Software Requirements Specification

for

[Teipon Gadget System]

Version *1.0*

Prepared by

MOHAMAD HAZIK HAIKAL BIN RAZAK (2024779495)
EIMAN DAMIEN BIN ROHMAN (2024779447)
WAN MUHAMMAD NAQIB BIN WAN MOHD NAZRI (2024926951)
MUHAMMAD TAUFIQ BIN SHOEID (2024542603)
MUHAMMAD LUQMAN MU`IZZ BIN ANUAR (2024974353)
MOHAMAD SYAZMIR B MOHD SAIDI (2024556469)
MUHAMMAD MAHDI BIN MOHD NORIZAL (2024947555)
SYARIFUL HUSAINI BIN SHARI FUDDIN (2024568373)

November 25, 2024

Table of Contents

Revision History

Name	Date	Reason For Changes	Version
MOHAMAD HAZIK HAIKAL BIN RAZAK	25/11/24	SRS	1.0

1. Introduction

1.1 Purpose

This Software Requirements Specification (SRS) outlines a transaction management system for Teipon Gadget, a shop in Seksyen 7, aiming to transition from manual processes to a digital platform to support business growth. The system will enable staff to create, read, update, and delete phone listings, while customers can search or sort phones based on specific criteria, facilitating a more efficient way to manage transactions and store information on phones and customer interactions. This SRS covers the full scope of the transaction management system, detailing both staff and customer functionalities to support the shop's expansion into online operations.

1.2 Definitions, Acronyms and Abbreviations

- UiTM: Universiti Teknologi MARA
- SRS: System Requirement Specification
- DBMS: Database Management System
- PHP: Hypertext Preprocessor (a scripting language)
- CSS: Cascading Style Sheets
- HTML: Hypertext Markup Language
- JavaScript: A programming language for web development
- IDE: Integrated Development Environment
- Laragon: Cross-platform web server solution stack
- MySQL: An open-source relational database management system
- HTTP: Hypertext Transfer Protocol
- HTTPS: Hypertext Transfer Protocol Secure
- SQL: Structured Query Language

1.3 Intended Audience and Reading Suggestions

STAKEHOLDERS	DESCRIPTION
Project Managers	Use the document to understand the project scope, objectives, and constraints, aiding in effective resource allocation, timeline management, and overall coordination.
Developers	Reference detailed functional and non-functional requirements for building the system. Focus on the system's design, coding, and implementation aspects.
Testers	Design and execute tests based on functional and non-functional requirements to ensure the system works as expected.
End-Users	review the system's features and capabilities to confirm it meets their needs, ensuring smooth adoption and understanding of benefits.
Documentation Writers	Use the SRS as a basis to create user manuals, guides, and help documents. Focus on areas such as user interactions and system behavior for effective communication.

1.4 Product Scope
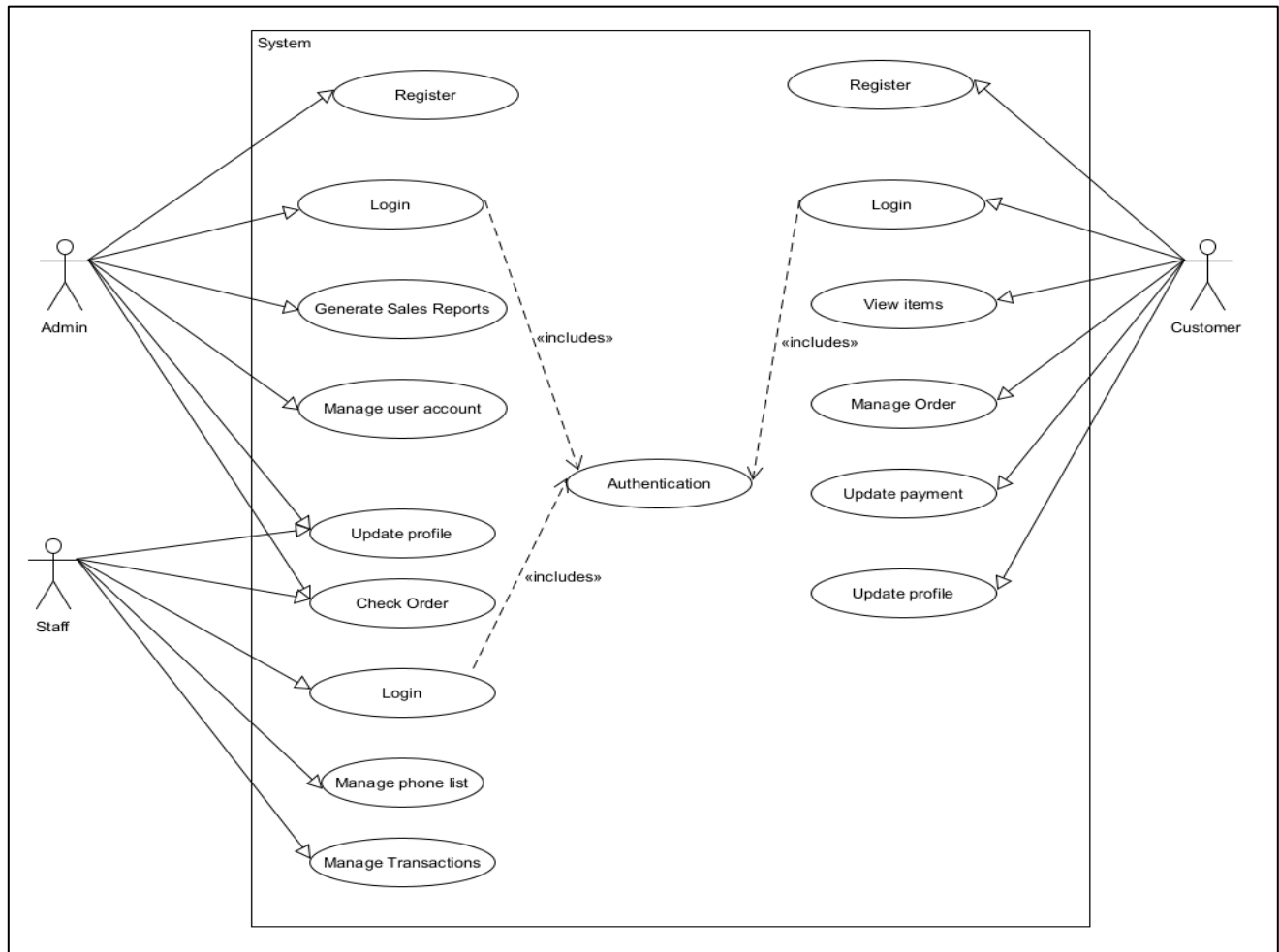
Figure UML Case Diagram

Software Description and Purpose

This system is designed to store and manage information about phones and customer transactions efficiently and securely online, providing structured access for tasks such as sales reporting, order management, and user account management.

Objectives and Benefits

- Secure Access and Authentication: The system's login and authentication features enhance security by ensuring that only authorized users can access into the system.

- Enhanced User Experience: The system allows customers to view items, manage orders, update payments, and edit profiles seamlessly.

- Efficient Management Tools: Admins and staff members have dedicated features to generate sales reports, manage user accounts, and handle transactions, thus increasing operational efficiency.

1.5 References

- Affordable Second-Hand Smartphones, Tablets & Laptops | CompAsia MY. (2022). CompAsia E-Store. https://compasia.my/
- SRO, E. (n.d.). Example Software Requirements Specification (SRS) | REQView Documentation. https://www.reqview.com/doc/iso-iec-ieee-29148-srs-example/
- Mobile shop Billing software | POS Software for Mobile shop. (n.d.). https://www.gofrugal.com/retail/electronics-pos/mobile-shop-billing-software.html

2. Overall Description

2.1 Product Perspective

The Teipon Gadget System (TGS) is a new, self-contained web-based application designed exclusively to modernise and streamline Teipon Gadget's existing manual transaction processes at their mobile phone shop in Seksyen 7. Currently, all transactions and inventory management in the shop are done manually, limiting efficiency, scalability, and accessibility. This project intends to replace the manual system with a full digital solution that will allow the shop to extend its online operations and reach a larger market.

This system is not a replacement for any existing software in the organisation, but it represents a total digital transformation by offering an all-in-one solution for effectively managing transactions, inventories, and customer relations. The system is self-contained, but it can be expanded with external APIs or third-party services in the future to support additional capabilities like payment processing or customer relationship management.

System Interfaces

The Teipon Gadget System interfaces include: -

➢ **Staff Interface**: Provides workers with abilities for managing product inventory such as adding new phones, updating existing listings, and deleting outdated items. Staff can also view transaction records to track sales.

➢ **Customer Interface**: Customers can search, sort, and filter available mobile phones based on multiple criteria such as brand, price, and characteristics. The interface is intended to make navigating easier and the purchasing process more efficient.

➢ **Database Interface**: Secure database for storing product information such as customer information, and transaction histories. The database used CRUD activities (Create, Read, Update, and Delete) to ensure that data is correct and reliable for staff and customers.
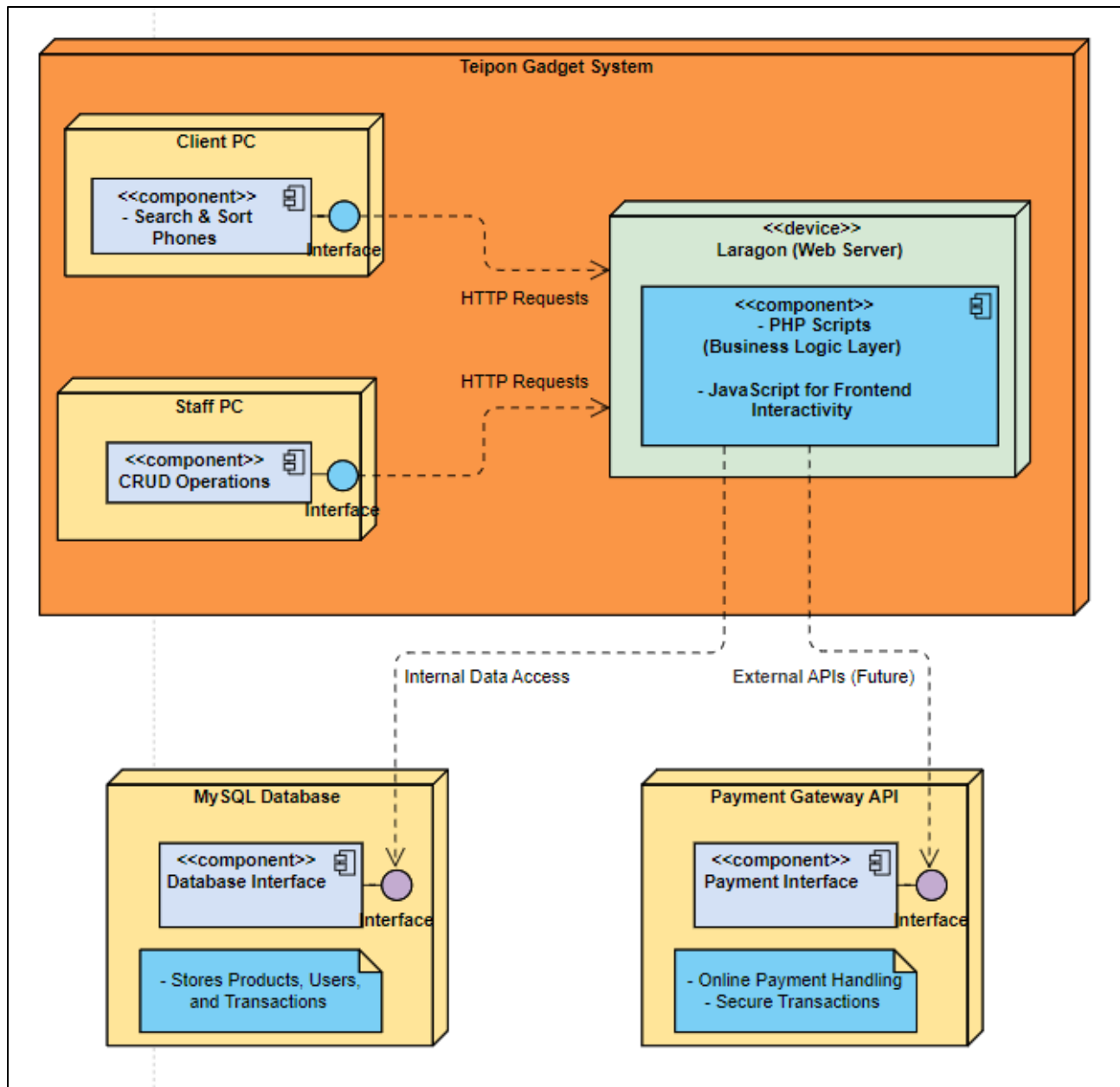
Subsystem Interconnections

The staff and customer interfaces communicate with a central database that contains all important data for product listings, customer information, and transaction records. The internal database provides real-time changes and data retrieval to ensure a responsive and efficient user experience while surfing the web. The system is intended to be modular, which means the ability to connect to external services in the future if the company expands into online payment options.

2.2 Product Functions

- *Refer appendix D for Class Diagram.*

Summarize of the major product functions for the Teipon Gadget System: -

1. User Management
  I.   Staff Accounts:
  - o Enable staff to log in securely.
  - o Manage access permissions for inventory operations.

  II. Customer Accounts:
  - o Allow customers to register, login, and manage profiles.

2. Inventory Management (Staff)

  - o Add new mobile phones with specifications, price, and stock details.
  - o Update existing phone details such as price, and stock availability.
  - o Delete outdated or discontinued phone listings.
  - o View the complete inventory list with filtering and sorting options.

3. Product Browsing and Search (Customer)

  - o Display available phones with key details such as model, price, and specifications.
  - o Provide sorting options by price or brand.
  - o Enable search functionality with customizable criteria by budget, and features.

4. Transaction Management
  I.   For Staff:
  - o Record and track in-store or online transactions.
  - o Access transaction logs for auditing or analysis.

  II. For Customers:
  - o View their purchase history.
  - o Receive order confirmation details.

5. Data Storage and Retrieval

   o Securely store all user data, phone details, and transaction records in the MySQL database.

   o Ensure fast and efficient data retrieval for both staff and customers.

6. Interactive and Responsive User Interface

   o Use JavaScript for dynamic features such as live filtering and real-time validation.

   o Ensure a mobile-friendly design for easy access on different devices.

7. Future Expandability

   o Support potential integration with external systems and payment gateways for secure online transactions.

2.3 User Classes and Characteristics

The Teipon Gadget System is designed to fulfill two primary user classes for each with distinct roles, usage patterns, and characteristics.

1. Staff (Administrative Users)

Frequency of Use	:	Regular users that access the system multiple times daily to manage operations.
Technical Expertise	:	Moderate, familiar with basic computer and web applications.
Security Level	:	High privilege level, it requires authentication and role-based access control.
Responsibilities	:	- Manage product inventory (add, update, delete, view phones).
		- Monitor and record in-store and online transactions.
		- Generate reports on sales and inventory tracking.
Characteristics	:	- A user-friendly dashboard with clear navigation for inventory management tasks.
		- Secure login to protect sensitive business data.
		- Quick access to data with sorting and filtering capabilities.

Importance	:	**Highly important**
		Ensures smooth operations and management of the gadget store.

2. Customers

Frequency of Use	:	Irregularly, access the system as needed to browse products or make purchases.
Technical Expertise	:	Varies to some users may have limited experience with e-commerce platforms.
Security Level	:	Basic privilege level, it requires a secure login for personal account management.
Responsibilities	:	- Browse and search for mobile phones based on personal preferences.
		- View detailed product specifications and prices.
		- Purchase phones online and review past transactions.
Key Needs	:	- A visually appealing and intuitive interface for product exploration.
		- Mobile responsiveness for easy access across devices.
		- Simple and secure registration and login process.
Importance	:	**Highly important**
		Represents the target audience and primary revenue source for the business.

2.4 Operating Environment

The Teipon Gadget System is a web-based platform designed to operate in the following environments. This operational environment ensures compatibility and smooth functioning of the system across all suitable platforms: -

1. Server Environment

Hardware Requirements					
Minimum			Recommended		
Processor	:	Quad-core, 2.0 GHz or higher.	Processor	:	Octa-core, 3.0 GHz or higher.
RAM	:	8 GB.	RAM	:	16 GB.
Storage	:	50 GB (dedicated for application and database storage)	Storage	:	100 GB SSD (for faster data retrieval).

Software Requirements			
Web Server	:	Laragon	Provides the hosting environment for the PHP backend.
Programming Languages	:	PHP	Backend logic
		JavaScript	Frontend interactivity and AJAX calls.
Database	:	MySQL	Handles persistent storage of data like products, transactions, and users.
Operating System	:	Compatible with	**Windows Server** (Windows 10/11 or later)
			Can run on **Linux distributions** (Ubuntu 20.04+ or CentOS 7+) for production deployment.
Frameworks and Tools	:	Composer	(Dependency Manager for PHP).

2. Client Environment

Hardware Requirements					
Minimum			Recommended		
Processor	:	Dual-core, 1.5 GHz.	Processor	:	Quad-core, 2.0 GHz or higher.
RAM	:	4 GB.	RAM	:	8 GB.
Storage	:	Sufficient space for browser and system files.	Storage	:	At least 20 GB of free space.

Software Requirements		
Web Browsers	:	Latest versions of Chrome, Firefox, Edge, or Safari.
		JavaScript and cookies must be enabled for full functionality.
Operating System	:	Windows 10/11, macOS (Catalina or later), Android (8.0+), or iOS (12.0+).

3. Network Requirements

Minimum			Recommended		
Bandwidth	:	5 Mbps for smooth interaction with the system.	Bandwidth	:	20 Mbps or higher for faster loading of dynamic content.
Connection	:	Both wired (LAN) and wireless (Wi-Fi) connections are supported.			

4. Dependencies and Integration

Third-Party Libraries	:	• Bootstrap or TailwindCSS for responsive design (if used). • jQuery or native JavaScript for interactive UI components.
Future API Integrations (Optional)	:	Payment gateways such as Stripe, and PayPal for online transactions.

5. Deployment Environment

Development	:	• Localhost environment using Laragon as a server stack. • Test database hosted on the local MySQL instance.
Production	:	• Deployable, hosted on an on-premises web server running Laragon or a similar stack. • Alternatively, on cloud-based platforms such as AWS, Azure, or DigitalOcean.

2.5 Design and Implementation Constraints

Several constraints and limitations exist when developing the Teipon Gadget System. These constraints may influence design decisions, technology selection, and overall implementation approach. Furthermore, restrictions limit what technologies and techniques can be used to ensure that the system stays consistent, secure, and managed. Below is an overview of the important constraints: -

1. <u>Technology Stack Constraints</u>

Server Platform	- The system must use **Laragon** as the local development server. This requires compatibility with technologies supported by Laragon, primarily PHP for the backend.
	- Deployment will use Apache or Nginx that limiting the use of server-side technologies to those compatible with this environment.

Programming Languages	-	The backend developed using **PHP**.
	-	Frontend scripting must use **JavaScript**, with a preference for lightweight and widely supported libraries.
Database	-	**MySQL** is the designated database management system that requires all data interactions to be based on SQL queries compatible with MySQL.
	-	This limits the use of other database systems like NoSQL (MongoDB) and enforces SQL-specific query optimizations.
Operating System	-	Development is targeted at environments compatible with **Windows Server** (Laragon) but must also be capable of deploying Linux-based systems that limit some platform-specific features.

2. Security Constraints

User Authentication	-	The system must enforce **secure user authentication** using encryption protocols, for example HTTPS, and secure password hashing.
	-	Constraints on password storage: passwords must not be stored in plain text, necessitating the use of **password hashing algorithms** like bcrypt or Argon2.
Data Protection	-	The system must follow **GDPR** or similar privacy regulations for storing and managing customer data including proper handling of personally identifiable information (PII).
	-	These places constraints on data handling include secure data storage, encryption, and proper user data deletion mechanisms.

3. Hardware Constraints

Server Requirements
- The server must operate within hardware limits specified with minimum quad-core processor, and 8 GB RAM for development this impacting scalability and resource-intensive operations.
- Limitations on storage require database optimization to handle product listings and transaction data efficiently.

Client Devices
- The system must be accessible via a range of client devices (desktops, tablets, and mobile phones) that require a **responsive design** compatible with lower-performance hardware.

4. Integration and Interface Constraints

Third-Party API Integration
- Future integrations such as payment gateways must be compatible with PHP and MySQL that limit the selection of third-party APIs.
- Constraints on available API libraries for secure communication and data transactions that require the use of widely supported APIs like **REST** over HTTP.

Data Format
- All data exchanges between clients and servers should use **JSON** format, limiting the use of XML or other data structures.

5. Development and Maintenance Constraints

Design Conventions
- Code must adhere to PHP and JavaScript **coding standards,** for example, PSR-12 for PHP to ensure maintainability.
- Use of **MVC design pattern** for backend implementation enforcing separation of concerns between data, business logic, and presentation layers.

Documentation and Code Commenting	-	All code must be well-documented, and key sections commented on for future developers' reference by limiting the use of obscure code practices or complex one-liners.
Version Control	-	Development must use a **version control system** like Git to manage code changes that require strict branching and merging guidelines to prevent conflicts.

6. Regulatory and Compliance Constraints

Legal Compliance	-	The system must comply with local and international **e-commerce laws** by including requirements for online transaction security and data privacy.
	-	Customer data collection and storage must be done following privacy policies by limiting unauthorized access and requiring customer consent for data usage.
Audit and Logging	-	Implementation of a logging mechanism for inventory changes, sales transactions, and user activities for auditing purposes.
	-	This imposes constraints on data logging, requiring secure and non-intrusive audit trails.

7. Communication Protocols

Network Security	-	All data communication between client and server must be secure by enforcing the use of **HTTPS** instead of HTTP.
	-	Constraint on WebSocket usage for real-time features due to server limitations unless supported by the Laragon environment.

8. User Interface Constraints

Browser Compatibility	-	The user interface must be compatible with modern web browsers (Chrome, Firefox, Edge, Safari) but may limit the use of browser-specific or experimental features for broader compatibility.

| Responsive Design | - | The interface must be fully responsive that limiting the use of desktop-only layouts or non-adaptive design components. |
| | - | Support for a mobile-first design approach by constraining the complexity of some desktop features for better mobile compatibility. |

2.6 User Documentation

The Teipon Gadget System will have extensive user documentation that helps employees, consumers, and administrators in effective using and maintaining the system. With these parts of the user manual, we can guarantee that everyone who uses the system will be able to do it well and will have the help they need when they run into problems. The most important parts of the user manual that comes with the program are as follows:

1. User Manual

    Audience: Staff (Administrative Users) and Customer

    Content: - **Introduction** to the Teipon Gadget System and its features.
    - Step-by-step **instructions for registration, login, and password recovery**.
    - Detailed guide on **browsing and searching products**.
    - Instructions for **managing product listings**, including adding, updating, and deleting mobile phone entries (for staff).
    - Procedures for **viewing and handling transactions**, including recording in-store and online sales (for staff).
    - Guidelines on **managing user profiles**, including editing personal information and checking transaction history.
    - **Frequently Asked Questions (FAQs)** to address common user queries.

    Format   - Delivered as a PDF document.
    - Available as a downloadable file on the website.
    - Printed version available upon request.

2. Online Help System

Audience: All Users.

Content: - Context-sensitive help is available for each page of the system.

- Tooltips and pop-up guides embedded in the user interface for quick guidance.

- Step-by-step instructions for commonly performed tasks, such as:

  • Searching for products.

  • Filtering product listings based on criteria.

  • Completing a purchase.

- Embedded **links to video tutorials** for visual instructions on key processes.

Format - Integrated into the web interface.

- Searchable help topics with a keyword-based search option.

- Available in HTML format, accessible through a "Help" or "?" icon in the navigation menu.

3. Tutorials

Audience: All Users.

Content: - **Getting Started Guide** for first-time users, covering initial setup, navigation basics, and account creation.

- Walkthroughs for **specific use cases**, such as:

  • Creating and managing product entries (for staff).

  • Browsing and purchasing phones (for customers).

- Video tutorials demonstrate system functionality, accessible through embedded links in Online Help.

- Advanced tips for efficient usage, like using advanced search filters or generating inventory reports.

Format - Video tutorials in MP4 format, hosted on YouTube or embedded directly in the system.

- Step-by-step text guides in PDF format, downloadable from the website.

- Interactive tutorials (e.g., guided tours) directly on the system's user interface for first-time users.

4. Technical Documentation (For Administrators)

Audience: System Administrators and IT Support.

Content: - System architecture overview, including server configuration, database setup, and technology stack.
- Instructions for **system installation, deployment, and configuration** using Laragon.
- Troubleshooting guide for common servers or database issues.
- **Backup and recovery procedures** for the MySQL database.
Details on updating and maintaining the software, including how to apply patches and upgrades.
User management instructions, including creating and deleting user accounts with appropriate privileges.

Format - Delivered as a PDF.
- Hosted on the internal admin panel for quick access.

5. Quick Reference Guide (Cheat Sheets)

Audience: Staff and Customers.

Content: - Summarized, a one-page guide covering the most essential system functions.
- Tips for efficient use of product search and inventory management.
- Shortcuts and quick tips for the interface, like filtering options and search tricks.

Format - PDF document.
- Printed version available at the shop for reference.
- Quick guide cards are integrated within the user dashboard.

6. Release Notes

Audience: All Users.

Content: - Documentation of system updates, including **new features**, bug fixes, and enhancements.

- Known issues and planned improvements.

- Instructions on how to adapt to new or changed features.

Format - HTML page accessible from the user dashboard.

- PDF document for download with each software update.

2.7 Assumptions and Dependencies

The Teipon Gadget System's development and deployment are predicated on specific assumptions and dependencies, which may have an influence on the project if they are inaccurate, not discloseed, or susceptible to change. These assumptions and dependencies will be critical to the project's development and operations. Adjustments may be required if assumptions alter, or dependencies are dissatisfied. Below is a list of major assumptions and dependencies:

I.   Assumptions

1. **Consistent Access to Technology Stack**

    The development team is expected to have reliable access to Laragon, which includes Apache or Nginx, PHP, JavaScript, and MySQL. Disruptions or constraints in the use of these technologies may have an impact on development schedules.

2. **Availability of Skilled Development Team**

   The development team is assumed to be skilled in PHP, JavaScript, and MySQL, as well as expertise dealing with web-based systems based on the MVC paradigm. If further training is required or there is a dearth of experienced developers, the project timeframe may be compromised.

3. **Stable Operating Environment**

   The system is expected to run in a reliable environment, either on Windows Server for development (with Laragon) or on a Linux-based production server. Changes in the operating system or hardware specifications may need changes to server setup or program compatibility.

4. **Browser Compatibility**

   Users are expected to access the system through modern web browsers (Chrome, Firefox, Edge, or Safari) that support JavaScript. If users use outdated or unsupported browsers, the system's functioning may be limited, and additional compatibility changes are required.

5. **Reliable Internet Connection**

   The project expects that users will have access to a reliable internet connection, particularly when performing online functions such as product searches and transactions. If network stability is disrupted, it may have an impact on the user experience.

6. **Database Scalability**

   It is assumed that **MySQL** will handle the expected volume of data, including product listings, user data, and transaction records, without performance issues. If the database volume exceeds expectations, optimization or database scaling might be necessary.

7. **Third-Party Integration Reliability**

   Any third-party APIs (such as payment gateways, if they are used) are presumed to provide dependable and consistent service. Third-party service outages could affect how well the system works.

8. **Customer Data Privacy Compliance**

   Users are expected to handle data in accordance with privacy rules. The system might need to be adjusted to guarantee compliance if rules change or more stringent requirements are added.

II. Dependencies

1. **Dependence on Laragon Server Environment**

   For local development, the project depends on the Laragon server environment. The development process may be impacted by any upgrades or modifications made to Laragon that alter its compatibility with PHP, MySQL, or Apache.

2. **Third-Party Libraries and Tools**

   External PHP libraries, JavaScript libraries like jQuery, CSS frameworks like Bootstrap, and any other tools used to improve system functionality may be required for the project. The project might need to be modified if these libraries become obsolete or need significant modifications.

3. **MySQL Database**

   MySQL is the only tool used to manage data in the system. Project scope and implementation may be impacted by any modifications to database needs, unforeseen performance issues, or the demand for a changing database type (such as moving to a NoSQL solution).

4. **Web Server Configuration**

   The PHP application is served using Apache in this project. Changes to these web servers or modifications to server configurations may influence the deployment and operating environment of the system.

5. **User Feedback for UI Design**

   It will be expected that early user input would direct the system interface's design and usability enhancements. Feedback that is unavailable or delayed could affect usability testing and the final design of the user interface.

6. **Hosting and Deployment Infrastructure**

   Whether the system is deployed on a local server or on a cloud platform (such as AWS or Azure) depends on the hosting infrastructure that is selected. The deployment strategy will be influenced by the performance, cost, and stability of the hosting environment.

7. **Compliance with E-commerce Regulations**

   It is expected that the system will abide by existing data protection legislation (such as the GDPR) and e-commerce laws. The software may need to be modified in response to any changes in legislative regulations, especially those pertaining to online transactions, data security, and privacy.

8. **Client Devices Compatibility**

   The system must work with PCs, tablets, and smartphones for the project. To guarantee consistent user experience, further work might be necessary if there are notable variations in the system's performance across devices.

9. **Regular Software Updates and Maintenance**

   The system depends on PHP, MySQL, Apache, and any used libraries receiving frequent updates and patches. Performance problems or security flaws may occur from not updating the software components.

10. **Payment Gateway Integration (Optional)**

The system will rely on the stability and availability of the chosen payment gateway APIs such as PayPal or Stripe if a payment gateway is integrated. The implementation may be impacted by modifications to the terms or services offered by the payment gateway.

3. External Interface Requirements

3.1 User Interfaces

The Teipon Gadget System will feature a modern, user-friendly interface designed to ensure effortless navigation. All interface elements will be intuitively linked, providing a seamless and efficient user experience. A storyboard, complemented by screenshots and footage, has been developed to illustrate the navigation flow and the purpose of each system function. Additionally, the graphical user interface (GUI) adheres to established guidelines and standards, ensuring consistency, readability, and accessibility for users.

The screen layout is a top priority, designed to enhance user convenience and ensure that all features are well-organized to facilitate intuitive navigation. Interactive elements, such as buttons and text boxes, are systematically arranged for clarity and ease of use, remaining consistently visible on the screen. Additional features, such as seamless navigation between pages and logical page functions, are emphasized to highlight the intuitive interaction between the user and the system.

Authentication and Authorization Page:
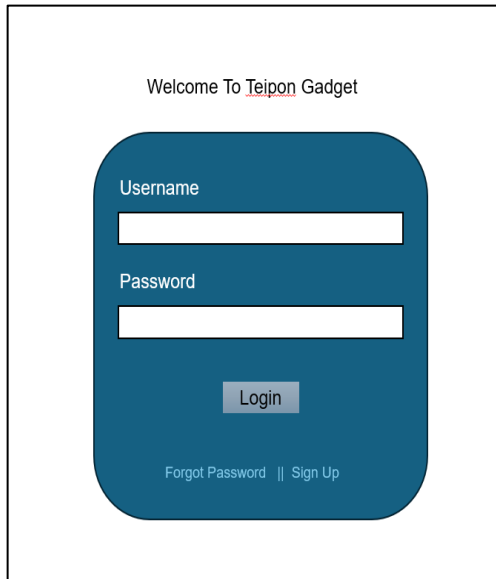
Figure Sign Up Page

Figure Login Page

Figure *User Profile Page*
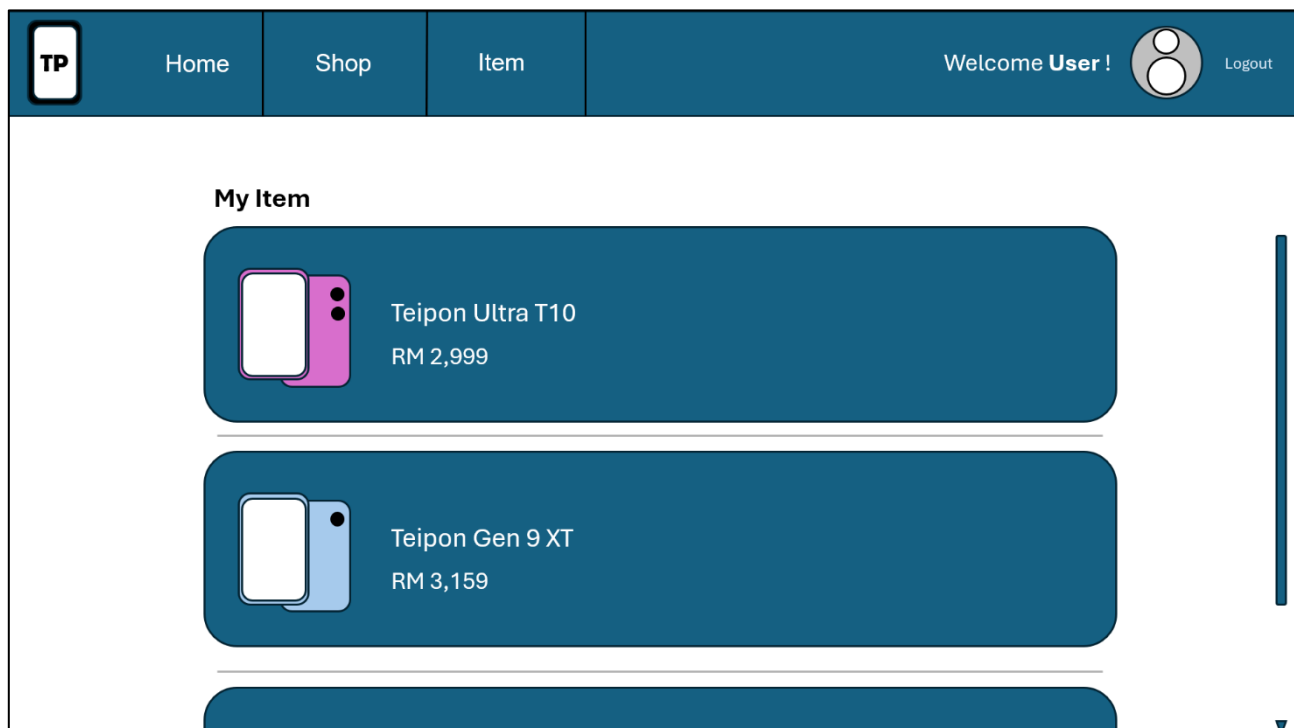
TP | Home | Sales Report | Manage User Account | Welcome **John** ! | Logout

Edit My Profile

Name
John Doe

Password
****

Email
*******12@email.com

Save Edit

Figure User Update Profile Page

TP | Home | Shop | Item | Welcome **User** ! | Logout

My Item

Teipon Ultra T10
RM 2,999

Teipon Gen 9 XT
RM 3,159
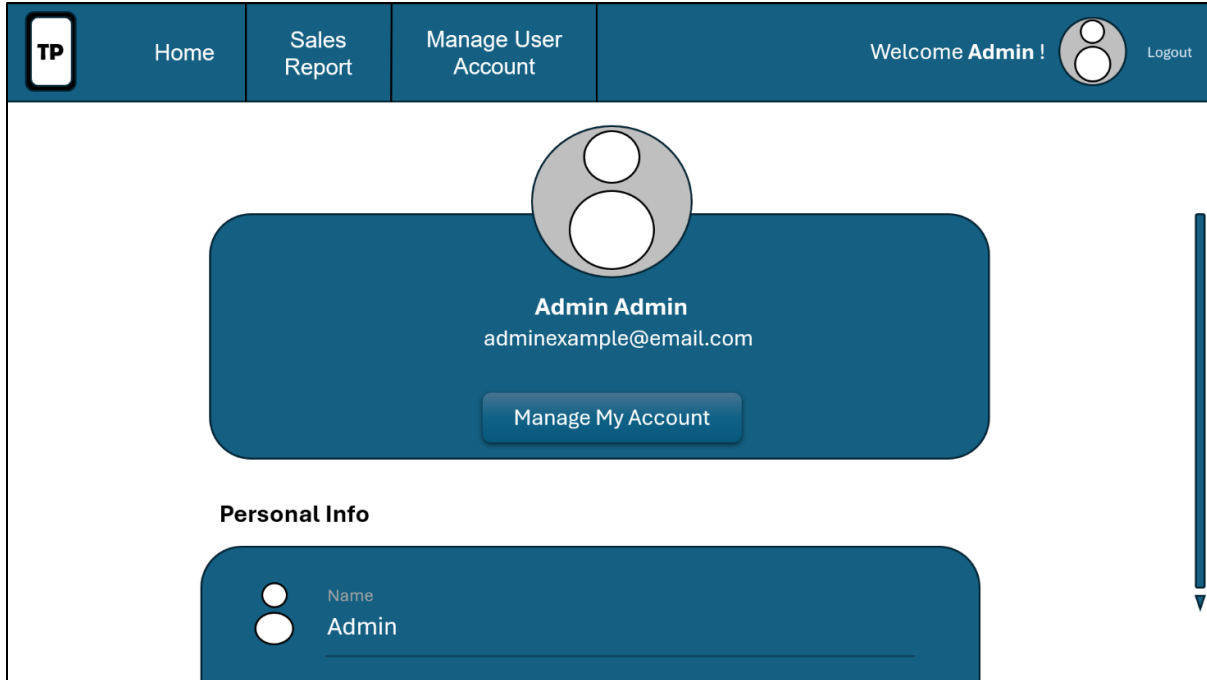
Figure User View Item
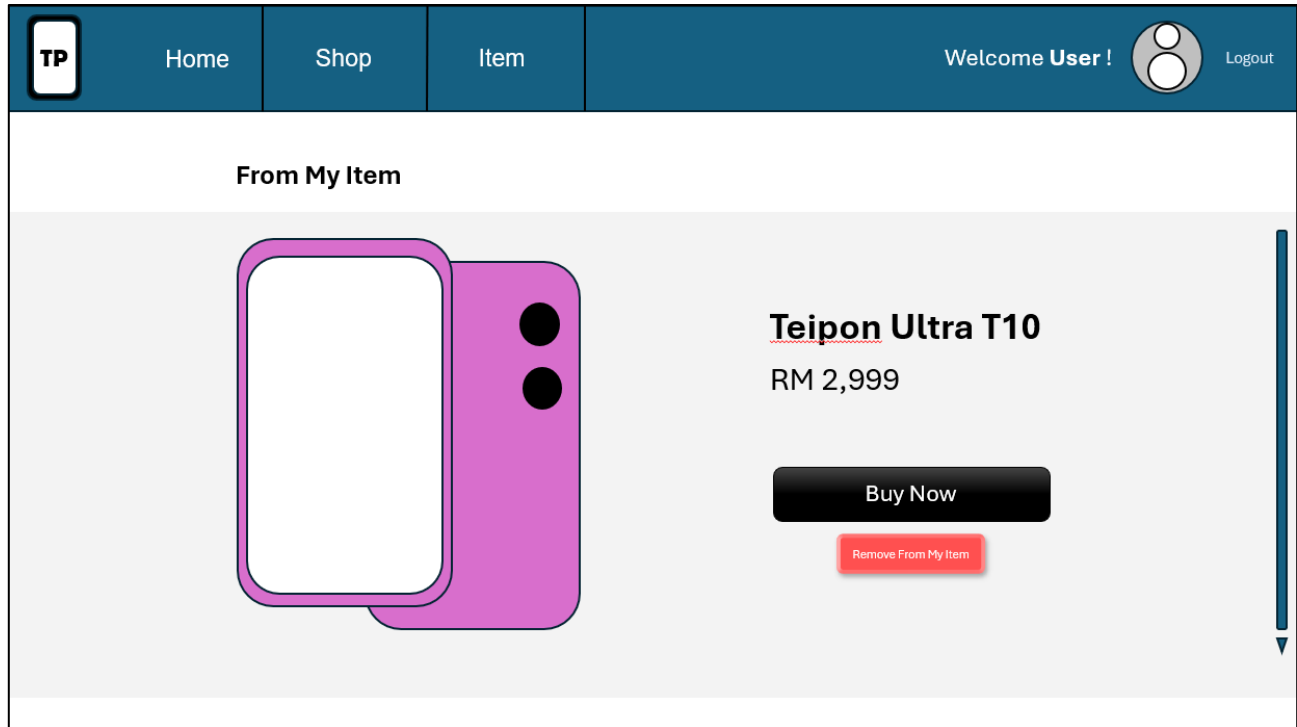
Figure User Manage Order
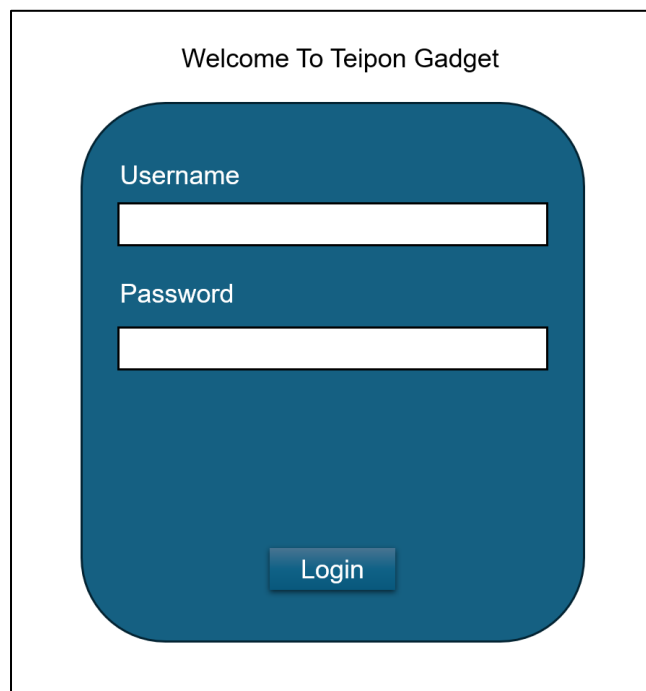
Figure Admin Login Page

Figure Admin Profile Page
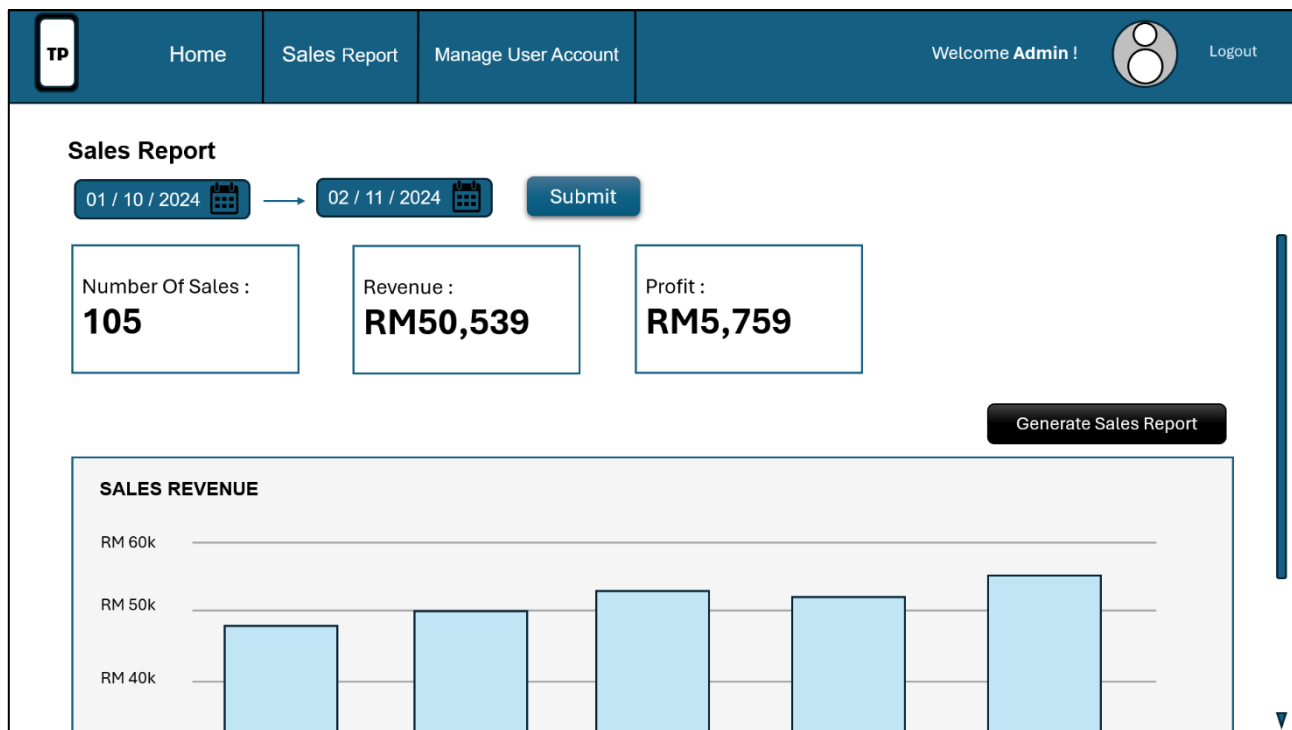
Figure Admin Sales Report Page
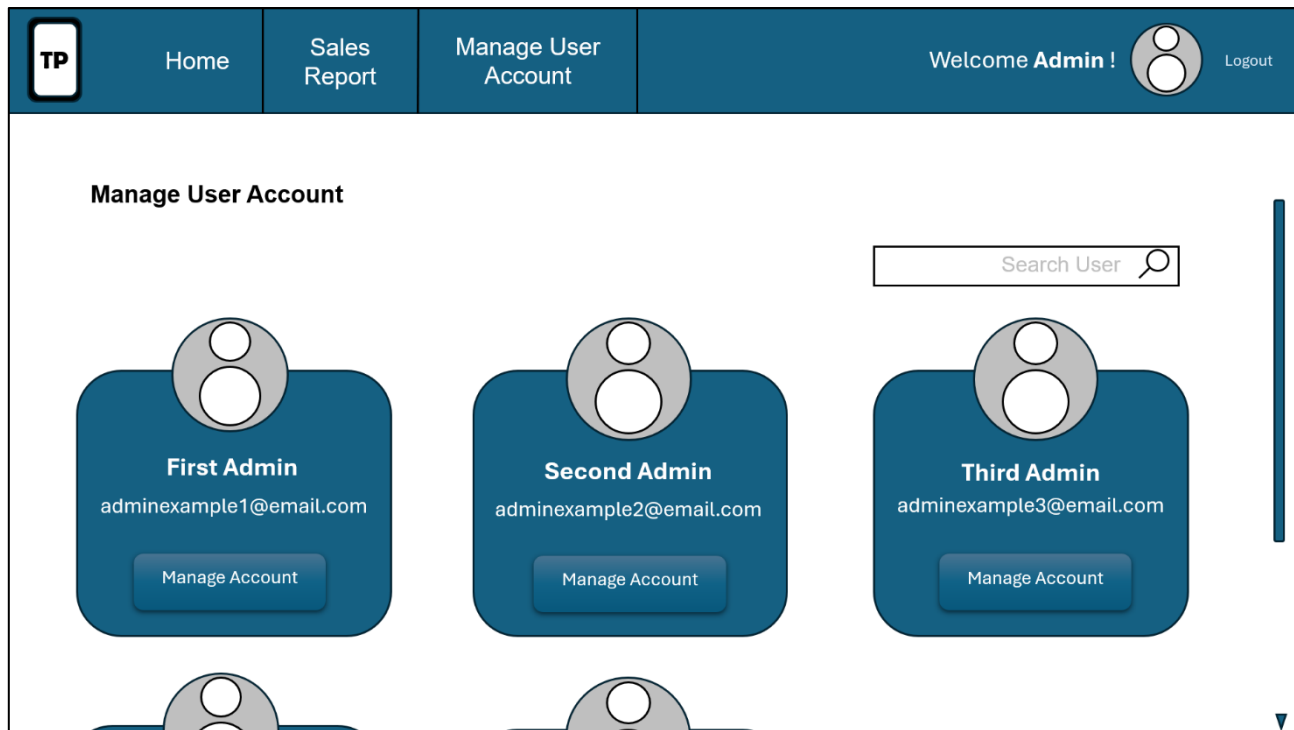
Figure Admin Manage User Account
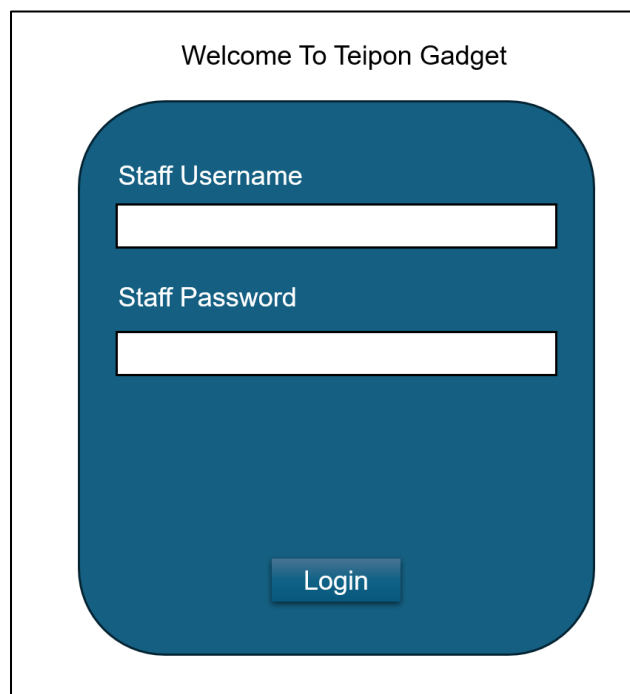
Figure Staff Login Page
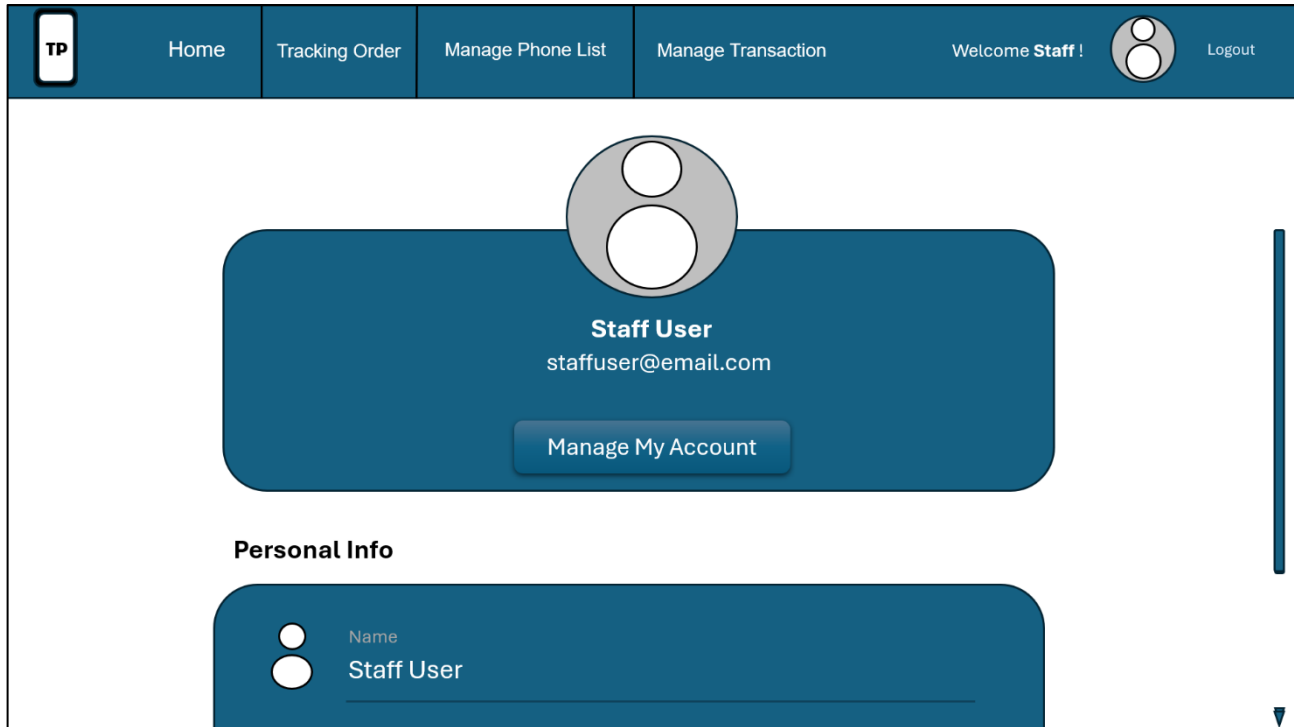
Figure Staff Update Profile Page
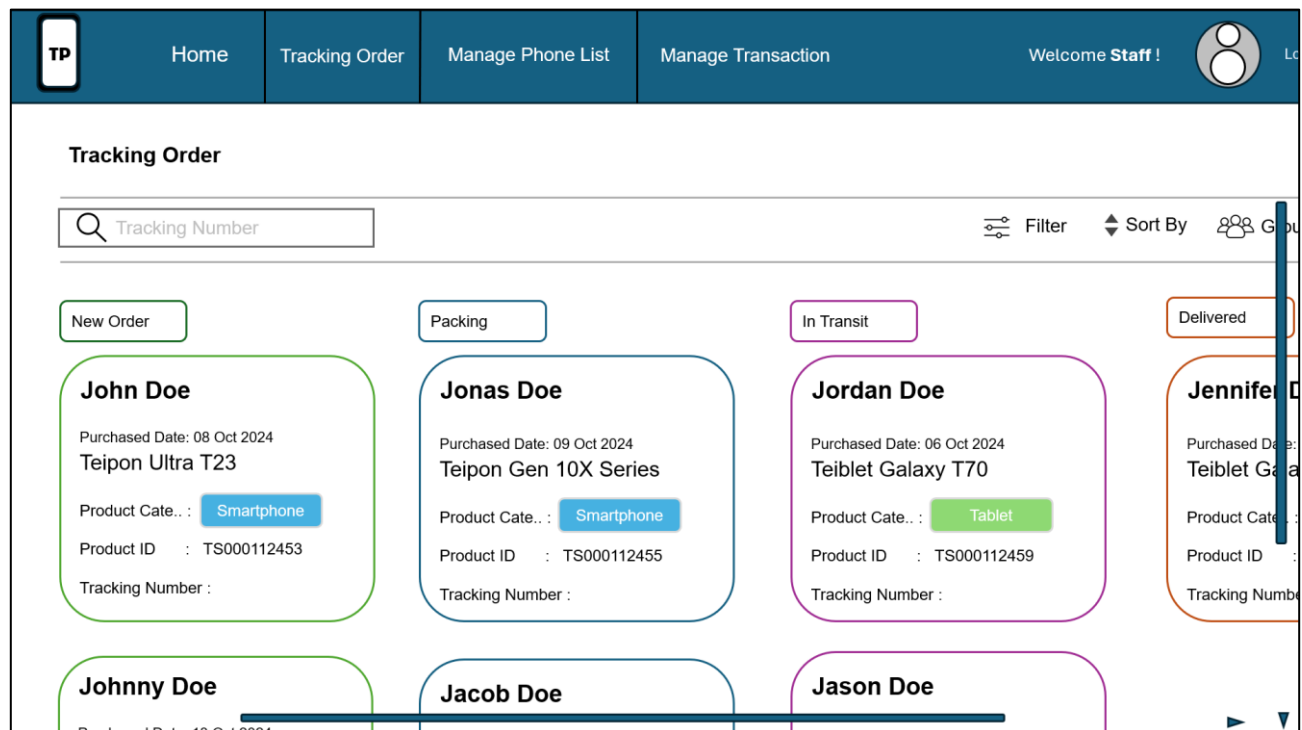
Figure Staff Tracking Order Page
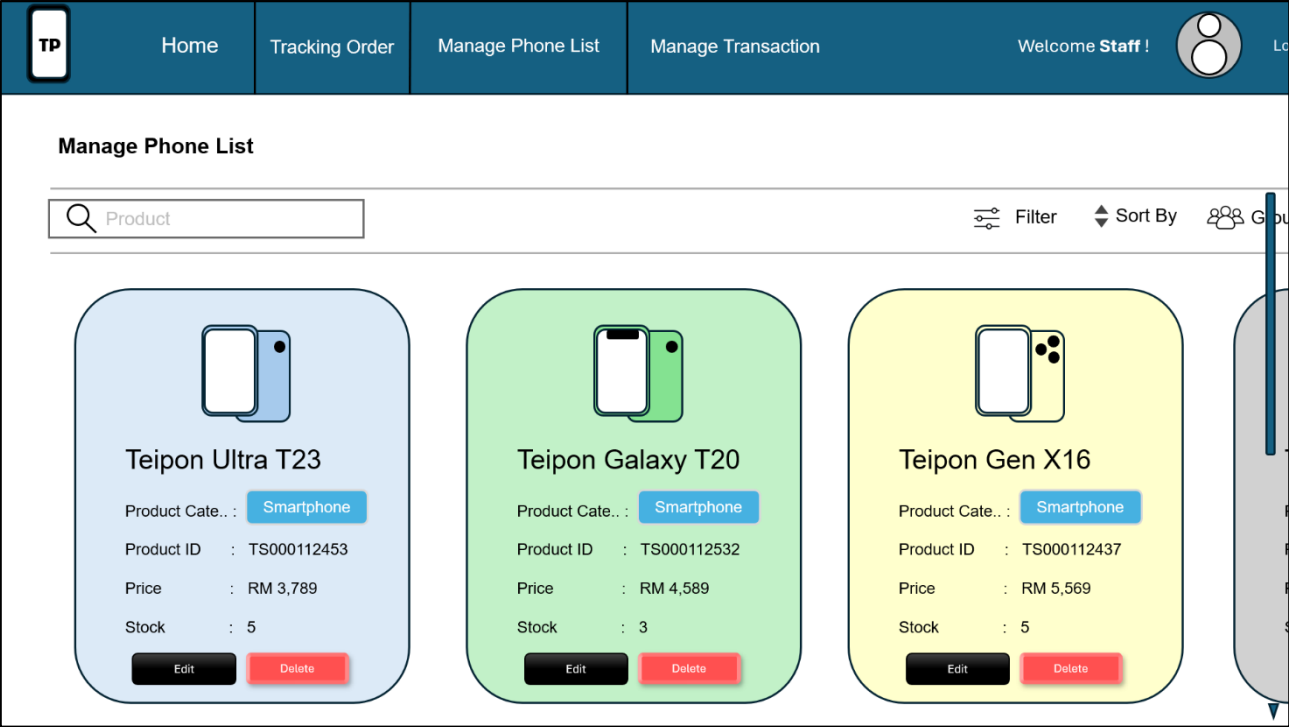
Figure Staff Manage Phone List
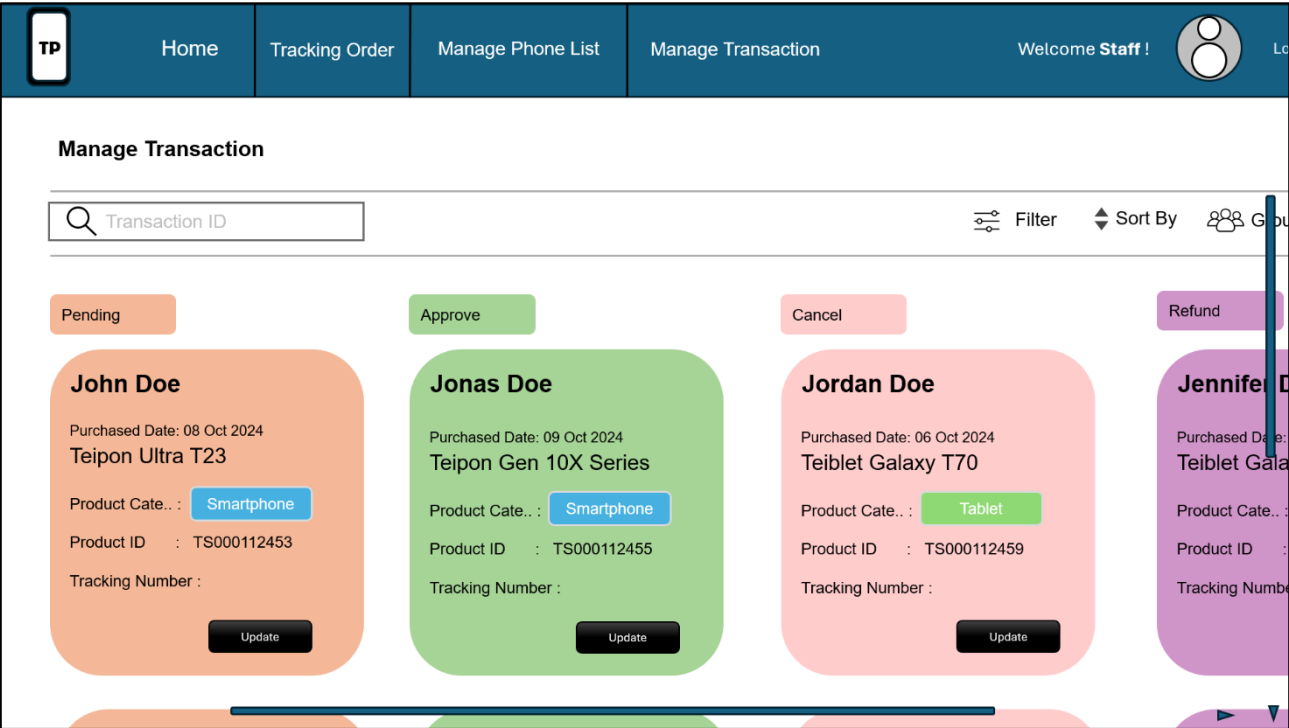
Figure Staff Manage Transaction

3.2 Hardware Interfaces

A hardware interface is essential for the Teipon Gadget System, serving as the bridge between the software and the system's hardware components. Below are the hardware interface requirements for the Teipon Gadget System.

Interface	Supported Device Types	Description	Communication Protocol
Display Interface	Monitors, screens, mobile devices	Enables the system to display content and system visuals to users	HTML, CSS, JavaScript
Input Interface	Keyboards, mouce, touchscreens	Allows users to input commands and interact with the system	HTML form elements, JavaScript event listeners
Storage Interface	Local storage, cloud storage	Provides mechanisms for storing and retrieving user data and caching resources	HTTP or HTTPS for secure data transfer
Networking Interface	Network adapters, routers, modems	Supports connectivity for communication and data exchange between devices	HTTP, HTTPS, WebSockets for real-time communication
Graphics Interface	GPUs, integrated graphics	Handles the rendering of system visuals, ensuring smooth graphical outputs	HTML5 Canvas API, WebGL for 3D graphics

Hardware specifications for browsers are essential considerations to achieve optimal performance, functionality, and user experience. The table below outlines the detailed hardware requirements, including the recommended and minimum specifications for optimal operation:

Requirement	Minimum Requirement	Recommended Requirement
Processor	Dual-core, 1.5 GHz.	Quad-core, 2.0 GHz or higher.
RAM	4 GB	8 GB.
Storage	Sufficient space for browser and system files.	At least 20 GB of free space.
Network	5 Mbps for smooth interaction with the system.	20 Mbps or higher for faster loading of dynamic content.
Browser	Google Chrome, Safari, Microsoft edge, Firefox with latest version	

3.3 Software Interfaces

The software interface serves as a bridge for interactions between the product and other specific software components. Its purpose is to ensure efficient data transfer, optimize system performance, and enhance the system's functionality. This section provides detailed connections, specifying the functions of the operating system, tools, libraries, and components involved. It also outlines how data and communication are transferred within the Teipon Gadget System.

1. Databases

The system manages user profiles, product inventories, and transaction records by integrating with MySQL, a powerful database management system. Important features included as shown below.

CRUD Operations (Create, Read, Update Delete)	Supports To guarantee the accuracy of data in real time, perform activities such as create, read, update, and delete.
Data Flow	**Incoming Data**: User account details, transaction of the product details and product registered details. **Outgoing Data**: Display inventory lists, user profiles, and sales reports.
Implementation Limitation	Implementing a SQL query is necessary to guarantee the seamless transfer of a significant amount of data.
CRUD Operations (Create, Read, Update Delete)	Supports To guarantee the accuracy of data in real time, perform activities such as create, read, update, and delete.

2. Operating System Compatibility

The system is compatible with Linux distributions (Ubuntu 20.04+, CentOS 7+) for production and Windows Server (10/11) for development. Scalability and deployment flexibility are offered by this dual compatibility.

3. Web Server and Communication

Laragon is a tool that has been implemented for the development of the Teipon Gadget System, offering reliable and efficient functionality for the development of the system. This tool supports PHP, MySQL, and either Apache or Nginx servers, which are used for developing, testing, and deploying the application. The flexibility and ease of use of Laragon make it the best choice for managing the backend and the database for the system.

To optimize its security and make communication between components of the system more dependable, the system uses strong communication protocols. The system implements HTTP and HTTPS as standard encryption for data transfer, ensuring security and protecting sensitive information. The system also implements JSON as it is efficient for data exchange and lightweight. Therefore, the system can maintain its compatibility across many platforms and devices.

The system offers services that focus on enhancing user experiences. For example, user requests such as product searches and transaction verifications run smoothly, ensuring the accuracy of the data delivered effectively and within appropriate response times. Additionally, being powered by AJAX allows real-time communication and makes the user interface smoother without requiring full-page reloads. This combination of technology enhances user experience and ensures a highly interactive interface.

By deploying an optimized development environment, communication protocols that are more secure, and service mechanisms that are more effective, the system can meet user demands while maintaining optimum performance, security, and functionality.

4. Programming Frameworks and Tools

Backend	Powered by **PHP**
Frontend	Uses JavaScript for interactivity, alongside frameworks like Bootstrap for responsive design.
Libraries	Includes jQuery for enhanced UI interactivity.

5. Integrated Components and APIs

Third-Party Payment Gateways	The system plans to integrate with payment providers like **PayPal** or **Stripe** for secure online transactions.
Data Items	**Incoming**: Payment confirmation, user authentication tokens. **Outgoing**: Payment requests, transaction details.
Implementation Constraints	Requires RESTful API protocols for seamless integration and standardized communication.

6. Data Sharing and Security

Shared Data	Includes product information, transaction histories, and user credentials.
Implementation Mechanism	**Incoming**: Payment confirmation, user authentication tokens. **Outgoing**: Payment requests, transaction details.
Security Measures	Data encryption using SSL/TLS protocols during transmission. Passwords are hashed with algorithms like bcrypt for storage.

7. Contrainst and Future Expansions

When building the system, future expansions and specific constraints are taken into account. The MySQL database's transaction logs provide a reliable way to maintain the integrity of global data by ensuring data consistency in multitasking situations. Additionally, the system is made to be easily expanded, enabling seamless integration with cutting-edge technologies like CRM (customer relationship management) systems and complex analytics platforms. This proactive approach ensures that the system will remain scalable and adaptable to meet evolving company needs.

3.4 Communications Interfaces

3.4.1 Communication Standard

HTTP and HTTPS are used in the system for securing communication and data transmission. HTTPS encrypt user data credentials secure and keep payment information secure. All data exchanged between the client and the server use JSON format as it is known as their lightweight and organized data handling. WebSocket is implemented as well as to support real-time data updates, tracking order and phone item list updates.

3.4.2 Email System

SMTP Standards:	• Sending auto-generated email for order confirmations and password recovery
Email Formatting:	• Messages are in form of HTML format to ensure e it is readability across devices.

3.4.3 Communication Security

The Teipon Gadget System ensures secure data transfer across various devices. All data exchanged between the client and the server is encrypted using SSL/TLS protocols to prevent interception and tampering during transmission. To secure user sessions, the system uses authentication tokens, ensuring only verified users can access the data. Passwords are stored using advanced hashing algorithms like bcrypt, making the stored credentials highly resistant to breaches and unauthorized access.

3.4.4 Data Transfer Rates

Bandwidth:

Minimum	Optimal
5 Mbps is required for smooth interaction with the system.	20 Mbps or higher for dynamic content loading and faster transaction processing.

3.4.5 Compliance Standards

The Teipon Gadget System uses REST API standards to connect smoothly with third-party systems like PayPal, Stripe, and CRM tools. These standards make communication efficient and keep the system flexible for future upgrades or integrations. The system also follows ISO/IEC 27001 guidelines to handle user data securely. This ensures user privacy, keeps the system trustworthy, and meets important security requirements.

3.4.6 Synchronization System

AJAX is used for asynchronous communication, enabling real-time updates without the need to refresh the entire webpage. This allows for a smoother user experience as new information can be loaded in the background. Additionally, database synchronization ensures that both the central database and user interfaces remain consistent. This is achieved through scheduled updates and database triggers, which automatically keep the data up to date across all systems, preventing any discrepancies between what the user sees, and the data stored in the backend.
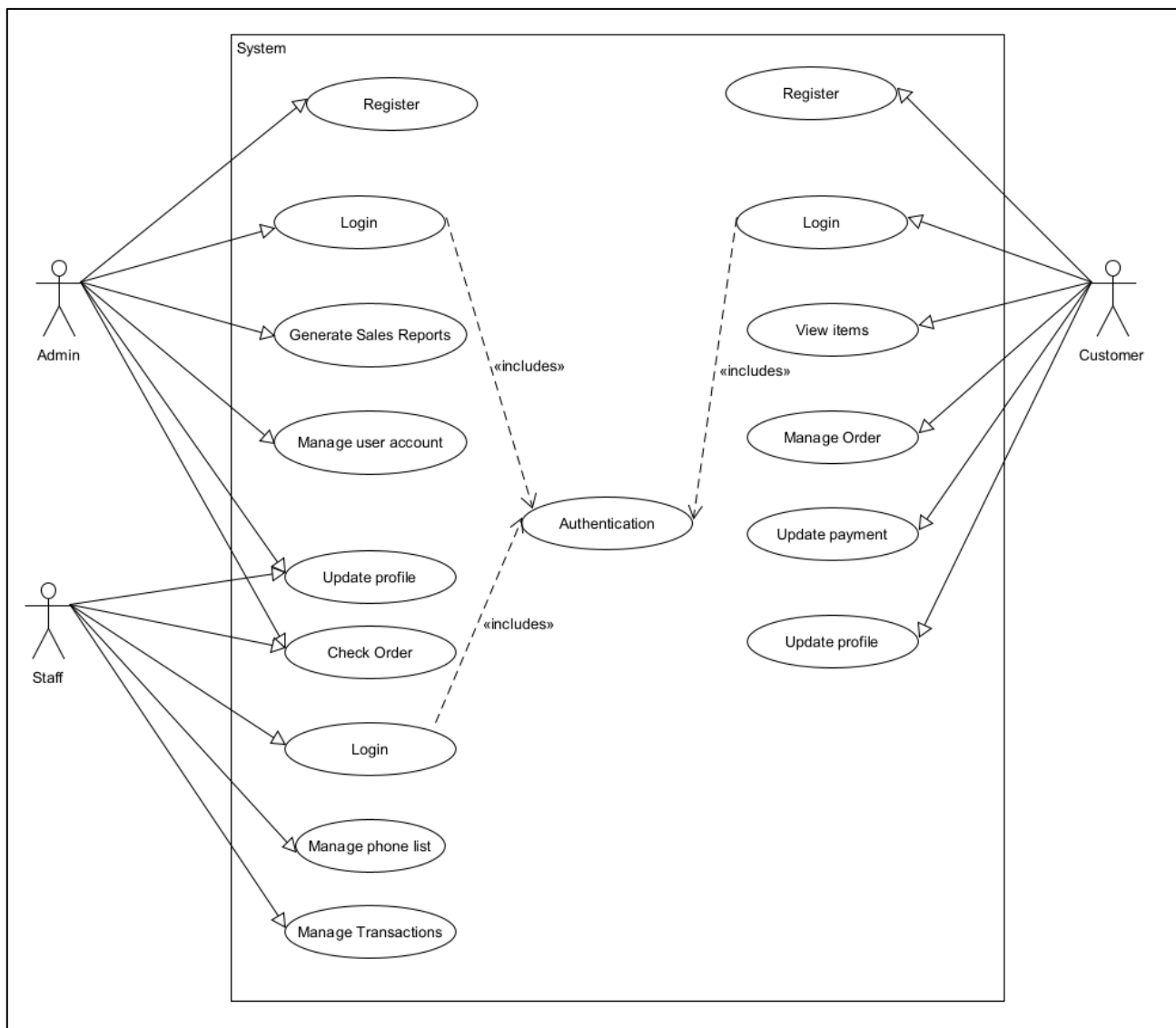
Figure UML Case Diagram

- Admin register staff account

- Admin login

- Admin generate sales reports

- Admin manage user account

- Admin update profile

- Staff update profile

- Staff check order

- Staff login

- Staff manage phone list
- Staff manage transaction
- Customer register account
- Customer login
- Customer view items
- Customer manage order
- Customer update payment
- Customer update profile

4. System Features (Functional Requirements)

4.1 Admin register staff account

4.1.1 Description and Priority

This feature allows admin to register an account for staff and be stored in database. Once the account has been made, staff will be allowed to login by using the account that has been made by admin to have access as a staff.

Component	Priority (1 to 10)	Explanation
Benefit	7	Significantly improves system efficiency
Penalty	5	Potential security risks if not implemented correctly, such as unauthorized access or data breach.
Cost	4	Moderate development effort required for implementation and testing.
Risk	3	Low risks, mainly related to data security and admin verification

4.1.2 Stimulus/Response Sequences

1. Admin navigates to the staff registration page
2. The system displays the registration form, prompting admin to enter staff credentials.
3. Admin fill in the registration form.

4. The system validates the entered credentials.

5. If the credentials are correct, the system logs into the staff account.

6. If the credentials are incorrect, the system prompts the admin to re-enter the correct information.

7. Once logged in, the system redirects to the staff main page.

4.1.3   Functional Requirements

Requirement ID	Description
REQ-REG-1.1	The system must provide an interface for admin to register staff account.
REQ-REG-1.2	The system must validate admin inputs for account registration to ensure accuracy and completeness.
REQ-REG-1.3	The system must employ industry-standard encryption methods to securely store account credentials and sensitive information.
REQ-REG-1.4	After successful registration, the system must generate a unique staff ID and associate it with the provided staff information.
REQ-REG-1.5	The system must implement measures to prevent duplicate account creation, such as using unique identifiers or staff ID.
REQ-REG-1.6	In case of registration errors such as invalid inputs, the system must notify the admin and provide guidance for resolution.
REQ-REG-1.7	During registration, admin must have the ability to review and agree the terms of service and privacy policies presented by the system.

4.2 Admin Login

4.2.1   Description and Priority

These features for the Admin Login allow the admin to have a secure and safe page before having access to the administrator. It is a high priority feature to ensure systems have a safe system to avoid any data leak or abnormal access from anyone to the administrator.

Component	Priority (1 to 10)	Explanation
Benefit	8	Enhanced admins engagement in the web application by providing secure page to avoid any abnormal access from the administrator.
Penalty	9	Any wrong login attempt will make the system alert and send a message to higher authorities about abnormal access.
Cost	5	Moderate development effort required, manageable within resources.
Risk	9	Ignoring the Admin Login would give highly negative feedback to the system because it would make it unsafe and harmful.

4.2.2 Stimulus/Response Sequences

1. Admin navigates to login page
2. The system displays the login form, prompting the user to enter their credentials.
3. Admin enters their username/email and password.
4. The system validates the entered credentials.
5. If the credentials are correct, the system logs into the admin account.
6. If the credentials are incorrect, the system prompts an admin to re-enter the correct information or provides an option for password recovery.
7. Once logged in, the system redirects to the admin page.

4.2.3 Functional Requirements

Requirement ID	Description
REQ-ADM-1.1	The system must have an interface that allows admin to log in to their accounts.
REQ-ADM-1.2	The system must prompt admin to enter their username/email and password during the login process.
REQ-ADM-1.3	The system must validate the entered credentials against the stored admin data to authenticate admin

REQ-ADM-1.4	If the entered credentials are incorrect, the system must provide an error message indicating the failure and prompt admin to re-enter the correct information or initiate a password recovery process
REQ-ADM-1.5	The system must securely handle and encrypt admin login credentials to prevent unauthorized access.
REQ-ADM-1.6	Upon successful authentication, the system must log admin into their account and grant access to their personalized features and data.
REQ-ADM-1.7	If the system encounters errors during the login process, such as database connection issues or server errors, it must notify the admin and provide guidance on how to proceed.

4.3 Admin generate sales report

4.3.1 Description and Priority

This feature enables admin to generate sales reports. This allows the admin to see the sales revenue or other calculations related to the sales that have been made.

Component	Priority (1 to 10)	Explanation
Benefit	8	Admin can generate Financial Report of the company.
Penalty	6	Without it, administrators may struggle to track financial system, potentially causing financial problem.
Cost	4	Implementing this feature requires moderate time and resources, but it's not excessively costly.
Risk	6	There's a moderate risk of errors or security issues if the system integration isn't carefully executed.

4.3.2 Stimulus/Response Sequences

1. Admin navigates to the "Generate Sales Report" page by clicking the specific button on admin page.
2. Admin will be showing the financial report about the company on "Generate Sales Report" page.
3. Admin can generate the report in PDF format by clicking the print button on the "Generate Sales Report" page.

4.3.3   Functional Requirements

Requirement ID	Description
REQ-GNT-1.1	The system shall display the financial report in a table format accessible only to the administrator.
REQ-GNT-1.2	The system should provide an administrator with print button to generate the financial report in PDF Format

4.4 Admin manage user account

4.3.1   Description and Priority

This feature enables admin to update if there is any new information they want to update about user profile information in the system. Since it makes system functionalities accessible, it has a high priority.

Component	Priority (1 to 10)	Explanation
Benefit	8	Admin can update or remove information of user.
Penalty	6	Users may not be updated by changes made by admin.
Cost	4	Moderate development and maintenance costs for implementation
Risk	6	Moderate risk of errors impacting user data, but manageable with proper handling and training.

4.3.2   Stimulus/Response Sequences

1. Admin navigates to the user profile page that contains user information.
2. Admin selects the option to update or delete user account information.
3. Admin enters the new information and submits the changes.
4. Admin can click the "Deactivate Account" button to delete or disable user account.
5. The system verifies and updates or deletes the user's account information.
6. The system confirms the successful update with a notification or confirmation message.

4.3.3 Functional Requirements

Requirement ID	Description
REQ-MUA-1.1	The system must provide an interface for administrators to access and update user account information from the user profile page.
REQ-MUA-1.2	Upon selecting the option to update account information, the system must prompt the administrator to input the new information.
REQ-MUA-1.3	Admin can select delete button to deactivate or disable user account.
REQ-MUA-1.4	The system must verify the accuracy and completeness of the administrator's input during the account information update process.
REQ-MUA-1.5	After successful verification, the system must securely store and update the account information using industry-standard encryption methods.
REQ-MUA-1.6	Upon completion of the account information update process, the system must confirm the successful update to the administrator with a notification or confirmation message.
REQ-MUA-1.7	If there are any errors during the account information update process, such as invalid input or system failure, the system must notify the administrator and provide guidance.

4.5 Admin update profile

4.3.1 Description and Priority

This feature enables an admin to update if there is any new information they want to update about profile information in the system. Since it makes system functionalities accessible, it has a high priority.

Component	Priority (1 to 10)	Explanation
Benefit	6	Admins can control their profile data, boosting satisfaction.
Penalty	7	Not having this feature may lead to admin retention issues.
Cost	5	Moderate development effort required, manageable within resources.
Risk	5	It will make the work difficult to implement and not smooth

4.3.2 Stimulus/Response Sequences

1. Admin navigates their profile page that contains their information.
2. Admin selects the option to update account information (e.g., change password, update email address, etc.).
3. Admin enters the new information and submits the changes
4. The system verifies and updates the admin account information.
5. The system confirms the successful update with a notification or confirmation message.

4.3.3   Functional Requirements

Requirement ID	Description
REQ-AUP-1.1	The system must provide an interface for administrators to access and update their account information from their profile page.
REQ-AUP-1.2	Upon selecting the option to update account information, the system must prompt the administrator to input the new information.
REQ-AUP-1.3	The system must verify the accuracy and completeness of the administrator's input during the account information update process.
REQ-AUP-1.4	After successful verification, the system must securely store and update the account information using industry-standard encryption methods.
REQ-AUP-1.5	Upon completion of the account information update process, the system must confirm the successful update to the administrator with a notification or confirmation message
REQ-AUP-1.6	If there are any errors during the account information update process, such as invalid input or system failure, the system must notify the administrator and provide guidance.

4.6 Staff update profile

4.3.1   Description and Priority

This feature enables staff to update personal information that is already in the system by replacing old information with updated information.

Component	Priority (1 to 10)	Explanation
Benefit	7	Staff can control their profile data, boosting satisfaction.
Penalty	7	Not having this feature may lead to miss communication and misunderstanding among staff.
Cost	5	Moderate development effort required, manageable within resources.
Risk	5	Cannot update staff profile can cause technical problems at work.

4.3.2   Stimulus/Response Sequences

1. Staff navigate their profile page that contains their information.
2. Staff select the option to update account information (e.g., change password, update email address, etc.).
3. Staff enter the new information and submit the changes.
4. System verifies and updates the user's account information.
5. The system confirms the successful update with a notification or confirmation message.

4.3.3 Functional Requirements

Requirement ID	Description
REQ-SUP-1.1	The system must provide an interface for staff to access and update their account information from their profile page.
REQ-SUP-1.2	Upon selecting the option to update account information, the system must prompt the staff to input the new information.
REQ-SUP-1.3	The system must verify the accuracy and completeness of the staff input during the account information update process.
REQ-SUP-1.4	After successful verification, the system must securely store and update the account information using industry-standard encryption methods.
REQ-SUP-1.5	Upon completion of the account information update process, the system must confirm the successful update to the staff with a notification or confirmation message
REQ-SUP-1.6	If there are any errors during the account information update process, such as invalid input or system failure, the system must notify the staff and provide guidance.

4.7 Staff check order

4.3.1 Description and Priority

This feature allows staff easily to view details of the order that has been made by the customer in the system. It is a high priority as it involves financial transactions of the company.

Component	Priority (1 to 10)	Explanation
Benefit	8	Enhanced staff engagement in the web system by providing a feature to view all the user orders that have been made in the system.
Penalty	6	Missing the order may lead to financial problems and disappointment to user.
Cost	4	Moderate development costs for designing and order information interface.
Risk	6	Moderate risk of inaccuracies in the order details and data security challenge.

4.3.2 Stimulus/Response Sequences

1. Staff navigate to the "Check Order" page on the staff page section.
2. The system will display the order details made by user on the "Check Order" page.

4.3.3 Functional Requirements

Requirement ID	Description
REQ-SCO-1.1	The system must be provided with updated user order data or details.
REQ-SCO-1.2	The system then displays all the user order details or data to the page for staff.

4.8 Staff Login

4.3.1   Description and Priority

The feature for the Staff Login allows the staff to have a secure and safe page before having access to the staff page. It is a high priority feature to ensure systems have a secure and safe system to avoid any data leak or abnormal access.

Component	Priority (1 to 10)	Explanation
Benefit	8	Enhanced staff engagement in the web application by providing secure page to avoid any abnormal access from the staff
Penalty	9	Any wrong login attempt will make the system alert and send a message to higher authorities about abnormal access.
Cost	5	Moderate development effort required, manageable within resources.
Risk	7	Ignoring the staff Login would give highly negative feedback to the system because it would make it unsafe and harmful.

4.3.2   Stimulus/Response Sequences

1. The system will display normal login pages for staff to log in.
2. The system will give access to staff if the login is successful.
3. The system will show and send alerts to higher authorities (email, etc.) to alert them to the abnormal attempt to access the staff page.

4.3.3 Functional Requirements

Requirement ID	Description
REQ-STL-1.1	The system must provide an interface for staff to log in before having access to admin authorities.
REQ-STL-1.2	The system must verify the username and password that are being entered into the page
REQ-STL-1.3	Upon receiving the data, the system checks the accuracy of the username and password.
REQ-STL-1.4	If the data is not the same, it will alert the higher authorities by making alerts or emails to the admin who has authorities
REQ-STL-1.5	If the data is accurate, it will go to the staff page to access the staff authorities for the system

4.9 Staff Manage Phone List

4.9.1 Description and Priority

This feature allows staff to add new phones to the system, edit the phone details, delete the phone listing, view and search phone listing and manage the phone stock levels. Since it requires that a phone list is the main content for the shop, it has a high priority to the system.

Component	Priority (1 to 10)	Explanation
Benefit	9	Keeping the phone list updated with new models, attracting customers and potential increase in sales.
Penalty	10	Without this, the phone list becomes outdated, resulting in customer dissatisfaction and lost revenue. Outdated or incorrect details could lead to returns, complaints, and reputational damage.
Cost	7	Development effort required to create an intuitive interface, backend support, user-friendly editing tools, validation rules, database synchronization, search and filter algorithms.
Risk	7	1. Errors in data entry (e.g., incorrect prices or specifications) could mislead customers or lead to financial losses.

| | | 2. Mistakes during updates (e.g., setting the wrong price) could result in financial or reputational harm. |
| | | 3. Errors in stock updates could lead to overselling or unnecessary inventory buildup. |

4.9.2 Stimulus/Response Sequences

1. Staff navigates to the "Phone Management" page.
2. Staff clicks on "Add New Phone" button. The system displays a form to input phone details (e.g., name, brand, specifications, price, stock, images).
3. Staff fill in the form with full details of the phone and clicks "Save" after finishes it.
4. The system then validates the action and saves the phone data to the database and confirms the addition with a success message.
5. Staff select a phone from the list and click "Edit." The system retrieves and displays the current details of the selected phone in an editable form with newer details (e.g., price format, image type).
6. Staff update the new phone details and then proceed to click "Save Changes".
7. The system updates the database and displays a successful message after changes has been made.
8. Staff selects a smartphone from the list and clicks "Delete" and the system will pop up a display with confirmation dialog with "Are you sure you want to delete this smartphone?".
9. Staff confirm the deletion by clicks "Yes" and the system removes the smartphone from the database and displays a success message.
10. Staff cancels the deletion by clicks "No" and system aborts the action and returns to the list without making changes.
11. Staff use the search bar or filter options by brand and price range. The system dynamically filters and displays results matching the criteria.
12. Staff click on a phone entry. The system displays detailed information about the selected phone.
13. Staff selects a phone from the list and clicks "Update Stock". The system displays a form or dialog showing the current stock level.

14. Staff enter the updated stock quantity and click "Save". The system validates the input.

15. The system updates the stock level in the database and displays a success message.

4.9.3 Functional Requirements

Requirement ID	Description
REQ-MPL-1.1	The system must allow staff to add a new phone to the phone list by providing fields for product name, brand, model, specifications, price, stock quantity, and uploading product images.
REQ-MPL-1.2	The system has to allow staff to update the details of an existing phone, including specifications, price, stock quantity, and images. Updates should reflect in the list immediately.
REQ-MPL-1.3	The system shall allow staff to delete a phone listing from the list. The deletion process must include a confirmation prompt to avoid accidental removals.
REQ-MPL-1.4	The system should display a list of all phones in the list, including their names, brands, prices, stock levels, and a preview image. The list should support pagination for large inventories.
REQ-MPL-1.5	The system should provide search and filtering options for staff to find phones by name, brand, price range, or specifications.
REQ-MPL-1.6	The system needs to allow staff to modify the stock quantity of a smartphone, with real-time updates reflected in the system's list.

4.10   Staff Manage Transaction
4.10.1 Description and Priority

This feature enables staff to oversee, update, and handle customer transactions efficiently, ensuring smooth operations and customer satisfaction.

Componen t	Priority (1 to 10)	Explanation
Benefit	10	Enable staff to monitor and manage customer transactions such as order status updates, payment verification, cancellations, or refunds.
Penalty	10	If staff cannot manage transactions effectively, delays may occur in order processing, refunds, or payment verification, leading to customer frustration and potential loss of trust.
Cost	6	Development of the transaction management module involves creating interfaces for tracking orders, managing refunds, and updating payment statuses, which require both frontend and backend resources.
Risk	6	Risks include operational errors and data security concerns.

4.10.2 Stimulus/Response Sequences

1. Staff navigate the "Transaction Management" page. The system retrieves and displays a list of recent transactions, including details such as transaction ID, customer name, date, amount, status, and payment method.

2. Staff apply search or filter criteria such as by date, status, or customer name. The system dynamically filters the list based on the criteria and displays the relevant transactions.

3. Staff select a transaction and click "Update Status" and the system displays a drop-down menu or options for available statuses such as "Processing," "Shipped," "Delivered," "Refunded").

4. Staff selects a new status and clicks "Save". The system updates the transaction status in the database and logs the change in the transaction's history.

5. To process refunds, staff selects a transaction with a refund request and clicks "Process Refund." The system retrieves transaction details, including the amount paid, and displays a confirmation dialog.

6. Staff confirm the refund request. The system processes the refund, updates the transaction status to "Refunded," and records the action in the transaction log.

7. To cancel transactions, staff select an active transaction and click "Cancel Transaction". The system displays a confirmation prompt with details of the transaction.

8. Staff confirm the cancellation. The system updates the transaction status to "Cancelled," adjusts the inventory for the associated products, and notifies the customer via email of the customer.

9. To verify payment, staff selects a transaction with pending payment and clicks "Verify Payment". The system retrieves payment details from the integrated payment gateway and displays the current payment status.

10. The system updates the transaction status to "Paid" and displays a success message.

4.10.3　　Functional Requirements

Requirement ID	Description
REQ-MNT-1.1	The system shall allow staff to view a list of transactions, including details such as transaction ID, customer name, date, amount, status, and payment method. Staff should also be able to filter and search for transactions based on criteria such as date range, status, or customer name.
REQ-MNT-1.2	The system shall allow staff to update the status of a transaction from "Processing" to "Shipped" or "Delivered" through an easy-to-use interface. Changes must be logged in the transaction history for auditing purposes.
REQ-MNT-1.3	The system shall allow staff to process refunds for completed transactions. The system must display the transaction details and the amount to be refunded and confirm the action before processing. Refunds must be integrated with the payment gateway for seamless execution.
REQ-MNT-1.4	The system shall allow staff to cancel active transactions before fulfilment. Upon cancellation, the system must update the transaction

		status to "Cancelled," restock inventory for any affected products, and notify the customer of the cancellation.
REQ-MNT-1.5		The system shall allow staff to verify the payment status of a transaction by querying the integrated payment gateway. If the payment is successful, the transaction status shall be updated to "Paid." Any failed payment attempts must be logged and flagged for follow-up.

4.11 Customer Register Account

4.11.1 Description and Priority

This feature allows customers to create accounts, enabling personalized shopping experiences, order tracking, and access to additional services.

Component	Priority (1 to 10)	Explanation
Benefit	8	Enhances user experience by enabling personalized features such as saved addresses, order history, and personalized suggestion towards phones.
Penalty	7	Without registration, the system cannot provide personalized services, order tracking, or promotional notifications, reducing customer satisfaction.
Cost	5	Development involves creating secure registration forms, databases for storing customer information, and integration with authentication mechanisms including designing in user interface design, backend development, and testing for security and usability.
Risk	6	Risks include data breaches or mishandling customer information, leading to reputational damage and potential legal consequences.

4.11.2 Stimulus/Response Sequence

1. Customer clicks the "Register" button on the website.
2. The system displays the registration page, including input fields for required details including name, email address, password, phone number and address.
3. After customer completes filling up the form, the customer clicks the button "Done".
4. The system will validate all input fields for completeness and accuracy.
5. Upon successful completion in registration, the system confirms successful registration by displaying a "Successful Registration" message on the interface.

4.11.3 Functional Requirements

Requirement ID	Description
REQ-CRA-1.1	The system must provide an interface for admin to register customer account.
REQ-CRA-1.2	The system must allow customers to input their registration details, including required fields such as name, email address, password, phone number and address.
REQ-CRA-1.3	The system must validate customer input for account registration to ensure accuracy and completeness.
REQ-CRA-1.4	The system must check if the email address or username already exists in the database and prevent duplicate account creation. In addition, the email must be in a valid format and the password meets strength requirements.
REQ-CRA-1.5	After successful registration, the system must generate a unique customer ID and associate it with the customer information provided.
REQ-CRA-1.6	The system should display a confirmation message upon successful registration and provide the option to log in or proceed to the customer dashboard.

4.12   Customer Login

4.12.1 Description and Priority

This feature allows customers to securely access their accounts to view orders, make purchases, manage preferences, and track deliveries.

Component	Priority (1 to 10)	Explanation
Benefit	8	This feature allows customers to securely access their accounts to view orders, make purchases, manage preferences, and track deliveries. It also ensures only authorized users access personal data.
Penalty	9	Without a login system, the business misses the opportunities for personalized services, loyalty programs, and customer retention. The customer also cannot track their previous orders, leading to frustration and potential loss of business.
Cost	5	Includes creating a secure login page, user authentication mechanisms such as email, password and backend integration for session management.
Risk	6	Risks include security vulnerabilities and usability challenges.

4.12.2 Stimulus/Response Sequence

1. The customer clicks the "Login" button on the homepage. The system displays the login page, providing fields for the customer's credentials which are customer's email and password.
2. The customer enters their email and password in the respective fields.
3. After finishing fill in the details, the customer clicks the "Login" button to proceed.
4. The system encrypts the submitted data for secure transmission and verifies the credentials against the user database.
5. If the customer provides valid credentials, the login system comes to success and displays a welcome message, such as "Welcome back, [Customer Name]!"

4.12.3 Functional Requirements

Requirement ID	Description
REQ-CLO-1.1	The system must provide a login page accessible from the homepage.
REQ-CLO-1.2	The system allows customers to input their login credentials, including email and password, using appropriate input fields.
REQ-CLO-1.3	The system must validate login credentials against stored customer records to confirm authenticity and access rights to the system.
REQ-CLO-1.4	The system must encrypt login credentials during transmission to ensure data security and protect against interception.
REQ-CLO-1.5	Upon successful authentication, the system must redirect the customer to their dashboard and display a personalized welcome message.
REQ-CLO-1.6	The system must provide a logout option, allowing customers to manually end their session.

4.13   Customer View Items

4.13.1 Description and Priority

This feature allows customers to browse available smartphones in the system with search, filter, and sorting functionalities.

Component	Priority (1 to 10)	Explanation
Benefit	9	Customers can quickly view and browse available smartphones with clear product listings with details like specifications, pricing, and availability. This will improve the shopping experience.
Penalty	10	Poorly implemented browsing features can frustrate customers and damage the brand's reputation.
Cost	5	Building a user-friendly interface with filtering, sorting, and responsive design incurs initial development costs.

Risk	5	System performance, data accuracy, and usability risks require mitigation.

4.13.2 Stimulus/Response Sequence

1. The customer selects the "Shop" on the navigation bar on top of the web system.
2. The system retrieves the list of available smartphones from the database and displays details such as name, price, and image.
3. The customer applies one or more filters, such as price range, brand and storage capacity.
4. The system refines the displayed products based on the selected criteria and updates the results dynamically.
5. The customer chooses a sorting option such as price low to high or high to low.
6. The customer clicks on a product to view more details and clicks "Add to Cart" to add the product into cart to proceed payment later.

4.13.3 Functional Requirements

Requirement ID	Description
REQ-CVI-1.1	Display a list of available smartphones with basic details.
REQ-CVI-1.2	Provide a search feature to locate specific products.
REQ-CVI-1.3	Enable filtering by price, brand, storage, and other criteria.
REQ-CVI-1.4	Allow sorting of products by price.
REQ-CVI-1.5	Provide a detailed view of individual products.
REQ-CVI-1.6	Provide a feature to add the product into cart to proceed payment.

4.14   Customer Manage Order

4.14.1 Description and Priority

This feature allows customers to view, track, modify, and cancel their orders, ensuring a smooth post-purchase experience.

Component	Priority (1 to 10)	Explanation
Benefit	10	This feature allows customers to have control over their order and track their order status in real-time.
Penalty	10	Without order management capabilities, customers cannot view, track and cancel their orders and this leads to negative experience regarding the system.
Cost	6	Building features like order tracking, cancellation, and modification requires robust backend integration with inventory and payment systems.
Risk	7	Bugs or failures in the order management system can lead to incorrect information being shown to customers, causing confusion or dissatisfaction.

4.14.2 Stimulus/Response Sequence

1. The customer navigates to the "My Orders" section to view their past and current orders.
2. The system retrieves and displays a list of orders, including order IDs, product details and their order statuses.
3. The customer clicks on a specific order to view its detailed status and shipment tracking information.
4. The customer requests to update delivery information such as edit the address to be delivered to for an order that has not yet been shipped.
5. The customer selects an order and clicks the "Cancel Order" button if the customer decides to cancel their order.
6. The customer provides feedback or a rating for a delivered order.

4.14.3 Functional Requirements

Requirement ID	Description
REQ-CMO-1.1	Allow customers to view a list of their orders.
REQ-CMO-1.2	Provide detailed information for selected orders.
REQ-CMO-1.3	Enable real-time order tracking with delivery details.
REQ-CMO-1.4	Allow customers to modify delivery details for eligible orders.
REQ-CMO-1.5	Enable order cancellation for unprocessed or unshipped orders.
REQ-CMO-1.6	Allow customers to submit feedback or ratings for completed orders.

4.15   Customer Update Payment

4.15.1 Description and Priority

This feature allows customers to update payment methods for their orders and complete pending payments to ensure seamless transaction experience towards the system.

Component	Priority (1 to 10)	Explanation
Benefit	10	Customers can resolve payment issues without requiring manual support. This will improve their shopping experience within the system.
Penalty	9	Without this feature, failed or incomplete payments may result in cancellations or abandoned purchases, reducing overall revenue. This also will lead to customer frustration.
Cost	7	Requires integration with payment gateways and secure handling of customer payment data, which can be complex and resource intensive.
Risk	9	Mishandling of payment data could lead to breaches, damaging the company's reputation and potentially incurring legal penalties.

4.15.2 Stimulus/Response Sequence

1. The customer navigates to the order payment section and selects the option to update payment details.
2. The system retrieves the current payment status and displays the available payment methods such as online banking and credit/debit card.
3. The customer selects new payment methods and enters some information regarding the payment method.
4. The system validates the entered information, ensuring the format, expiration date, and other details are correct. If valid, the system proceeds to the payment confirmation step.
5. The customer confirms the new payment method and authorizes the transaction. If successful, it updates the order status and sends a confirmation message to the customer.
6. The payment update is successfully processed. The system updates the payment status to "Paid".

4.15.3 Functional Requirements

Requirement ID	Description
REQ-CPY-1.1	The system displays the current payment status of the order in the order cart.
REQ-CPY-1.2	Provide an option for customers to update payment methods for pending payment to specific order.
REQ-CPY-1.3	Validate the new payment information entered by the customer, checking details such as card number, expiration date, and CVV for credit/debit method and some details for online banking method.
REQ-CPY-1.4	Process updated payment information and reflect the status in the order.
REQ-CPY-1.5	Send confirmation to customers when the payment update is successful.

4.16   Customer Update Profile

4.16.1 Description and Priority

This feature allows customers to modify their account details, such as name, contact information and shipping addresses, ensuring their profiles remain accurate and up to date.

Compone nt	Priority (1 to 10)	Explanation
Benefit	8	Customers can keep their latest information updated and reduce errors related to incorrect shipping addresses or outdated contact information, this will improve order processing and delivery success rates.
Penalty	8	Without the ability to update profiles, customers may face issues such as incorrect deliveries. A lack of profile management options can reflect poorly on the platform's usability, reducing customer experience regarding the system.
Cost	6	Implementing a user-friendly profile update feature requires resources for design, development, and testing.
Risk	10	Improper handling of sensitive information during updates could expose customer data to unauthorized access, leading to reputational and legal issues. Incorrect updates such address may affect the shipment product.

4.16.2 Stimulus/Response Sequence

1. The customer logs into their account and selects the "Edit Profile" option from the account settings menu.
2. The customer updates their profile information, such as entering new details such as address, phone number.
3. The customer clicks the "Save" or "Update" button to submit the changes.
4. The system completes the profile update successfully by displaying a confirmation message on the screen with "Successfully Updated".

4.16.3 Functional Requirements

Requirement ID	Description
REQ-CPR-1.1	Display current profile information in an editable format.
REQ-CPR-1.2	Validate updated information for correct formats and completeness.
REQ-CPR-1.3	Save updated profile information securely in the database.
REQ-CPR-1.4	Notify the customer of successful updates on the screen with pop up message "Successfully Updated".

5. Other Nonfunctional Requirements

5.1 Performance Requirements

To satisfy the needs and expectations of its audiences, a system must adhere to certain criteria, sometimes known as performance requirements. Depending on the users' internet connectivity, this system must react in around 5 to 7 seconds. In addition to the system's reaction time. There is no limit to how many users are using it. Therefore, if one is using it, others can utilize it without any issues. In addition, the system features scalability, reliability and the capacity to handle an increasing user base without removing its functionality. To maintain its responsiveness and stability during a demanding period, the system must be built to handle peak loads.

5.2 Safety Requirements

When the system enters sensitive user data like personal information or credit card / debit card information, the system must take precaution steps and take full responsibility. A document of protection is required in the event of any loss or any security breach. The fact that consists of providing encryption methods for data transfer and storage, adding restriction on access on place to prevent unwanted access and producing audit trails to monitor system activity. These precautions are vital for defending users from possible attacks and ensure that there are no unauthorized parties that can access their personal data. To maintain the integrity of database, we must detect any duplication of data and elimination of data is required. It is for the system's principal safety criteria. The administrator notifies those impacted through email when there is a redundancy and will be given an option for confirmation before their data is deleted. To protect user privacy and data security

policies, the deletion process can only be carried out by the administrator with the user's consent.

5.3 Security Requirements

Laws or regulations are established to prevent unauthorized access, disclosure, change, or destruction of systems and data are known as security requirements. These requirements are essential for maintaining the availability and integrity of systems and resources, protecting sensitive data, and ensuring privacy. To access this system, staff, customers and the administrator must authenticate. This is a precautionary software requirements specification for the system. The administrator, the staff and the customer will need to provide their username and password on the system login screen. The system will determine whether it matches the information in the database.

5.4 Software Quality Attributes

Features of a software system that characterize how well the system functions across a variety of aspects rather than just its specific capability are known as software quality attributes. Good software is characterized by its durability, usefulness, and portability. Regarding the system's dependability, it has performed all its responsibilities in relation to the activities of the administrator, staff and customers, thereby fulfilling its intended roles. Administrators, staff and customers can access the system with ease by entering their user ID and password. Finally, the system is portable and compatible with several browsers, such as Google, Firefox, and others

5.5 Product Requirements/Business Rules

5.5.1 Product Requirement

- **Authentication Module:**

  Include login and session management for all actors.

  Support secure password storage and verification.

- **Admin Features:**

  Provide a feature to generate detailed sales reports with filters and export options.

  Include a user management interface for Admins to add, update, or delete user accounts.

- **Staff Features:**

  Enable staff to view and update orders.

  Provide an interface for managing phone lists.

  Allow staff to manage financial transactions, including creating, updating, and deleting them.

- **Customer Features:**

  Implement item browsing functionality for customers to view available products or services.

  Include an order management system for customers to create, modify, and cancel orders.

  Support updating payment methods securely.

  Provide profile editing functionality for customers to update personal information.

- **General Features:**

  Ensure that all actions requiring authentication are seamlessly integrated with a centralized "Authentication" module.

  Design a unified "Update Profile" interface accessible to all user roles.

  Include a registration feature for new users

5.5.2 Business Rules

- Only registered users (Admins, Staff, and Customers) can access the system functionality.
- Authentication is required for all actions, including registration, login, and other operations.
- Admin users are authorized to:
- Generate sales reports.
- Manage user accounts.
- Staff users are authorized to:
- Check orders.
- Manage phone lists.
- Manage transactions.
- Customers are authorized to:
- View items.
- Manage their orders (e.g., create, update, or cancel orders).
- Update payment information.
- Profile updates are available to all types of users.
- Sales reports can only be generated by Admin users.

6. Other Requirements

N/A

Appendix A: Approval

The undersigned acknowledge they have reviewed the *Teipon Gadget* Software Requirements Specification and agree with the approach it presents. Changes to this Software Requirements Specification will be coordinated with and approved by the undersigned or their designated representatives.

1. Signature :   Date: 23/11/2024

     Name   : Mohamad Hazik Haikal bin Razak

     Student Id: 2024779495

     Role   : Project Manager

2. Signature :   Date: 7/11/2024

     Name   : Muhamaad Luqman Mu'izz bin Anuar

     Student Id: 2024974353

     Role   : Software Tester

3. Signature :   Date: 7/11/2024

     Name   : Wan Muhammad Naqib bin Wan Mohd Nazri

     Student Id: 2024926951

     Role   : Software Requirement Analyst

Appendix B: Glossary

UiTM	A public university in Malaysia, known as Universiti Teknologi MARA.
SRS	A document that describes the system's requirements and specifications.
DBMS	Software that helps manage and organize databases.
PHP	A scripting language used for creating dynamic web pages.
CSS	A style sheet language for designing how web pages look.
HTML	The standard markup language for creating web pages.
JavaScript	A programming language to make web pages interactive.
IDE	Software used by developers to write, test, and debug code.
Laragon	A tool for setting up a local web server environment.
MySQL	A system for managing relational databases.
HTTP	A protocol is used to transfer data over the web.
HTTPS	A secure version of HTTP with data encryption.
SQL	A language used to manage and query databases.

Appendix C: Use Case Descriptions

1a. Id No.	1	1b. Title	Register
2. Actor	Customer		
3. Brief Description	1. Allows customer to create an account on the system.		
4. Precondition	1. Customer is not already registered in the system. 2. Fill in the required information.		
5. Normal Flow	1. Customer accesses registration page. 2. Customer fills out registration form. 3. Customer submits the registration form. 4. The system validates input. 5. System creates new account and displays an alert "Registration Successful".		

6. Alternative Flow	1. Customer accesses registration page.
	 2. Customer fills out registration form.
	 3. Customer submits the registration form.
	 4. The system validates input.
	     4.1 Missing required fields.
	     4.3 Username already taken.
	 5. System fails to create new account and displays an alert "Registration failed".		

1a. Id No.	2	1b. Title	Login
2. Actor	Customer		
3. Brief Description	1. Customer need to login to get access into the system.		
4. Precondition	1. Customer already has an account. 2. Customer not login yet.		
5. Normal Flow	1. Customer accesses the login page. 2. Customer enters username and password.		

	3. System validates credentials.
	4. Customer gains access.
	5. Customer redirect to homepage.
	6. The system displays an alert "Login Successful".
6. Alternative Flow	1. Customer accesses the login page.
	2. Customer enters username and password.
	3. System invalid credentials.
	4. The system displays an alert "Invalid username or password".

1a. Id No.	3	**1b. Title**	View Item
2. Actor	Customer		
3. Brief Description	Allow customers to browse the items available on the product page.		
4. Precondition	1. Customer already login.		
5. Normal Flow	1. Customer access to the item page. 2. Customers view the item available. 3. Customer can view details of an item.		
6. Alternative Flow	Not applicable.		

1a. Id No.	4	**1b. Title**	Manage order
2. Actor	Customer		
3. Brief Description	Allow customers to add, view, or update their orders.		
4. Precondition	1. Customer already login.		
5. Normal Flow	1. Customer access to cart page. 2. Customer can add their item quantity or remove it from cart. 3. System update quantity of the item. 4. System displays an alert "Cart updated successfully".		

6. Alternative Flow	1. Customer access to cart page
	2. Customer can add their item quantity or remove it from cart.
	2.1 Item do not have enough stock.
	3. System does not update quantity of item.
	4. System displays an alert
	"Insufficient stock available for this item".

1a. Id No.	5	1b. Title	Update payment
2. **Actor**	Customer		
3. **Brief Description**	Allow customers to update payment receipt for their orders.		
4. **Precondition**	1. Customer already login. 2. Customer must already confirm their order.		
5. **Normal Flow**	1. Customer access to payment page. 2. Customer uploads a payment receipt as a PDF file. 3. System update the status payment to "pending" and displays an alert "Receipt uploaded successfully".		
6. **Alternative Flow**	1. Customer access to payment page. 2. Customer uploads a payment receipt. 2.1 File size is too large. 2.2 File is not in PDF format. 3. System fails to update payment status and displays an alert "Failed to upload.".		

1a. Id No.	6	1b. Title	Update profile
2. **Actor**	Customer		
3. **Brief Description**	Allow customers to update their profile information.		
4. **Precondition**	User already login.		

5. Normal Flow	1. Customer access to profile page.
	2. Customer view, edit and add information.
	3. System validates credentials.
	4. System update customer profile.
	5. System displays an alert
	"Profile updated successfully".
6. Alternative Flow	1. Customer access to profile page.
	2. Customer view, edit and add information.
	3. System invalidates credentials.
	4. System displays an alert
	"Failed to update profile".
	5. System does not update customer profile.

1a. Id No.	7	1b. Title	Register
2. Actor	Admin		
3. Brief Description	Admin can register a new account for new staff.		
4. Precondition	1. Staff should not have any accounts yet.		
	2. Admin needs to login.		
5. Normal Flow	1. Admin access to registration page.		
	2. Admin fill out registration form.		
	3. Admin submits the registration form.		
	4. System validates input.		
	5. System creates new staff's account and displays an alert "Registration Successful".		
6. Alternative Flow	1. Admin accesses registration page.		
	2. Admin fills out the registration form.		
	3. Admin submits the registration form.		
	4. System validates input.		
	4.1 Missing required fields.		
	4.3 Username already taken.		

	5. System fails to create new staff's account and displays an alert "Registration failed".		

1a. Id No.	8	**1b. Title**	Login
2. Actor	Admin		
3. Brief Description	1. Admin needs to login to get access to the system.		
4. Precondition	1. Admin already has an account. 2. Admin not login yet.		
5. Normal Flow	1. Admin accesses the login page. 2. Admin enters username and password. 3. System validates credentials. 4. Admin gains access. 5. Admin redirect to homepage. 6. System displays an alert "Login Successful".		
6. Alternative Flow	1. Admin accesses the login page. 2. Admin enters username and password. 3. System invalid credentials. 4. System displays an alert "Invalid username or password".		

1a. Id No.	9	**1b. Title**	Generating Sales Reports
2. Actor	Admin		
3. Brief Description	Allows Admin to generate reports summarizing sales data.		
4. Precondition	User already login.		
5. Normal Flow	1. Admin access to report page. 2. Admin view the report. 3. Admin can filter the report.		
6. Alternative Flow	Not applicable.		

1a. Id No.	10	1b. Title	Manage user account
2. Actor	Admin		
3. Brief Description	Allows admin to view, add, edit, or delete user accounts.		
4. Precondition	Admin already login.		
5. Normal Flow	1. Admin access to user (customer and staff) page. 2. Admin can view, edit, add, or delete a user account. 3. Admin update information for his user. 4. System validates credential. 5. System updates the details and displays an alert "Updated successfully."		
6. Alternative Flow	1. Admin accesses the user (customer or staff) management page. 2. Admin can view, edit, add, or delete a user account. 3. Admin updates information for an account. 4. System invalidates credential 4.1 Missing required fields. 4.2 Incorrect format. 5. System does not update the account details and displays an alert "Failed to update".		

f

1a. Id No.	11	1b. Title	Login
2. Actor	Staff		
3. Brief Description	Staff need to log in to get access to the system.		
4. Precondition	1. Staff already have an account. 2. Staff not login yet.		
5. Normal Flow	1. Staff accesses the login page. 2. Staff enter username and password. 3. System validates credentials. 4. Staff gain access.		

		5. Staff redirect to homepage.
		6. System displays an alert "Login Successful".
6. Alternative Flow		1. Staff accesses the login page.
		2. Staff enter username and password.
		3. System invalid credentials.
		4. System displays an alert "Invalid username or password".

1a. Id No.	12	**1b. Title**	Manage Phone List
2. Actor	Staff		
3. Brief Description	Allow staff to update information or list of available phones.		
4. Precondition	1. Staff need to login.		
5. Normal Flow	1. Staff access the item store page.		
	2. Staff can add, view, edit, or delete items.		
	3. Staff fill out the form if want to add or delete an item.		
	4. system validates input.		
	5. System update the new list of items.		
	6. System displays an alert "Item list updated successfully".		
6. Alternative Flow	1. Staff access the item store page.		
	2. Staff can add, view, edit, or delete items.		
	3. Staff fill out the form if want to add or delete item.		
	4. system validates input.		
	4.1 Missing required fields.		
	5. System fails to update the item and displays an alert "Failed to update the item."		

1a. Id No.	13	**1b. Title**	Manage Transactions
2. Actor	Staff		

3.	Brief Description	Staff can view and manage transactions made by customers.
4.	Precondition	Staff already login.
5.	Normal Flow	1. Staff access the manager's transactions page.
		2. System display all payment made by customers.
		3. Staff view each payment.
		4. Staff approve or reject each customer's payment.
		5. System update payment status and displays an alert "Payment status updated successfully".
6.	Alternative Flow	1. Staff access to manage transactions page.
		2. System displays all customer payments.
		3. Staff view each payment.
		3.1 The file is corrupt.
		4. Staff cannot view the payment receipt.
		5. System displays an alert "Failed to open receipt".

1a. Id No.	14	1b. Title	Update Profile
2. Actor	Admin, staff		
3. Brief Description	Allows Admin/Staff to update their profile information.		
4. Precondition	Admin/Staff already login.		
5. Normal Flow	1. Admin/Staff accesses the profile page.		
	2. Admin/Staff view, edit and add information.		
	3. System validates credentials.		
	4. System update user profile and displays an alert "Profile updated successfully".		
6. Alternative Flow	1. Admin/Staff accesses profile page.		
	2. Admin/Staff view, edit and add information.		
	3. System invalidates credentials.		
	4. System does not update user profile and displays an alert "Failed to update profile".		

1a. Id No.	15	1b. Title	Check order
2. Actor	Admin, staff		
3. Brief Description	Allow admin/staff to view and monitor customer orders.		
4. Precondition	Admin/Staff already login.		
5. Normal Flow	1. Admin/Staff accesses the check order page. 2. System displays a list of customer orders. 3. Admin/Staff view the details of each order.		
6. Alternative Flow	Not applicable.		

| 1a. Id No.	16	1b. Title	Authentication
2. Actor	System (Supporting use case for Login)		
3. Brief Description	Verifies that the user credentials match those stored in the system.		
4. Precondition	User has submitted login credentials.		
5. Normal Flow	1. System checks the database for a matching username and password. 2. valid credentials 3. System give access to user and displays an alert "Login successful".		
6. Alternative Flow	1. System checks the database for a matching username and password. 1.1 System invalid credentials. 2. System denies access to the user and displays an alert "Invalid username or password".		

Appendix D: Analysis Models
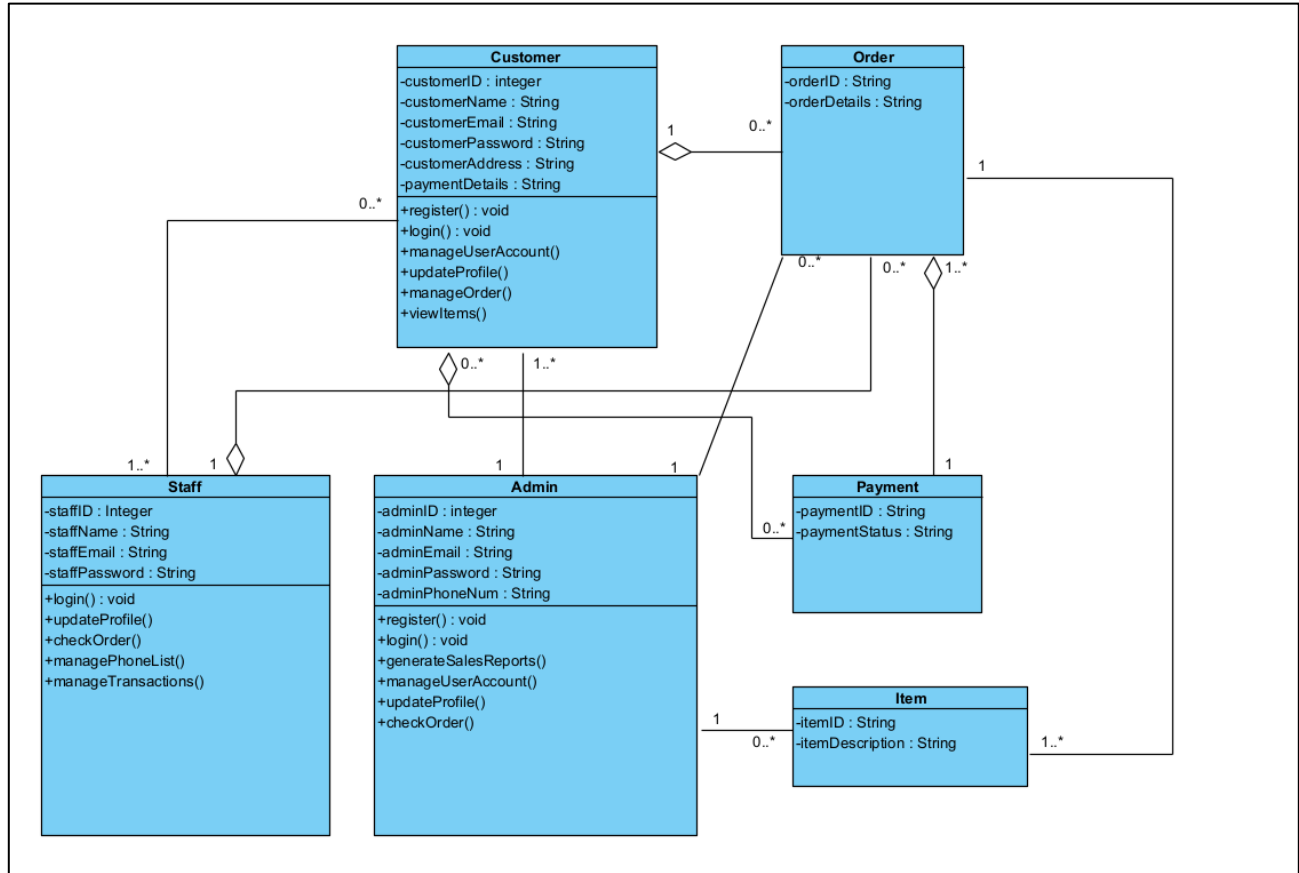
Figure Class Diagram

Appendix E: To Be Determined List

N/A