

Smart Repair System
(SRS)

NURUL HUDA BINTI RAMLI

Bachelor of Computer Science (Computer
Systems & Networking) with Honours

UNIVERSITI MALAYSIA PAHANG

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Smart Repair System

(SRS)

NURUL HUDA BINTI RAMLI

Thesis submitted in fulfillment of the requirements
for the award of the degree of
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.

ABSTRAK

Matlamat utama projek ini adalah untuk membangunkan sistem kemasukan data dalam talian untuk IT Mines Expert Resources. Sistem ini membolehkan para pekerja mempunyai system pengurusan yang baik untuk menguruskan masalah peranti pelanggan yang hadir ke kedai. Sistem Smart Repair juga akan membolehkan juruteknik dan pelatih membuat kerja dengan pantas terutama ketika membaiki peranti yang rosak. Juruteknik akan memastikan pelajar dapat mengendalikan masalah peranti dengan baik dan mempelajari sesuatu untuk meningkatkan ilmu pengetahuan dan menambah pengalaman dalam pembaikan alat peranti. Pentadbir adalah yang bertanggungjawab dalam mengendalikan system ini. Projek ini menggunakan Rapid Application Development (RAD) sebagai metodologi yang berfungsi sebagai garis panduan fasa atau proses pembangunan.

ABSTRACT

The main goal of this project is to develop an online data inventory system for IT Mines Expert Resources. This system allows the employees to have a good management system to manage the device problems of customers who come to the store. The Smart Repair system will also allow technicians and trainees to work quickly, especially when repairing damaged devices. Technicians will ensure students can handle device problems well and learn something to improve knowledge and add experience in device repair. The administrator is responsible for operating this system. This project uses Rapid Application Development (RAD) as a methodology that serves as a guideline for the development phase or process.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Computer or other devices repair is the process of diagnosing, repairing, and maintaining the hardware and software components to ensure they are functioning properly. This can include mending hardware components such as a broken screen or a damaged motherboard, as well as fixing software issues like virus infection or malfunctioning operating system. Technicians have the option of working in several situations such as freelancers, in store repair companies, or retail computer stores. In order to debug and repair the devices they make use of a wide range of equipment including diagnostic software, and soldering equipment. There are some popular types of computer repair services which are hardware repair, software repair, network repair, data recovery, and upgrading the hardware components such as adding more memory or a faster processor or upgrading software to the latest version. When it comes to computer or other technology devices health, it is crucial to follow one's sense and if something feels off, it is advisable to get expert from the reliable organization like computer repair shop. (*How To Find A Professional Computer Repair Service* | 2023, n.d.)

Maintaining the computer or other devices helps keep it safe from viruses and spyware and keep in its excellent operating order. Regular maintenance guarantees that the antivirus software remains up to date and functional. (*5 Reasons Why Computer Maintenance Is Necessary* | *Computer and Server Maintenance*, n.d.) There are several reasons why people need devices repair for example, computer and laptop play crucial role in most businesses and individuals' daily operations and a broken or malfunctioning them can lead to decrease productivity and missed deadline. Repairing them can help restore the normal operation rather than buying the new ones that consumes lots of money. However, it still based on the issue and condition happens to the devices so it is crucial to get the advice from the trusted tech expert. (*Why You Should Repair Your Phone vs Buying a New One* | *Asurion*, n.d.) Moreover, the devices like handphone, laptop and

computer often contain important and sensitive information including personal and financial data. If them not functioning properly, there is a risk that this data may be lost or compromised, by having repair can help prevent the data loss.

In this project, the Smart Repair System (SRS) will be developed for the IT Mines Expert Resources which is the computer repair shop located at Centerpoint@pasaraya Billion in Sungai Petani, Kedah. The shop provided different kind of services related to the repair devices for their customer. Also, this shop sales the accessories and other devices components like mouse, keyboard and many more. Usually, in a normal day the shop gets busier to repair the customer devices and need to be done before the due date. However, the management system to manage the repair process is not effective due to the increase number of their customer every single day. The shop still uses the job sheets paper-based to record the problems of the customer devices. Hence, by using the Smart Repair System can help the shop to manage the repair process and inventory of the devices components. The system can help to track the inventory in real-time, reducing the chances of short shortages or overstocking. This increase can lead to cost saving and customer satisfaction. (*What Is a Computerized Inventory System?* / Sortly, n.d.) The IT Mines Expert Resource must comply with the due date of the customer devices, management system can help ensure that all necessary measure is taken, and records are kept.

1.2 Problem Statement

For small computer repair shop like IT Mines Expert Resources that want to grow up their business, the use of the job sheet paper based to record the details of device problems from customers by the technician and internship student. However, it is the an unprofessional way that easy to have the issues. Firstly, the lack of job sheet safety because it tends to miss important information due to human error and the place to keep all the previous job sheets. The shop needs to provide more space in the store to place all the old job sheets from the previous work. Plus, human error can happen like the staff can forget to do the service repair of the devices problem because there is too many job sheets and possible for them to mislook at certain of them. Unfortunately, it is not effective if the staff wants to find the specific job sheet as a reference because it takes some time to find it manually.

As a new internship student that doing the internship at the computer store need to have good knowledge of computer hardware and information technology. This is because student will analyze many problems on the devices from every new customer. The more knowledge and experiences the student gets the more easier for student to solve problems. Thus, the technician needs to guide the new internship student every time the new one comes. However, it is not practical because it gives frustration and loss of focus to the technician when doing the work. He needs to give the same explanation about the problems and the new internship student tends to disturb him by calling him while doing the work. Hence, the technician lost interest to do the work and possible for him to resign from the company. The budget and accuracy of the price are important when doing the computer business. Sometimes, customers are not satisfied with the price of the services and do complain about the service being expensive then make bad reviews of the shop. The solution recommended by the technician and internship student is the best for them to choose because they are experts in the computer field and have reasons for the suggested solutions. Hence, it is crucial that the solution chosen by customers and related services price and proof are recorded in the system as evidence.

As a solution, Smart Repair System is developed to keep the customer's information safe in the database and easy for the staff to find and collect the data. Plus, the reminder from the system is crucial for the staff to make sure they do the repair services on time. Moreover, this project can reduce workload and ease technician and internship student tasks. When staff want to look at the related information likes customer information, problem type, solution and product available when doing the service or repair, they can retrieve data from the system. In addition, based on the records the admin can know how far the internship student can do the jobs and get the allowance based on their work.

1.3 Objectives

This project is intended to achieve the goals as listed below.

- I. To study the Smart Repair System with the inventory and management system.
- II. To design and develop the Smart Repair System with the inventory and management system.

- III. To evaluate the functionality of the Smart Repair System with the inventory and management system.

1.4 Scope of Project

The users that will take part in this project is administrator, technician and internship student of IT Mines Expert Resources computer shop, who is leading the computer business process.

Function

Smart Repair System will be focused to develops a computer repair management system.

Those are the functions that will cover:

- Registration and Login Users.
- Manage the E-jobsheet for customer.
- Notify the staff for reminder.
- Determine the due date of E-jobsheet.
- Updating the E-jobsheet status
- Viewing the data.

1.5 Thesis Organization

Chapter 1: The explanation and discussion on the introduction of the web-based system. Next is the discussion of the development of the Smart Repair System for IT MINES EXPERT RESOURCES. This chapter also consists of the problem statement, objectives, and the scope of the study.

Chapter 2: Provided the three existing systems based on the research from the internet. This chapter also explains the difference between the existing system and the current project. Based on the observation, the information can guide to development the current project effectively.

Chapter 3: Detail explanation of the methodology used to develop the web-based system. It shows the structure of the project and design that should be demanded in this system. The suitable hardware and software used in the development process also show in this chapter.

Chapter 4: Detail explanation about the system implementation process where the development is apply in the code. When doing the coding can see some other changes happen in the design. The implementation of coding can improve the system development and design.

Chapter 5: In the conclusion, the previous chapters are helpful to develop the system in ordering manners. The system ensuring every step taken is a purposeful stride towards the coveted objective. It also able to integrate with inventory and management system to make sure the system can function as the requirements. There is also recommendation for future features that are not able to apply in the current system

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter provides information about the projects related to the Smart Repair System. The main purpose of the literature review is to study the existing system that is related to the project title. There are a lot of computer repair management systems available on the internet. It develops for business growth no matter what size of their enterprise and most of them are for computer repair and other businesses that are related to this industry. It is crucial to develop the system based on user requirements. Based on the figures 2.1 below shows the conversation with the real customers about his requirements to achieve the objectives of this project.

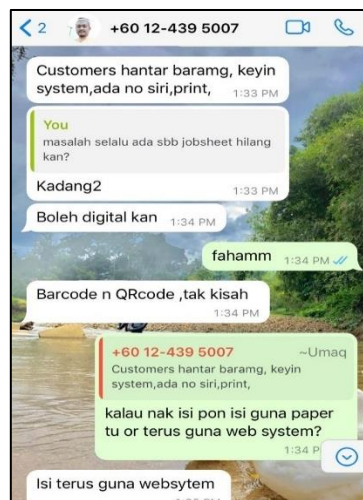


Figure 2.1 Screenshot from the client

Moreover, this project comes out with a solution when developing the current project which is the Smart Repair System. This project is to change the use of the manual job sheet to the computer repair management system to be more effective. The use of the inventory and management system is more practical among the technician and internship students when dealing with customers.

2.2 Existing System

Existing system happens to be a non-computerized operating system where all operations are done manually. Due to the manual works, it is very difficult to keep track of the business operations and satisfy the needs of the customers because it does not allow efficient data management and retrieval process. However, as technology evolving day by day, there are many kinds of automated payroll management system that is compatible to calculate monthly wages including taxes, leaves, and claims of the employees. The payroll system will keep track of every calculation including cash in and out that is implied based on the company itself.

Computer Repair Shop Management System

Computer Repair Shop Management System is a web-based application project developed in PHP and MySQL Database. (*Computer Repair Shop Management System in PHP/OOP Free Source Code / Free Source Code Projects and Tutorials*, n.d.-a) This management system is an online platform with a fully automated process that focused on computer repair shop specially to manage the daily transaction between the shop and customers. There are some functions that help in business for example easy and effective inventory for storing information, users are also able to manage and retrieve transaction records. Based on the figure 2 show the main page of the Computer Repair Shop Management System.

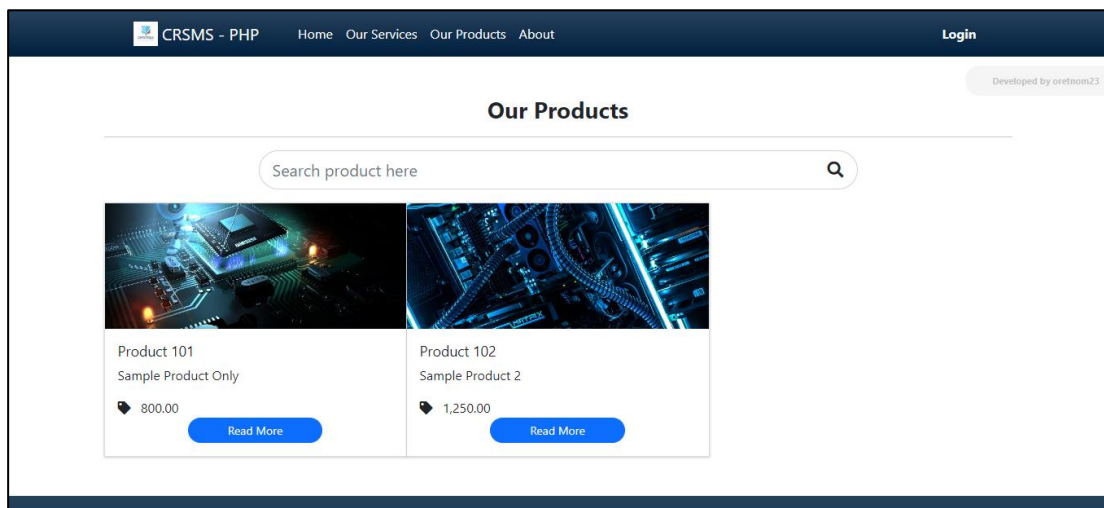


Figure 2.2 Main page of Computer Repair Shop Management system

HelloClient

HelloClient is web-based application and powerful cloud platform to automate service routines and manage orders effectively in repair shop. (*HelloClient- Simple and Powerful Repair Shop Software*, n.d.) In this software, is required to store all the data in one place which it allows to create the new customers, provided tickets to check status and add services and products and user can manage their expenses and income because it shows the exact money that earns from the sales. Based on the figure 3 show the main page of the HelloClient Website System.

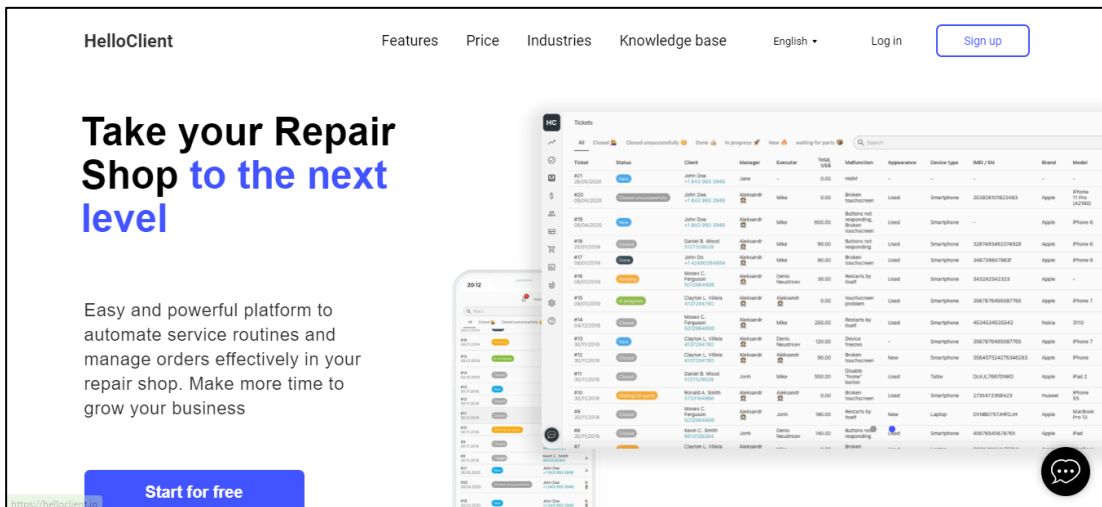


Figure 2.3 HelloClient Website

MyGadgetRepair

MygadgetRepairs is the web-based application and cloud-based deployment that offer powerful tools that help shops of all sizes to grow their business. (*Week 49 - Begin the Week on a Positive Note! #mygadgetrepairs #mondaymotivation - My Gadget Repairs, n.d.*) It is an international company where the headquarters is at London and another office is at Norway. It famous in developing various software system in different industries that can gain trust of its clients. This software provides the main business management like invoicing, CRM, repair ticketing, POS, and inventory management to enhance the quality of their system. Based on the figure 4 show the main page of the MyGadgetRepair System.

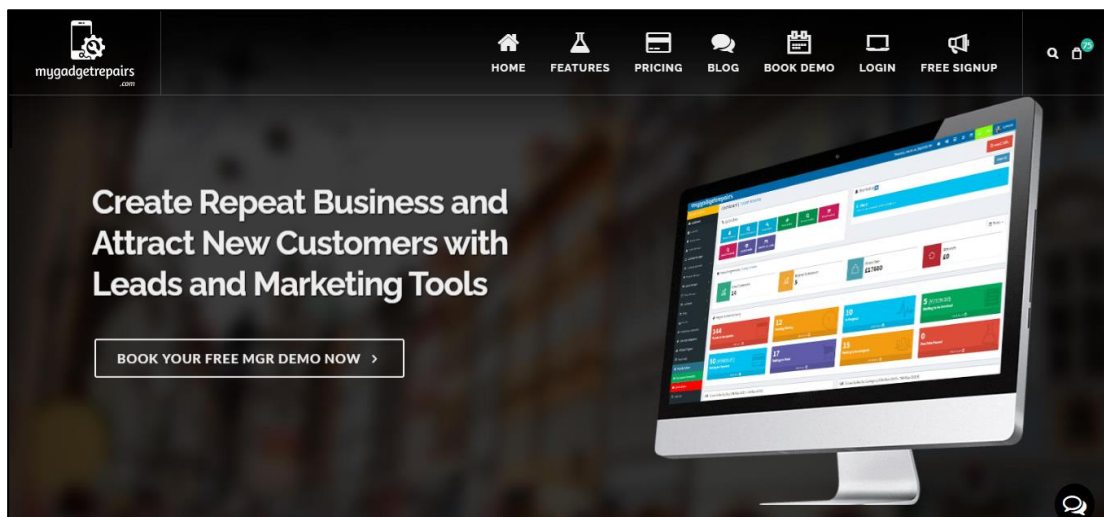


Figure 2.4 MyGadgetRepair Website

2.3 Analysis/ Comparison of Existing System

In this part, the three existing systems available on the internet which are Computer Repair Shop Management system, HelloClient system and MyGadgetRepair system will be doing critical review of the comparison and explains the details of the process, procedure, methods, and technologies to be uses in the proposed project.

2.3.1 Computer Repair Shop Management System

The Computer Repair Shop Management system show static and dynamic web-based system. In transaction management section, on pages add new transaction, update transaction and update transaction status show the static web pages where the information keep the same unless it has been fixed and edited by the user. Moreover, possible user able to change the content from the source code given on the internet. This system shows the dynamic web where some of the function need to access the information from the database. For example, product offered page that shows the product information based on the database information that filled from the possible user.

In addition, based on simplicity of this web-based system is simple but easy to use based on user experience for small companies. Although the navigation is interacting the users and finding what are they looking for and consistency on every page, but the color use is not enough to communicate messages and bring up the emotional response. Based on the figure 2.5 shows the dashboard page for admin.

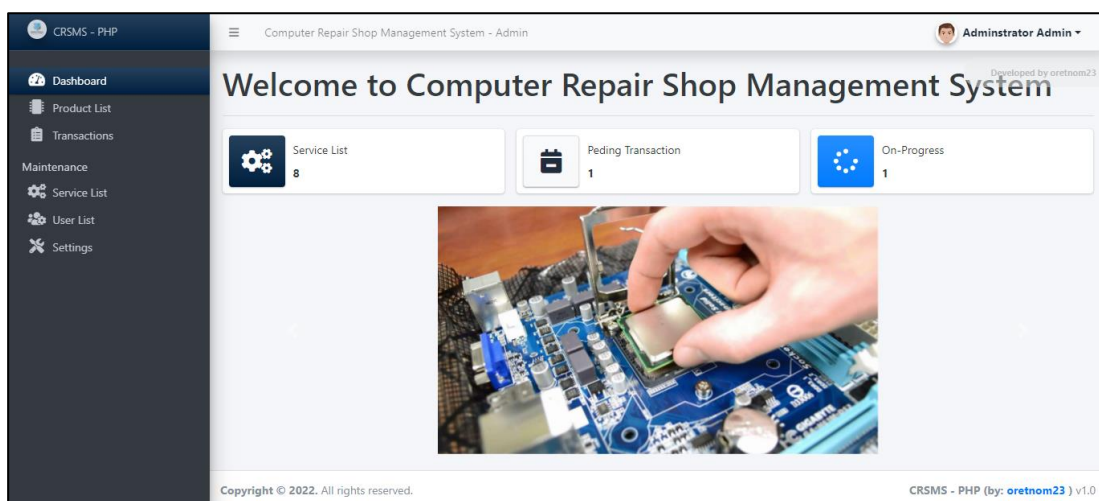


Figure 2.5 The Dashboard Page for Admin

There are three types of user roles available in this system which is Administrator, Staff and Technician. Every user has their own function to manage the system. As an administrator, user have the privilege to access and manage all the features and functionalities of the system.(Computer Repair Shop Management System in PHP/OOP Free Source Code | Free Source Code Projects and Tutorials, n.d.) Based on the figure 2.5 shows one of the admin functions which is to list all the users of the system. User able to perform CRUD action on user information.

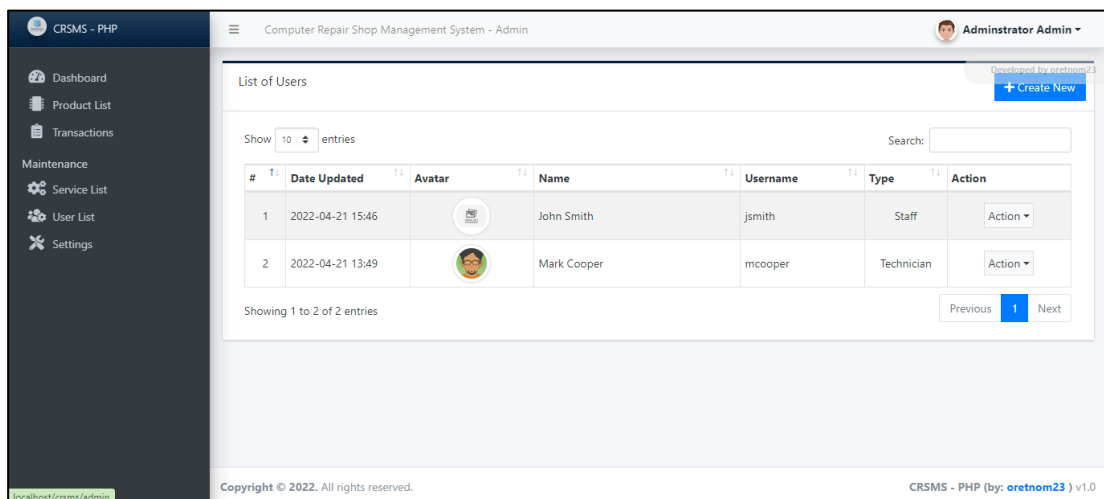


Figure 2.6 The List of Users Page

Moreover, admin able to update system information that will display on the public side. The example contents that are able to update is welcome description content, system logo, website cover and banner images. Based on figure 2.7 show the system information page of the Computer Repair Shop Management System.

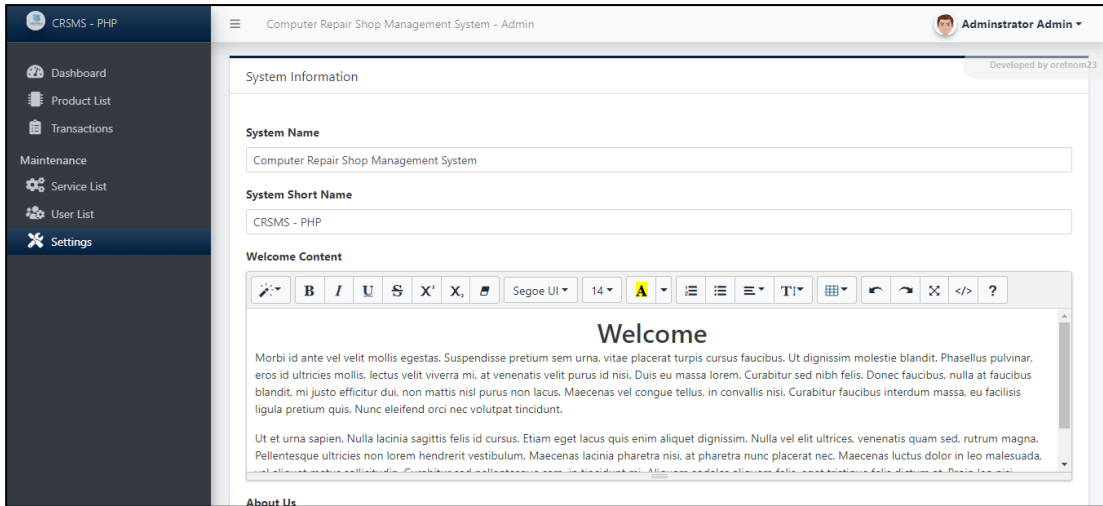


Figure 2.7 Update System Information Page

There are feature of transaction management where the user especially technician and staff able to update the transaction status of the client. On the same page, user can make changes of client information. For example, general information, selected services and add products. Then, the system will generate the total payable amount to the client. The information able to print as a receipt to the client.

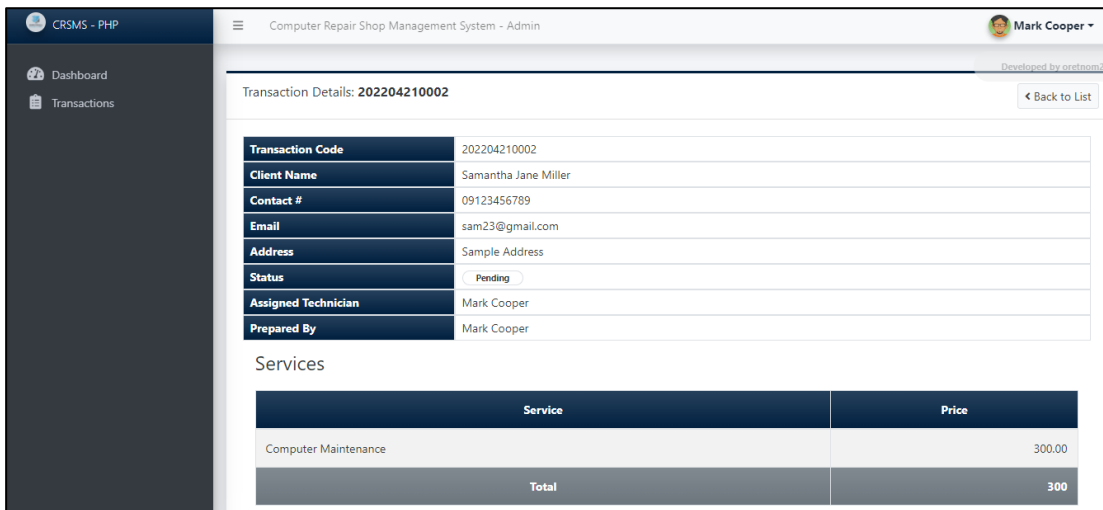


Figure 2.8 Transaction Management Page

The other feature is product management where it shows the list of products available in the system. The user able to add new product then the system will update the new product, all the details are able to view and user able to update the details in the future. On this page it shows the date of the product created image, name, price, and status of the products. Based on the figure 2.9 shows the list of products page of the Computer Repair Shop Management System.

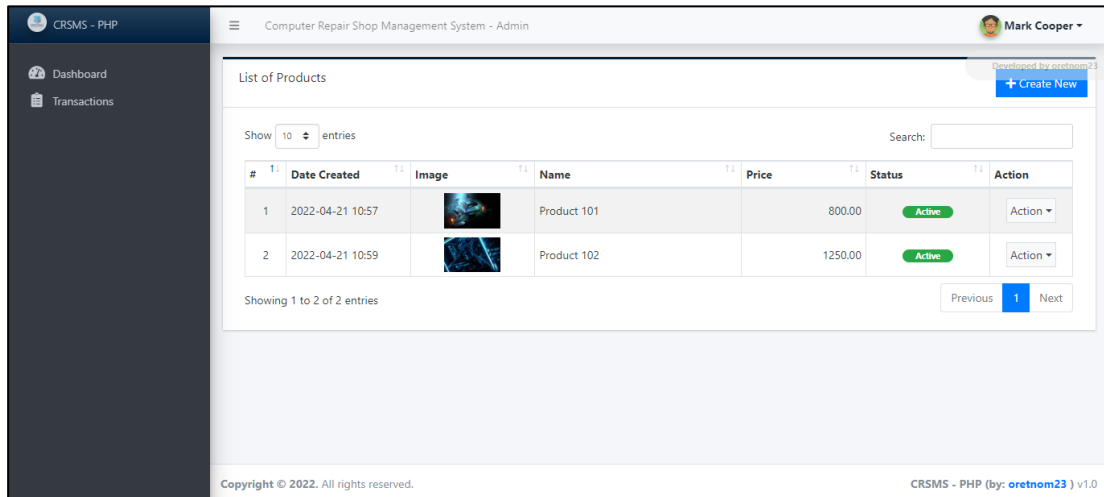


Figure 2.9 List of Products Page

Lastly, the other important feature shows in the system are service management progresses. The user able to create the new services available of the store. The details can be update likes name, description, price of the service and status progress of the services. Based on the figure 2.10 shows the list of services page of the Computer Repair Shop Management System.

CRSMS - PHP

Computer Repair Shop Management System - Admin

Administrator Admin

Developed by azizahm23

+ Create New

Show 10 entries

Search:

#	Date Created	Name	Price	Status	Action
1	2022-04-21 10:21	Accessories Repair	200.00	Active	Action
2	2022-04-21 10:22	Computer Maintenance	300.00	Active	Action
3	2022-04-21 10:21	Data Recovery and Buck-up	300.00	Active	Action
4	2022-04-21 10:18	Desktop Check-up	150.00	Active	Action
5	2022-04-21 10:20	Hardware Repair	350.00	Active	Action
6	2022-04-21 10:23	Hardware Upgrade	150.00	Active	Action
7	2022-04-21 10:21	Troubleshooting and Networking Support	350.00	Active	Action
8	2022-04-21 10:20	Virus Removal	150.00	Active	Action

Showing 1 to 8 of 8 entries

Previous 1 Next

Figure 2.10 List of Services Page

2.3.2 HelloClient

The HelloClient system shows dynamic web-based system. Most of the pages show dynamic web pages because the user needs the interaction with the system. For example, the Trends page it immediately shows the graphs change every time the user updates the new one. The other case is client do not able to change the contents in the system unless the developer changes them according to the client requests. The system is more complex and difficult to program because of some advanced features developed that influence on the high cost of the system to host. Thus, these show that the HelloClient is dynamic web-based system.

Moreover, based on the analysis the design of the system is simple which is easy for the user to understand and recognized something when look at it. It keeps organized of the features and used on the icon and available with a cursor change on hover so that users can point out at the correct icon. However, based on the color it looks dull. Based on the figure 2.11 show the Tasks page design in HelloClient system.

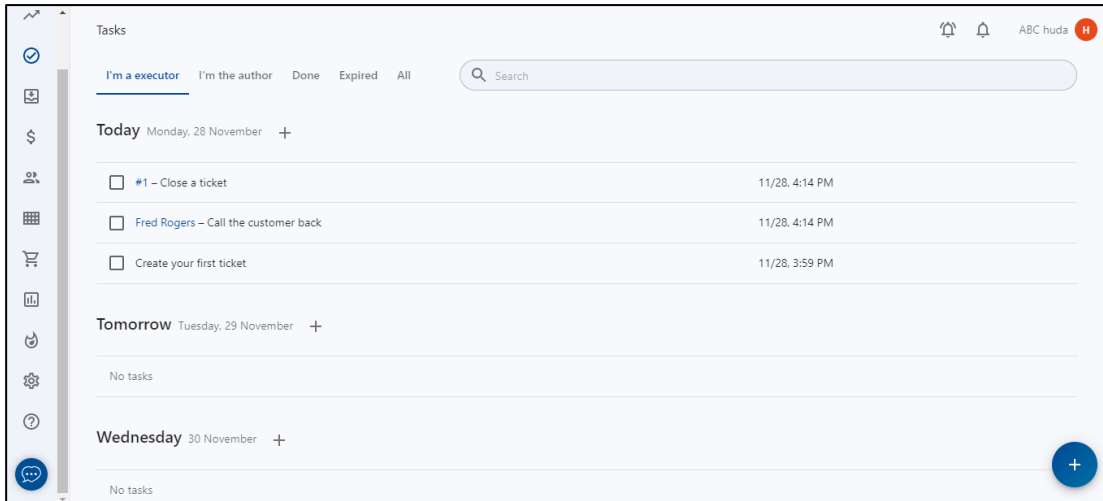


Figure 2.11 The Tasks Page

There are important features will be explained from the HelloClient system. The first one is customer database. Based on Figure 2.12, 2.13, 2.14 shows customer information with the ticket status. The system list down all the client's information likes name, phone number, email, type, referral source, director and VATIN. The users able to create new client, update and edit the client's information.

Name	Phone	Email	Type	Referral Source	Director	VATIN	Payment account
CR Christopher Baldwin	+7 991 986 29 92, +7 910 407 34 17	-	Individual	-	-	-	-
BW Bonnie Walters	+7 932 852 40 55	-	Individual	-	-	-	-
GP Gardner Patton	+7 918 651 67 83, +7 941 888 33 89	-	Individual	-	-	-	-
DG Derick Glisson	+7 985 677 75 32	-	Individual	-	-	-	-
FR Fred Rogers	+7 973 629 23 62	-	Individual	-	-	-	-

Figure 2.12 The Clients Page

Client [X]

Individual Company

Name *

Phone

Email

Referral Source ▼

Save

Figure 2.13 The Create New Client Page

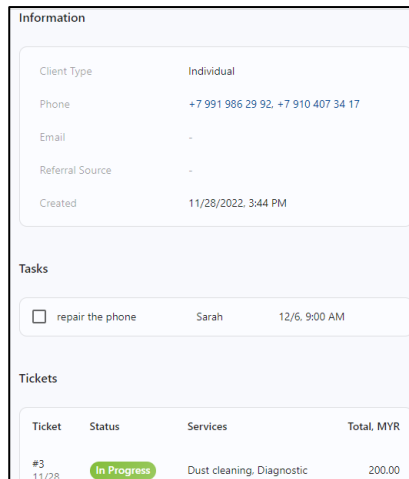


Figure 2.14 The Client Information Page

The second feature is inventory management which is to categorize all the products available in the shop. The system shows the inventory of the categorized information such as SKU barcode, title, quantity, price, and cost. Users able to add the staff in charge of the product under the tasks part. The functions able in this page is search the data, load the data and download the data of the inventory management.

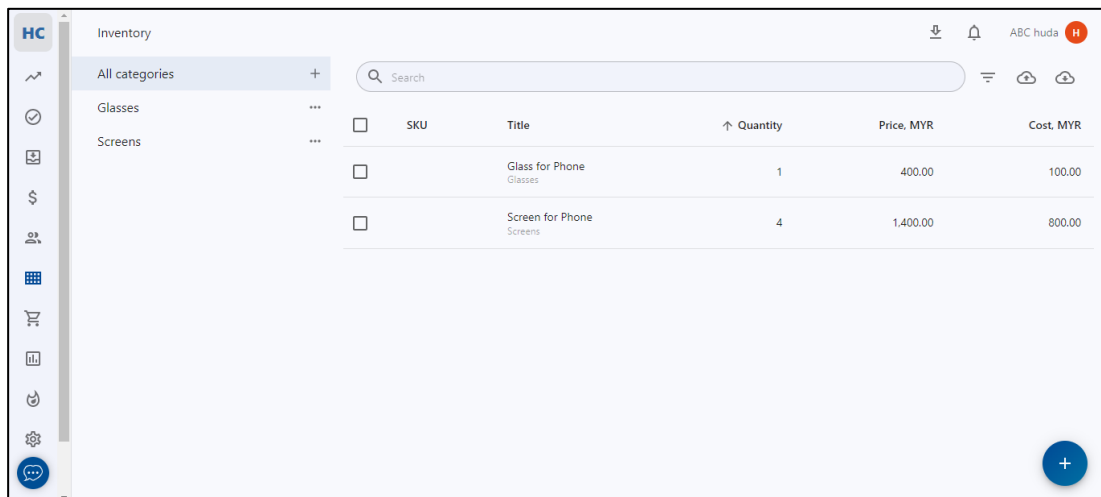


Figure 2.15 The Inventory Management Page

The third feature is historical reporting where it shows the big view trend of the business process for example, ticket by date, ticket average check, sales average check, urgent tickets, and tickets overdue. From this, user can see the progression of the business by selecting date until one year. Moreover, the system also comes up with the reports of crucial documents. For example, salary reports of employees, finance management report, products and services, tickets, clients, and inventory management reports.

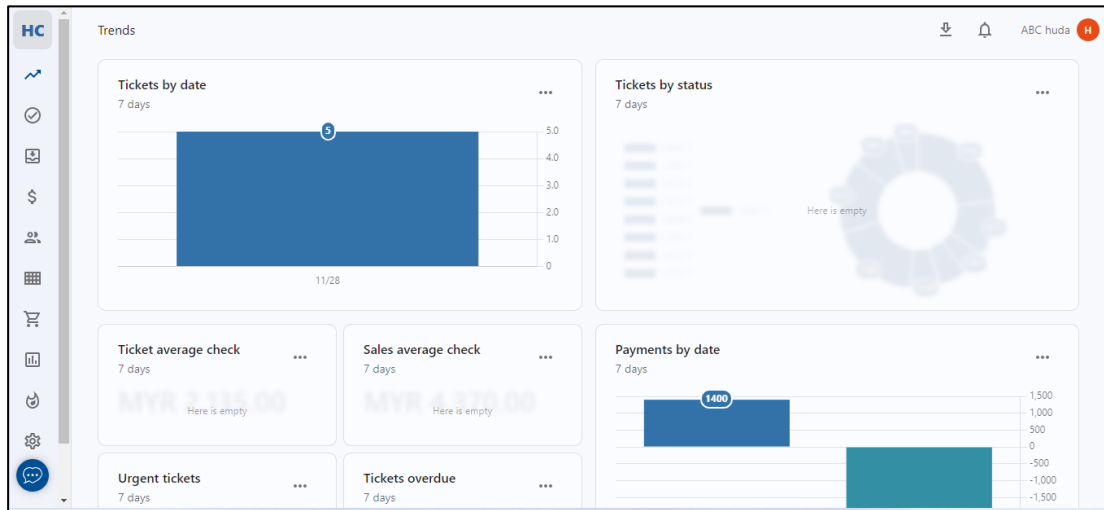


Figure 2.16 The Trends Page

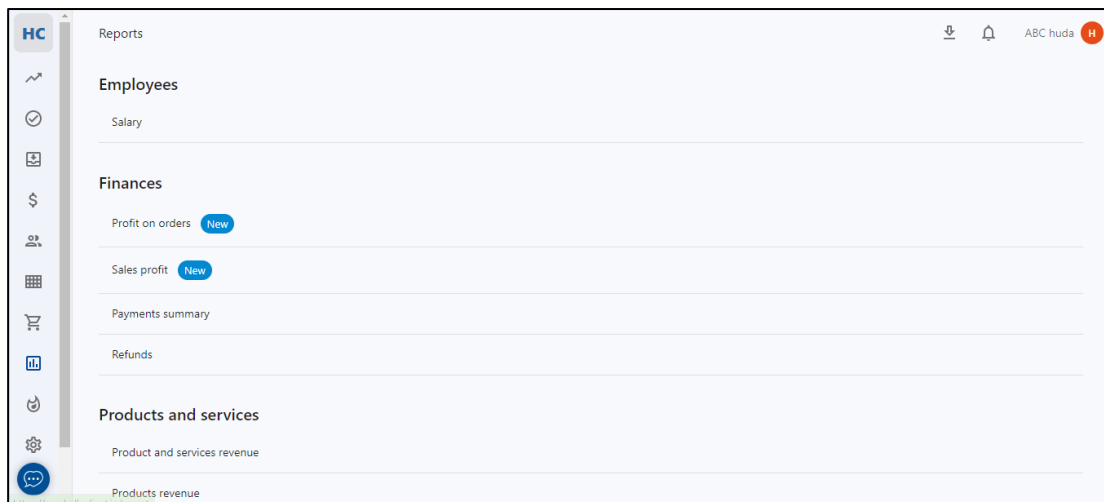


Figure 2.17 The Reports Page

The next feature is employee management where user able to add new employee and update all the information about them. In the update part, user can assign the employee salary and choose the rights for them to manage the system.

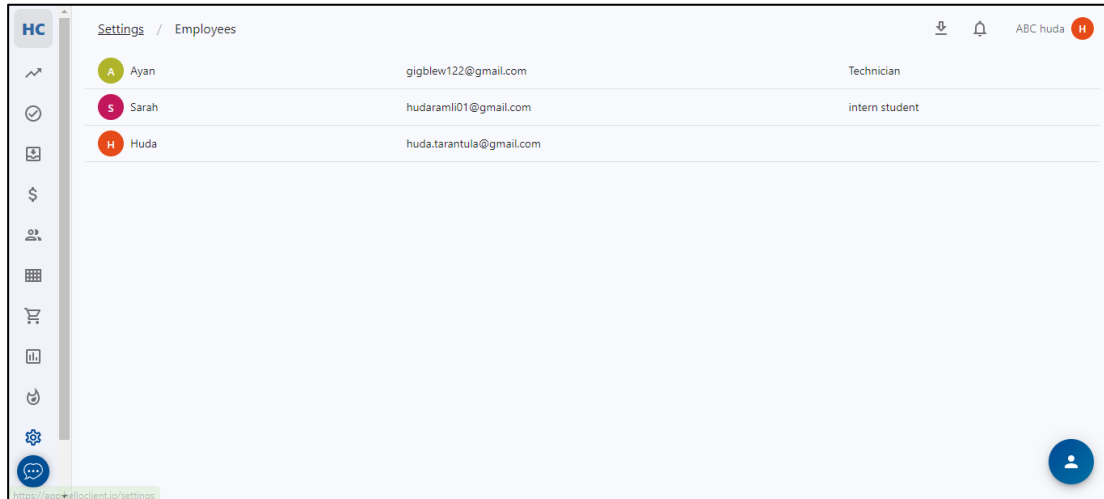


Figure 2.18 The Employees Management Page

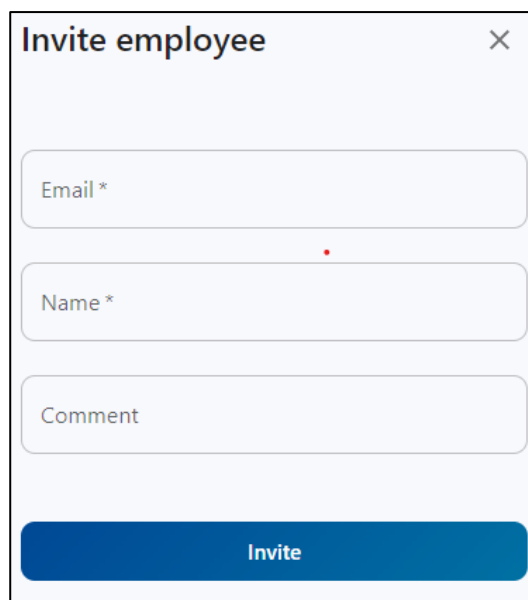
A screenshot of a modal form titled "Invite employee" with a close button (X) in the top right corner. The form contains three input fields: "Email *" (with a red asterisk), "Name *" (with a red asterisk), and "Comment". Below the input fields is a blue button labeled "Invite".

Figure 2.19 The Add Employees Page

Ayan + ×

To edit the name or phone number of an employee, ask him to go to his profile and enter the necessary data

Common

VATIN

Comment
Technician

Locations
Main Location ▼

Salary ▼

Rights ▼

Save

Figure 2.20 The Update Employees Page

Lastly, the important feature available in the HelloClient is real time data. Based on figure show the real time data in the tickets page. Basically, the tickets page shows the status progress of the client's tickets. The information shows the ticket number, updated date and time, status, deadline, client name and phone number, manager, executor, total price, reasons, appearance, and device type, IMEI/SN, brand, model, equipment, and password. Users can choose to view the data in different mood such as active, urgent, done, in progress, waiting parts or pending.

Ticket	Updated	Status	Deadline	Client	Manager	Executor	Total MYR	Reason	Appearance	Device Type	IMEI / SN	Brand	Mod.
#5 11/28	11/28 3:44 PM	Done	3 d.	Bonnie Walters +7 932 852 40 55	Huda	Huda	1,240.00	Blocked	Fall Traces	Notebook	-	-	-
#4 11/28	11/28 3:44 PM	New	3 d.	Derick Glisson +7 985 677 75 32	Huda	Huda	200.00	Quickly Discharges	Scuffs	Monoblock	-	-	-
#3 11/28	11/28 10:22 PM	In Progress	3 d.	Christopher Baldwin +7 991 986 29 92. +7 910 407 34 17	Huda	Huda	200.00	Not turn on	Fall Traces	Tablet	-	-	-
#2 11/28	11/28 3:44 PM	New	3 d.	Fred Rogers +7 973 629 23 62	Huda	Huda	1,200.00	Quickly Discharges	Scuffs	Notebook	-	-	-
#1 11/28	11/28 3:44 PM	In Progress	3 d.	Gardner Patton +7 918 651 67 83. +7 941 888 33 89	Huda	Huda	200.00	Broken front panel	Scuffs	Monoblock	-	-	-

Figure 2.21 The Tickets Page

2.3.3 MyGadgetRepair

The MyGadgetRepair shows statics web-based system. This is because most of the design pages remain the same and cannot be changed unless the original code is changed. Moreover, it required user real time updates that happened manually to change it. For example, the number sales progression and repair tickets activity. The information is change rarely based on the customers and the user. If many customers come, then the user need to update and create the new information. Hence, is shows that the MyGadgetRepair is statics web-based system.

Furthermore, the design of the MyGadgetRepair system is simple and have the interactive elements such as different color with different function button. The users quickly recognize the contents that want to visit because it is more noticeable and at some parts it is provided with a cursor change on hover to ensure the users correctly point out the clickable part.

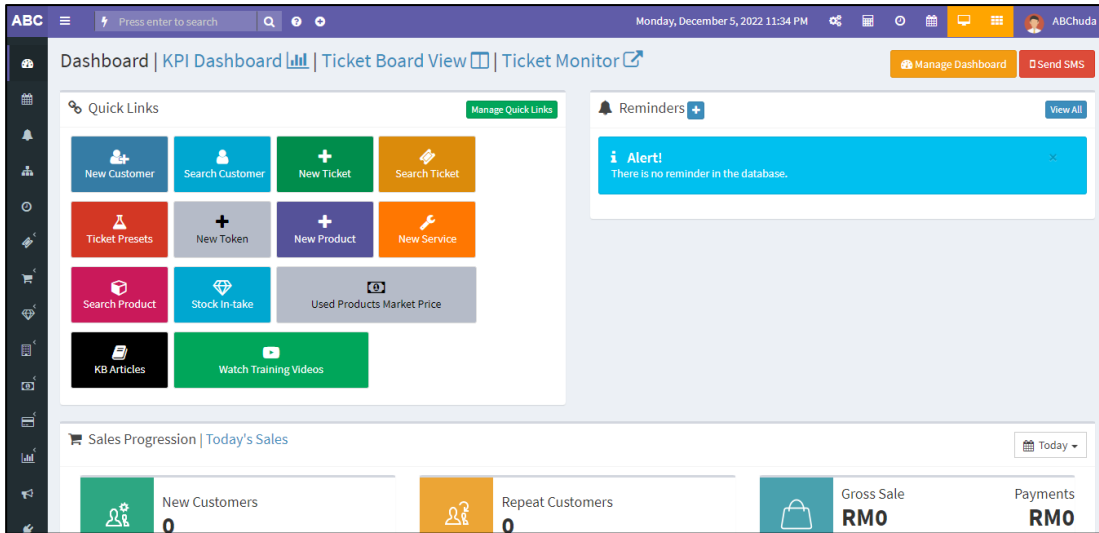


Figure 2.22 The Dashboard Page

There are many features provided in the MyGadgetRepairs system. The important features will be explained in this part. Firstly, customer database for MyGadgetRepairs system where in this function users able to create new customer, customers groups, assets manager, and show map. The system also lists all the customers and users able to act on the customers database such as update, copy, make new ticket, new reminder and send SMS.

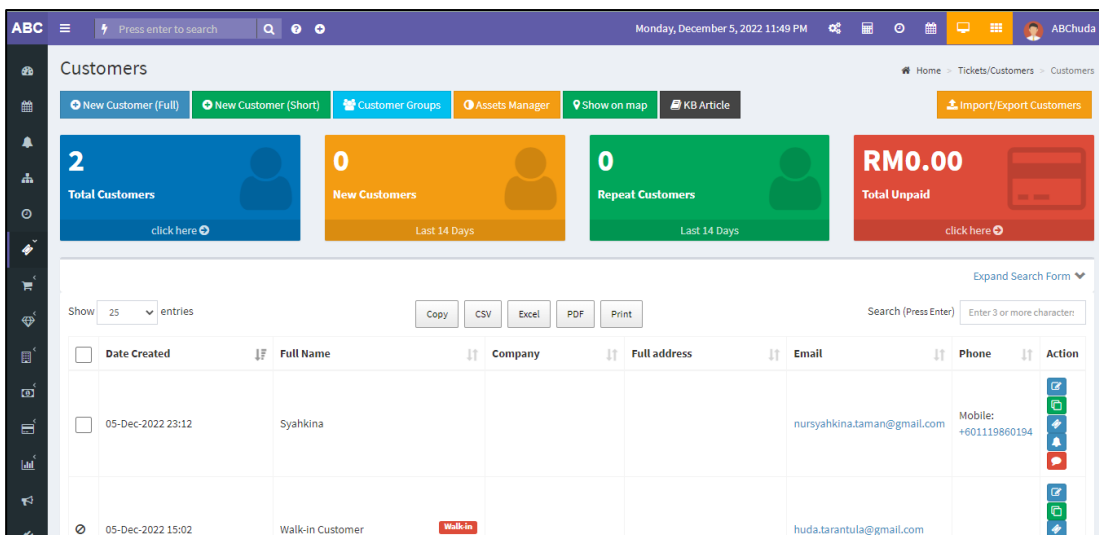


Figure 2.23 The Customers Page

On the create new customer page, users need to fill in customer information such as full name, mobile, email address and additional information for business purpose. The customer ID will be generated automatically by the system for every new customer and all the customer details likes tickets open, invoices unpaid and total and returned total will be showing up.

Figure 2.24 The New Customer Page

Figure 2.25 The Customer Data Page

The second feature is inventory management for the customers tickets. In this system, every customer can have many tickets. The function ticket is to ensure the IT support like technician can track, manage, speed up and deal effectively with the customers problems. (Ticketing Systems: The Complete Guide [Updated to 2022] / SysAid, n.d.) In this part, users able to create new ticket, ticket monitor, ticket board view, multiple ticket update, create bulk ticket, and import or export ticket. In the new ticket page, user need to fill in customer information, device issue, type of device and other required information. Then the view board will update the number of tickets in the pipeline.

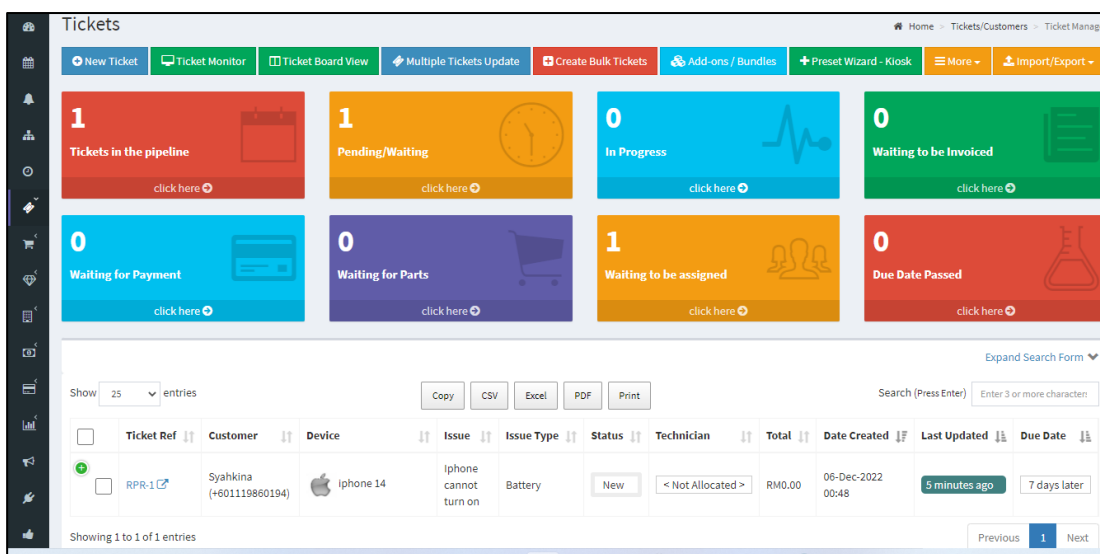


Figure 2.26 The Tickets Page

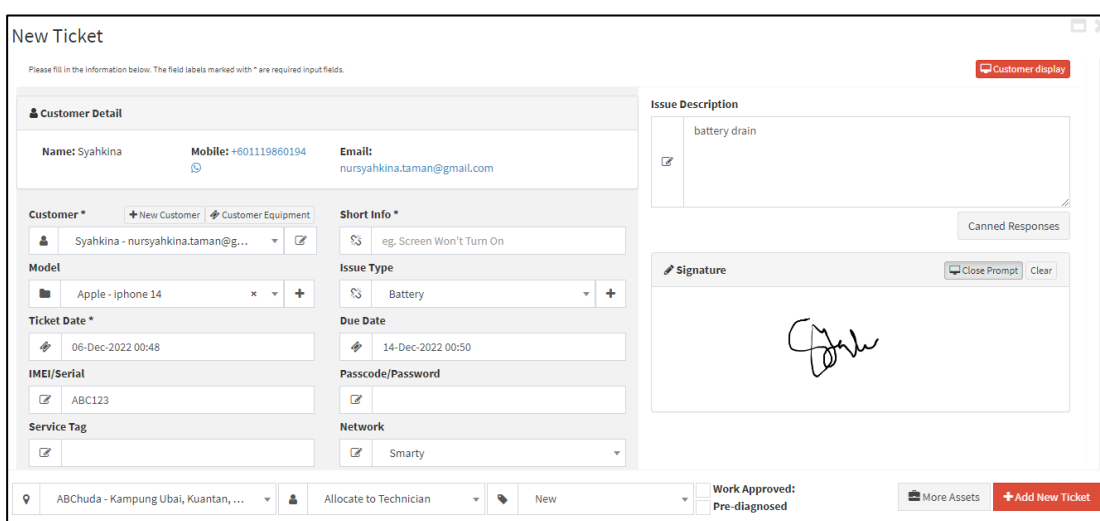


Figure 2.27 The New Ticket Page

The third feature is historical reporting where the users able to obtain a big view on what is happening in the system. In the Dashboard page, it shows the notification and the sales progression based on the selected date. Plus, it also shows repair tickets activity which is the progress from the technician that handle the customers. The system also shows all the reports from sales, customers, tickets, invoices, inventory, suppliers, employees, payments, and queue.

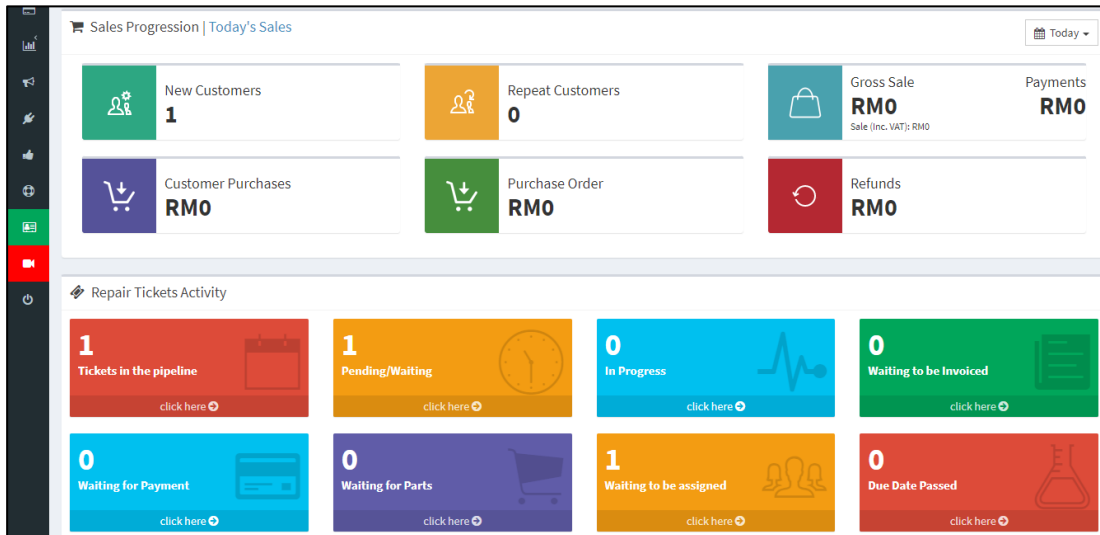


Figure 2.28 The Dashboard Page

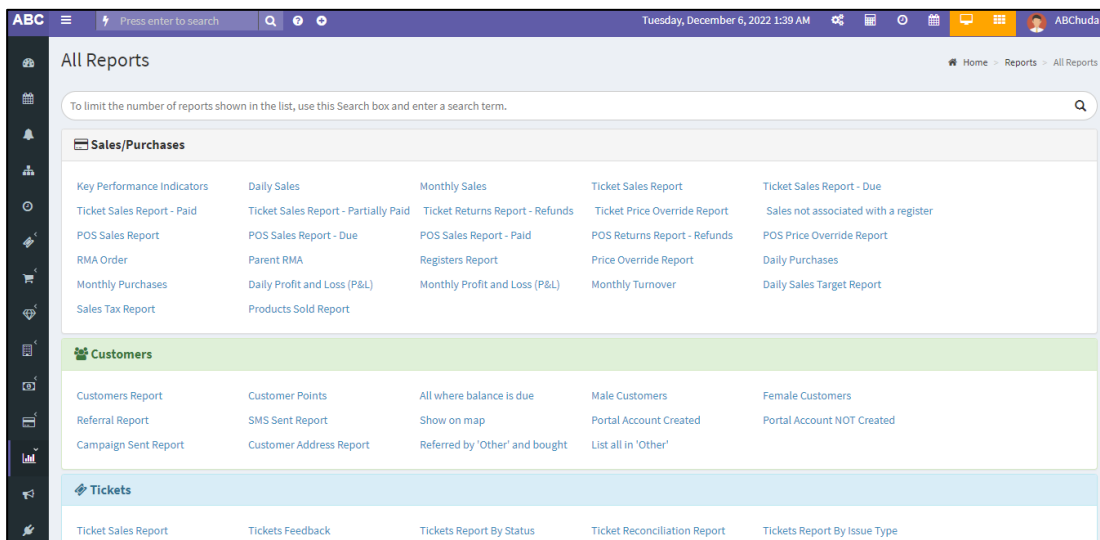


Figure 2.29 The Report Page

Next, the employee management feature where the users can add new shop user or staff, shop user or staff rights group and maps. Admin able to see the account information of user, commission based on the ticket handled by him/her general information, repair history, products, and IP Address of the users. Shop admin responsible to update all the staff data especially at the commission page.

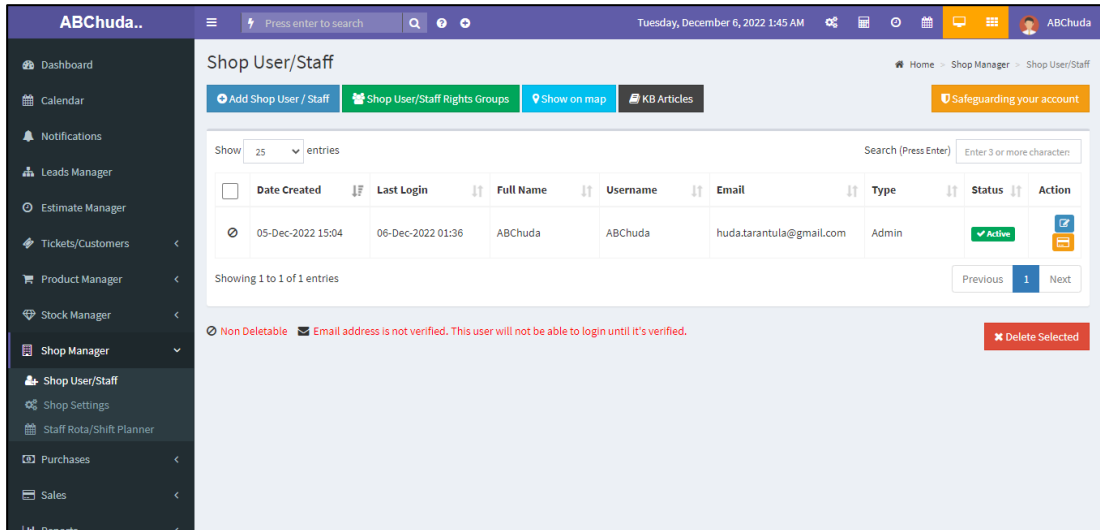


Figure 2.30 The Employee Management Page

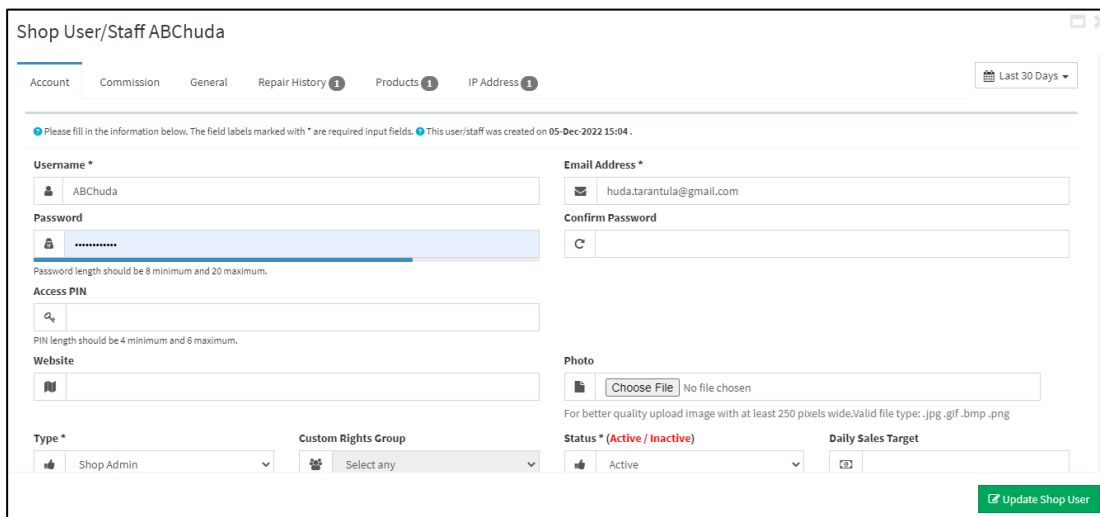


Figure 2.31 The Employee Account Page

Lastly, the other important feature is reminders to organize the work. Users can add reminder by setting the date, choose the repair ticket, find the customer, leads, supplier, select the technician and do take notes on important tasks. The click on the add reminder to add the new one.

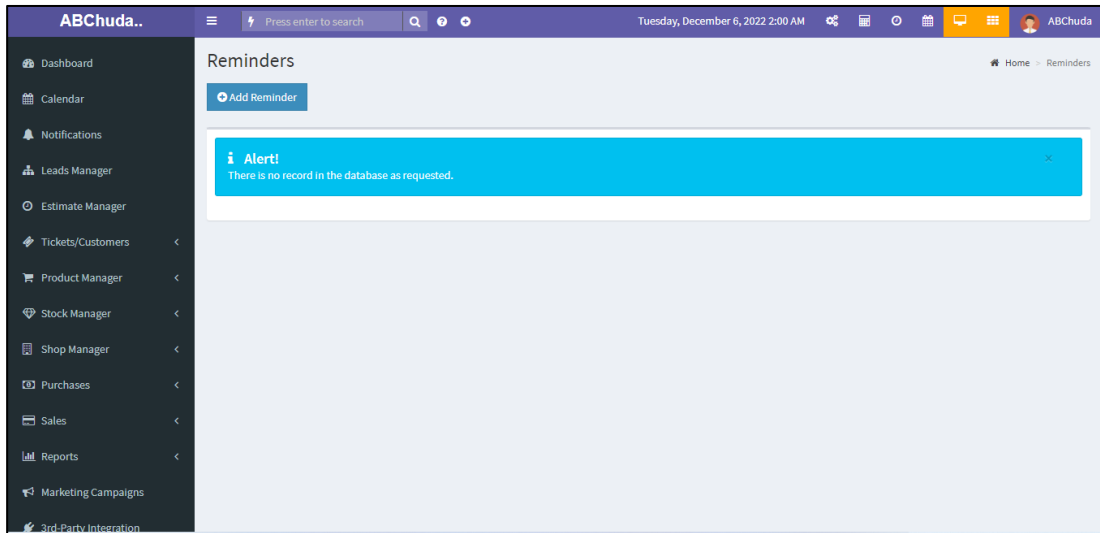


Figure 2.32 The Reminder Page

2.3.4 Comparative Analysis

Table 2.1 The comparison summary between three existing system

Element	Computer Repair Shop Management System	HelloClient system	MyGadgetRepair system
Web application categories	<ul style="list-style-type: none"> ✓ Static web-based system. ✓ Dynamic web-based system. 	<ul style="list-style-type: none"> ✓ Dynamic web-based system 	<ul style="list-style-type: none"> ✓ Dynamic web-based system
Design	<ul style="list-style-type: none"> ✓ Easy to understand. ✓ Unattractive. 	<ul style="list-style-type: none"> ✓ Easy to understand. ✓ Minimalist. 	<ul style="list-style-type: none"> ✓ Easy to understand. ✓ Interactive. ✓ User-friendly.
Metaphor (Language)	<ul style="list-style-type: none"> ✓ Simple 	<ul style="list-style-type: none"> ✓ Common 	<ul style="list-style-type: none"> ✓ Common
Features	<ul style="list-style-type: none"> ✓ Services Management. ✓ Product Management. ✓ Transaction Management. ✓ Employee Management. 	<ul style="list-style-type: none"> ✓ Billing & Invoicing. ✓ Customer Database. ✓ Employee Management. ✓ Inventory Management. ✓ Real Time Data. ✓ Reporting & Statistics ✓ Notification. ✓ Repair Tickets 	<ul style="list-style-type: none"> ✓ Billing & Invoicing. ✓ Customer Database. ✓ Employee Management. ✓ Inventory Management. ✓ Real Time Data. ✓ Reporting & Statistics Notification. ✓ Calendar Management.

			Repair Tickets.
Programming Language	✓ HTML	✓ Java byte code	✓ CFML
Module	✓ Dashboard. ✓ Product List. ✓ Transactions. ✓ Service List. ✓ User List.	✓ Trends. ✓ Tasks. ✓ Tickets. ✓ Payments. ✓ Clients. ✓ Inventory. ✓ Shop Manager. ✓ Reports.	✓ Dashboard. ✓ Calendar. ✓ Lead Manager. ✓ Estimate Manager. ✓ Ticket/ Customers. ✓ Product Manager. ✓ Stock Manager. ✓ Shop Manager. ✓ Purchases. ✓ Sales.

			✓ Reports.
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2.4 Relevance of Comparison with Project Title

2.4.1 Comparison of three existing system

Table 2.2 Advantages and Disadvantages of Existing System

Systems	Advantages	Disadvantages
Computer Shop Management System	<ul style="list-style-type: none"> • Flexibility: users able to change the system based on their preferences. • Simple: for small computer shop (1-2 employees) easy to manage the system 	<ul style="list-style-type: none"> • Low quality: free system always has poor quality system likes frequent error in some functions. • Limited feature: to make the business running smoothly is possible because only have the basic features likes managing features and transaction.
HelloClient	<ul style="list-style-type: none"> • Minimalist: simple user interface implements in the system. • Convenient: suitable for small computer shop (1-2 employees) to manage the business quickly because have the useful features and do not complicated to manage. 	<ul style="list-style-type: none"> • Do not have calendar management where user cannot assign the available date for customers to pick up their devices. • Lack of images in the inventory. • Plain user interface: some users might be confused with the contents especially in Tickets main interfaces.
MyGadgetRepair	<ul style="list-style-type: none"> • User-friendly: have clear icon and button to avoid user doing mistakes. 	<ul style="list-style-type: none"> • Inconvenience: Do not suitable for small computer shop (1-2 employees) to use because have some

	<ul style="list-style-type: none"> • Email Notification: Customers can get notification about the repair progress via email. • Can create schedule appointment for customers. 	<p>complicated and unuse features.</p>
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Hence, the IT Mines Smart Repair System for IT Mines Expert Resources is able to optimize the management of this computer shop. The proposed system is suitable for the small organization likes IT Mines Expert Resources where it is not the complicated system to handle but still have the crucial features and function likes bar code system generation, notification, solution generation and other able to make the technician and internship student to work effectively and quickly. Admin also able to monitor the system to look the improvement of the business by generating staffs, client, and sales report.

2.4.2 Comparison of three existing and proposed system

Table 2.3 The comparison summary between three existing system and proposed system

Features	Computer Shop Management System	HelloClient	MyGadgetRepair	IT Mines Smart Repair System
Simple and attractive design.	✓	✓	✓	✓
User-friendly system.	✓	✓	✓	✓
Barcode Management.	×	✓	✓	✓
Employee Management.	✓	✓	✓	✓
Analysis of the customer devices problems	✓	✓	✓	✓
Reporting & Statistic	×	✓	✓	✓
Calendar Management	×	×	✓	✓

Notification	×	✓	✓	✓
Generate Solutions of The Problems	×	×	×	✓
Excellent Service Award Generator	×	×	×	✓
Status Progress	×	✓	✓	✓

2.5 Proposed Project

The enhancement or changes of the project, application development, coding, integration, and system testing are implements in the construction phase.

2.6 Summary

Based on the three existing system which are Computer Shop Management System, HelloClient and MyGadgetRepair have their own advantages and disadvantages that makes their project powerful. However, those system also have the with the proposed system. Thus, this literature review is documenting to give the guidance and idea when developing the IT MINES Smart Repair System.

CHAPTER 3

METHODOLOGY

3.1 Introduction

In this chapter, the focal point is about discussion of the methodology that will be implemented while developing the project based on the software developer's side of view. The selected development methodology consists of a few phases that will make this project go smoothly. It will guide this project to create tasks in between the phases. Moreover, it will show the use case description for every system function. The structure development will present more details of the functions and exception flow.

3.2 Project Management Framework/Methodology

3.2.1 Rapid Application Development (RAD)

Rapid Application Development is popular strategy in software development because the process of creating software is fast and effective compared to the other traditional methodology that is not easy to make changes after the crucial development is done. Many developers preferred to use RAD because it designs to be flexible where developers can make changes and still can accept new inputs at each of parts of development process such as features and functions without destroying the product. Based on figure 3.1 shows the four phases in RAD which are requirements planning, user design, construction, and cutover.

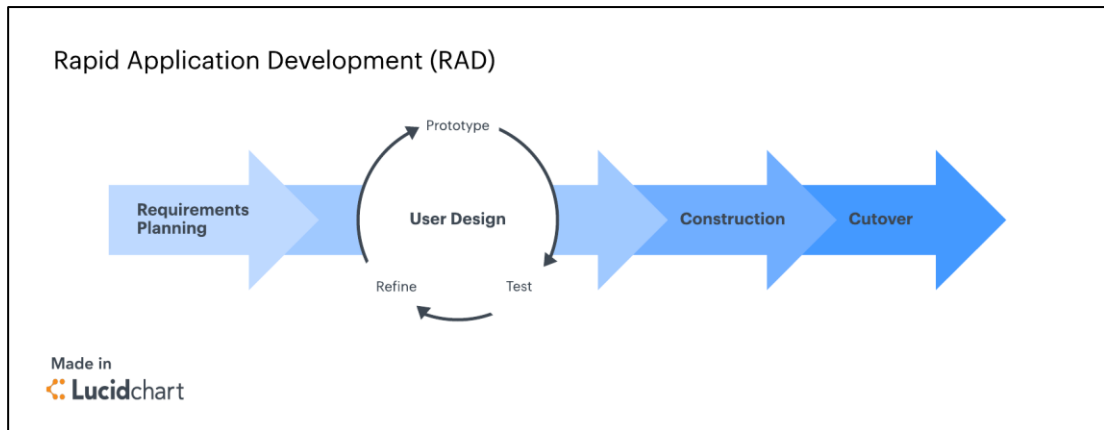


Figure 3.1 RAD methodology model diagram

Phase I: Requirements Planning

This phase is crucial step to ensure the project is success. At this point, developers and the clients should have good communication about the project goals and objective to avoid any miscommunication and lost budget. This is because it is important to develop the system by following the user expectation and requirements. Moreover, during this phase it can determine any possible issue that will happen during the build process.

General tasks during this phase

- Hunting the supervisor.
- Project approved from supervisor.
- Discuss and give explanation about case study.
- Identify problem statement and solution.

Phase II: User Design

This phase is essential part where the developers should work together with the clients in order to make sure it meets every client’s requirements in the design process. Clients able to try-out each prototype to make sure it reaches their expectation and free from the bugs and kinks. In this phase, developers could modify the design until the satisfactory design can be reach by them. From the developers and clients experience, if any possible failure happened it can be noticed by them. Basically, Adobe XD is used in designing the user interface.

General tasks during this phase

- Choose the best SDLC for the project. This project used Rapid Application Development (RAD).
- Design flowchart, use case diagram, ERD and context diagram
- Design user interface.

Phase III: Rapid Construction

In this phase, the prototypes and beta system are converted into the working model. Then, developers can construct the final operation model quickly because it uses the standard project management techniques because the issues and changes can be determined during the design phase. Several steps are implemented during this phase which are planning for fast construction, development of program and application, coding and unit, integration, and system testing.

The third phase is crucial because clients still can get in touch with the process where any suggestion of alterations, changes and new ideas can be accepted. This is because it may help to solve the problems if the developers find out any potential issues might happen.

General tasks during this phase

- Develop system using Visual Studio Code.
- Create Database.
- Fix the error in the system.

Phase IV: Cutover

In the last phase, the implementation of stability and maintainability have been optimized as the final product is ready for launch. Making the final changes is crucial because coders and clients continue to identify the bugs in the system. The documentation of

data conversion, testing, changeover, and the other tasks is prepared before conducting the clients a complete product.

General tasks during this phase

- Test the whole system in real.
- Carry out the system change over.
- Conduct user training based on (User Acceptance Test).
- Presentation.

3.3 Project Requirement

3.3.1 Software Requirements

Table 3.1 Software requirement for IT Mines Smart Repair System

Software	Purpose
Microsoft Word	<ul style="list-style-type: none">To write the documentation of the project and create data dictionary.
Microsoft Visio	<ul style="list-style-type: none">To draw flowchart, create and design functional diagram (ERD, user case diagram, context diagram).
Adobe XD	<ul style="list-style-type: none">To design the application interface.
PhP	<ul style="list-style-type: none">To store the data and generate data from database.
Visual Studio Code	<ul style="list-style-type: none">To write the code
Xampp	<ul style="list-style-type: none">To test the web-based application
Excel	<ul style="list-style-type: none">Create Gantt chart.

3.3.2 Hardware Requirements

Table 3.2 Hardware requirement for IT Mines Smart Repair System.

Hardware	Specification	Purpose
Laptop	Acer	To develop the project system and do documentation.
Printer	Canon	To print the report

3.3.3 Functional and Non-Functional

Table 3.3 Functional requirement for IT Mines Smart Repair System.

Functional	Description
Login Module	<ul style="list-style-type: none"> The system allow user to Sign up and login based on their email, password, and type of user.
Manage Tickets Module	<ul style="list-style-type: none"> The system must allow users to insert the new devices problems information and solution. The system allow user to update the progress status The system allow user to generate analysis of the problem.
Manage Client Module	<ul style="list-style-type: none"> The system allow user to enter client information. The system allow user to generate the bar code for each client.
Manage Staff Module	<ul style="list-style-type: none"> The system allow user to manage information of the staff.
Report Module	<ul style="list-style-type: none"> The system allow user to manage and generate the modules reports.

Table 3.4 Non-Functional requirement for IT Mines Smart Repair System

Non-Functional	Description
Availability	The system is available to operate during working hours.
Reliability	To ensure the system is highly reliable function by tracking the system time between critical failures.
Security	To protect the sensitive data the system required password generation.
Environment	Ensure the external environment is safe to the system performance and the application's environment able to runs 24/7.

3.3.4 User Requirements

The user target of this project are administrator, technician, and internship student. Each of the users will be explain their requirements.

Administrator

- Sign-in

Admin can sign in the system using username and password. He does not need to sign up because he manages the whole system.

- Manage Staff Report

Admin can invite new internship student to access the system same with the technician. In this module, admin can manage internship students' allowances based on the tickets and services he evolves.

- Manage Customer.

Admin can generate the bar code for every customer to keep their information and tickets that assigned by their name. From this, when staff scan the bar code the system will retrieve the data that match with the bar code.

- Manage tickets.

Admin can monitor the tickets progress. He able to change work reminder to ensure the repair process finish on time.

Technician

- Sign up

Technician must sign up first as a new user and choose as a technician in the system.

- Sign in

To sign in use username and password.

- Add new ticket

Technician can create new ticket for customer to manage customer device problem.

- View the ticket

Technician able to view the previous tickets without able to make changes.

- Manage the ticket

Technician can update the repair progress by stating the problems of the devices and suggest the better solution in the system.

- Assigned the ticket

Technician can assign the ticket to the internship student if he believes that the internship student can solve the problems.

Internship Student

- Sign up

Internship student must sign up first as a new user and choose as an internship student in the system.

- Sign in

To sign in use username and password.

- View the ticket

Internship student able to view the previous tickets without able to make changes. He can refer the tickets as a guidance to manage the new ticket.

- Manage the ticket

Internship student can update the repair progress by stating the problems of the devices and suggest the better solution in the system only the ticket that assigned for him by the technician.

3.3.5 Constraint and Limitation

In this system, there are constraints and limitation because of budget and deadline while designing the website. It also can control and limit anything within development and designing the web-based system. Listed here is the constraint and limitation of this project:

- User account limitation

IT Mines Smart Repair System manage only one user can have one account. Do not have sharing accounts among the users. Thus, only admin can access as an administration same with another user.

- Online Support

IT Mines Smart Repair System does not support offline user and the system only available if the computer has connection with the internet.

- Permission Required

IT Mines Smart Repair System required permission first before keep the personal data in the website system.

3.4 Proposed Design

In this part, the proposed design for this project will be discussed. The diagram used to propose design will be flowchart, context diagram, use case diagram with its description and activity diagram.

3.4.1 Flowchart

The flowchart explains from the beginning until the end of the system process. Firstly, if the user already has an account, they can proceed with the login by entering the email and password. However, if the user does not have an account, then they can register first. Next, fill in the user information like full name, username, phone number, password and user type. Based on figure 3.2 shows the flowchart of signup and login of the Smart Repair System. Every type of user has a different process in the system. So, users must log in correctly.

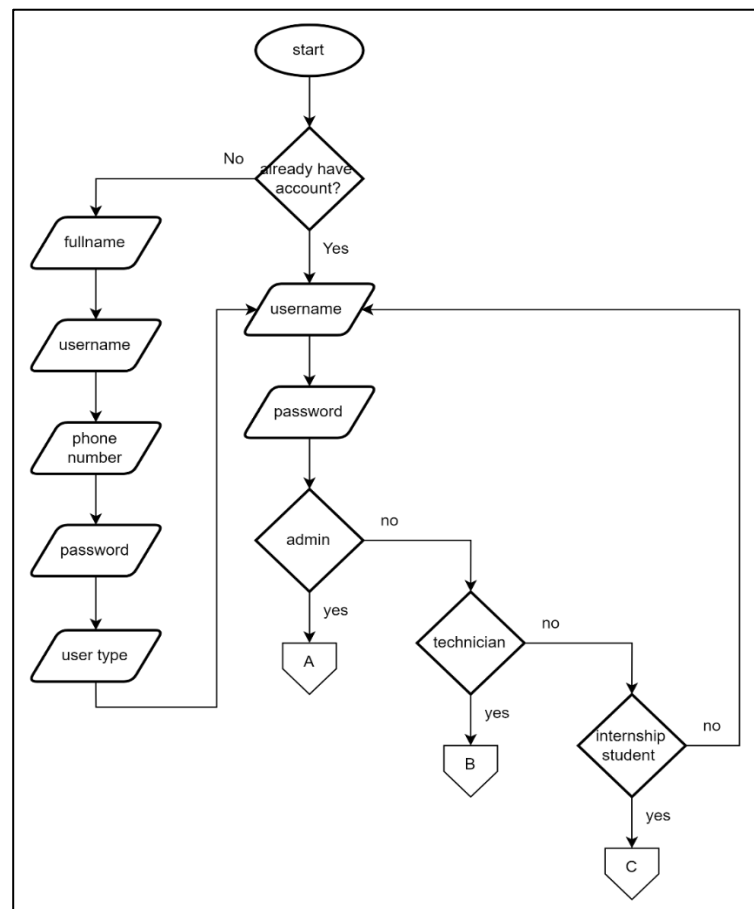


Figure 3.2 flowchart for signup and login process

Based on figure 3.3 shows the flowchart of the admin process. First, in the dashboard part, the admin is able to view the number of customers, staff, and e-jobsheet that have been assigned in the system. Next, admin able to view information about the e-jobsheet managed by the technician and internship student.

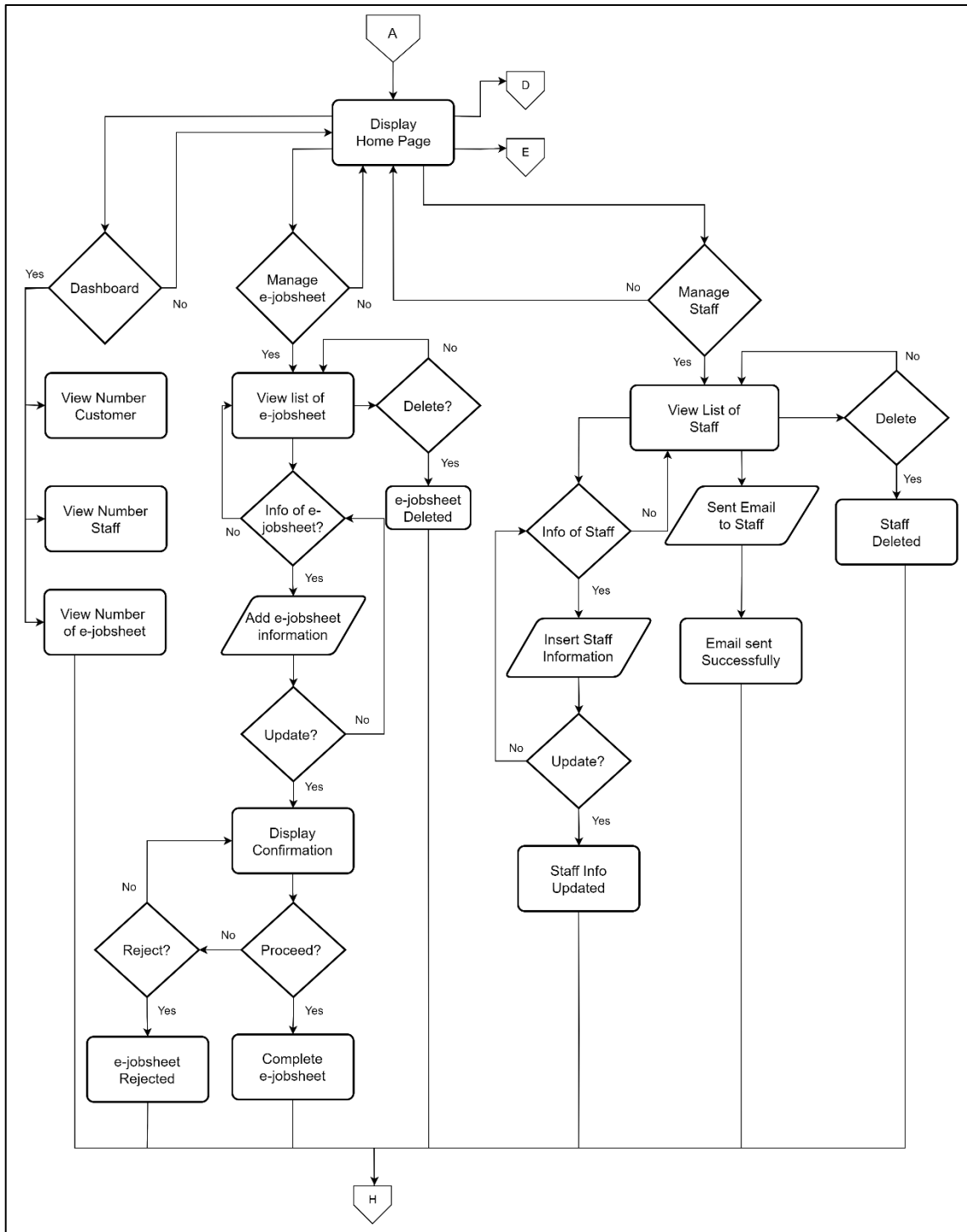


Figure 3.3 Flowchart for Admin (Part I)

Based on figure 3.4 shows manage customer function for admin continue from the part I by using continue page (D). In this part, admin able to view list of customers then able to create new customer. For the first timer customer should create new section to keep all the e-jobsheet just for one customer. Admin also able to update customer information incase customer have information that need to change. Once customer already have own section, admin can create new e-jobsheet or update the previous e-jobsheet. Admin also able to delete the customer and the jobsheet in this section.

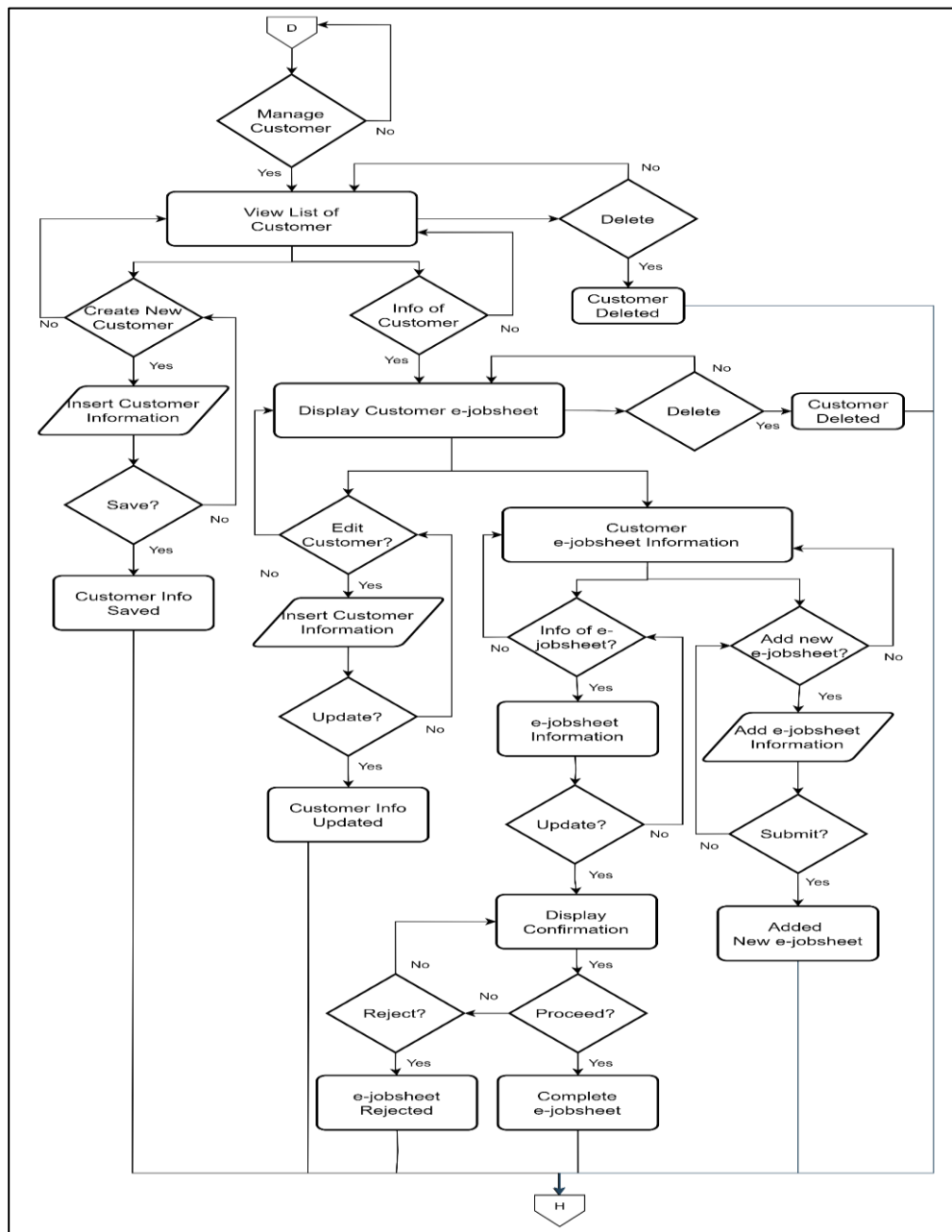


Figure 3.4 Flowchart for Admin (Part I)

Based on figure above shows the manage product function and manage profile function for admin continue by using continuing page (E). In manage product admin able to create new function, update the existing function view all the function available or not available and delete the function that are not use or need to be delete. The product function is to make sure the all the product in the computer shop is able to use when needed. The product stock can be detected, and admin need to always update the products condition, availability, and price by updating in the system. Lastly, admin able to update the profile like insert the phone number or update the profile picture.

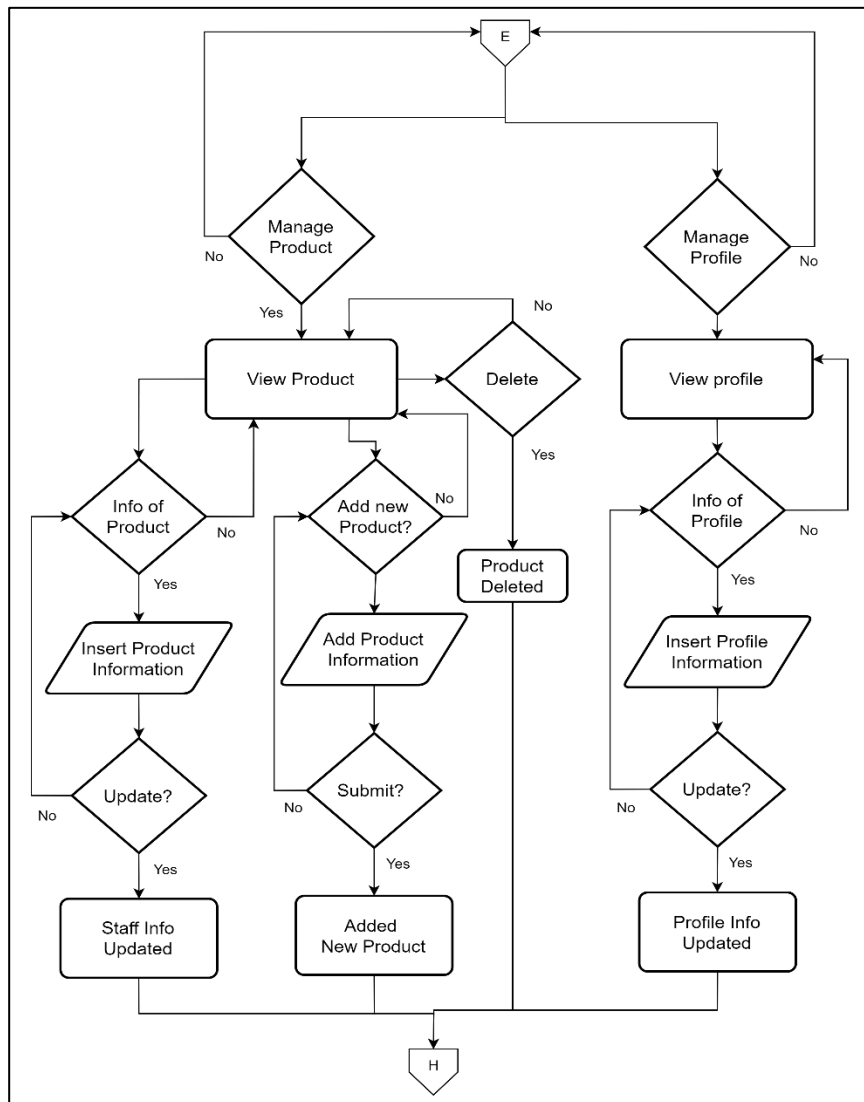


Figure 3.5 Flowchart for Admin (Part II)

Based on figure shows the technician flow chart. After technician successfully login into the system, technician able to view the dashboard that able to view pending, reviewed, rejected, and completed e-jobsheet. Technician also able to manage the e-jobsheet where its able to view list of e-jobsheet. After click on the info button technician can update the e-jobsheet from pending status to reviewed status. After confirmation for updated technician able to proceed or reject the e-jobsheet. Plus, technician able to delete the e-jobsheet if needed. Other function for technician is manage problem type where it able to create new problem type, view list of problem type, update the problem type information and delete the problem type.

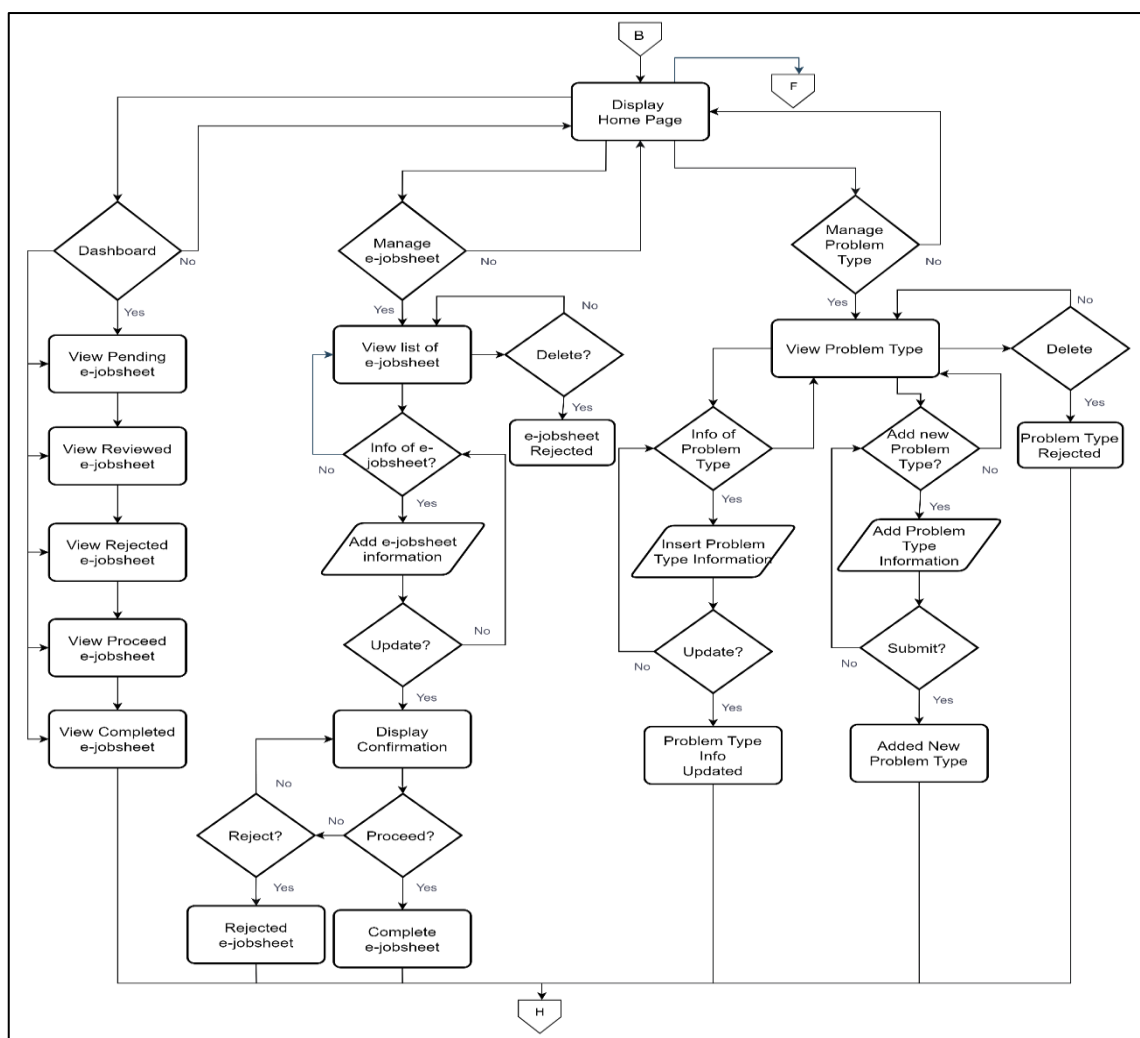


Figure 3.6 Flowchart for Technician (Part I)

Based on the figure above shows manage solution function where technician able to create new solution, read all the solution information, update the information, and delete. Lastly, manage profile where technician can view the profile that retrieved data from registration form. Technician able to update the information like photo and phone number.

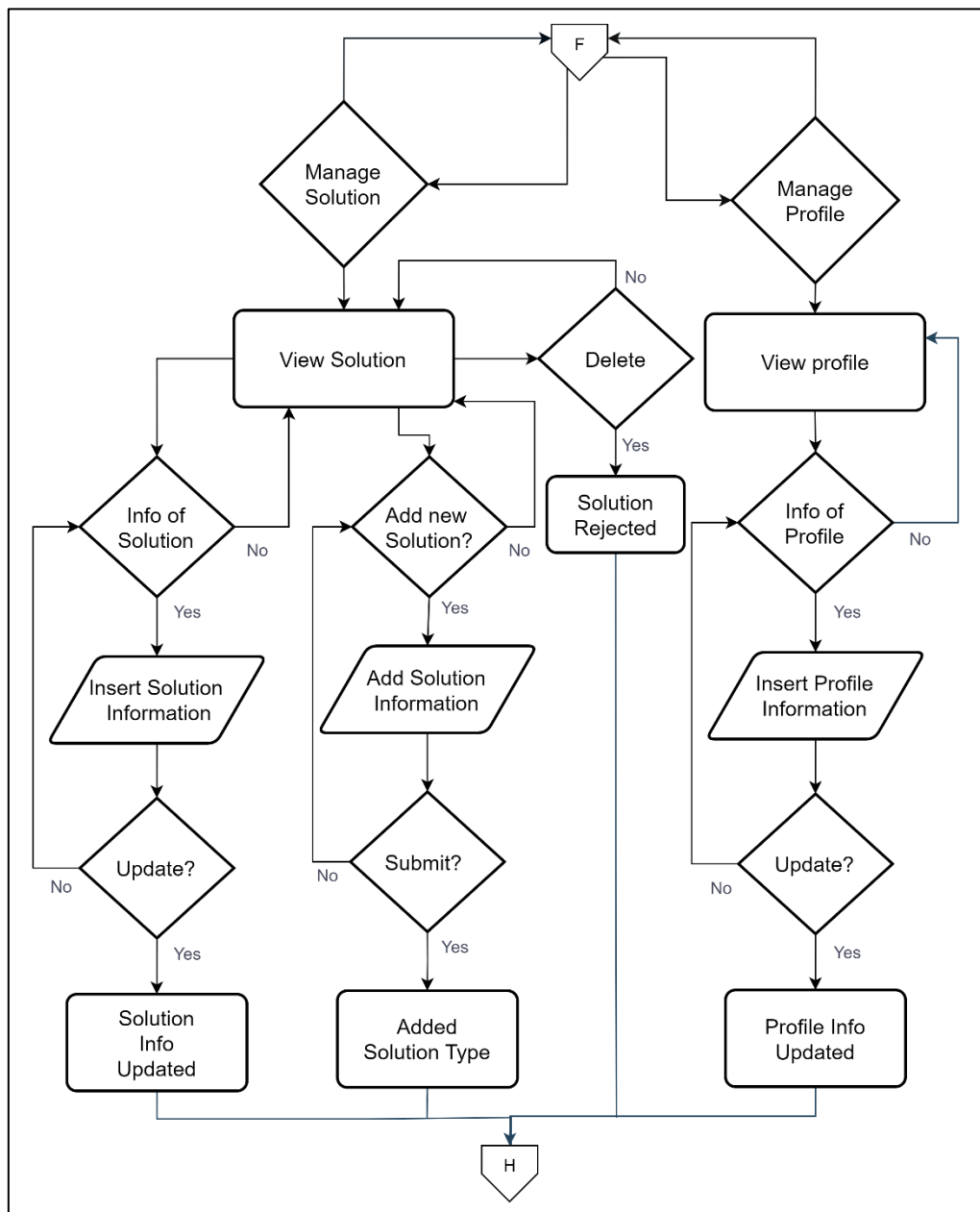


Figure 3.7 Flowchart for Technician (Part II)

Based on figure shows flowchart of internship student that explain the function able for them to access in the SRS system. First, internship student able to view the dashboard that shows the pending, reviewed, rejected, proceed, and completed of e-jobsheet. The next function is managed e-jobsheet, where it can update the e-jobsheet assigned by the technician to the internship student. Next, view the problem type where internship can refer the problem type during the repair and service the devices.

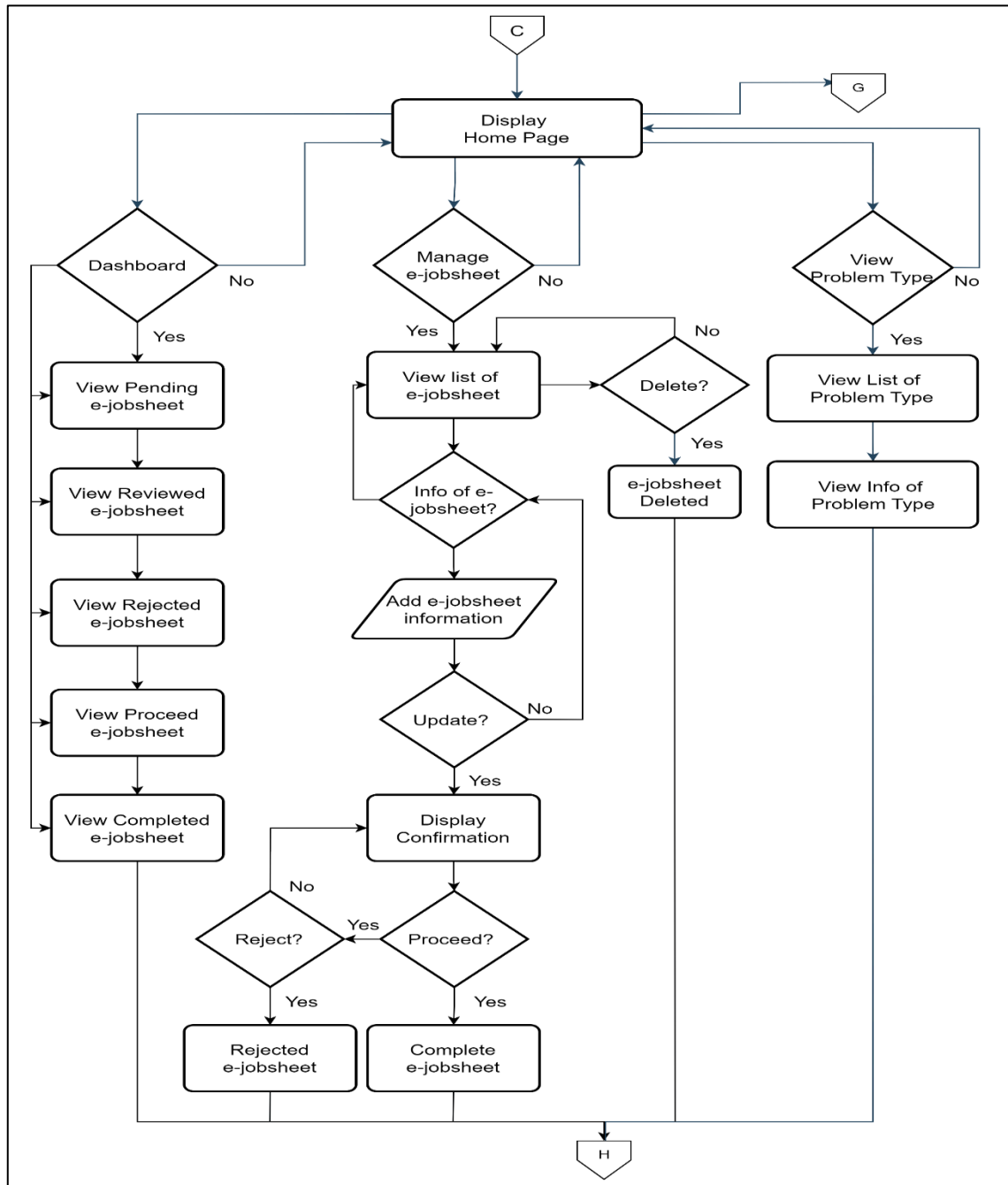


Figure 3.8 Flowchart for Internship Student (Part I)

Based on the flowchart above shows the student internship able to view solution and product information same function as view problem type as a reference during the repair and service time. Lastly internship student able to manage the profile where student can view, update the new information like picture and contact number.

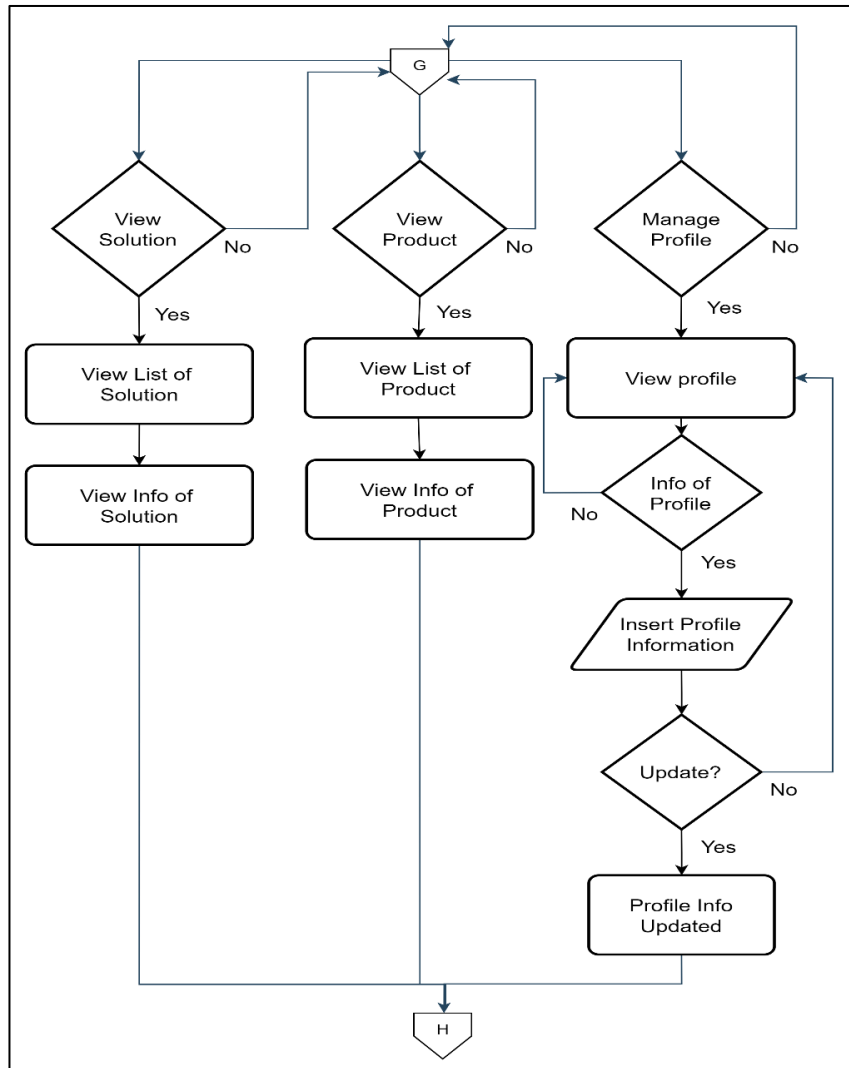


Figure 3.9 Flowchart for Internship Student (Part II)

3.4.2 Context Diagram

The Smart Repair System has three users which are admin, technician and internship student shows in figure 3.10. This part, it shows the user's activities and the process of the system. For admin, the system will show e-jobsheet details managed by the technician and student. For technicians, the system shows the status of the e-jobsheet in terms of pending, reviewed, reject, proceed and complete. This is to make sure the technician alerts of the e-jobsheet and do not miss one of them. Technicians are able to generate the solution and problem type. Lastly, internship student are able to manage e-jobsheet that was assigned to internship student. The system will show the information of problem type, solution and product as a reference for them when doing the work.

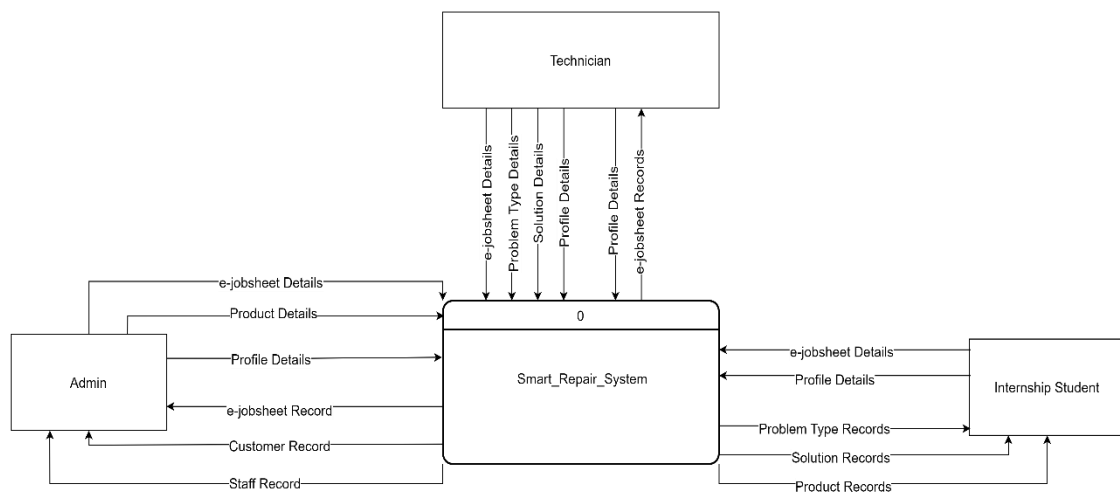


Figure 3.10 Context Diagram

3.4.3 Use Case Diagram

Based on the use case diagram in figure 3.7 shows the use case diagram of Smart Repair System. There are three actors which are admin, technician and internship student. The total modules in the system based on the use case diagram is eight modules. The modules are manage registration extend with register, manage e-jobsheet, manage problem type, manage product, manage service, manage staff, manage customer and manage report.

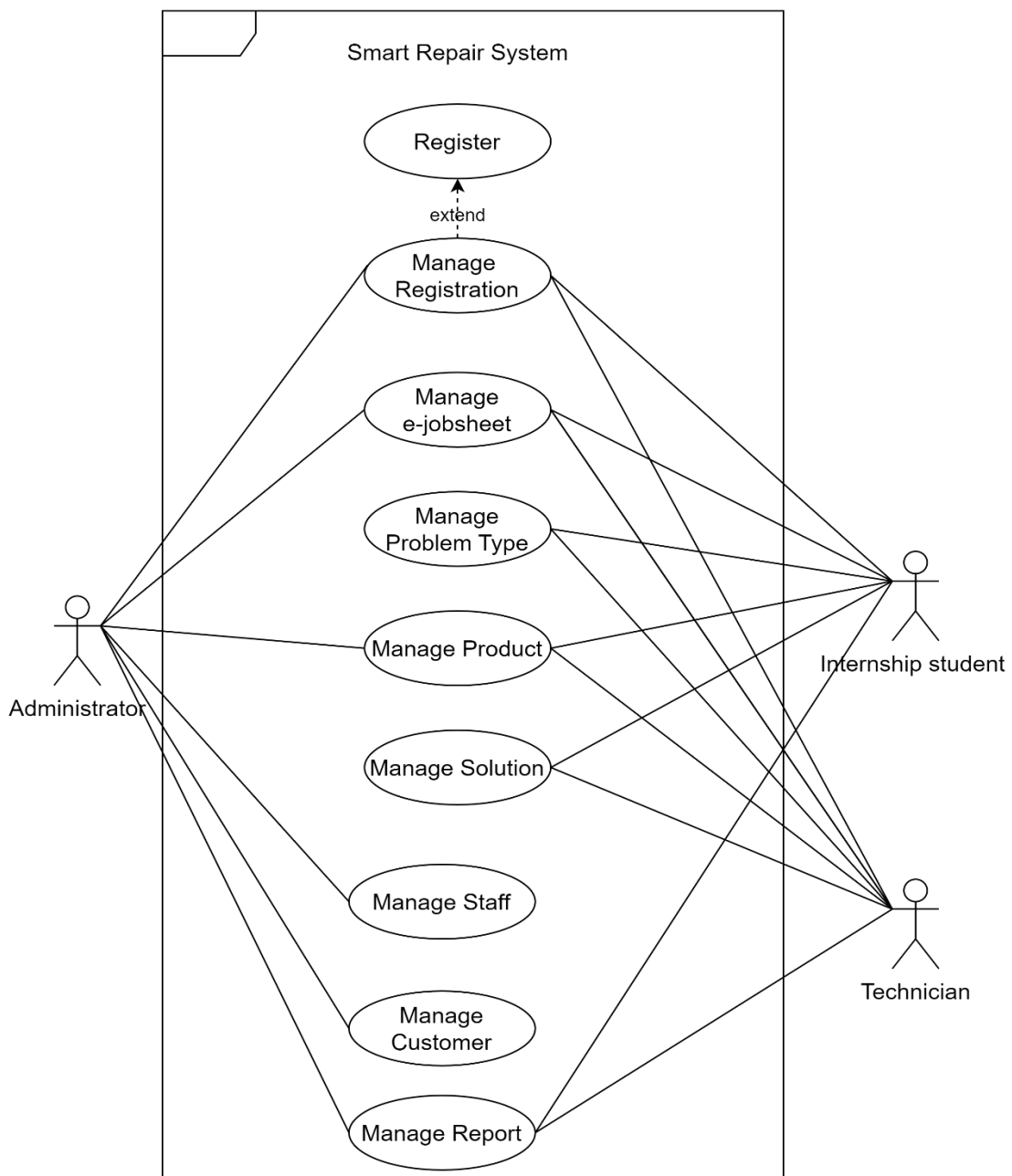


Figure 3.11 Use Case Diagram

- Manage Registration
 - Users need to fill in the details like fullname, username, phone number, email, password and user type to register the account for the SRS system.
 - Email and password registered by the users used to login into the system.
- Manage E-jobsheet
 - Admin able to create, view, update and delete e-jobsheet.
 - Technician can view, update and delete e-jobsheet.
 - Internship student can view and update e-jobsheet.
- Manage Problem Type
 - Technician can create new problem type and fill in the details like problem name and description.
- Manage Product
 - Admin can create new product available and fill in the product details such as product type, brand name, model name, quantity, price , add picture, and status.
- Manage Solution
 - Technician can create new solution, update solution information, status, and price. The solution also able to delete by the technician.
 - Internship student able to view the solution from the system.
- Manage Staff
 - Admin can update the staff profile like fullname, username, phone number, email.
- Manage Customer
 - Admin will record customer fullname, address, phone number and email.
- Manage Report
 - Administrator will manage report based on the number of customers, number of staff and number of e-jobsheet.

3.4.4 Details Use Case Diagram

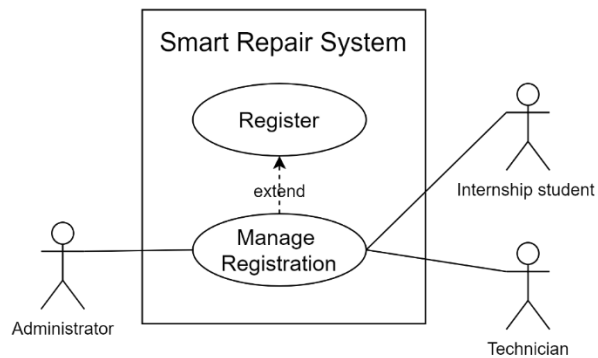


Figure 3.12 Use Case Diagram for Registration

Table 3.5 Login for use case description

Use Case ID	SRS-UCD-100
Brief Description	This use case allows users to register and login.
Actor	Admin, Technician, Internship Student
Pre-condition	Users must have stable internet connection to access the system
Basic flow	<ol style="list-style-type: none"> 1. For the first timer user click on register button. 2. The system displays a registration form for users to fill-in. User fill-in the registration form. 3. The system displays a message box saying that users successfully registered. 4. For user that have the account the system displays a login form for users to fill-in.

	<p>Users' fill-in the login form [E1 – username and password] [R1 – username and password must be correct]</p> <p>5. The users click on the login button to login into the system.</p>
Alternative flow	Not applicable
Exception flow	<p>[E1 – Username and password is registered]</p> <ol style="list-style-type: none"> 1. System display error messages 2. Users click <<OK>> button 3. The use case continues with step 2 in the basic flow.
Post condition	Users are login to the Smart Repair System.
Rules	<p>[R1 - Username and password must be correct]</p> <p>Username and password should be correct with the sign-up information.</p>
Constraints	Not applicable

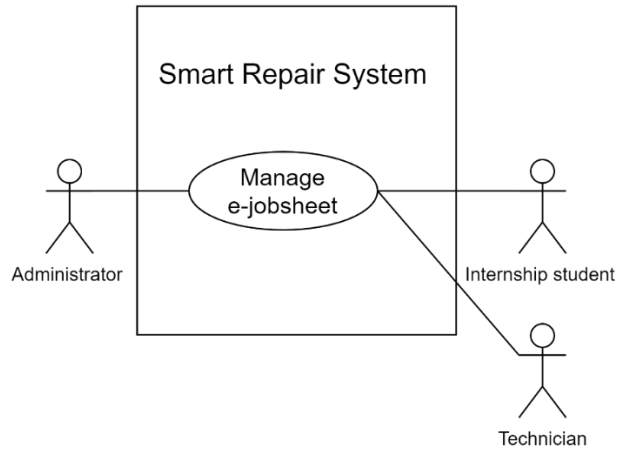


Figure 3.13 Use Case Diagram for Manage E-Jobsheet

Table 3.6 Manage E-Jobsheet use case description

Use Case ID	SRS -UCD-200
Brief Description	This use case allows users to view the list of e-jobsheet.
Actor	Admin, Technician, Internship Student
Pre-condition	Users must have stable internet connection to access the system
Basic flow	<ol style="list-style-type: none"> 1. The system shows admin, technician and internship student manage the e-jobsheet. 2. Admin creates new e-jobsheet for the customer by clicking on +e-jobsheet. 3. Admin enters the information and the problem of devices. 4. Technician reviewed the e-jobsheet and updates the information.

	<p>5. Technician assigned the e-jobsheet to the internship student.</p> <p>6. Internship student can view and update the e-jobsheet assigned by the technician.</p>
Alternative flow	Not applicable
Exception flow	Not applicable
Post condition	Admin successfully create the e-jobsheet.
Rules	Not applicable
Constraints	<p>[C1: Internet Connection]</p> <p>Users will only be able to manage e-jobsheet only if there is Internet connection.</p>

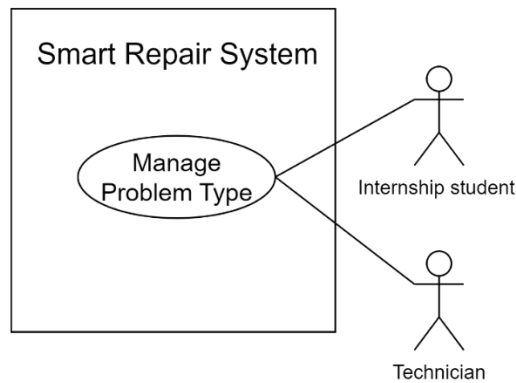


Figure 3.14 Use Case Diagram for Manage Problem Type

Table 3.7 Manage problem type use case description

Use Case ID	SRS -UCD-300
--------------------	--------------

Brief Description	<ol style="list-style-type: none"> 1. This use case shows the process of how technician manage problem type 2. Technician able to create, update, view, and delete the problem type. 3. Admin and student able to view the problem type.
Actor	Admin, Technician, Internship Student
Pre-condition	User successfully registered as Technician and logged into the system.
Basic flow	<ol style="list-style-type: none"> 1. After logged into the system, technician will click the manage Problem Type button on the left-side navigation bar. [C1: Internet connection] 2. The system requests the details of the problem type from the database. 3. The system will retrieve problem type data from database. 4. The system list problem type. 5. If technician want to view info about the problem type, then click on the info button. 6. If technician want to delete the problem type, then click on the delete button. 7. In view problem type interface, technician can edit the problem type information then click edit button to update the information. 8. The internship student can view the problem type.
Alternative flow	Not applicable
Exception flow	Not applicable
Post condition	Technician successfully updated the problem type.

Rules	Not Applicable
Constraints	[C1: Internet Connection] Users will only be able to manage e-jobsheet only if there is Internet connection.

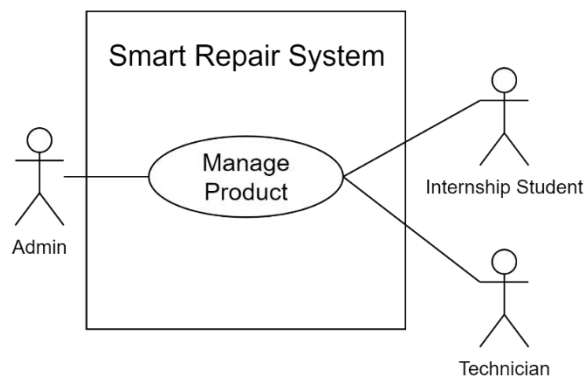


Figure 3.15 Use Case Diagram for Manage Product

Table 3.8 Manage product use case description

Use Case ID	SRS-UCD-300
Brief Description	<ol style="list-style-type: none"> 1. This use case shows the process of how admin manage product 2. Admin able to create, update, view, and delete the product. Admin and student able to view the problem type.
Actor	Admin, Technician, Internship Student
Pre-condition	User successfully registered as Admin and logged into the system.

Basic flow	<ol style="list-style-type: none"> 1. After logged into the system, admin will click the manage product button on the left-side navigation bar. <p>[C1: Internet connection]</p> <ol style="list-style-type: none"> 2. The system requests the details of the product from the database. 3. The system will retrieve product data from database. 4. The system list product. 5. If admin want to view info about the product, then click on the info button. 6. If admin want to delete the product, then click on the delete button. 7. In view product interface, admin can edit the product information then click edit button to update the information. 8. The technician and internship student can view the product.
Alternative flow	Not applicable
Exception flow	Not applicable
Post condition	Admin successfully updated the product.
Rules	Not Applicable
Constraints	<p>[C1: Internet Connection]</p> <p>Users will only be able to manage ticket only if there is Internet connection.</p>

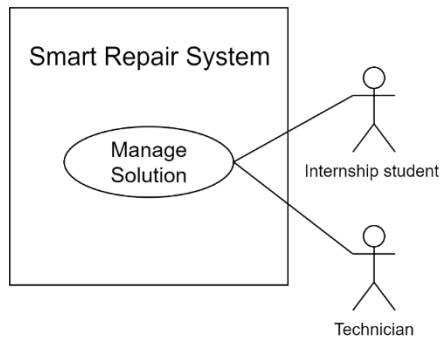


Figure 3.16 Use Case Diagram for manage Solution

Table 3.9 Manage solution use case description

Use Case ID	ITMINE-UCD-500
Brief Description	<ol style="list-style-type: none"> 1. This use case shows the process of how technician manage product 2. Technician able to create, update, view, and delete the solution. <p>Student able to view the problem type.</p>
Actor	Technician, Internship Student
Pre-condition	User successfully registered as technician and logged into the system
Basic flow	<ol style="list-style-type: none"> 1. After logged into the system, technician will click the manage solution button on the left-side navigation bar. [C1: Internet connection] 2. The system requests the details of the solution from the database. 3. The system will retrieve solution data from database.

	<ol style="list-style-type: none"> 4. The system list solution. 5. If technician want to view info about the solution, then click on the info button. 6. If technician want to delete the solution, then click on the delete button. 7. In view solution interface, technician can edit the solution information then click edit button to update the information. 8. The internship student can view the solution.
Alternative flow	Not applicable
Exception flow	Not applicable
Post condition	Technician successfully add new solution.
Rules	Not Applicable
Constraints	<p>[C1: Internet Connection]</p> <p>Users will only be able to manage product only if there is Internet connection.</p>

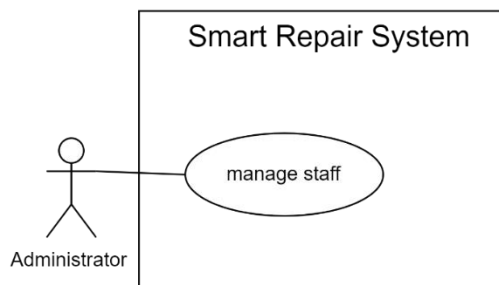


Figure 3.17 Use Case Diagram for Manage Staff

Table 3.10 Manage staff use case description

Use Case ID	ITMINE-UCD-600
Brief Description	This use case shows the process of how Admin manage staff. Admin will be able view, edit and delete staff.
Actor	Admin
Pre-condition	User successfully registered as Admin and logged into the system
Basic flow	<ol style="list-style-type: none"> 1. After logged into the system, users will click the manage staff button on the left-side navigation bar. [C1: Internet connection] 2. The system requests the details of the staff from the database. 3. The system will retrieve staff data from database.

	<ol style="list-style-type: none"> 4. The system list staff. 5. If admin want to view more about the staff, then click on the info. 6. If admin want to delete the staff, then click on the delete button. 7. In view staff interface, admin can edit the staff information then click update button to edit the information.
Alternative flow	Not applicable
Exception flow	Not applicable
Post condition	Admin successfully add new staff.
Rules	Not Applicable
Constraints	<p>[C1: Internet Connection]</p> <p>Users will only be able to manage staff only if there is Internet connection.</p>

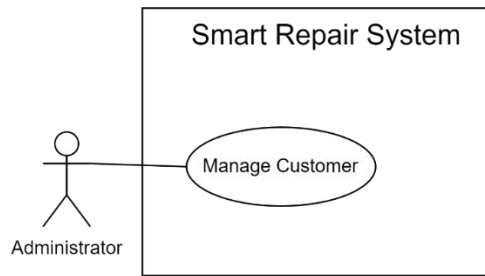


Figure 3.18 Use Case Diagram for Manage Customer

Table 3.11 Manage customer use case description

Use Case ID	SRS-UCD-700
Brief Description	This use case shows the process of how Admin manage customer. Admin will be able to add, view, edit and delete customer.
Actor	Admin
Pre-condition	User successfully registered as Admin and logged into the system
Basic flow	<ol style="list-style-type: none"> 1. After logged into the system, users will click the manage customer button on the left-side navigation bar. [C1: Internet connection] 2. The system requests the details of the customer from the database. 3. The system will retrieve customer data from database. 4. The system list customer. 5. If admin want to view more about the customer, then click on the info button.

	<p>6. If admin want to delete the customer, then click on the delete button.</p> <p>7. In view customer interface, admin can edit the customer information then click update button to edit the information.</p>
Alternative flow	Not applicable
Exception flow	Not applicable
Post condition	Admin successfully add new customer.
Rules	Not Applicable
Constraints	<p>[C1: Internet Connection]</p> <p>Users will only be able to manage customer only if there is Internet connection.</p>

3.4.5 Activity Diagram

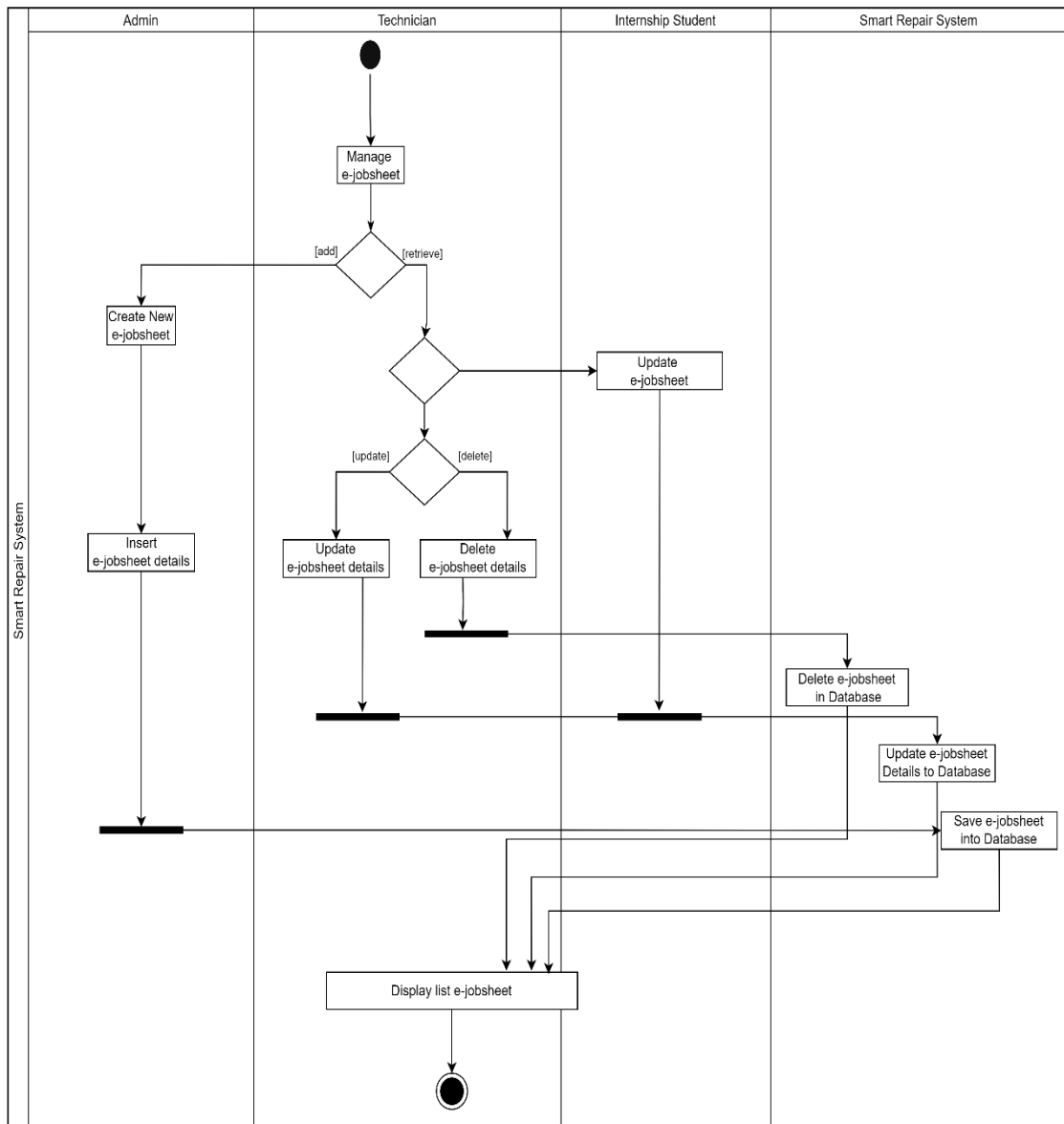


Figure 3.19 Activity Diagram Smart Repair System

3.4.5 storyboard

Based on figure 3.20 shows the login page for registered user. User should fill in the username and password correctly. Before fill in make sure user already create an account then can login the system.

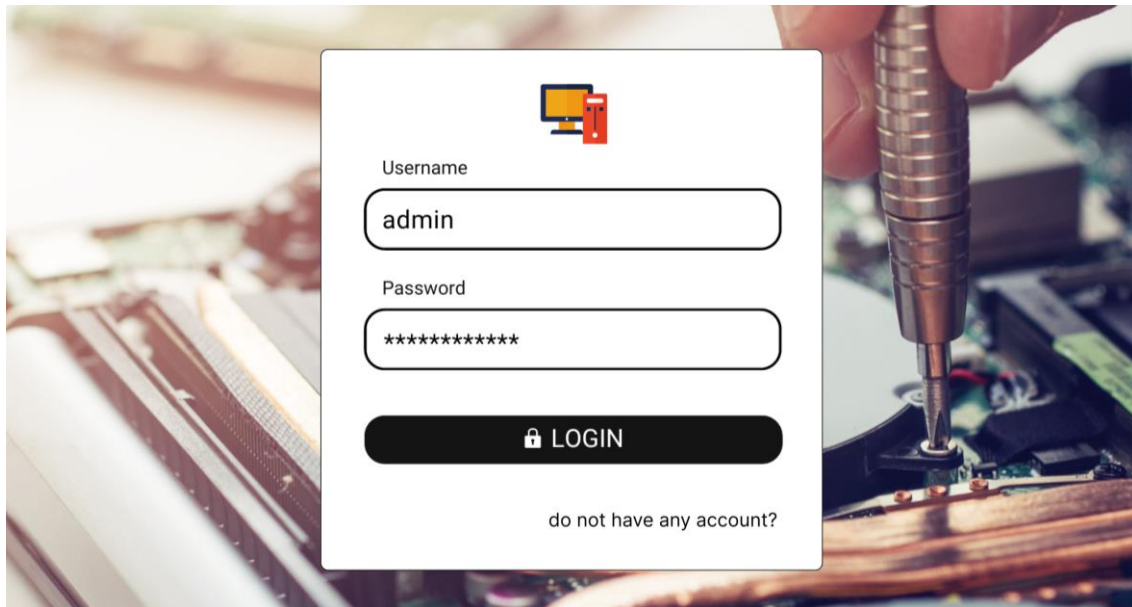
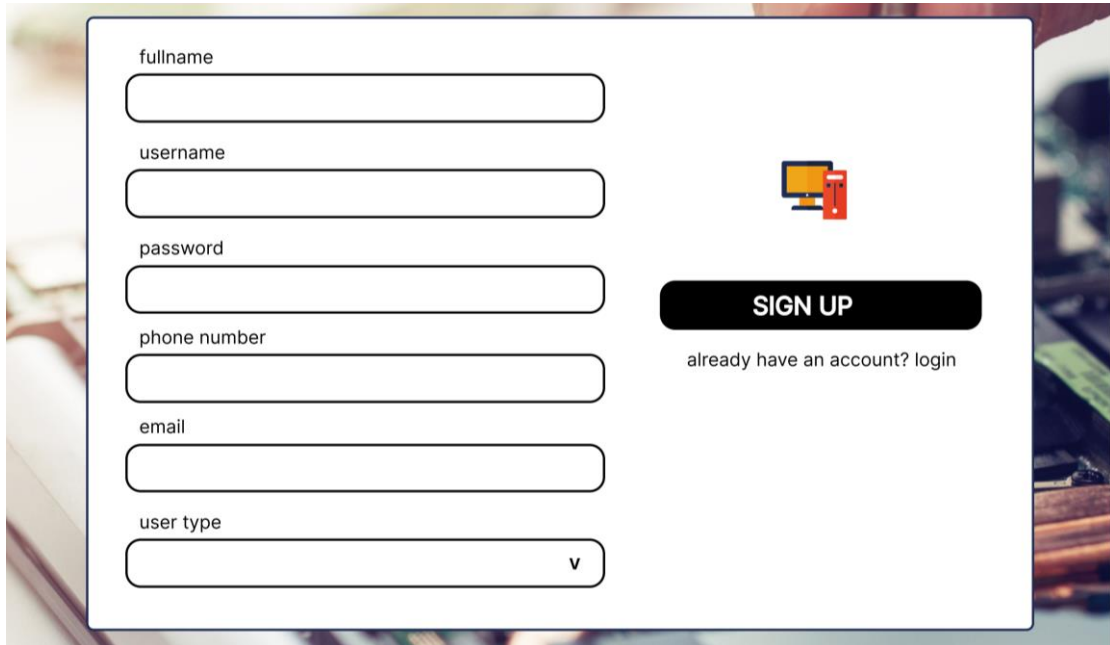


Figure 3.20 Login Page

Based on figure 3.21 shows the interface of registration for user to create an account. User should fill in the fullname, username, password, phone number, email and user type. If user already create an account then can proceed to the login page.

The image shows a registration form with the following fields: fullname, username, password, phone number, email, and user type. The user type field has a dropdown arrow. To the right of the form is a 'SIGN UP' button and a link that says 'already have an account? login'. There is also a small icon of a laptop and a smartphone above the button.

fullname


username

password

phone number

email

user type



SIGN UP

[already have an account? login](#)

Figure 3.21 Registration

Admin Interface

Based on figure 3.22 show the dashboard for admin interface. It show the number of customer, number of staff , number of ticket and the graph with the title ‘number of ticket by ticket status for today’. On the left bar navigation, shows the function in the system which are dashboard, manage ticket, manage staff, manage customer, manage service and product, and my profile.

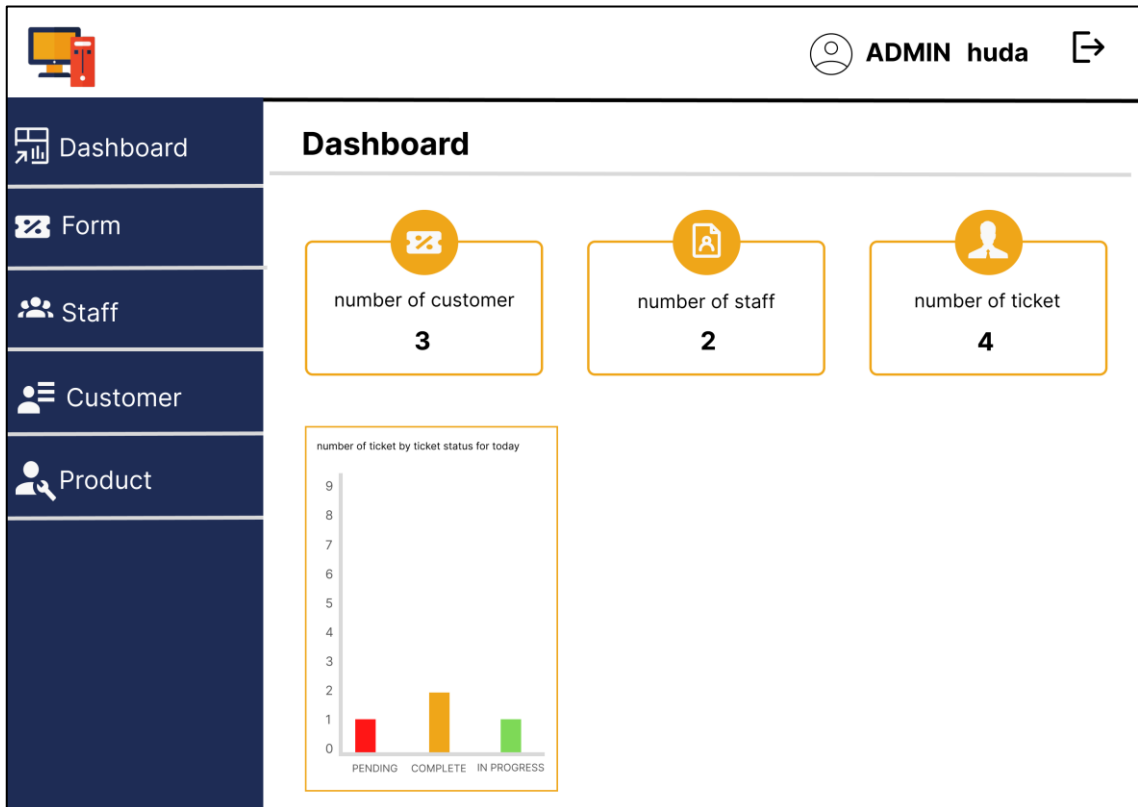










Figure 3.22 Dashboard for admin

Based on the figure 3.23 shows the ticket list with different status. Admin can take action to view more or delete ticket.

The screenshot displays a web application interface for managing tickets. At the top, there is a navigation bar with a back arrow, a user profile icon labeled 'ADMIN huda', and a forward arrow. Below this is a section titled 'Form'. Inside the 'Form' section, there is a 'List of Tickets' area. This area includes a search bar with the placeholder text 'search by customer name'. Below the search bar is a table with the following data:

No	Customer	Status	Action
1	zahra alia	Completed	 
2	ali rahman	Rejected	 
3	aina salina	Proceed	 
4	zahra alia	Pending	 

At the bottom right of the table, there are pagination controls with buttons for 'previous', '1', and 'next'.

Figure 3.23 Form







Based on the figure 3.24 shows the ticket report with the customer details and other information. admin can print and edit this page.

ADMIN huda

Staff

List of Staff

search by staff name

No	Name	Username	User Type	Action
1	Nurul Huda	huda	Admin	 
2	Nur Afiqah	afiqah	Technician	 
3	Maisarah	maisarah	Internship Student	 

previous 1 next

Figure 3.24 Staff

Based on figure 3.25 shows list of the staff on the admin interface. Admin able to view more or delete the staff.

The screenshot displays an admin interface for managing customers. At the top, there is a navigation bar with a back arrow, a user profile icon labeled 'ADMIN huda', and a forward arrow. Below this, the main heading is 'Customer'. The content area is titled 'List of Customer' and features a '+ Create Customer' button in blue. A search bar with the placeholder text 'search by customer name' is positioned above a table. The table has five columns: 'No', 'Name', 'Phone Number', 'Home Address', and 'Action'. It contains two rows of data. The first row shows a customer named 'Alia Hidayah' with phone number '0192837465' and address 'Kampar, Perak'. The second row shows 'Ain Aleeya' with phone number '0192937465' and address 'Lot 12, Kelantan'. Each row has an 'Action' column with icons for a menu, an eye, and a trash can. At the bottom of the table, there are navigation buttons labeled 'previous', '1', and 'next'.







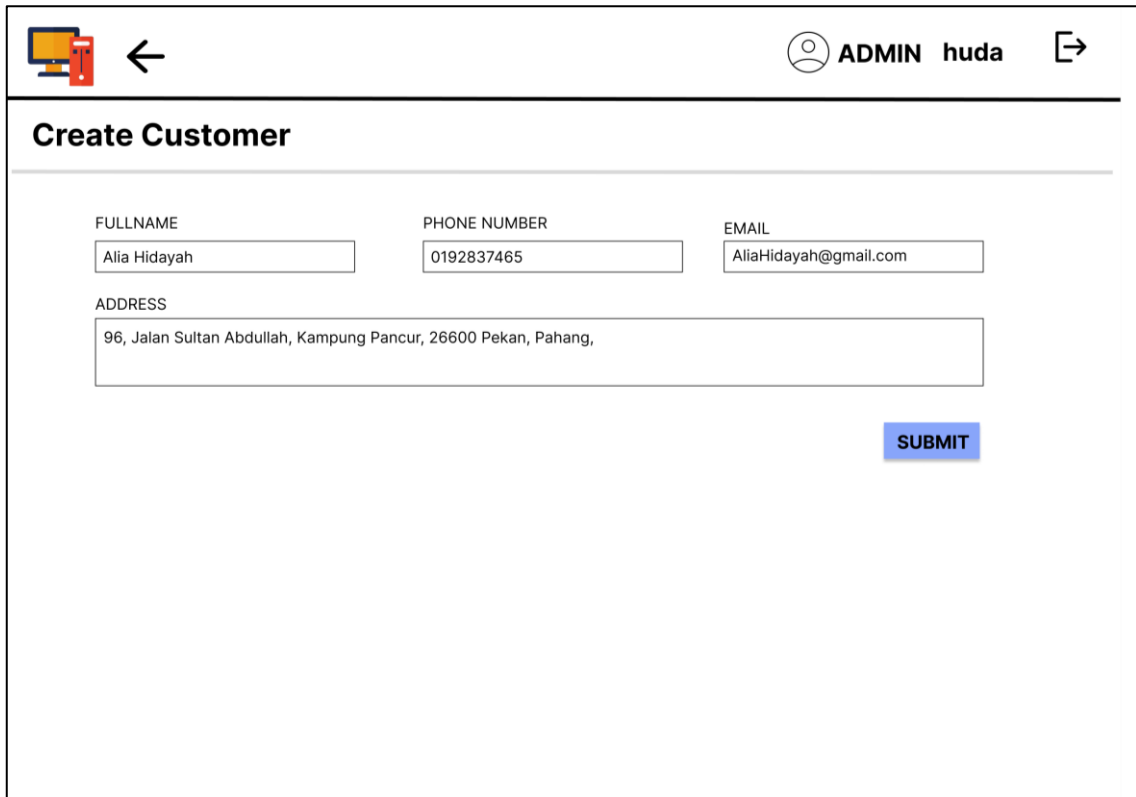
No	Name	Phone Number	Home Address	Action
1	Alia Hidayah	0192837465	Kampar, Perak	  
2	Ain Aleeya	0192937465	Lot 12, Kelantan	  

Figure 3.25 Manage staff

Based on figure 3.26 shows the update page interface where admin can do updating in this page.



The screenshot shows a web interface for creating a customer. At the top left, there is a navigation bar with a monitor icon and a left arrow. At the top right, there is a user profile icon, the text "ADMIN huda", and a right arrow icon. Below the navigation bar, the title "Create Customer" is displayed. The form contains four input fields: "FULLNAME" with the value "Alia Hidayah", "PHONE NUMBER" with the value "0192837465", "EMAIL" with the value "AliaHidayah@gmail.com", and "ADDRESS" with the value "96, Jalan Sultan Abdullah, Kampung Pancur, 26600 Pekan, Pahang,". A blue "SUBMIT" button is positioned at the bottom right of the form.

Figure 3.26 Update ticket

Based on the figure 3.27 shows the profile staff where admin able to edit the profile staff. .

The screenshot displays a mobile application interface for editing a staff profile. At the top, there is a navigation bar with a back arrow on the left and the user's name 'ADMIN huda' with a profile icon on the right. Below the navigation bar, the title 'EDIT PROFILE STAFF' is centered. The main content area contains a form with the following fields:

- Fullname:** Input field containing 'afiqah jamil'.
- Username:** Input field containing 'afiqah'.
- Phone Number:** Input field containing '01928273646'.
- Email:** Input field containing 'afiqahjamil01@gmail.com'.
- User Type:** Dropdown menu with 'Technician' selected and a downward arrow icon.

At the bottom of the form, there is a grey button labeled 'EDIT'.

Figure 3.27 Profile staff

Based on the figure 3.28 shows the list of customer. Admin can view customer, manage the ticket and delete customer.

The screenshot displays a web interface for managing customers. At the top, there is a navigation bar with a back arrow, a user profile icon labeled 'ADMIN huda', and a forward arrow. Below this is a section titled 'MANAGE CUSTOMER'. Inside this section, there is a container labeled 'List of Customer' which includes a search bar with the placeholder text 'search by customer name'. Below the search bar is a table with the following data:







No	Name	Phone Number	Email	Action
1	zahra alia	0192837465	zahra@gmail.com	
2	ali rahman	0192937465	ali@gmail.com	

At the bottom right of the table area, there is a pagination control with buttons for 'previous', '1', and 'next'.

Figure 3.28 Manage ticket

Based on figure 3.29 shows list of services where admin can create new service, read, update and delete the services. In this page, it will shows the services status whether it is available or unavailable.

The screenshot displays a mobile application interface for managing services. At the top, there is a navigation bar with a back arrow, a user profile icon labeled 'ADMIN huda', and a forward arrow. Below the navigation bar is the title 'MANAGE SERVICE'. The main content area is titled 'List of Services' and features a '+ Create New' button in the top right corner. A search bar with the placeholder text 'search by service name' is located below the title. The central part of the interface is a table with the following data:

No	Name	Price	Status	Action
1	Computer Maintenance	RM100.00	available	 
2	Hardware Repair	RM80.00	available	 
3	Hardware Upgrade	RM40.00	available	 

At the bottom right of the table, there is a pagination control with buttons for 'previous', '1', and 'next'.

Figure 3.29 Manage service

Based on figure 3.30 shows the service information where admin able to make changes on it.

The screenshot displays a web application interface for viewing and editing service information. At the top, there is a navigation bar with a back arrow, a user profile icon labeled 'ADMIN huda', and a forward arrow. Below the navigation bar, the main heading is 'VIEW SERVICE'. The service details are presented in a form with the following fields:

- name:** Computer Maintenance
- description:** Your home and business computers require constant updating and tune-ups. This regular maintenance will not only enhance the working speed of your computer, but it will also increase its lifetime. Maintenance service includes file cleanup, upgrading and installing new windows or programs and general inspections.
- price:** RM100.00
- TICKET STATUS:** available

An 'UPDATE' button is located at the bottom right of the form area.

Figure 3.30 View Service



Based on the figure 3.31 shows the list of product where the products are use to manage the customer ticket. In this page, admin can see the products name, brand, status whether it is available or unavailable and edit the product information.

The screenshot displays a web interface for managing products. At the top, there is a navigation bar with a back arrow, a user profile icon labeled 'ADMIN huda', and a forward arrow. Below this is a header section titled 'MANAGE PRODUCT'. The main content area is titled 'List of Products' and features a '+ Create New' button and a search input field labeled 'search by product name'. A table lists three products, each with a 'No' column, 'Name', 'Brand', 'Status' (all marked as 'available' in green), and 'Action' (edit and delete icons). A pagination control at the bottom shows 'previous', '1', and 'next'.

No	Name	Brand	Status	Action
1	Computer Maintenance	Razer	available	
2	Hardware Repair	Acer	available	
3	Hardware Upgrade	Seagate	available	

Figure 3.31 Manage product

Based on figure 3.32 shows the page where admin can view details of product information and make changes on it like type of product, brand name, model name, quantity, price, image, and status of the product.

ADMIN huda

VIEW PRODUCT


type of product

brand name

model name

quantity

price



status

v

UPDATE

Figure 3.32 View product

Based on the figure 3.33 shows the admin profile interface and admin can update the information such as fullname, username, phone number, email, and user type.

The screenshot displays a mobile application interface for an admin's profile. At the top, there is a navigation bar with a back arrow on the left and a user profile icon labeled 'ADMIN huda' with a right-pointing arrow on the right. Below the navigation bar, the title 'MY PROFILE' is centered. The main content area contains a form with the following fields:

- fullname**: A text input field containing 'huda ramli'.
- username**: A text input field containing 'huda'.
- phone number**: A text input field containing '01928273646'.
- email**: A text input field containing 'hudaramli01@gmail.com'.
- user type**: A dropdown menu with 'admin' selected and a 'v' icon on the right.

At the bottom of the form is a grey button labeled 'UPDATE'.

Figure 3.33 My Profile

Technician Interface

Based on figure 3.34 shows the dashboard page of the technician. Technician can view the number of ticket, pending ticket, complete ticket, in progress ticket and assigned ticket on the dashboard. In the left bar navigation, shows the function of technician in the system like ticket, manage ticket, manage solution and profile.

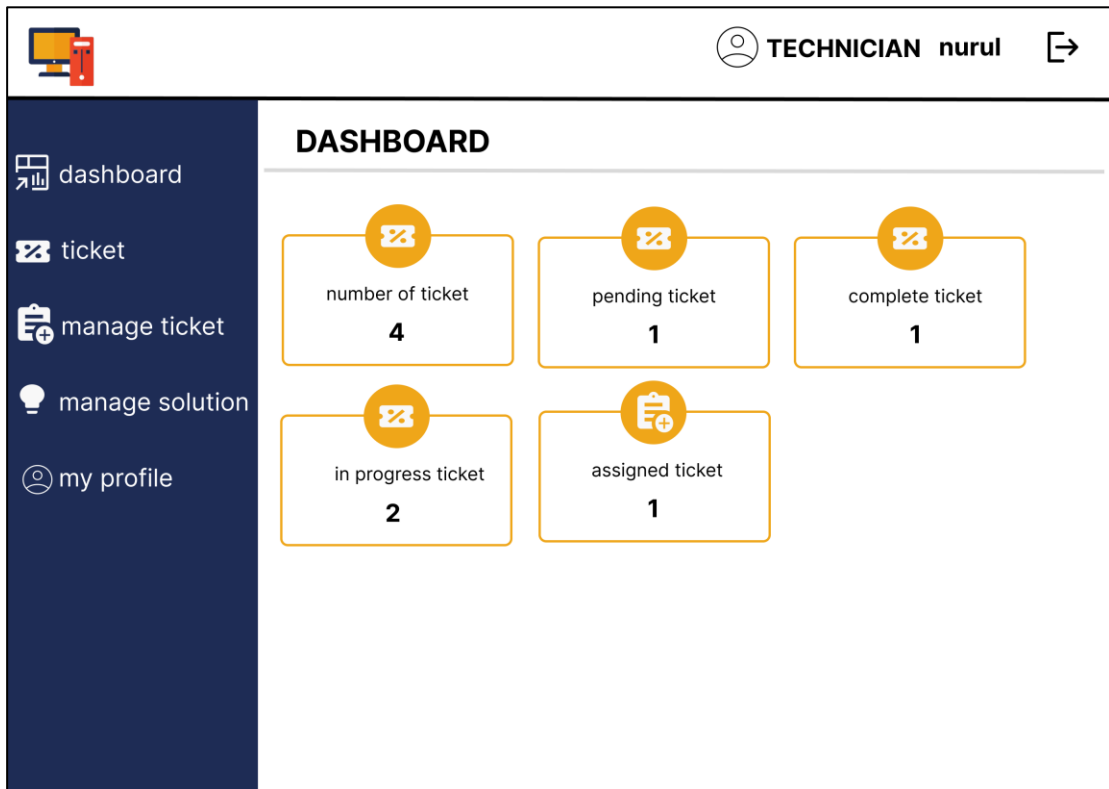


Figure 3.34 Dashboard

Based on figure 3.35 shows the customer information after scan the bar code and technician can view list of the customer tickets. Technician can search the customer ticket based on the code number. In this page also, technician can create new ticket for customer to manage.

The screenshot shows a mobile application interface for a technician named Nurul. At the top, there is a navigation bar with a back arrow on the left, a profile icon and the name 'TECHNICIAN nurul' in the center, and a home icon on the right. Below the navigation bar is a section titled 'CUSTOMER'. Under this title, there is a 'Customer Details' section with the following information: Full name: zahra alia, Address: 96, Jalan Sultan Abdullah, Kampung Pancur, 26600 Pekan, Pahang, Phone Number: 0192837465, and Email: zahra@gmail.com. Below the details is a section titled 'List of Zahra Alia Tickets'. This section includes a '+ Create New' button, a search bar with the placeholder text 'search by code number', and a table of tickets. The table has five columns: No, Received Date, Code, Status, and Action. The first row shows a ticket with No. 1, Received Date 14/01/2023, Code 1001, and Status complete. The Action column for this ticket contains icons for a list, an eye, and a trash can. Below the table is a pagination control with 'previous', '1', and 'next' buttons.




No	Received Date	Code	Status	Action
1	14/01/2023	1001	complete	  

Figure 3.35 Create customer

Based on the figure 3.36 shows the update ticket page for technician. In this ticket, the crucial information of customer devices like problem description, received date, brand and model name need to fill in. Then, technician can solve the problem by selecting the problem type, services provided and product used to repair the devices. The due date also need to fill in to make sure customer can come on the right time to pick up the device and technician can finish the repair based on the time given. If technician wants to assign the ticket to the internship student then can fill in the managed by part with the internship student name then click assign button to submit. The total payable amount is calculated based on the service provided and product used. Lastly, technician can select the ticket status whether it is pending, on progress or complete. The ticket available to print and give to the customer as a receipts.

UPDATE TICKET

Ticket Details - 1002

PROBLEM DESCRIPTION: laptop too slow and always lagging.

RECEIVED DATE: 20/01/2023

MODEL NAME: E 140

TICKET STATUS: pending

BRAND NAME: ACER

PASSWORD: -

PROBLEM TYPE: [dropdown]

SERVICE PROVIDED: [dropdown] + Add

PRODUCT USED: [dropdown] + Add

SOLUTION: [text area]

service	price
+	

product	picture	model	qty	price
+				

DUE DATE: 22/01/2023

MANAGED BY: kina

EXECUTOR: huda

TOTAL PAYABLE AMOUNT:

PRINT SAVE ASSIGN

Figure 3.36 Update ticket

Based on the figure 3.37, 3.38 and 3.39 shows the complete, in progress and pending ticket based on the ticket status. Technician can make view and make changes on the tickets. This pages are important to make sure all the tickets are been manage by the technician and internship student.

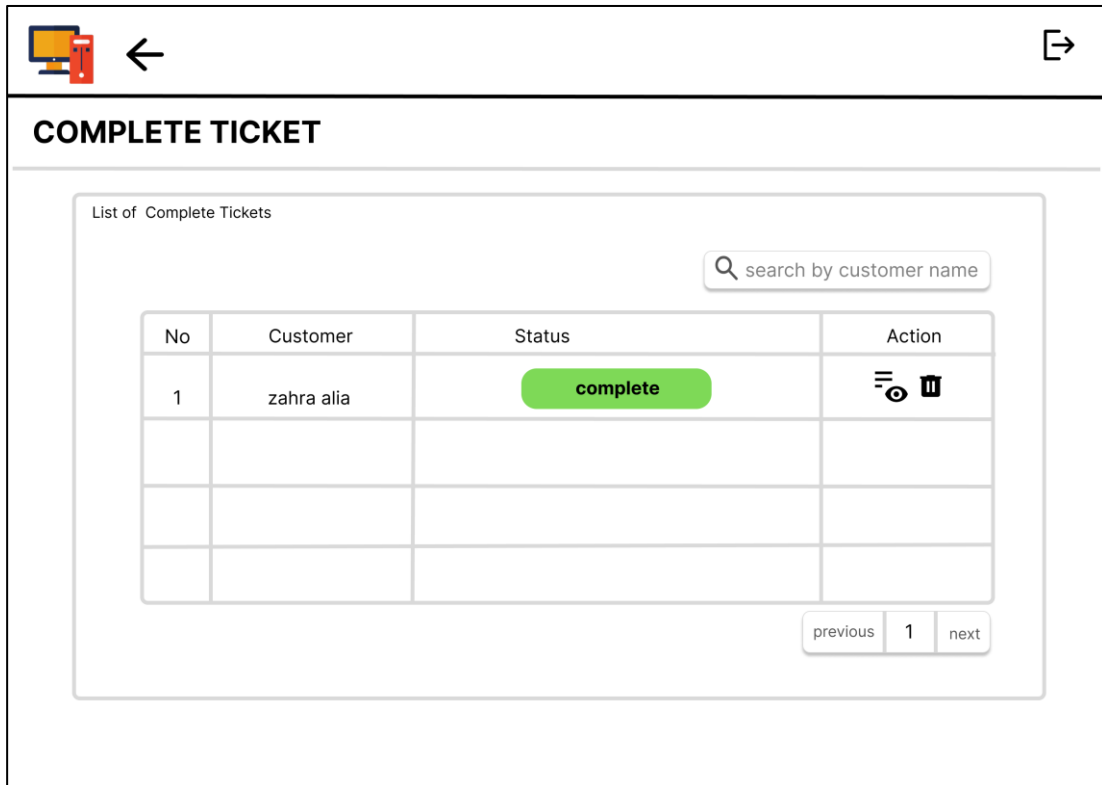


Figure 3.37 Complete ticket

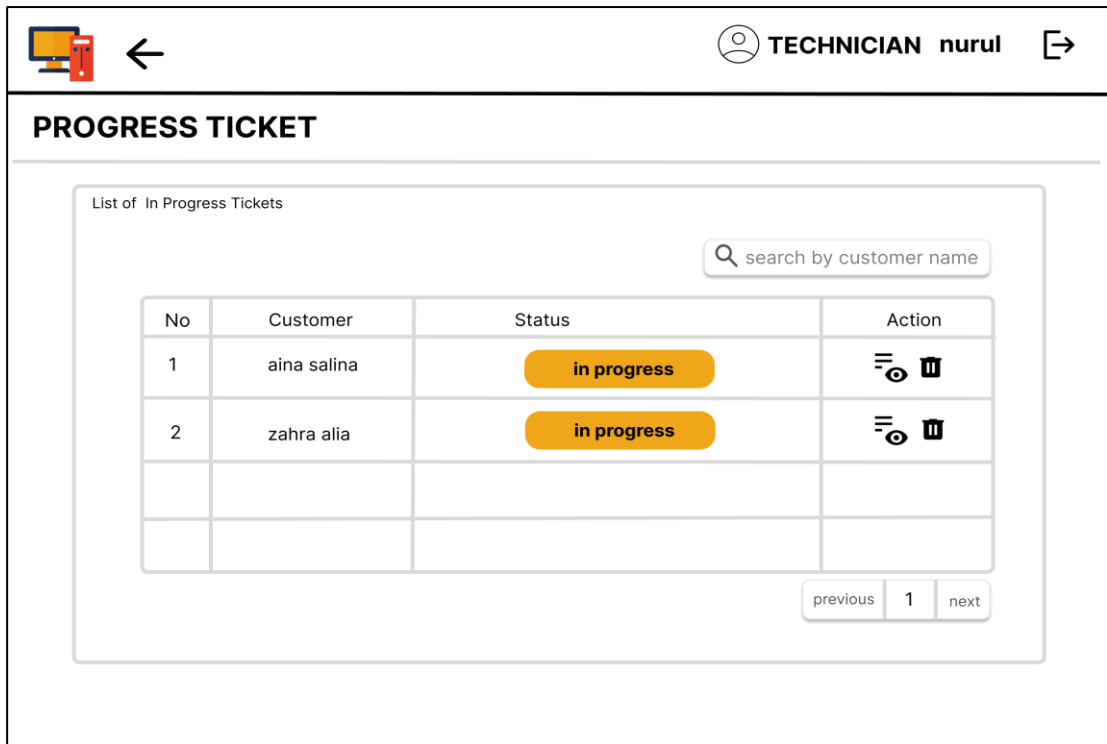


Figure 3.38 In progress ticket

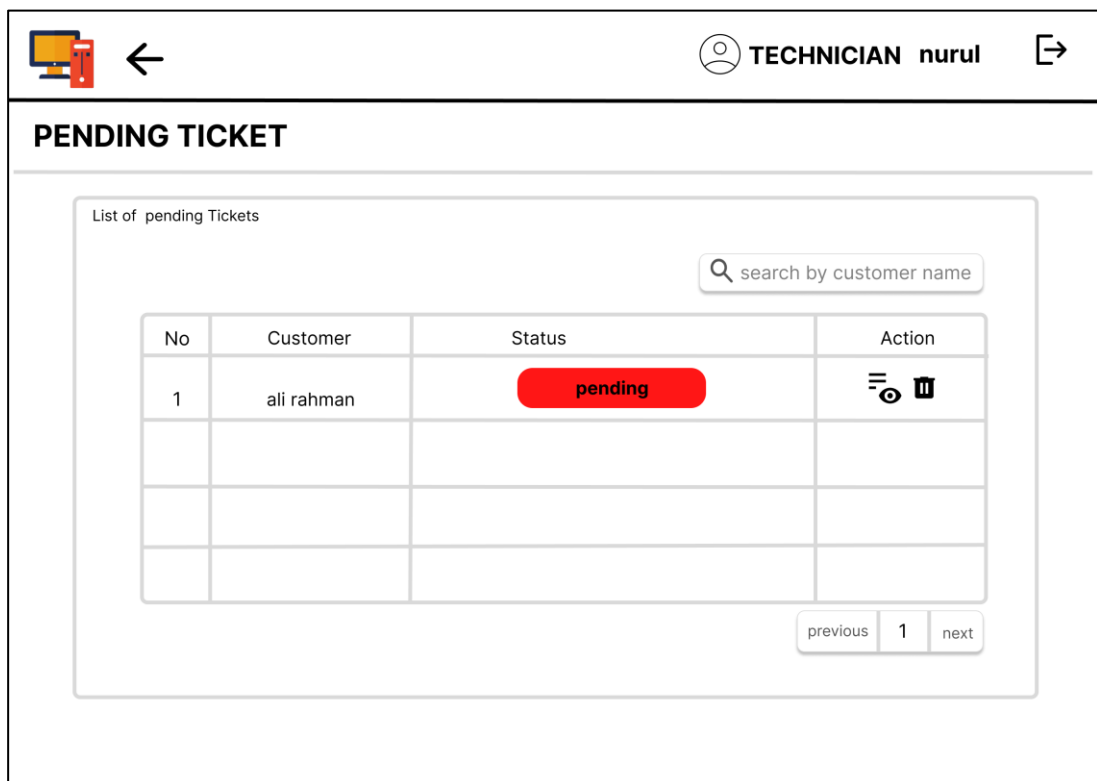


Figure 3.39 Pending ticket

Based on figure 3.40 shows the manage solution for technician. Manage solution is used on the ticket to solve the problems. It is important for internship student to generate the possible solution based on this function. In this page technician can update and create the new solution.

The screenshot displays a web interface for managing solutions. At the top, there is a navigation bar with a back arrow, a technician profile icon labeled 'TECHNICIAN nurul', and a forward arrow. Below this is a section titled 'MANAGE SOLUTION'. Inside this section, there is a container labeled 'List of Solution' which includes a '+ Create New' button and a search bar with the placeholder text 'search by customer name'. The main content is a table with three columns: 'No', 'Problem Type', and 'Action'. The table lists three solutions: '1 monitor', '2 laptop screen', and '3 harddisk'. Each row has two icons in the 'Action' column: a list icon and a trash icon. At the bottom right of the table, there are pagination controls with 'previous', '1', and 'next' buttons.

No	Problem Type	Action
1	monitor	
2	laptop screen	
3	harddisk	

Figure 3.40 Manage solution

Based on the figure 3.41 shows the edit solution page for technician to make changes. Any possible solution can be create by the technician to help when manage the ticket. Technician can delete the solution if it not available.

← TECHNician nurul →

EDIT SOLUTION

problem type
monitor

solution

- Check the power cable**
If the power cord is removable from the back of the monitor, try replacing it with another power cable. If you still cannot turn on the monitor after trying another wall outlet and cable, the monitor is broken and should be replaced.
- No Signal on Monitor**
https://www.youtube.com/watch?v=QCuZRBfrgjI&ab_channel=Robtech

Update
+ Add New

Figure 3.41 Edit solution

Internship Student Interface

Based on the figure 3.42 shows the dashboard for internship student. The student can view the complete tickets that have been done whether it is managed by the technician or other internship student. Student also can view the number of ticket assigned by the technician for student to manage. On the left side bar navigation, shows the function for student to manage. On the left side bar navigation, shows the function for student like view all the complete tickets, manage assign ticket and update profile.

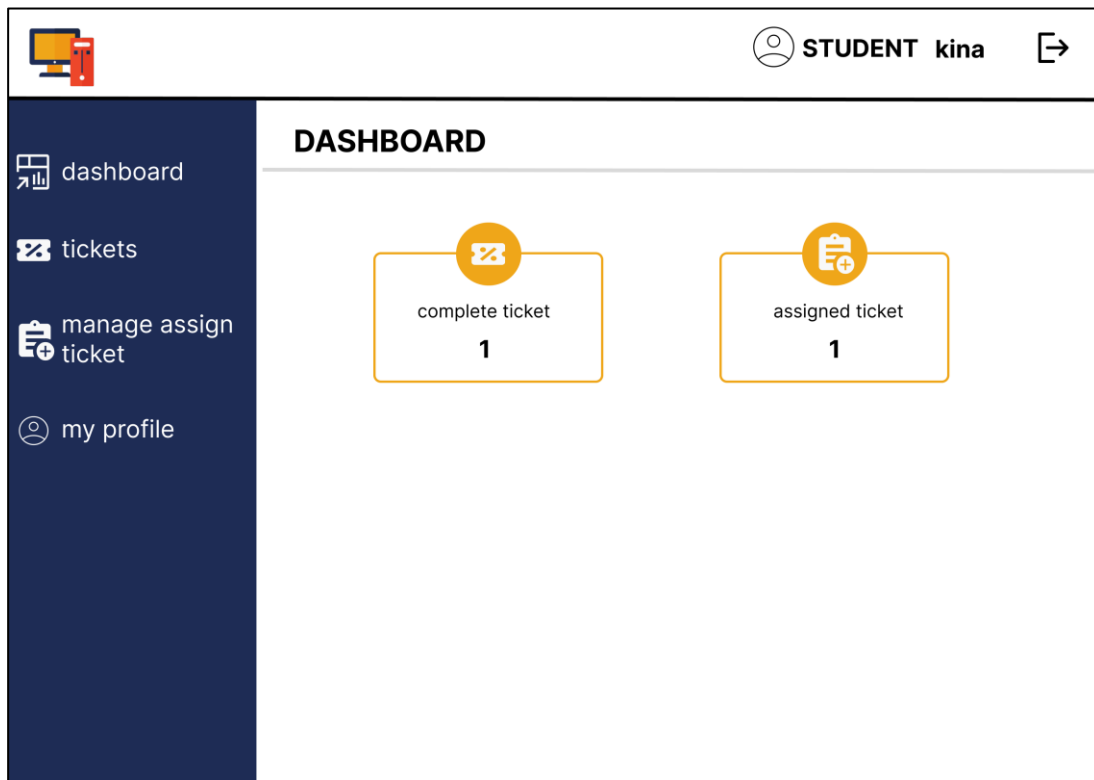


Figure 3.42 Dashboard

Based on the figure 3.43 shows list of the complete tickets from previous services for student to make the revision. Student can view as a reference when manage the tickets. In this page it shows the customer name, tickets code number and ticket status.

The screenshot displays a mobile application interface for a student named 'STUDENT kina'. The page is titled 'TICKET' and shows a 'List of Complete Tickets From Previous Services'. A search bar is present with the text 'search by customer name'. Below the search bar is a table with the following data:



No	Customer	Ticket Details	Status	Action
1	zahra alia	1001	complete	

At the bottom of the table, there is a pagination bar with 'previous', '1', and 'next' buttons.

Figure 3.43 Complete Ticket List

Based on the figure 3.44 shows the list of the ticket assigned by the technician for student to manage. From here student know number of tickets to manage and finish it before the due date. In this page, student can view the customer name, tickets details, ticket status and can make changes with the ticket. Student can search the ticket by customer name.

The screenshot displays a mobile application interface for managing tickets. At the top, there is a navigation bar with a back arrow, a user profile icon labeled 'STUDENT kina', and a forward arrow. Below the navigation bar is the title 'ASSIGN TICKET'. The main content area is titled 'List of Tickets from Technician' and contains a search bar with the placeholder text 'search by customer name'. Below the search bar is a table with the following data:

No	Customer	Ticket Details	Status	Action
1	zahra alia	1002	pending	 

At the bottom right of the table, there are pagination controls: 'previous', '1', and 'next'.

Figure 3.44 Assign ticket list

Based on the figure 3.45 shows the update ticket page where student able to make changes on the ticket. Student can generate the solution based on the problem type. Then, select the suitable services to repair the devices, and the product used to repair the devices. This page is available to print out as receipt for customer. Student can click on the view profile button to view the details about the customer.

←

STUDENT kina
→

UPDATE TICKET

Ticket Details - 1002

PROBLEM DESCRIPTION

laptop too slow and always lagging.

RECEIVED DATE

MODEL NAME

TICKET STATUS

 ▼

BRAND NAME

PASSWORD

PROBLEM TYPE

 ▼

SERVICE PROVIDED

 ▼
+ Add

PRODUCT USED

 ▼
+ Add

SOLUTION

	service	price
✖		

	product	picture	model	qty	price
✖				<input type="text"/>	

DUE DATE

MANAGED BY

EXECUTOR

TOTAL PAYABLE AMOUNT:

PRINT
SAVE
VIEW PROFILE

Figure 3.45 Update ticket

3.5 Data Design

3.5.1 Entity Relationship Diagram (ERD)

Based on the ERD in figure shows the relationship between the entity which are users, form, service, customer, product and solution. The diagram explain the relationship between each other.

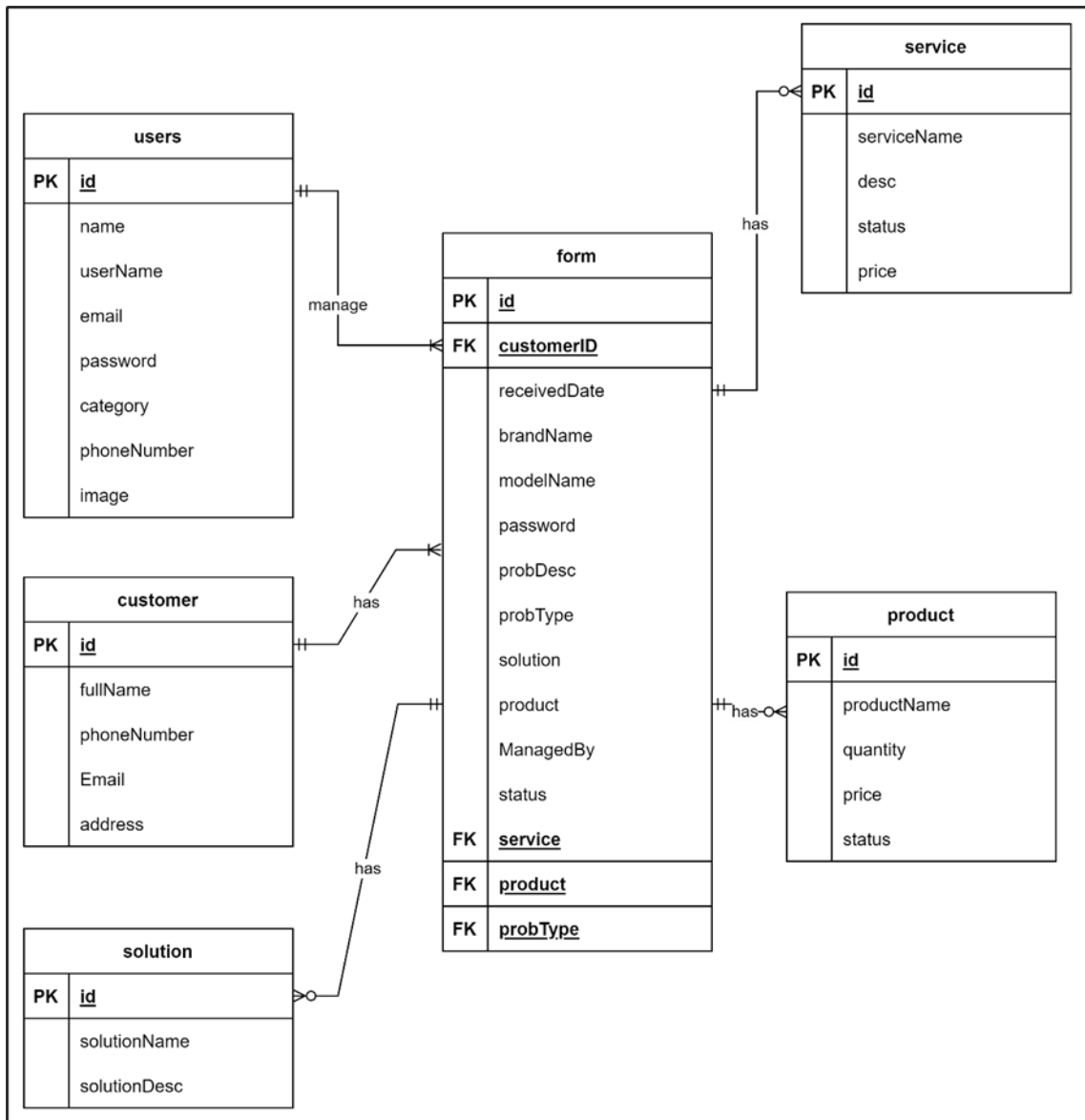


Figure 3.46 Entity Relationship Diagram of Smart Repair System

3.5.2 Data Dictionary

Table 3.12 Data Dictionary for User

Entity	Attribute	Data Type	Constraint
users	id	bigint(255)	Primary Key
	name	varchar(255)	Not Null
	userName	varchar(255)	
	email	varchar(255)	
	password	varchar(255)	
	category	varchar(255)	
	phoneNumber	varchar(255)	
	image	varchar(255)	

Table 3.13 Data Dictionary for Customer

customer	id	bigint(20)	Primary Key
	fullname	varchar(255)	Not Null
	phoneNumber	varchar(255)	
	Email	varchar(255)	
	address	varchar(255)	

Table 3.14 Data Dictionary for Solution

solution	id	bigint(20)	Primary Key
	solutionName	varchar(255)	Not Null
	solutionDesc	varchar(255)	

Table 3.15 Data Dictionary for form

	id	bigint(20)	Primary Key
	customerID	bigint(20)	Foreign Key
	probType	varchar(255)	
	solution	varchar(255)	

form	product	varchar(255)	Not Null
	receivedDate	date	
	brandName	varchar(255)	
	modelName	varchar(255)	
	password	varchar(255)	
	probDesc	varchar(255)	
	managedBy	varchar(255)	
	dueDate	date	
	status	varchar(255)	
	notes	varchar(10000)	

Table 3.16 Data Dictionary for Service

service	id	bigint(20)	Primary Key
	serviceName	varchar(255)	Not Null
	desc	varchar(10000)	
	status	varchar(255)	
	price	decimal(18,2)	

Table 3.17 Data Dictionary for Product

product	id	bigint(20)	Primary Key
	productName	varchar(255)	Not Null
	quantity	varchar(255)	
	price	decimal(18,2)	
	picture	varchar(255)	
	status	varchar(255)	

3.5.2 Testing/Validating Plan


User Acceptance Test

UAT is done by the end-users or representative group of users. The main objective of UAT is to ensure the Smart Repair System meets the business and technical requirements when doing the evaluation. It can guide in design and development of the system. UAT will ensure the system makes the user satisfied with the system simple and effective. Because it is the final stage of testing, UAT wants the system to be fully prepared before using it in real. Below is the UAT form plan.

Module	Activities	Status		Comment
		YES	NO	
Sign Up	Registration	/		
Manage Profile	Update information	/		
Manage E-jobshet	Create E-jobsheet	/		
	Retrive E-jobsheet	/		
	Update E-jobsheet		/	User cannot update
	Delete E-jobsheet	/		
Manage Service	Create new service	/		
	Retrive service	/		
	Update service	/		
	Delete service	/		
Manage Product	Create new product	/		
	Retrive product	/		
	Update product	/		
	Delete product	/		
Manage Staff	Retrive staff	/		
	Update staff	/		
	Delete staff	/		
Manage Customer	Create new customer	/		
	Retrive customer	/		
	Update customer	/		
	Delete customer	/		
Manage Notification	Send notification	/		
	View notification	/		

This test has been performed by:

Name : NUR ALIA HIDAYAH BINTI ROHAYA UDIN

Signature : 

Date : 05 /06/2023

Module	Activities	Status		Comment
		YES	NO	
Sign Up	Registration	/		
Manage Profile	Update information	/		
Manage E-jobshet	Create E-jobsheet	/		
	Retrive E-jobsheet	/		
	Update E-jobsheet		/	User cannot update
	Delete E-jobsheet	/		
Manage Service	Create new service	/		
	Retrive service	/		
	Update service	/		
	Delete service	/		
Manage Product	Create new product	/		
	Retrive product	/		
	Update product	/		
	Delete product	/		
Manage Staff	Retrive staff	/		
	Update staff	/		
	Delete staff	/		
Manage Customer	Create new customer	/		
	Retrive customer	/		
	Update customer	/		
	Delete customer	/		
Manage Notification	Send notification	/		
	View notification	/		

This test has been performed by:

Name : NURAIN ALEEYA BINTI CHE ZAHARUDIN


Signature : *Aleeya*

Date : 05 /06/2023

Module	Activities	Status		Comment
		YES	NO	
Sign Up	Registration	/		
Manage Profile	Update information	/		
Manage E-jobshet	Create E-jobsheet	/		
	Retrive E-jobsheet	/		
	Update E-jobsheet		/	User cannot update
	Delete E-jobsheet	/		
Manage Service	Create new service	/		
	Retrive service	/		
	Update service	/		
	Delete service	/		
Manage Product	Create new product	/		
	Retrive product	/		
	Update product	/		
	Delete product	/		
Manage Staff	Retrive staff	/		
	Update staff	/		
	Delete staff	/		
Manage Customer	Create new customer	/		
	Retrive customer	/		
	Update customer	/		
	Delete customer	/		
Manage Notification	Send notification	/		
	View notification	/		

This test has been performed by:

Name : MAISARAH BINTI FAISAL

Signature : 

Date : 05 /06/2023

Module	Activities	Status		Comment
		YES	NO	
Sign Up	Registration	/		
Manage Profile	Update information	/		
Manage E-jobshet	Create E-jobsheet	/		
	Retrive E-jobsheet	/		
	Update E-jobsheet		/	User cannot update
	Delete E-jobsheet	/		
Manage Service	Create new service	/		
	Retrive service	/		
	Update service	/		
	Delete service	/		
Manage Product	Create new product	/		
	Retrive product	/		
	Update product	/		
	Delete product	/		
Manage Staff	Retrive staff	/		
	Update staff	/		
	Delete staff	/		
Manage Customer	Create new customer	/		
	Retrive customer	/		
	Update customer	/		
	Delete customer	/		
Manage Notification	Send notification	/		
	View notification	/		

This test has been performed by:

Name : NURIN AZZYATI BINTI KAMILIZAHRI

Signature :




Date : 05 /06/2023

Module	Activities	Status		Comment
		YES	NO	
Sign Up	Registration	/		
Manage Profile	Update information	/		
Manage E-jobshet	Create E-jobsheet	/		
	Retrive E-jobsheet	/		
	Update E-jobsheet		/	User cannot update
	Delete E-jobsheet	/		
Manage Service	Create new service	/		
	Retrive service	/		
	Update service	/		
	Delete service	/		
Manage Product	Create new product	/		
	Retrive product	/		
	Update product	/		
	Delete product	/		
Manage Staff	Retrive staff	/		
	Update staff	/		
	Delete staff	/		
Manage Customer	Create new customer	/		
	Retrive customer	/		
	Update customer	/		
	Delete customer	/		
Manage Notification	Send notification	/		
	View notification	/		

This test has been performed by:

Name : NURAYUNI BINTI NORDIN SIN

Signature : 

Date : 07 /06/2023

3.6 Potential Use of Proposed Solution

Smart Repair System has great potential to be used in the computer repair shop, especially IT MINES Expert Resource. This is because the system is focused on the management of the repair service where it can manage the services, products, and tickets that have been provided by the shop. Moreover, the use of the bar code scanner will ease the technician and internship students' work. Hence, Smart Repair System will be involved by the admin, technician and internship student of the IT MINES Expert Resource. Smart Repair System provided a lot of modules in the system to make sure the management process of the IT MINES Expert Resource is effective.

1. Offering ticket management functionality. It is designed to ease the technician and internship student when dealing with the customer. It can save more time and make the process more systematic.
2. Offering friendly users in each module. All the modules in the system are easy to use because there is no complicated function for the user that needs to learn first, especially for internship students.

Besides, Smart Repair System provided solution generation where the user can select the problem type then it can generate the possible solution before doing the real repair. In this part, users especially internship students have an idea of how to solve the problems. In conclusion, Smart Repair System is a system for management especially the computer repair shop like IT MINES Expert Resource. It can make the business flow are going smoothly and effectively

3.7 Gantt Chart

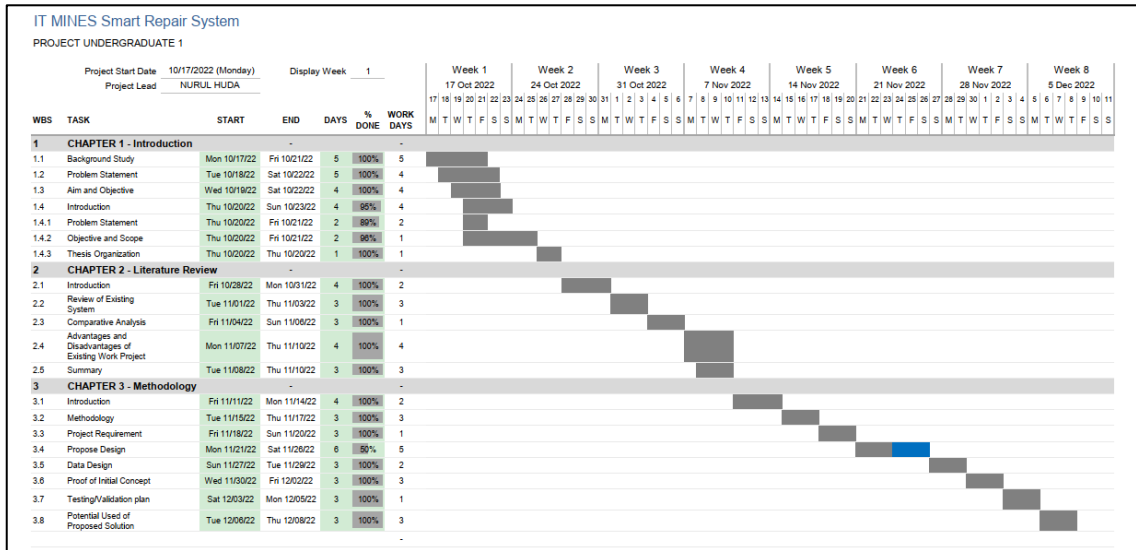


Figure 3.47 Gantt Chart

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

In this chapter, the implementation process and method of the IT Mines Smart Repair System will be explained. This application is implemented to the computer store that provided with the computer repair services. The testing application was performed based on the project module and the potential error can be promptly detected.

4.2 System Implementation Process

There is important software that are used to develop and deploy this project. To develop the interfaces is by using Visual Studio Code to develop the project. Meanwhile, Laravel as a PHP framework had been used to create project quickly and efficiently. Moreover, MySQL is used to manage and store all the data in the project. It allows the project to create, modify, and manage databases.

4.3 Input and Output Design

Figure 4.1 shows the input interface design based on the product module to add new product. In this page, admin can enter product name, quantity, price, picture, and product available. Meanwhile, figure 4.2 shows the output interface design of the product where the data input will retrieve in this page.

Product
Add New Product

PRODUCT NAME

QUANTITY

PRICE

No file chosen

STATUS
 Available
 Unavailable

Figure 4.1 Input product

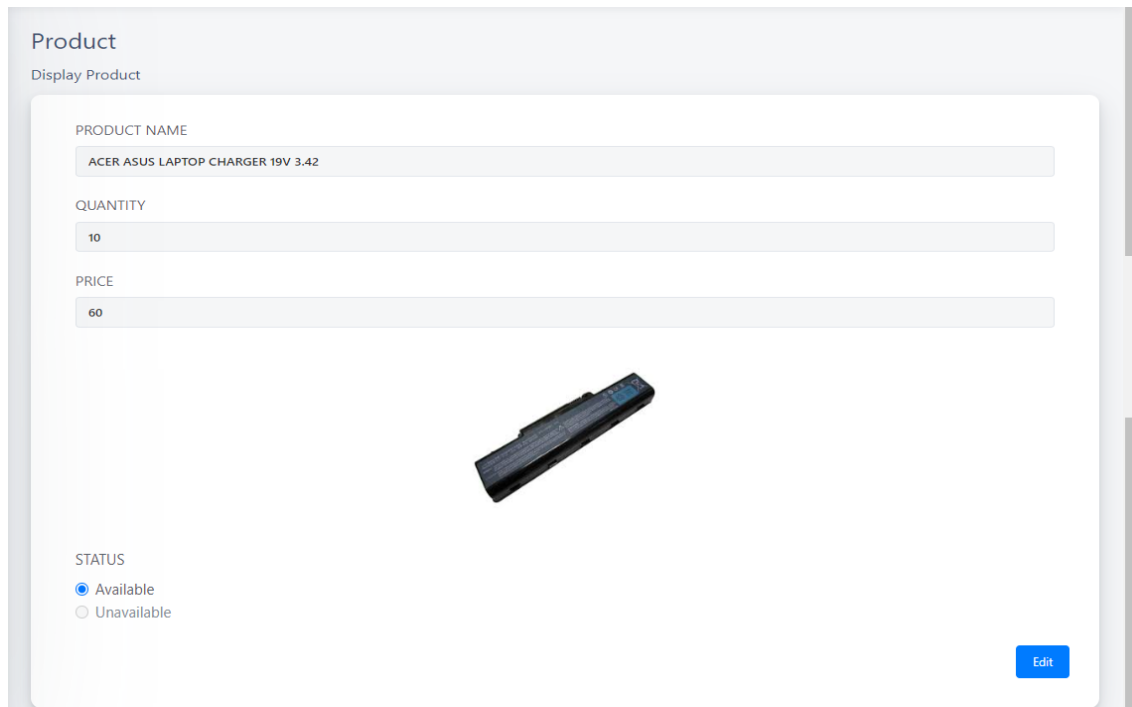


Figure 4.2 Output product

Figure 4.3 shows the coding development of the add new product interface. Meanwhile, Figure 4.4 shows the coding development of the display product interface.

```

public function insertProduct(Request $request) > service
{
    $productName = $request->input('productName');
    $quantity = $request->input('quantity');
    $price = $request->input('price');
    $picture = $request->file('picture');
    $status = $request->input('status');

    // to rename the proposal file
    $filename = time() . '.' . $picture->getClientOriginalExtension();

    // to store the file by moving to assets folder
    $picture->move('assets', $filename);

    $data = array(
        'productName' => $productName,
        'quantity' => $quantity,
        'price' => $price,
        'picture' => $filename,
        'status' => $status,
    );

    // insert query
    DB::table('product')->insert($data);

    return redirect()->route('listOfProduct');
}

```

Figure 4.3 Coding insert product

```

public function UpdateProduct(Request $request, $id)
{
    // find the id from proposal
    $product = Product::find($id);

    // unlink the old proposal file from assets folder
    $path = public_path() . '/assets/' . $product->picture;
    if (file_exists($path)) {
        unlink($path);
    }

    $product->productName = $request->input('productName');
    $product->quantity = $request->input('quantity');
    $product->price = $request->input('price');
    $product->picture = $request->file('picture');
    $product->status = $request->input('status');

    // to rename the proposal file
    $filename = time() . '.' . $product->picture->getClientOriginalExtension();
    // to store the new file by moving to assets folder
    $request->picture->move('assets', $filename);

    $product->picture = $filename;

    // update query in the database
    $product->update();

    // display message box in the same page
    return redirect()->back()->with('message', 'Product Updated Successfully');
}

```

Figure 4.4 Coding update product

4.4 Database Implementation

Figure below shows the srs database structure for this project use to data storage and management for project needs. There are a few tables created for this application likes product, service, solution, and users.

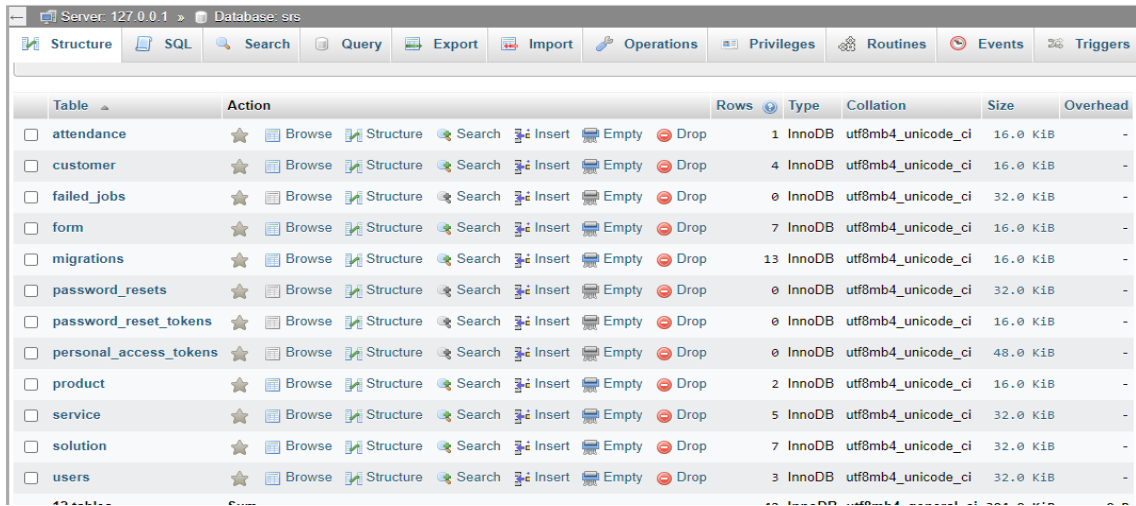


Table	Action	Rows	Type	Collation	Size	Overhead
attendance	★ Browse Structure Search Insert Empty Drop	1	InnoDB	utf8mb4_unicode_ci	16.0 KIB	-
customer	★ Browse Structure Search Insert Empty Drop	4	InnoDB	utf8mb4_unicode_ci	16.0 KIB	-
failed_jobs	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	32.0 KIB	-
form	★ Browse Structure Search Insert Empty Drop	7	InnoDB	utf8mb4_unicode_ci	16.0 KIB	-
migrations	★ Browse Structure Search Insert Empty Drop	13	InnoDB	utf8mb4_unicode_ci	16.0 KIB	-
password_resets	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	32.0 KIB	-
password_reset_tokens	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	16.0 KIB	-
personal_access_tokens	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 KIB	-
product	★ Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_unicode_ci	16.0 KIB	-
service	★ Browse Structure Search Insert Empty Drop	5	InnoDB	utf8mb4_unicode_ci	32.0 KIB	-
solution	★ Browse Structure Search Insert Empty Drop	7	InnoDB	utf8mb4_unicode_ci	32.0 KIB	-
users	★ Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_unicode_ci	32.0 KIB	-

Figure 4.5 Database structure for srs

Figure 4.6 shows the table form structure. In this table the attributes created are id as primary key, receiveDate, brandName, modelName, password, probDesc, probType, solution and product.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	id	bigint(20)		UNSIGNED	No	None		AUTO_INCREMENT	Change Drop More
2	receivedDate	date			No	None			Change Drop More
3	customerID	bigint(20)			No	None			Change Drop More
4	brandName	varchar(255)	utf8mb4_unicode_ci		No	None			Change Drop More
5	modelName	varchar(255)	utf8mb4_unicode_ci		No	None			Change Drop More
6	password	varchar(255)	utf8mb4_unicode_ci		No	None			Change Drop More
7	probDesc	varchar(255)	utf8mb4_unicode_ci		No	None			Change Drop More
8	probType	varchar(255)	utf8mb4_unicode_ci		Yes	NULL			Change Drop More
9	solution	varchar(255)	utf8mb4_unicode_ci		Yes	NULL			Change Drop More
10	product	varchar(255)	utf8mb4_unicode_ci		Yes	NULL			Change Drop More

Figure 4.6 product structure in database

4.5 Coding Implementation

In figure 4.7 shows the insertProduct function which is to insert the new product into database. The function receives a request object that contains the details of the new product, such as its name, quantity, price, picture, and status. The function starts by extracting the values from the request object and assigning them to local variables. It then generates a new filename for the picture by appending the current timestamp to the original filename's extension. The picture file is then moved to the "assets" folder. Next, the function creates an associative array with the product details and uses insert method to insert the new product into the "product" table in the database. Finally, the function redirects the user to a page that lists all the products in the database.

```

public function insertProduct(Request $request)
{
    $productName = $request->input('productName');
    $quantity = $request->input('quantity');
    $price = $request->input('price');
    $picture = $request->file('picture');
    $status = $request->input('status');

    // to rename the proposal file
    $filename = time() . '.' . $picture->getClientOriginalExtension();

    // to store the file by moving to assets folder
    $picture->move('assets', $filename);

    $data = array(
        'productName' => $productName,
        'quantity' => $quantity,
        'price' => $price,
        'picture' => $filename,
        'status' => $status,
    );

    // insert query
    DB::table('product')->insert($data);

    return redirect()->route('listOfProduct');
}

```

Figure 4.7 insertProduct coding

In figure 4.8 shows the displayProduct function that retrieves a product from the database and display it on the project page. The function receives a request object and an ID that identifies the product to retrieve. The function use Product model to query the database for the product with the specified ID. The find method of the Product model retrieves the record with the specified ID from the "products" table. Once the product record is retrieved, the function returns a view called "product.displayProduct" and passes the retrieved product to the view using the compact method. The compact method creates an array with the variable name and its value, which is then passed to the view. The "product.displayProduct" view will use the past product object to display the product details on the IT Mines Smart Repair System.

```
public function displayProduct(Request $request, $id)
{
    $product = Product::find($id);

    return view('product.displayProduct', compact('product'));
}
```

Figure 4.8 displayProduct coding

In figure 4.9 shows UpdateProduct function that update a product in the database. The function receives a request object that contains the updated product details, and an ID that identifies the product to be updated. the function unlinks the old product picture from the "assets" folder using the unlink function if it exists. Then, the function updates the product details with the new values obtained from the request object. After that, the function generates a new filename for the updated picture by appending the current timestamp to the original picture filename extension. The new picture is then stored in the "assets" folder using the move method. Then, the function sets the picture property of the Product model to the new filename and uses the update method of the model to save the updated product details to the database. Finally, the function redirects the user to the previous page with a success message indicating that the product was updated successfully using the redirect and with methods.


```

public function UpdateProduct(Request $request, $id)
{
    // find the id from proposal
    $product = Product::find($id);

    // unlink the old proposal file from assets folder
    $path = public_path() . '/assets/' . $product->picture;
    if (file_exists($path)) {
        unlink($path);
    }

    $product->productName = $request->input('productName');
    $product->quantity = $request->input('quantity');
    $product->price = $request->input('price');
    $product->picture = $request->file('picture');
    $product->status = $request->input('status');

    // to rename the proposal file
    $filename = time() . '.' . $product->picture->getClientOriginalExtension();
    // to store the new file by moving to assets folder
    $request->picture->move('assets', $filename);

    $product->picture = $filename;

    // update query in the database
    $product->update();

    // display message box in the same page
    return redirect()->back()->with('message', 'Product Updated Successfully');
}

```

Figure 4.9 UpdateProduct coding

In figure 4.10 shows the deleteProduct function that deletes a product from the database. The function receives two parameters which is request object and ID product to be deleted. The function starts by using Product model to query the database for the product with the specified ID. The find method of the Product model retrieves the record with the specified ID from the "products" table. Next, the function unlinks the product picture from the "assets" folder using the unlink function if it exists. Then, the function uses the DB class to delete the product record from the "product" table in the database using a prepared SQL statement that takes the product ID as a parameter. After deleting the record, the function redirects the user to the previous page with a success message indicating that the product was deleted successfully using the redirect and with methods. The success message is stored in a session and displayed on the webpage using the with method.

```
public function deleteProduct(Request $request, $id)
{
    // find proposal id
    $product = Product::find($id);

    // unlink the file in the assets folder
    $path = public_path() . '/assets/' . $product->picture;
    if (file_exists($path)) {
        unlink($path);
    }

    // delete the record from the database
    DB::delete('DELETE FROM product WHERE id = ?', [$id]);

    echo "Record deleted successfully.<br/>";
    return redirect()->back()->with('message', 'Product Deleted Successfully');
}
```

Figure 4.10 deleteProduct coding

4.6 Interfaces

Figure below shows the login interface design for all users' type (admin, technician, and internship student). User must register first before login using email address and password.

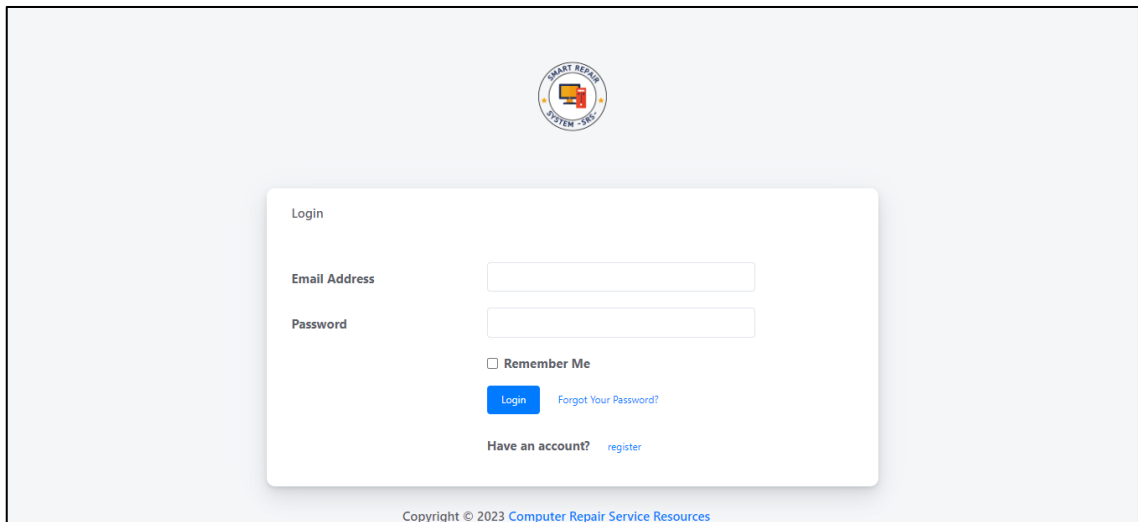


Figure 4.11 Login

Figure below shows the registration form to register into the system. User should fill in full name, username, email address, password, confirm password and user type. For user type user can select technician or internship student.

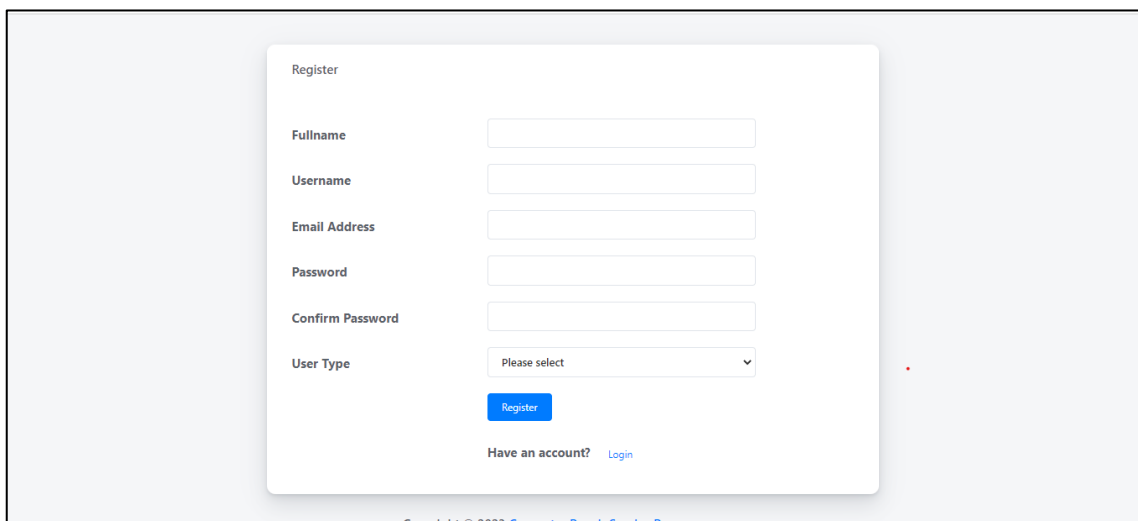


Figure 4.12 Registration Form

Figure below shows the manage staff interface for admin. In this page admin able view list of staff. The information retrieved in this page is id, name, user type and button delete, info and email. In this page admin able to delete the staff. For button info admin can view information about the staff and email button to sent email to the staff as a notification about the e-jobsheet assigned to the staff.

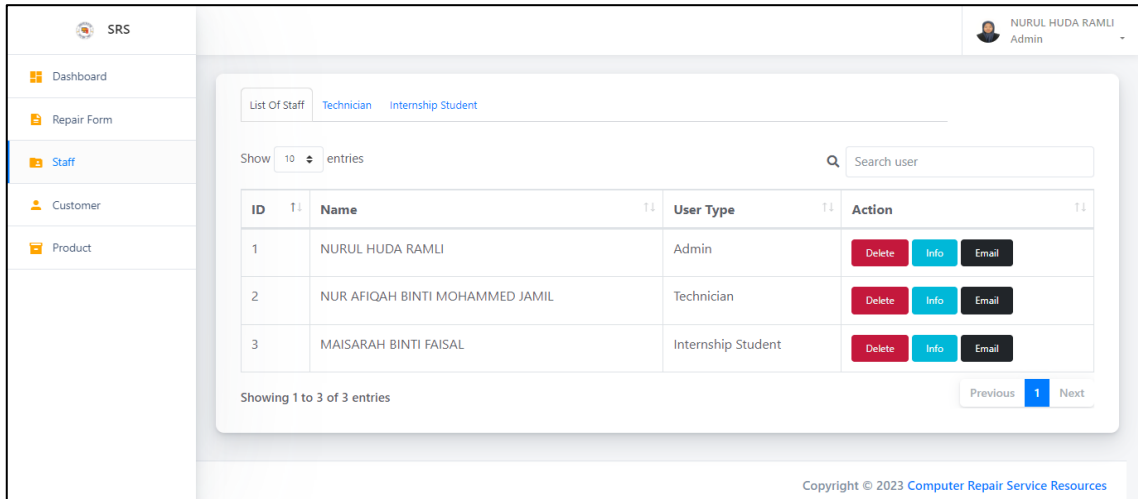


Figure 4.13 List of Staff

Figure below shows manage customer for admin interface shows list of customers. The system retrieved data of customer name, phone number and address. There is button create customer for admin to create new customer. There is button delete for admin to delete customer and button info to view and update customer information.

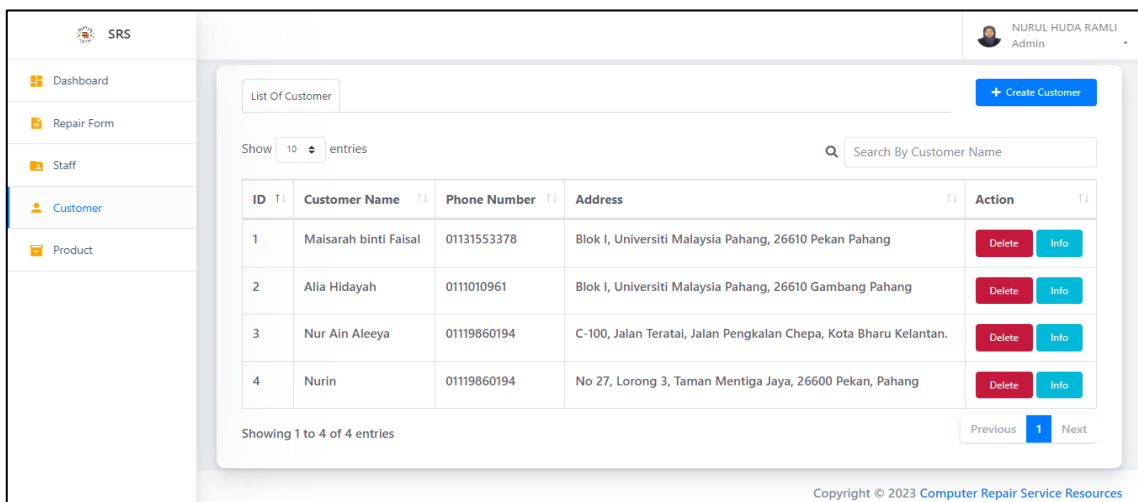


Figure 4.14 List of Customer

Figure below shows the interface after admin click on button info in the manage customer. This interface shows detail information about e-jobsheet for customer. The information shows received date, due date, status, time remaining, model name and button action. In button action the delete button to delete the e-jobsheet in that row and for button info to update the status of e-jobsheet. The function updates is for technician and internship student.

Received Date	Due Date	Status	Time Remaining	Model Name	Action
2023-04-16	2023-04-16	Rejected	56 day/days	ThinkPad X1 Carbon Gen 11	Delete Info
2023-03-06	2023-03-08	Proceed	95 day/days	Swift X 16	Delete Info
2023-02-24	2023-02-25	Completed	106 day/days	Swift X 16	Delete Info
2023-06-12		Pending	0 day/days	IdeaPad Slim 3 (15", Gen 8)	Delete Info
2023-06-12		Pending	0 day/days	Swift Edge 16	Delete Info

Figure 4.15 List of e-jobsheet

Figure below shows e-jobsheet when admin click on the button add new e-jobsheet. In this interface admin should enter received date, brand name, model name, password for the devices, and problem description. This information is getting from the customer.

CUSTOMER NAME	Maisarah binti Faisal
RECEIVED DATE	12/06/2023
BRAND NAME	Acer/Laptop
MODEL NAME	Swift Edge 16
PASSWORD	7878

PROBLEM DESCRIPTION

Slow Performance.

Submit

Figure 4.16 Add New e-jobsheet

Figure below shows the update e-jobsheet for the technician and internship student to updates. The information they should update is about the problem type happen of the devices, what is the possible solution and product that can be used. There is also due date to be set. Then click the update button to save the e-jobsheet.

The screenshot shows a web interface for updating an e-jobsheet. On the left is a sidebar with navigation options: Dashboard, Repair Form, Staff, Customer, and Product. The main content area contains four form sections: 'PROBLEM TYPE' with a dropdown menu set to 'Blue Screen of Death (BSOD)', 'SOLUTION' with a dropdown menu set to 'Keyboard Replacement/Repair', 'PRODUCT' with a dropdown menu set to 'ACER ASPIRE LCD LED SCREEN DISPLAY', and 'DUE DATE' with a date input field set to '13/06/2023'. A blue 'UPDATE' button is located at the bottom of the form. The top right corner shows the user profile 'NURUL HUDA RAMLI Admin'.

Figure 4.17 Update for e-jobsheet

Figure below shows the profile interface of the user. This interface shows the profile picture, full name, email address, username and phone number. In this interface admin can update the profile

The screenshot shows the 'User Profile' interface. It features a profile picture of a woman wearing a blue hijab. Below the picture is a 'Choose File' button with the text 'No file chosen'. The profile information is displayed in four fields: 'FULLNAME' (NURUL HUDA RAMLI), 'USERNAME' (admin), 'EMAIL ADDRESS' (hudaramli01@gmail.com), and 'PHONE NUMBER' (01119860194). A blue 'Submit' button is located at the bottom right. The top right corner shows the user profile 'NURUL HUDA RAMLI Admin'.

Figure 4.18 Profile

CHAPTER 5

CONCLUSION

5.1 Conclusion

In conclusion, the developing of the Smart Repair System is to focus on the objective of the project. The first objective is to study the Smart Repair System with the inventory and management system can be used in the real word. The focus will be on understanding the components, process and challenges associated in the system. the goal is to gain the best practise and identify the part for improvement. As the SRS system will be used by the computer shop which can make their inventory of the jobsheet ugraded. This is because the used of paper jobsheets do have many constarint. Hense, the improvement of the issue is by creating the e-jobsheet in the SRS system that is focus on security and accessible.

Next, based on the knowledge gathered during the developing process, the project will involve designing and developing a Smart Repair System that integrates with inventory and management system. This is to make sure the requirements in the system is satisfied with the cliendet expectation. The phase need to consider is designing architecture, determined the requirements and software implementation during the developing phase. The design should be address efficient inventory management of the product and services. To make sure there are no issue during the working times and can work more productivity. Moreover, the e-jobsheet play the main part in the system to make sure the business flow going smoothly. The system can be more systematic and able to solve the issue facing by the users.

Lastly, the functionality of the Smart Repair System can meet the requirements and get to solve the issues. Once the system is developed, the things that need to focus are system functionality, performance and usability. The evaluation phase using the user acceptance test to evaluate phase where it applied in the real world. It is important to get and gather the feedback from users and stakeholders to identify any pontential areas improvement and refinements needed. By pursuing the objectives, the project aims to

enhance the efficiency and effectiveness of the Smart Repair System by integrating an inventory and management system. The integration can pursue to streamlined repair process, optimized to use the system and improved customer satisfaction.

5.2 Recommendations

The results of the user acceptance test UAT from the client shows that the system is able to provide efficient and timely service to the customer. However, to maximize the potential and ensure operation, the management system is essential to optimizing the repair and service process, tracking inventory levels and maintaining efficient allocation. Currently, the SRS is not available to manage the previous paper-based jobsheet as the limited time to develop the function. The previous records should be in the system with the correct information. To enter the jobsheet should be fast to manage time wisely as the old jobsheet paper is too many.

As the suggestion, the use of hardware devices which is a barcode scanner and need to generate the bar code to every jobsheet paper. The use of the bar code scanner need to determine about the barcode format. Which of the bar code is suitable based on the system requirements. There are a few common formats like Code 39 and Code 128 or QR code. Moreover, for the barcode labels to be printed on jobsheet papers, create a design template. The encoded information, such as the distinct task or work order number, customer information, or any other pertinent identifiers, should be included on the label. To create barcode labels quickly, use templates or barcode design tools. Moreover, add a barcode creation feature to the Smart Repair System. This can be done by using third-party libraries or APIs that enable you to programmatically produce barcodes depending on the supplied data. Include this feature in the system's jobsheet generation procedure to make sure a barcode is created and assigned to each jobsheet automatically.

The other suggestion is utilizing Optical Character Recognition (OCR) for converting paper-based jobsheets into digital text. OCR technology can extract text from papers that have been scanned or photographed, allowing the system to digitize the data from the jobsheets. To parse the OCR-generated text and map it to the proper fields in the system, provide a data mapping and validation mechanism within the SRS. This phase makes sure that the extracted data is appropriately matched with the relevant data fields. The SRS can transform paper jobsheets into digital text by utilizing OCR technology,

making data entry quick and easy. By using this method, the necessity for manual transcription is removed, the time needed to migrate the records is greatly decreased, and the system is guaranteed to have the proper data.

Looking forwards, that someone will carry with this effort going forward, considering the suggestions made, and including them into the creation of the SRS. The Smart Repair System (SRS) must include barcode scanning and generation, as well as make use of optical character recognition (OCR) technology, to alleviate the difficulties associated with maintaining previous paper-based jobsheets. It can overcome time constraints and improve the accuracy and efficiency of data entry by following these suggestion.

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