GDPR. • Educate team members on security regulations and best practices through training sessions and workshops, enhancing the organization's overall security awareness. • Develop and manage incident response plans to properly handle security breaches or threats and guarantee a quick and successful resolution. • Implement initiatives to educate users about security features and practices, such as the importance of using strong passwords and recognizing phishing attempts.
5.	**Chia Wan Ying**	UI / UX Team Lead	• Lead the UI/UX team, focusing on the design and user experience aspects of the POS Malaysia mobile application. • Carry out user research to comprehend the needs and preferences of POS Malaysia's clients to ensure the design meets their requirements and enhances satisfaction. • Design intuitive and user-friendly interfaces, refining the layout for better usability. This

			includes careful button formatting, color schemes and alignment to create a visually appealing and cohesive design. • Create prototypes and usability tests are run to gather feedback and improve the designs. This involves experimenting with different button locations, color combinations and alignment to make sure the final product is both functional and aesthetically pleasing to consumers. • Document design guidelines, which include standards for buttons, color usage and alignment, make sure consistency throughout the application. This maintains a cohesive and professional look and keeps the app's overall appearance. • Collab closely with the development team to ensure precise implementation of design standards, including button functionality, color coding and alignment details, which will enable UI/UX elements to be seamlessly integrated into the final product.

1.4.4 Gantt Chart

Figure 5 *Project Gantt Chart*

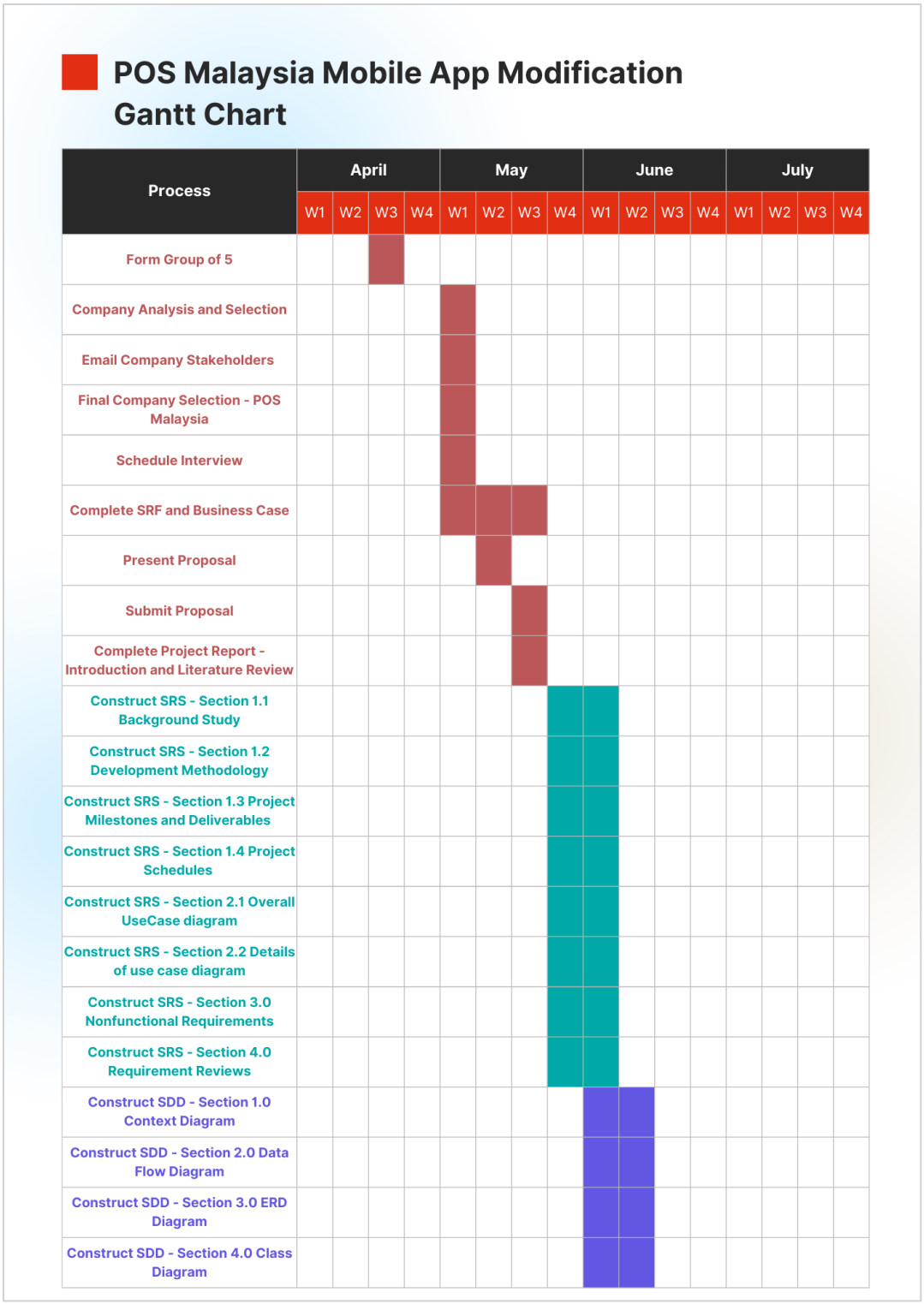
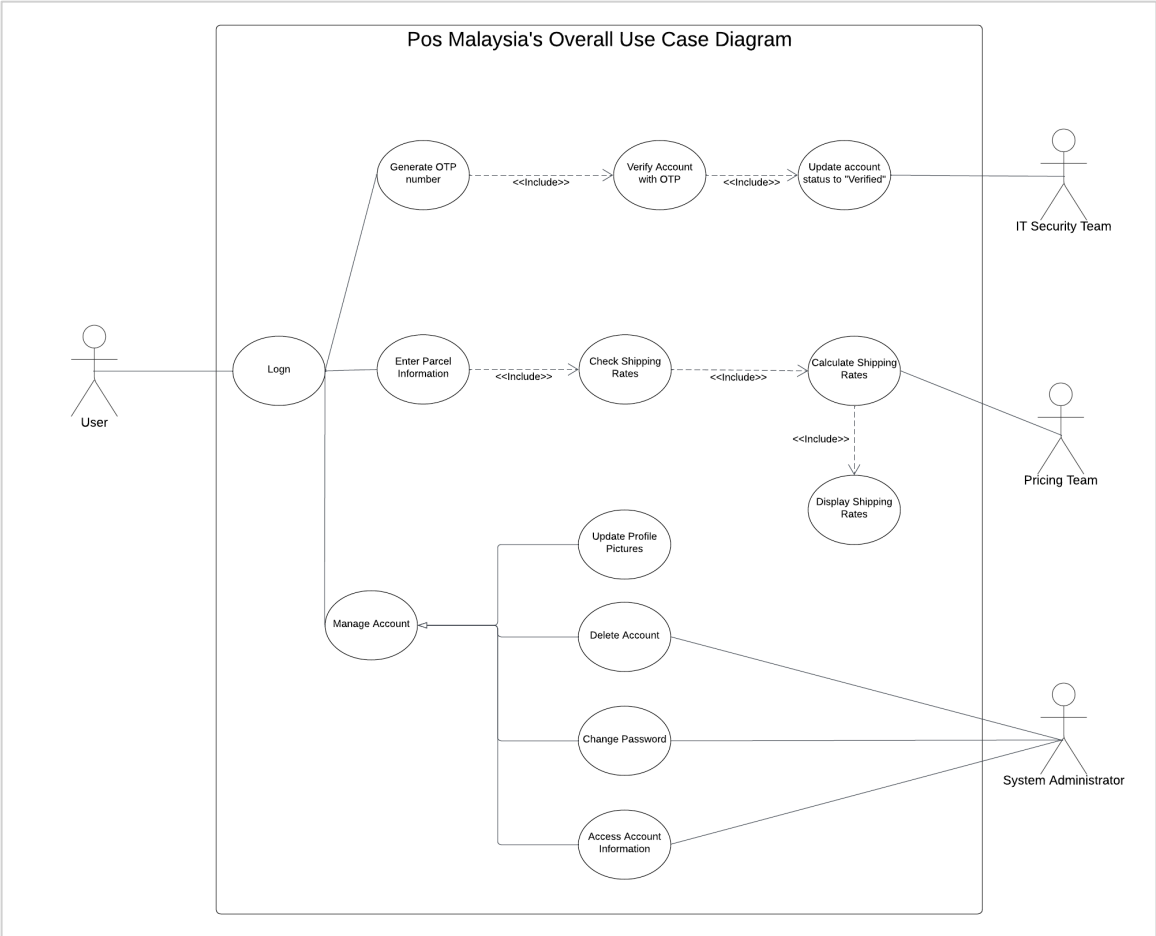


Figure 6 *Project Gantt Chart (cont.)*

2.0 Functional Requirements

2.1 Overall Use Case Diagram

Figure 7 *Overall Project Use Case Diagram*



Actor (s)

Table VI *Actors and Their Descriptions*

Actor (s)	Who are they	What they want
User	Users are the primary actor and end customers who interacts mostly with the POS Malaysia mobile application for various services. They perform various operations such as verifying their account using OTP, calculating shipping rates, and managing their accounts.	**Convenient Account Verification:** As a consumer, they may desire hassle-free, easy-to-use ways for securely authenticating their identity. For example, entering a 6-digit OTP received via SMS from the POS Malaysia's OTP generation and verification system. **Accurate Rate Calculator Feature:** In order to check accurate shipping fees depending on parcel dimensions, weight, and destination, users want an accurate and user-friendly rate calculator. **Efficient Account Management:** Users need to conveniently manage account settings, including updating profile pictures, deleting account, changing passwords and accessing account information.
IT Security Team	POS Malaysia's IT security team is in charge of supporting the integrity and security of the mobile application. This group of people makes certain that all the data and transaction records that happened and stored in the system are safe and compliant with applicable regulations.	**Verify OTP**: They want to generate and send OTPs to users and verify the entered OTP against the generated one. Once the user enters the correct OTP, they may update the users' account to "Verified". **Implement Security Measures:** They need to safeguard user information by implementing robust security ways such as OTP verification with users' mobile number, stopping any data breaches and unauthorized access.

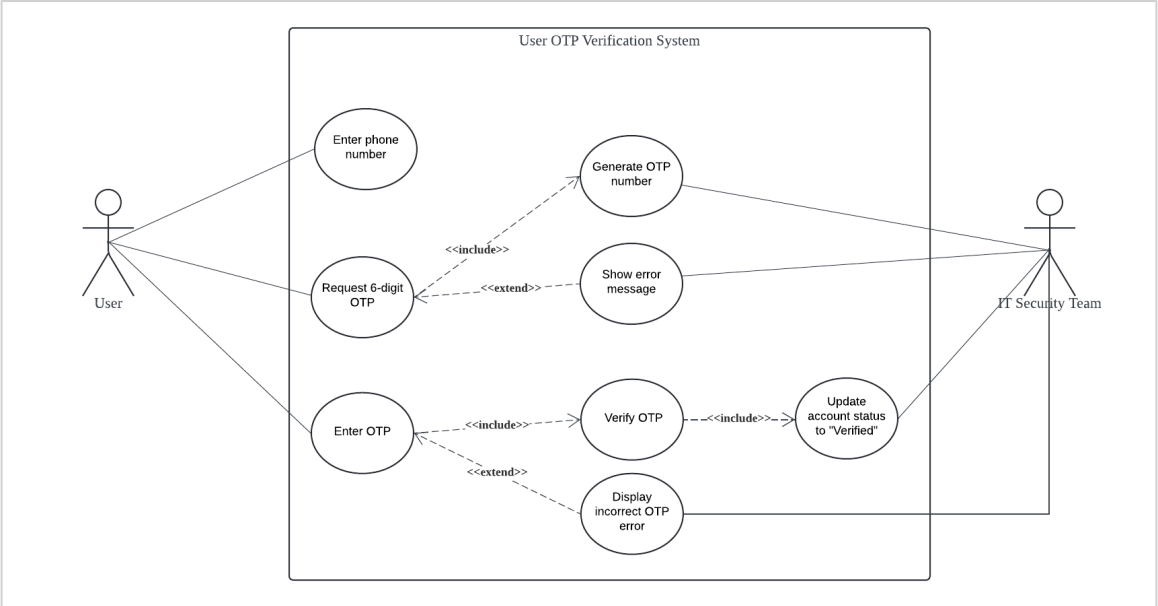
		Monitor Security Incidents: The team needs to keep a close eye on the system for any possible security lapses and resolve the incidents promptly if happened.
Pricing Team	POS Malaysia's pricing team is responsible for managing and updating the pricing algorithms and information used in the rate calculator within their mobile application. They aim to ensure that users receive precise and latest shipping cost estimates.	**Update Pricing Data:** The group must make sure that depending on the parcel dimensions, region and weight, the rate calculator uses the most recent pricing data. **Improve Rate Calculation Accuracy:** By considering more factors such as shipping method, insurance, additional services like packaging services or fuel charges, the team can refine the calculation algorithm and increase the rate calculator's precision. **User Feedback Integration:** The team must gather the feedback from POS Malaysia's mobile application users to continuously optimize the functionality of the rate calculator.
System Administrator	POS Malaysia's system administrator is important part for the overall maintenance and operation of its mobile application's backend infrastructure.	**User Account Management**: Provide customer support for the one who faces issues with account management features such as profile updates or password resets. They also manage user accounts, including account deletion, suspension and creation. **Performance Monitoring:** They aim to monitor usage patterns, system performance and error logs to recognize potential

		problems early and take proactive measures to address them. The goal is to optimize the system, so that the user loads can be handled efficiently. **Backup and Recovery:** The administrator needs to establish and manage backup and recovery procedures to ensure data integrity and availability in case of system failures or data loss. They may routinely work on the test backup and recovery processes to make sure system's effectiveness and reliability.

2.2 Details of Each Use Case

2.2.1 Use Case 1: OTP Verification System

Figure 8 *Specific Use Case Diagram – OTP Verification System*



Brief Description:

Users can verify their account using an OTP system. Users will enter their phone number and receive a unique 6-digit OTP number via SMS to verify their identity. Users can enjoy all services and functions of the app after verifying their identity.

Scenario:

When a user wants to authenticate account to utilize POS Malaysia app features.

Precondition:

Before this use case can be initiated, the user has to download and log in to the application.

Postcondition:

At the end of the use case, the user will be able to verify and authenticate their identity successfully. They can enjoy all services and functions of the app after that.

Normal Flow:

Table VII *Normal Flow Process for Use Case: OTP Verification System*

Steps	User	System
1.	The user enters their phone number.	
2.	User requests 6-digit OTP.	The system receives the phone number and prepares to generate a unique 6-digit OTP.
3.		The system generates a unique 6-digit OTP. *View "Alternative Flow a" for the flow when OTP system has error while generating OTP
4.		The system sends the OTP to the user's entered phone number via SMS.
5.	The user receives the OTP on their phone.	
6.	The user enters the received OTP into the app.	The system receives the entered OTP.
7.		The system verifies the OTP against the one it generated.
8.		If the OTP is correct, the system confirms the user's identity. *View "Alternative Flow b" for when the user enters wrong OTP, and "Alternative Flow c" for when the OTP has expired/not valid anymore.
9.		The system updates the user's account status to "verified".
10.	The user is notified that their account is verified, and they can now access all app services.	

Exception/Alternative Flow:

a) Steps taken if the system faces an error while generating an OTP (Continuing from Normal Flow Step 2 onwards)

Table VIII *Alternative Flow Process 1 for Use Case: OTP Verification System*

Steps	User	System
3a		The system encounters an error while generating the OTP.
3b		The system displays an error message to the user, informing them of the issue and advising them to try again later.
3c	The user receives the error message.	
3d	The user attempts to request OTP again.	
3e		The system successfully generates a new OTP.

b) Steps taken if users enter the wrong OTP (Continuing from Normal Flow Step 7 onwards)

Table IX *Alternative Flow Process 2 for Use Case: OTP Verification System*

Steps	User	System
8a		The system detects that the entered OTP does not match the generated OTP.
8b		The system displays an error message to the user, informing them that the entered OTP is incorrect.
8c	The user receives the error message.	
8d	Flow is repeated as in Normal Flow – Step 2 onwards until the OTP is entered successfully.	

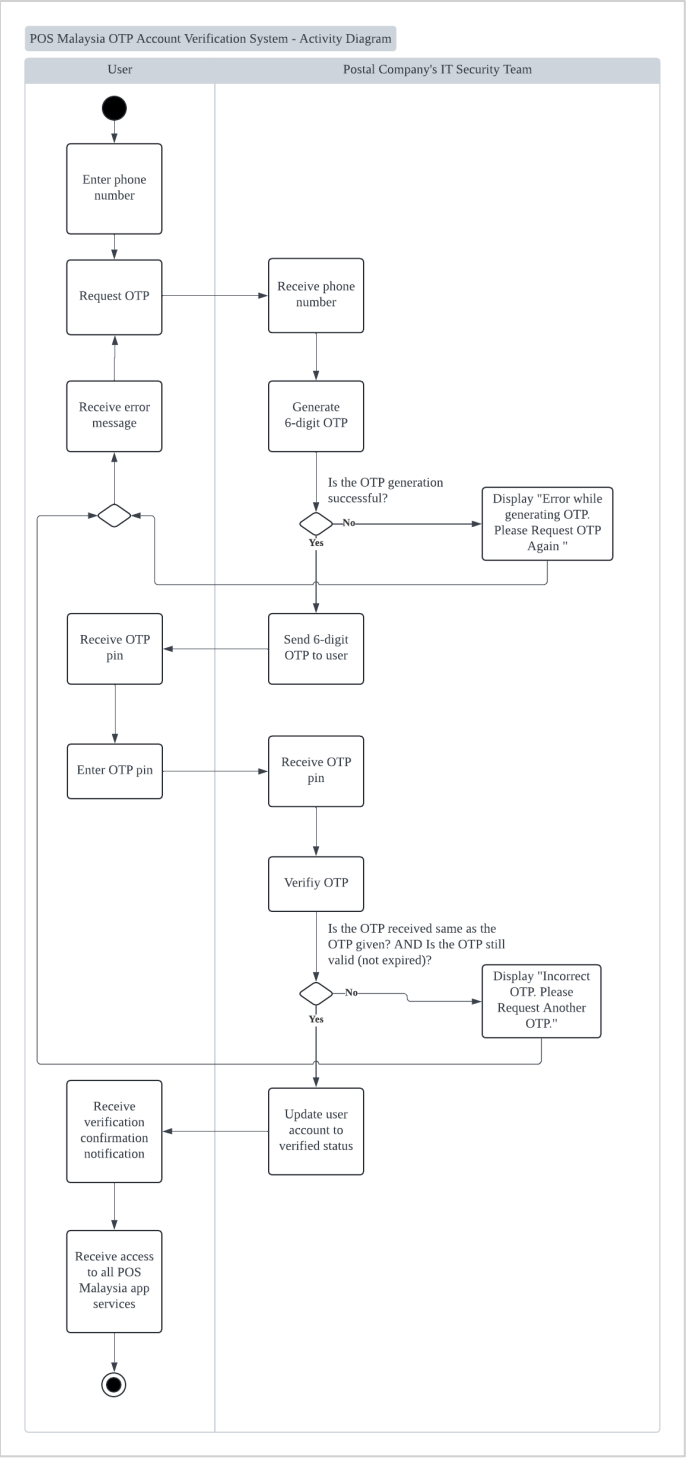
c) Steps taken if OTP expires due to overdue validity period (Continuing from Normal Flow Step 7 onwards)

Table X *Alternative Flow Process 3 for Use Case: OTP Verification System*

Steps	User	System
8a		The system detects that the entered OTP is invalid or expired due to the timer reaching zero.
8b		The system displays an error message to the user, informing them that the OTP has expired.
8c	The user receives the error message.	
8d	Flow is repeated as in Normal Flow – Step 2 onwards until the OTP is entered successfully.	

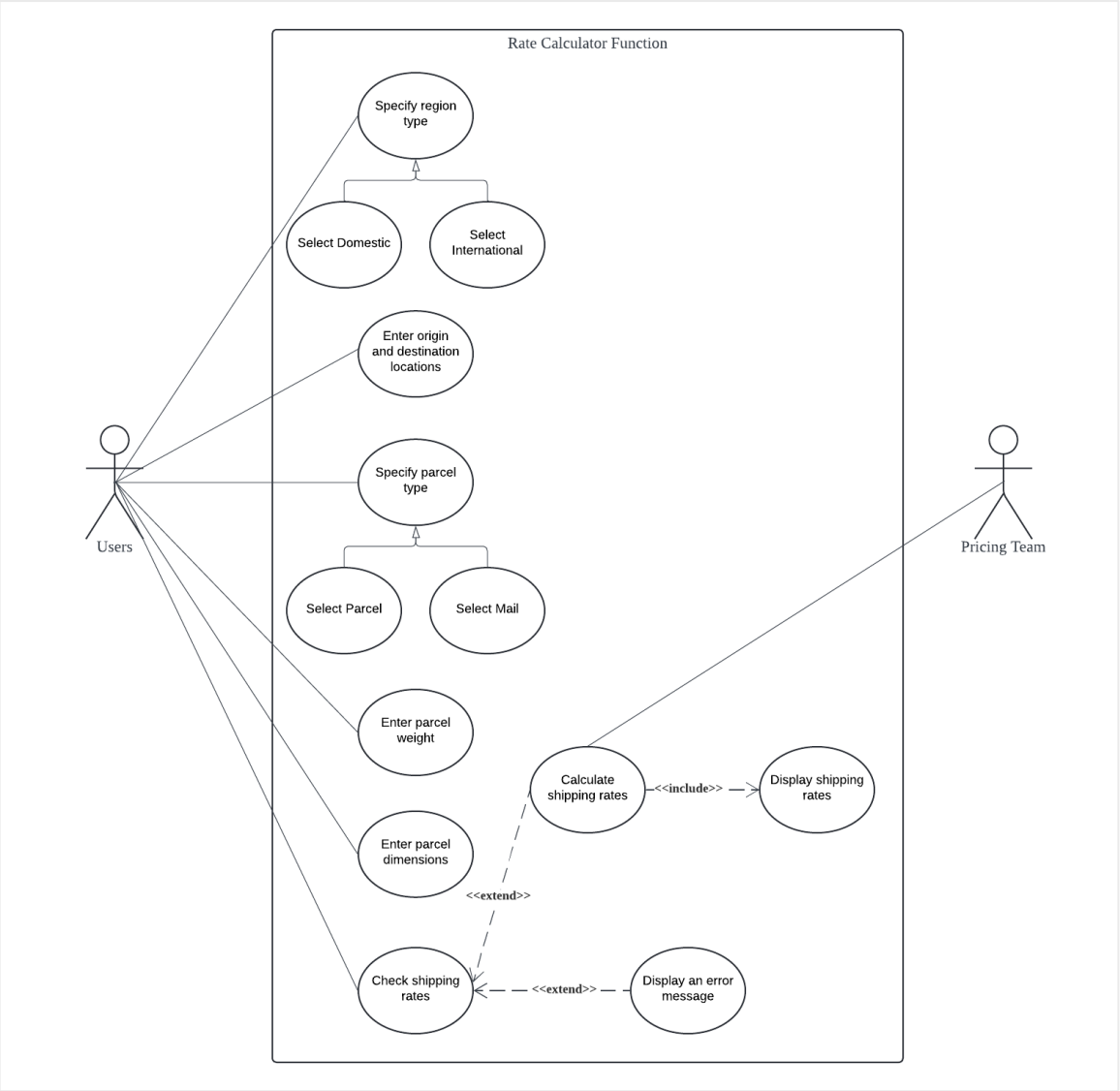
Activity Diagram:

Figure 9 *Activity Diagram for Use Case 1 – OTP Verification System*



2.2.2 Use Case 2: Rate Calculator Filters

Figure 10 *Specific Use Case Diagram – Rate Calculator Filters*



Brief Description:

Users can check shipping fees by entering their parcel and shipping details, including region type, origin and destination locations, parcel type, weight, and dimensions. Once all fields are filled out, the system will calculate and display the

shipping rates. If any fields are incomplete, an error message will prompt users to provide the missing information.

Scenario:

When users check the shipping rates for their parcels or mail to decide whether to use POS Malaysia's delivery service.

Preconditions:

1. Users need to create an account for the POS Malaysia app.

2. Users need to open the POS Malaysia app and select the Rate Calculator feature.

3. Users need to provide all necessary information such as region type, origin and destination locations, parcel type, parcel weight and dimensions.

Postconditions:

Users can view the shipping rates.

Normal Flow:

Table XI *Normal Flow Process for Use Case: Rate Calculator Filters*

Steps	User	System
1.	Users open POS Malaysia app.	
2.	Users select the Rate Calculator feature.	System shows all necessary fields to be filled up by users.
3.	Users specify region type; either Domestic or International.	System saves users input for region type.
4.	Users enter origin and destination locations.	System saves users input for origin and destination locations.
5.	Users specify parcel type; either Parcel or Mail.	System saves users input for parcel type.

6.	Users enter parcel weight.	System saves users input for parcel weight.
7.	Users enter parcel dimensions.	System saves users input for parcel dimensions.
8.	Users click on the “Calculate” button to check shipping rates.	
9.		Calculate shipping rates based on the inputs. *View “Alternative Flow” for the flow when there are incomplete input fields
10.		Display shipping rates.
11.	Users view shipping rates.	

Exception/Alternative Flow:

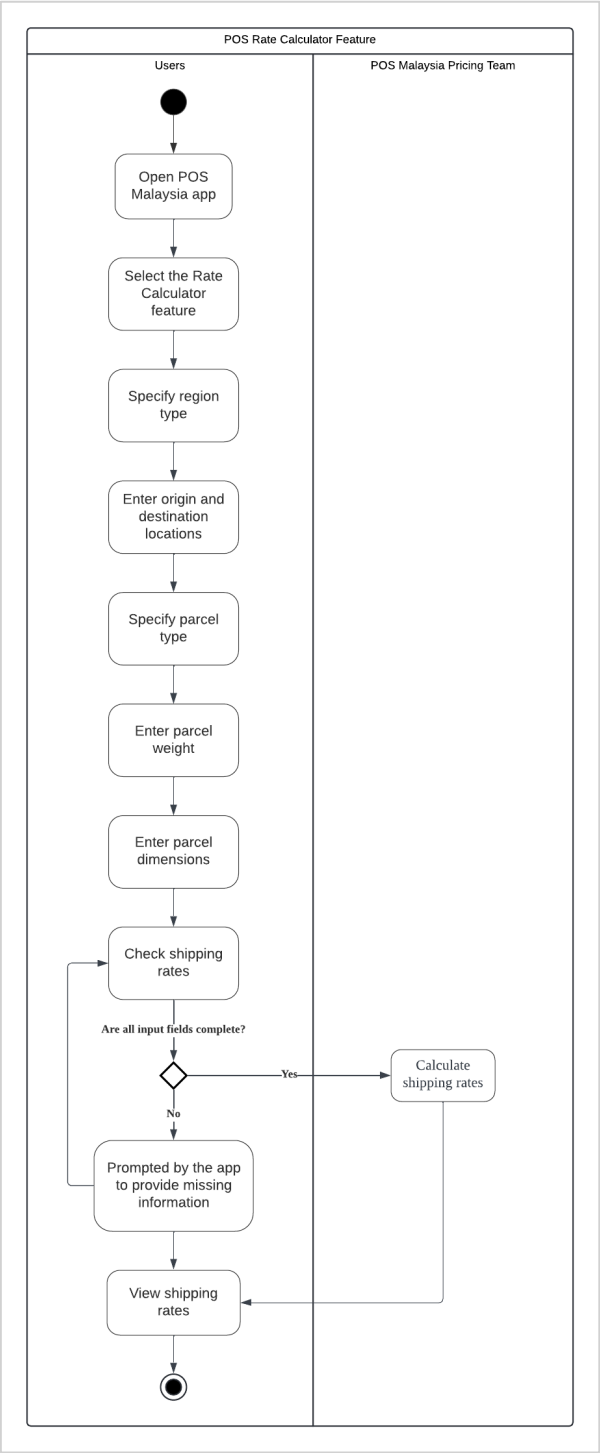
Steps taken if there are any incomplete fields (Continuing from Normal Flow Step 8 onwards)

Table XII *Alternative Flow Process for Use Case: Rate Calculator Filters*

Steps	User	System
9a		Detects incomplete field(s).
9b		Display an error message to prompt users to provide the missing information.
9c	Enter all necessary information.	
9d	Flow is repeated as in Normal Flow – Step 8 onwards.	

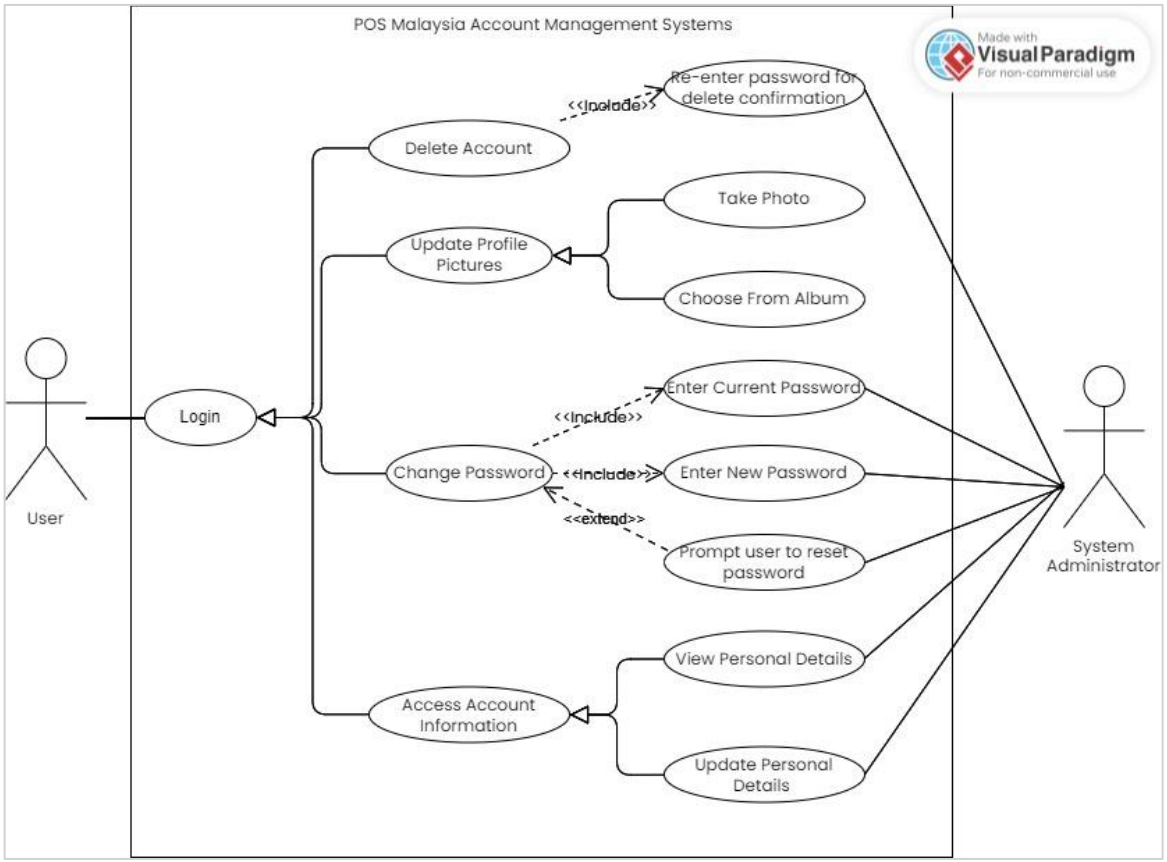
Activity Diagram:

Figure 11 *Activity Diagram for Use Case 2 – Rate Calculator Filters*



2.2.3 Use Case 3: User Account Management

Figure 12 *Specific Use Case Diagram – User Account Management*



Brief Description:

Users can manage their accounts efficiently. They are able to update their profile picture which can be taken on the spot or choose from album, navigates to the account settings and selects the option to change the password, direct to the account information section to view or edit details and delete account by re-entering the account password to confirm the deletion.

Scenario:

When users wish to perform account management functions such as deleting accounts, changing profile pictures, changing passwords, and accessing account information.

Precondition:

Before this use case can be initiated, users must have access to the POS Malaysia mobile application and a registered account for certain functionalities like changing passwords or updating profile pictures.

Postcondition:

At the end of the use case, users can manage their account settings securely and efficiently, and the systems ensure the account information is updated and saved correctly.

Normal Flow:

Table XIII *Normal Flow Process for Use Case: User Account Management*

Steps	User	System
1.	The user navigates to the 'Account Information' section.	
2.		The system displays the users' account information.
3.	The user can view and update any displayed information and save changes made. *View "Alternative Flow a" for the flow when changes error exists.	The system processes and saves the update.
4.	The user selects the 'Change Password' option.	The system prompts the user to enter the current password and new password.
5.	The user enters the current and new passwords. *View "Alterative Flow b" for the flow when incorrect current password entered.	The system verifies the current password and updates the password with the new one and saves the update.

Steps	User	System
6.	The user selects 'Update Profile Picture' option.	
7.		The system prompts the user to upload a new profile picture.
8.	The user selects a picture from their devices or takes picture and uploads it. *View "Alterative Flow c" for the error of updating profile picture.	
9.		The system processes the upload and updates the profile picture.
10.	The user selects on the 'Delete account' features.	The system prompts the user to confirm the deletion action.
11.	The user confirms the deletion by entering their password. *View "Alterative Flow b" for the flow when incorrect password met.	
12.		The system verifies the user's credentials.
13.		The system processes the deletion request and removes the user's account and associated data.

Exception/Alternative Flow:

a) Steps taken if the user attempts to save invalid or incomplete information

Table XIV *Alternative Flow Process 1 for Use Case: User Account Management*

Steps	User	System
3a		The system displays an error message indicating which fields need correction.
3b	The user makes changes for the information and saves it.	
3c		The system processes and saves the update.

b) Steps taken if the user enters an incorrect current password for account deletion and change password

Table XV *Alternative Flow Process 2 for Use Case: User Account Management*

Steps	User	System
1		The system displays an error message and prompts the user to retry.
2		The system displays a ‘Forgot Password’ option.
3	The user selects the ‘Forgot Password’.	The system prompts the user to enter their registered email address or phone number.
4	The user requests to key in their registered email address or phone number.	The system verifies the entered email address or phone number.
5		The system sends an OTP to the user’s registered email address or phone number.
6	The user receives the OTP and enters it into the system.	The system verifies the OTP.
7		The system requires the user to enter a new password.

8	The user enters the new password and confirms it.	The system verifies the new password meets security requirements and updates the new password.

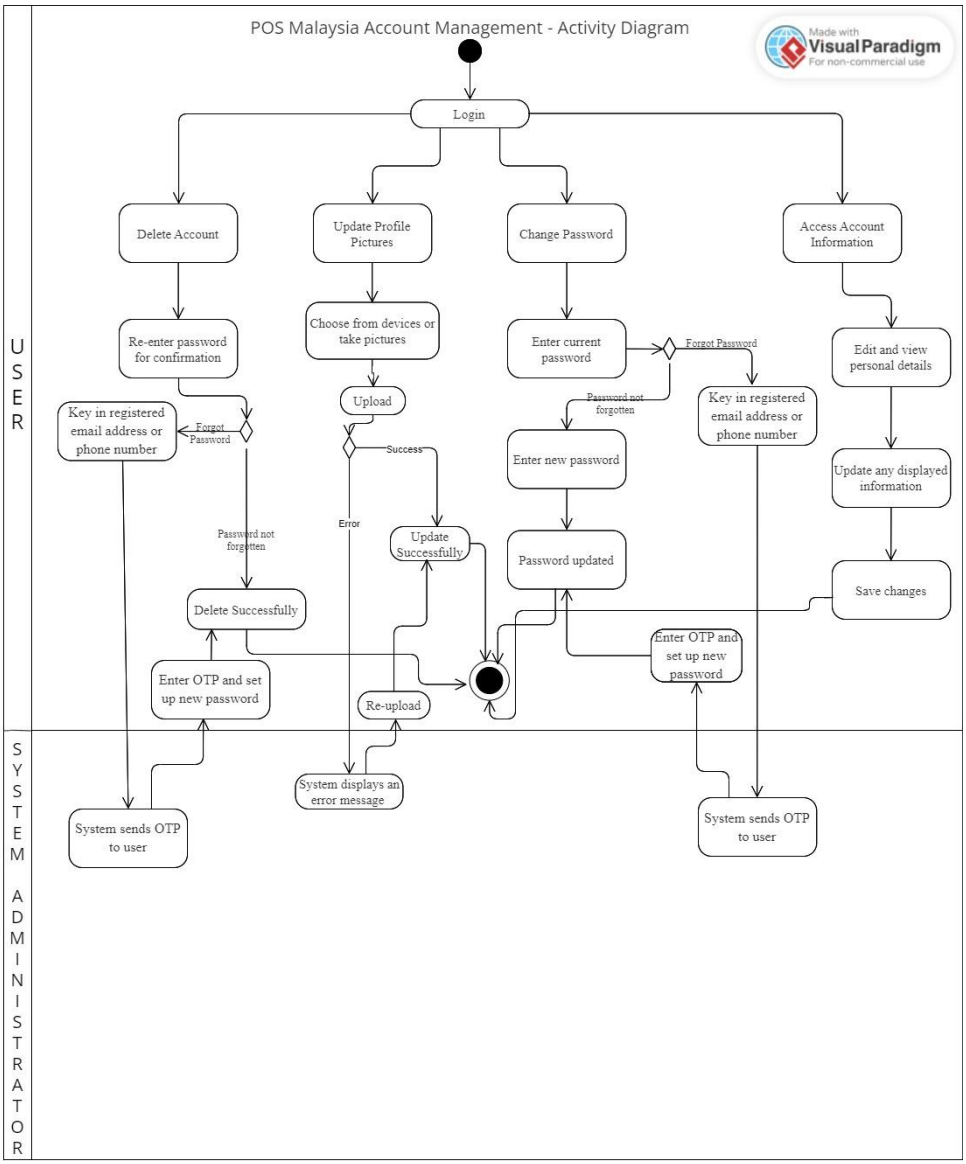
c) Steps taken if the user is unable to update profile picture

Table XVI *Alternative Flow Process 3 for Use Case: User Account Management*

Steps	User	System
8a		The system processes the upload but encounters errors such as file format not supported, file size too large, network issue.
8b	The user selects a different picture or retries the action.	
8c		The system processes the upload and updates the profile picture successfully.

Activity Diagram:

Figure 13 *Activity Diagram for Use Case 3 – User Account Management*



3.0 Nonfunctional Requirements

a) Performance requirements

There are few factors that affect the performance of an application. The time it takes to perform tasks, number of resources used to run the software, the amount of request the system can handle, the time it takes to process, and the relation between output and input (Abdeen et al., 2022). POS Malaysia's mobile application must respond to user actions such as generating OTP, calculating the shipping rates, changing password and updating user profile within an acceptable time limit to indicate it has high performance. The acceptable limit and **ideal response time should not exceed 2 seconds**. It is interruptive when the response time is more than 15 seconds (Hoxmeier & DiCesare, n.d.). When the waiting time is long, users may feel frustrated which can lead to lower user satisfaction and discouragement to use the app. If the action takes too long to perform, **messages like "completing soon" should be sent** to inform users. Hence, POS Malaysia mobile application app will have a **page response time of 1 – 2 seconds** by optimizing front-end and back-end performance, using scalable infrastructure, and continuously monitoring and improving the system.

b) Security requirements

Security of an application is crucial. **OTP codes** should have limited **validity for 30 seconds or less** to secure user access, which is the time limit implemented in our modified application. Advance encryption standards (AES) algorithms are used to convert plaintext into ciphertext blocks before sending the OTP to users. It ensures that the OTP is not vulnerable to hackers (Balasta et al., 2022) **Strong password policy** should be implemented to secure user access. A strong password should contain at least 8 characters, one upper case, one lower case, one numerical character, and one special keyboard character. Most importantly, passwords should not contain usernames (Yıldırım & Mackie, 2019). POS Malaysia can maintain user trust by complying with regulations to protect user data. The system should implement firewalls to protect the application from attacks and security threats. There are seven levels of firewalls where the higher the level, the more secure it is. FTP and HTTP is designed to test the firewall performance under various policies. Testing is done to identify which level of firewall is needed. It

shows that the higher the security level, the lesser security warning is found. However, level 4 and 5 have the same vulnerabilities (Lyu & Lau, 2002).

c) Reliability

Reliability of an application is important to maintain user trust and encourage users to rely on POS Malaysia's mobile application. To maintain high reliability, **maintenance** is be planned to remove faults and failures. The system will be able to **handle runtime failures** and improve the apps' ability to cope with it, this increases the robustness of the app (Wimalasooriya et al., 2022). The implementation of fault tolerance in the modified application increases the reliability of the system. The system will be able to detect faults and notify the application. **Backup** will then take place to where the system will replace or restart the nodes that have faults (Haines et al., 2000).

d) UI Design

POS Malaysia's mobile application will employ a **user-friendly interface** for OTP authentication, rate calculation, and profile management functions as the user interface of an application affects the interactions between users and the app. The application will also be **accessible by users regardless of the type of phones** user are using or the location they are at. The mobile application is more effective when it has user-friendly interfaces, and a wide range of users can access it regardless of the location, time and type of phone (Jung & Yim, 2018). Moreover, the usability of an application can also be influenced by the user interface design. Different design should be used for different age gaps. For example, designing a user interface for elder people should contain simpler functions, terms and icons, and simple navigation paths (Darejeh, 2013). A clean and minimalistic design will be implemented in the modified application to ensure all generations can use the app easily. This is because simplicity of the application with complete function increases the chance of users using the app. Furthermore, based on Badashian et al. (2008), systems should have consistent design such as placing buttons, using

the same wording, and implementing the same colour scheme throughout the system. It should also be easy for users to interact with the system, providing them a flexible and efficient system. **Colour scheme** in an application is also quite important, as well as appropriate graphics, text labels, and fonts. Colours used within an application should not be more than 5 or else users may feel overstimulated. Hence, the modified application will retain the primary original company colours, which are **blue, white, and red**.

e) Scalability

POS Malaysia's mobile application must be able to handle a growth of users during peak hour and maintain its performance level. **Load scalability** ensures that the system can function well when heavy resources are used. Reducing the time a system spends on unproductive work can improve the load scalability (Bondi, 2000). When one feature fails and needs maintenance, the entire system will be affected and down. So, isolating the services into three parts: OTP authentication, rate calculator, and profile management will ensure that they do not affect each other when one function is down.

f) Recoverability

The mobile application system may face system failures or problems caused by viruses. Backups help prevent data loss and attacks from viruses by restoring data back into the system. Sprintar, a backup and restore system, will be implemented to **recover data loss automatically**. The older version of the system is copied and backed up to restore files at any time (Andry & Po, 2017). Recoverability should be designed together with the system to ensure that a failure at any point of the system will not affect the whole system, mitigating the risk of losing data.

4.0 Requirements Reviews

Table XVII *Requirements Review Table*

Use Case Name	Completed by	Reviewed by	Review Results
Overall Use Case diagram	Ooi Shi Qi	Khor Jia Ming	*Completed* **Use case diagram:** • Illustrates the high-level functions and scope of the overall system. **Actors:** • Describes the actors involved in the overall use case and their capabilities.
OTP verification system	Lauren Wong Hyun-Ee	Tai Yong Xuan	*Completed* **Use case diagram:** • Illustrates the high-level functions and scope of the account authentication system. **Normal flow:** • Steps of how users verify their account using OTP authentication method. **Alternative flow:** • Steps taken if the system faces an error while generating an OTP • Steps taken if users enter the wrong OTP • Steps taken if OTP expires due to overdue validity period **Activity diagram:**

Use Case Name	Completed by	Reviewed by	Review Results
			• Illustrates steps of OTP verification process • Alternative ways to handle OTP errors are included.
Rate calculator filters	Khor Jia Ming	Ooi Shi Qi	*Completed* **Use case diagram:** • Illustrates the high-level functions and scope of the rate calculator system. **Normal flow:** • Identifies the steps to calculate rates if everything runs smoothly. **Alternative flow:** • Identifies the flow when incomplete fields are entered. **Activity diagram:** • Illustrates steps for user to use the rate calculator function • Identifies alternative path when errors happen.
User account management	Chia Wan Ying	Lauren Wong Hyun-Ee	*Completed* **Use case diagram:** • Illustrates the high-level functions and scope of the user account management system. **Normal flow:**

Use Case Name	Completed by	Reviewed by	Review Results
			• Steps when user manage their account. **Alternative flow:** • Alternative flow when users enter incorrect password for account deletion. • Steps when user attempts to save invalid or incomplete information. • Steps when users are unable to upload their profile picture. **Activity diagram:** • Visualizes the steps for account management. • Highlights alternative paths for errors.

Contribution Statement

Table XVIII *Contribution Statement with Percentage and Activities*

Name	StudentID	Percentage	Activities
Lauren Wong Hyun-Ee	21046305	20%	• Emailed POS Malaysia and ZUS Coffee for initial company selection. • Liaised with chosen company – POS Malaysia to set interview session.

Name	StudentID	Percentage	Activities
			• Participated in interview with Mr Amit and asked questions for further clarification regarding the POS Malaysia mobile application. • Prepared “Problem Identified” slide in business proposal slides, business case, and SRF. • Carried out market assessment and risk assessment in Business case. • Completed SRS Section 1.4.1, Section 1.4.3, and Section 2.2.1.
Khor Jia Ming	21044516	20%	• Participated in interview with Mr Amit and asked questions for further clarification regarding the POS Malaysia mobile application. • Prepared “Proposed Solutions” slide in business proposal slides, business case, and SRF. • Prepared suggestion section in SRF. • Filled out project definition and marketing strategy sections in Business case. • Completed SRS Section 1.2 and Section 2.2.2.
Tai Yong Xuan	22012835	20%	• Sent out email to MBE SDN BHD as part of shortlisted company. • Participated in interview with Mr Amit and asked questions for further clarification regarding the POS Malaysia mobile application. • Completed objective, description, and reason

Name	StudentID	Percentage	Activities
			sections of POS Malaysia in SRF. • Prepared “Comparing Systems” slide in business proposal slides, business case, and SRF. • Completed SRS Section 1.2, Section 3.0, and Section 4.0
Ooi Shi Qi	21098272	20%	• Participated in interview with Mr Amit and asked questions for further clarification regarding the POS Malaysia mobile application. • Documented insights gathered from interview with POS Malaysia stakeholder. • Prepared cover page, key stakeholder, SRS and Business case screenshots in slides. • Completed project organization of our group, together with financial appraisal for the application modification project. • Completed SRS Section 1.3, Section 1.4.2, and Section 2.1.
Chia Wan Ying	23020829	20%	• Drafted emails to be sent to shortlisted companies. • Participated in interview with Mr Amit and asked questions for further clarification regarding the POS Malaysia mobile application. • Prepared executive summary of application modification project, mission statement of the project, and the product/services provided by the revised POS Malaysia application.

Name	StudentID	Percentage	Activities
			• Completed SRS Section 1.1 – 1.1.5, Section 2.2.3.

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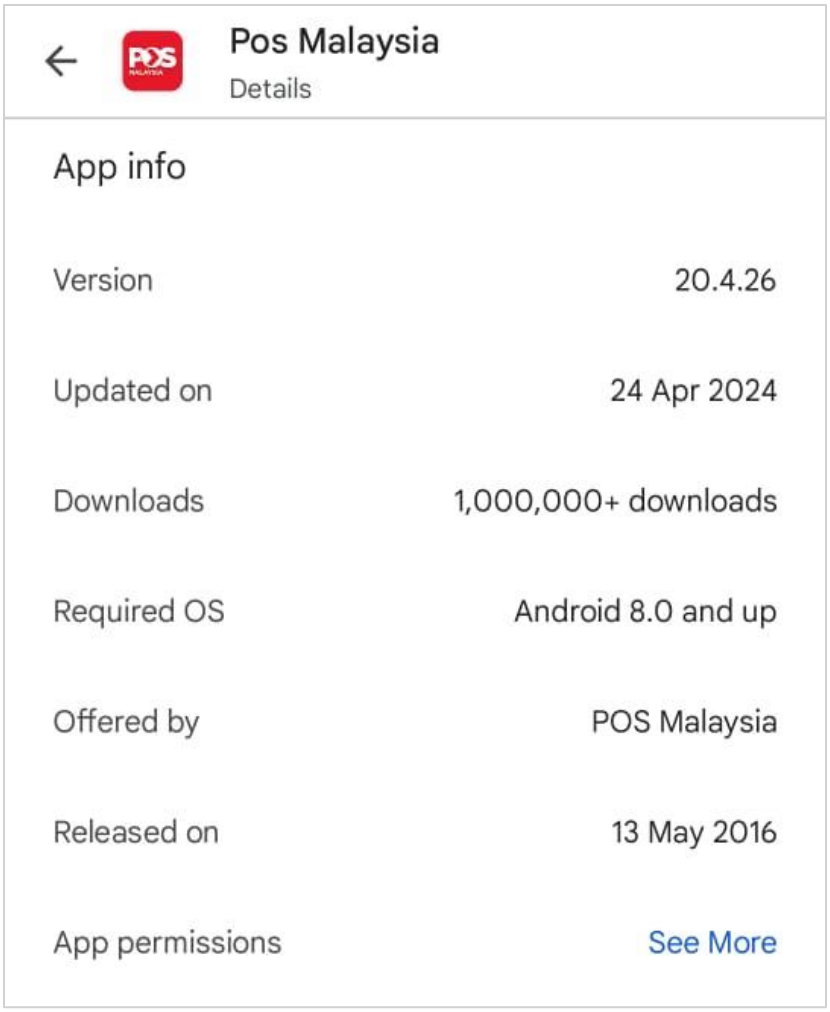
Appendix

Appendix A

POS Malaysia Mobile Application Details (POS Malaysia, 2024)

Figure A 1 *Information on POS Malaysia Application Version, Date Last Updated, Number of Downloads, Required OS, and Date Released*



Appendix B

POS Malaysia Mobile Application Current Issues (POS Malaysia, 2024)

Figure B 1 *POS Malaysia Account/User Authentication Process (Camera Initialization)*

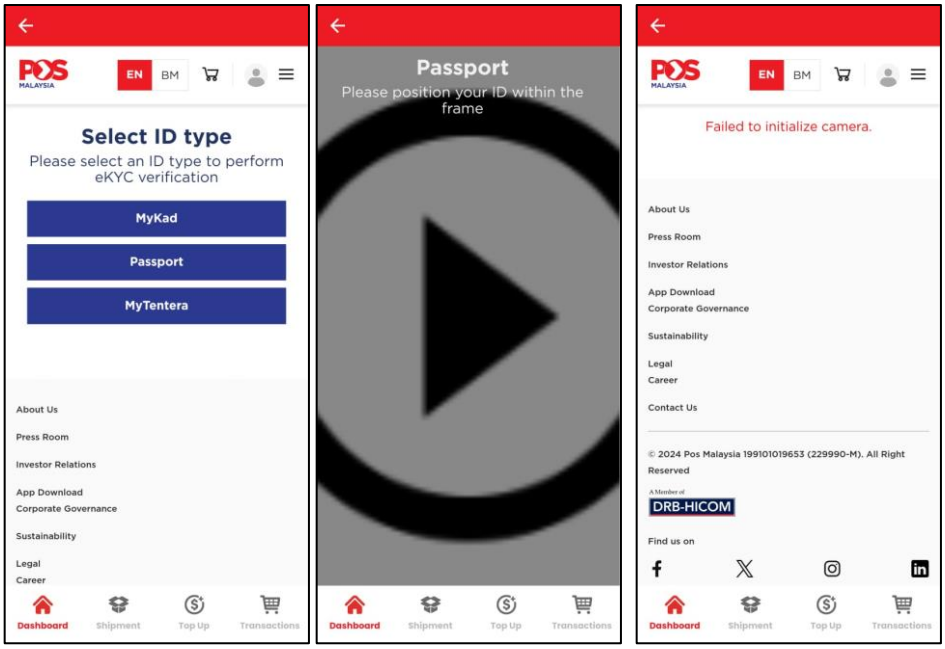


Figure B 2 *POS Malaysia Rate Calculator for Domestic Shipping that lacks Location and Dimension based Filtering*

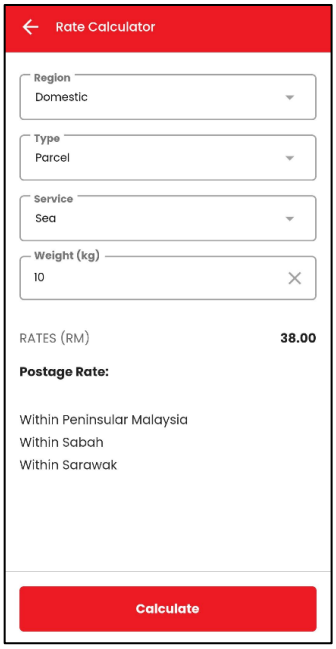
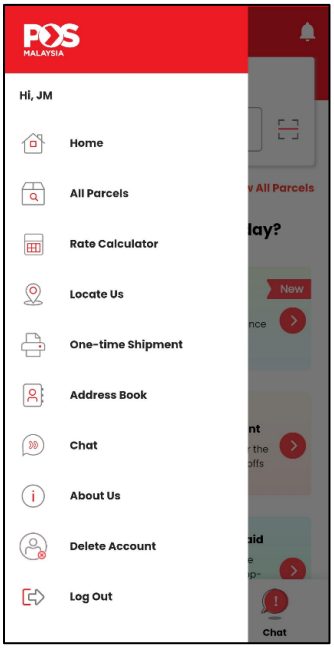


Figure B 3 *POS Malaysia Home Page Features that Do Not Include Account Page*



Appendix C

Figure C 1 *J&T OTP Authentication Process*

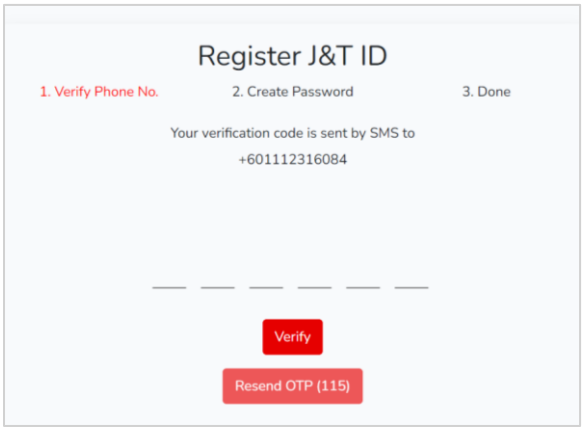


Figure C 2 *J&T Rate Calculator that Includes Dimension and Location based Filtering*

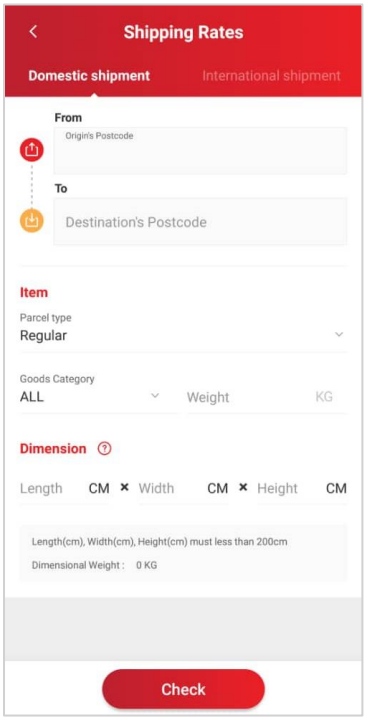
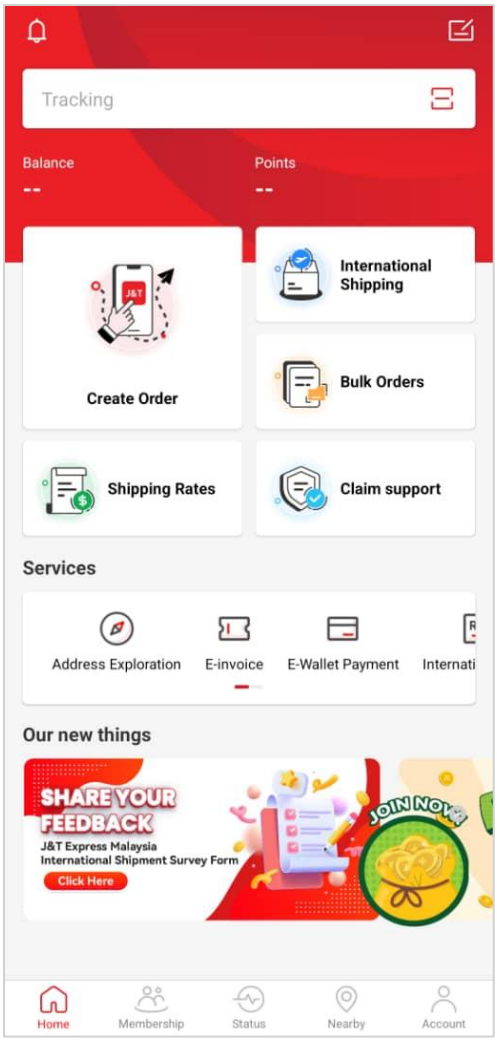


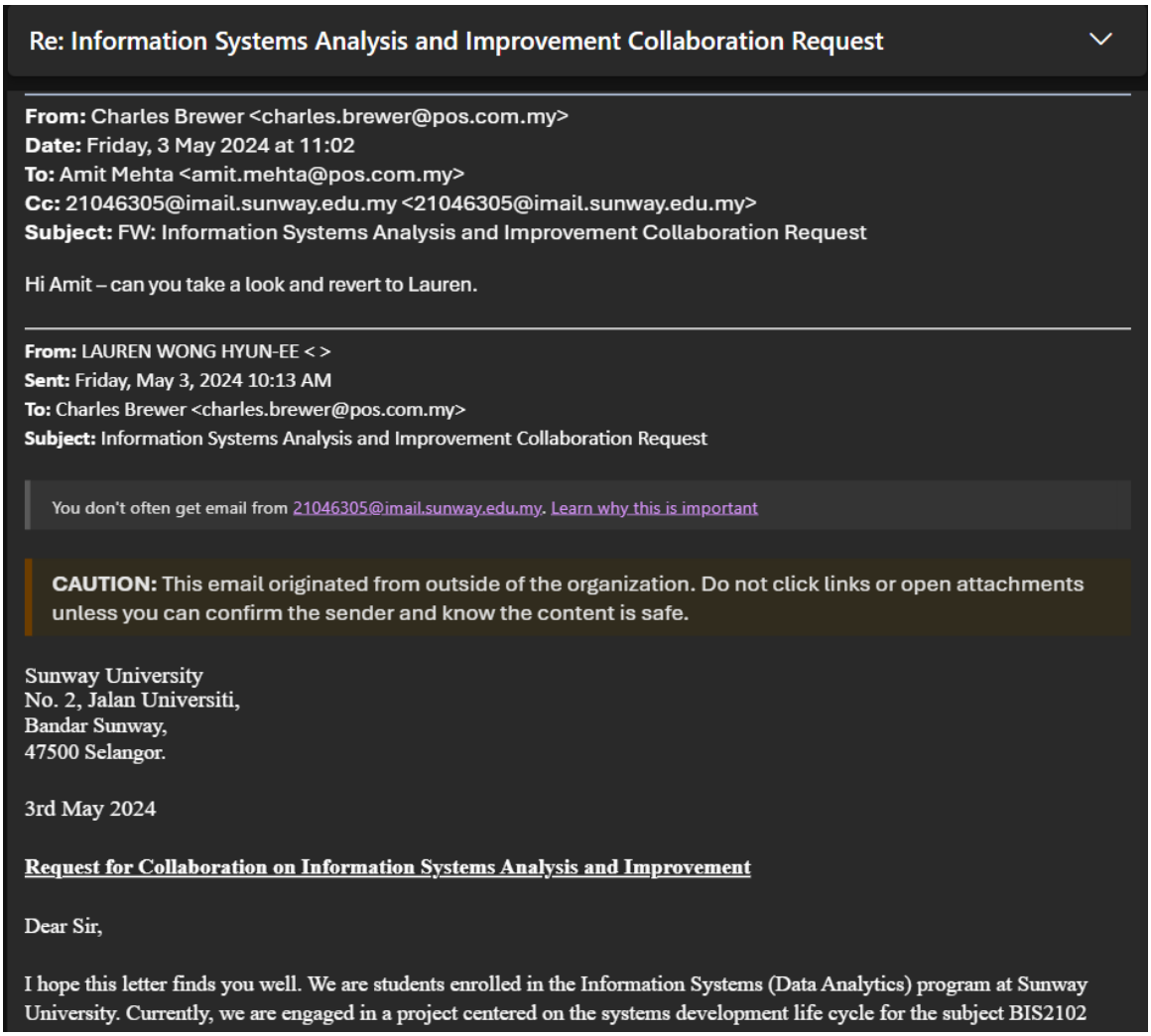
Figure C 3 *J&T Home Page with Account page*



Appendix D

Email Received from POS Malaysia CEO – Charles Brewer

Figure D 1 *Introductory Email to Charles Brewer and His Reply*



Re: Information Systems Analysis and Improvement Collaboration Request

From: Charles Brewer <charles.brewer@pos.com.my>
Date: Friday, 3 May 2024 at 11:02
To: Amit Mehta <amit.mehta@pos.com.my>
Cc: 21046305@imail.sunway.edu.my <21046305@imail.sunway.edu.my>
Subject: FW: Information Systems Analysis and Improvement Collaboration Request

Hi Amit – can you take a look and revert to Lauren.

From: LAUREN WONG HYUN-EE < >
Sent: Friday, May 3, 2024 10:13 AM
To: Charles Brewer <charles.brewer@pos.com.my>
Subject: Information Systems Analysis and Improvement Collaboration Request

You don't often get email from 21046305@imail.sunway.edu.my. Learn why this is important

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

Sunway University
No. 2, Jalan Universiti,
Bandar Sunway,
47500 Selangor.

3rd May 2024

Request for Collaboration on Information Systems Analysis and Improvement

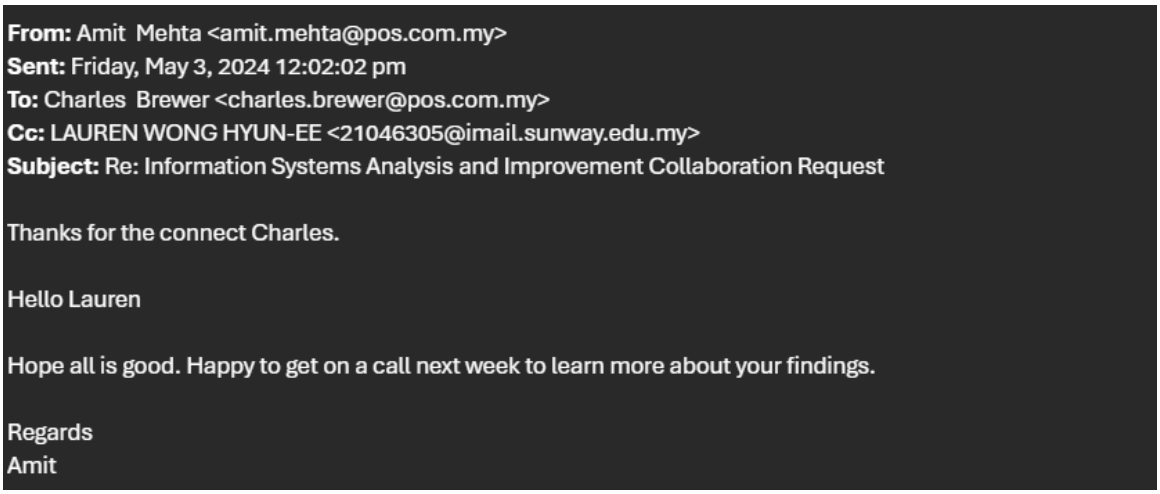
Dear Sir,

I hope this letter finds you well. We are students enrolled in the Information Systems (Data Analytics) program at Sunway University. Currently, we are engaged in a project centered on the systems development life cycle for the subject BIS2102

Appendix E

Emails With POS Malaysia Head of Product – Amit Mehta

Figure E 1 *Introductory Email to Amit Mehta*



From: Amit Mehta <amit.mehta@pos.com.my>
Sent: Friday, May 3, 2024 12:02:02 pm
To: Charles Brewer <charles.brewer@pos.com.my>
Cc: LAUREN WONG HYUN-EE <21046305@imail.sunway.edu.my>
Subject: Re: Information Systems Analysis and Improvement Collaboration Request

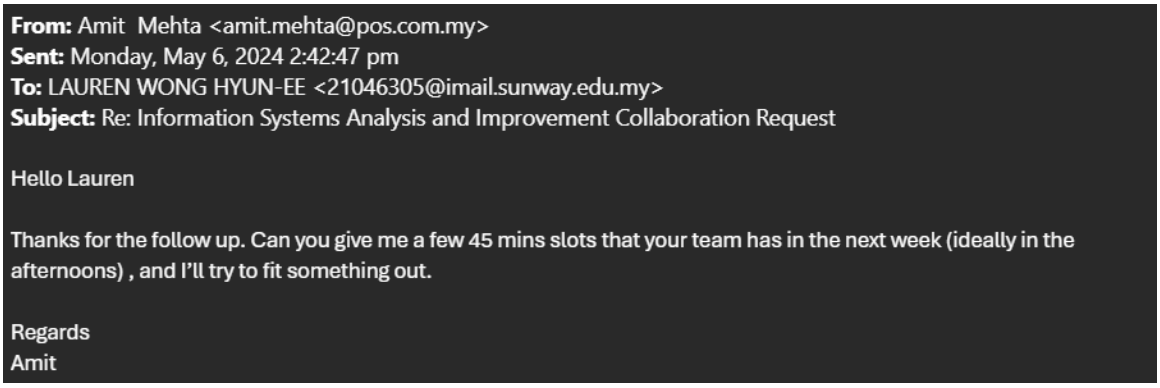
Thanks for the connect Charles.

Hello Lauren

Hope all is good. Happy to get on a call next week to learn more about your findings.

Regards
Amit

Figure E 2 *Follow-up Email for Interview Schedule*



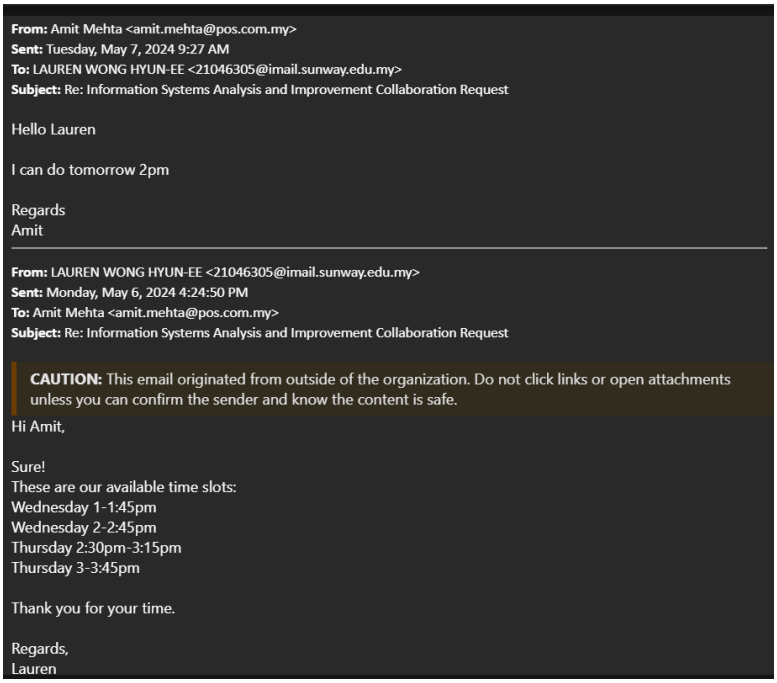
From: Amit Mehta <amit.mehta@pos.com.my>
Sent: Monday, May 6, 2024 2:42:47 pm
To: LAUREN WONG HYUN-EE <21046305@imail.sunway.edu.my>
Subject: Re: Information Systems Analysis and Improvement Collaboration Request

Hello Lauren

Thanks for the follow up. Can you give me a few 45 mins slots that your team has in the next week (ideally in the afternoons) , and I'll try to fit something out.

Regards
Amit

Figure E 3 *Follow-up Email for Interview Schedule (2)*



From: Amit Mehta <amit.mehta@pos.com.my>
Sent: Tuesday, May 7, 2024 9:27 AM
To: LAUREN WONG HYUN-EE <21046305@imail.sunway.edu.my>
Subject: Re: Information Systems Analysis and Improvement Collaboration Request

Hello Lauren

I can do tomorrow 2pm

Regards
Amit

From: LAUREN WONG HYUN-EE <21046305@imail.sunway.edu.my>
Sent: Monday, May 6, 2024 4:24:50 PM
To: Amit Mehta <amit.mehta@pos.com.my>
Subject: Re: Information Systems Analysis and Improvement Collaboration Request

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

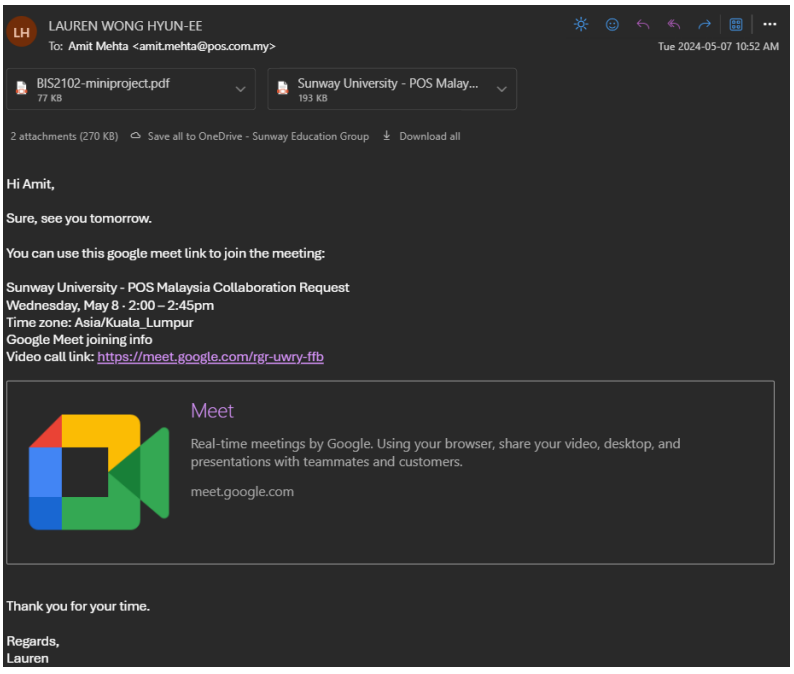
Hi Amit,

Sure!
These are our available time slots:
Wednesday 1-1:45pm
Wednesday 2-2:45pm
Thursday 2:30pm-3:15pm
Thursday 3-3:45pm

Thank you for your time.

Regards,
Lauren

Figure E 4 *Confirmation of Interview via Google Meet*



LH LAUREN WONG HYUN-EE
To: Amit Mehta <amit.mehta@pos.com.my>
Tue 2024-05-07 10:52 AM

BIS2102-miniproject.pdf 77 KB
Sunway University - POS Malay... 193 KB

2 attachments (270 KB) Save all to OneDrive - Sunway Education Group Download all

Hi Amit,

Sure, see you tomorrow.

You can use this google meet link to join the meeting:

Sunway University - POS Malaysia Collaboration Request
Wednesday, May 8 · 2:00 – 2:45pm
Time zone: Asia/Kuala_Lumpur
Google Meet joining info
Video call link: https://meet.google.com/rgr-uwry-ffb

Meet
Real-time meetings by Google. Using your browser, share your video, desktop, and presentations with teammates and customers.
meet.google.com

Thank you for your time.

Regards,
Lauren