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Barbershop Service Booking Application for Hair Emotion Matrix Saloon

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Abstract: The Booking Barber Service System is a system which managing customer reservations. The purpose of developing this system is to solve the problem of when there are too many customers coming at one time, which result shopkeepers becoming less focused on service quality. This system accepts barber services from customers. Barber service information will be gathered and display to the barber and owner. Business information will gather and display to the owner based on the filter criteria. To ensure the security of the system, users will need to register in order to access user activity. Through the system, customers can place their booking on particular barber services while the barber conduct the barber service according to booking. The development of this system will systematic booking process can overcome the problem of waiting time and improve the quality of service as well as better business data management.

Keywords: Barber Service System, Business Information

1. Introduction

The barber's main occupation is to cut, dress, groom, style, and shave men's and boy's hair or beards. According to THE NATIONAL BARBER MUSEUM & HALL OF FAME (2014) barber were named hairdresser or barber surgeons been found among relics of the Bronze Age. The revolution of barber until 20th century, barbers already become one of the professions of cosmetology branched were to involve more type of different services. In addition, the services as straight razor shaving, colouring, and other work. The barber has their work place which is called a barbershop where people will go to the location for their hair or beards services.

Furthermore, the Hair Emotion Matrix Saloon is a barbershop that provide local barber services around the Kampung Tawas, Ipoh, Perak area. The barbershop has be operated over three years where provided the hair cut, dye hair, and wash for the customer. The barbershop also provided suitable environment for the customer. Although the services is good but the customer require to walk in and

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wait for their turn. In this case, whenever there are many customers the customer require to wait longer for their turn. The times requires for services customer also differences between customer and services. The barbershop also provided some of the hair care product for the customer but the product and sales are recorded manually in Microsoft excel.

In addition, the process of require the sales and income invoice for the owner have become a problem because of calculate all the data manually. Besides, the current existing space for storing all the invoices cause hard to find the old record if needed and there would be waste of paper and storage to save all the pass invoices.

The project of "Barbershop Service Booking Application" is proposed to solve the difficulty of data management in traditional business barbershops. This system is created to manage the booking appointment of the customer, where to remove the traditional waiting in a queue for a haircut. The customer can view and select the services they want such as haircut, wash, and dye hair. The customer can book an appointment as per their desired time and date. The system also resolve the current management of employee, invoice and sales.

2. Literature Review

2.1 Mobile-base Application

In the revolution of information and communication systems, the average individual has become acclimated in utilizing electronic devices such as computers and smartphones. Although web and computer application is the current trend, with the establishment of the 5G communications network, mobile application could replace the current trends. Software applications which run on mobile devices are called mobile applications [1]. Mobile applications become increasingly more famous because of the open source, some of the development tools are free, so there is a lot of utilization generated. In consequence, mobile-base is a better option for developing the Barbershop Service Booking Application. The mobile apps contain two main categories which are native apps and web apps [2]. Therefore, the mobile base is selected for the development of the proposed system because customers can facilitate in booking the barber services by using only smartphones. In consequence, customers can make booking barber services anywhere and at any time.

2.1.1 Android Studio

The android studio is introduce in May 2013 with 0.1 version and stabilized version is in December 2014. The system is integrated development environment for Google's Android operating system where build on JetBrains' IntelliJ IDEA software and designed specifically for Android development. The technology is selected because with the increasing of e-commerce especially due to COVID-19 pandemic, research found that the Walmart grocery e-commerce increased 74% [3] Therefore, the conventional business of Hair Emotion Matrix Saloon need to e-commerce in order to growth their business further. The android is more compatible compared to the IOS in term of the mobile devices. Hence, the android studio is selected for building the system. In addition, developer allowed to access all the application framework can neither reuse of its components or from other apps components [4]. Thus, this application could help the development of the system much easier and faster.

2.1.2 QR Code

The QR code stands for 'Quick Response' code. The QR code was invented in 1994 by Denso and approved with ISO international standard (ISO/IEC18004) in June 2000 [5]. The QR code has a machine-readable optical label with information on the associated item or product [6]. In addition, the QR code is used for the Barbershop Service Booking Application to increase the efficiency for booking records. The QR code will be implemented in the booking module when customer success makes a

barber services appointments, the QR code is generate as receipt. Then, the barber is required to scan QR code from the customer before the barber service is conducted. The QR code would produce the faster way to record the receipt from customers compared to manual typing.

2.3 System Comparison

The study of three existing system are compare to the feature of the proposed system. The Franpos is a Point-of-Sale System where to process transaction and manage the client base. This system is suitable for chain barbershop where system able to access and manage all the data in real-time [8]. The application of theCut is a mobile platform for barbers and clients. The application is open for public at the Google Play. The system allow barber to manage and invite the client [9]. The Mera Saloon application is an android application that provided to public user. The application also embedded with global positioning system which allow to allocate the current user in order to acknowledge the user where the nearest barbershop around them [10]. The comparison result are shown in the Table 1.

Table 1 : Comparison between exiting system and proposed System

	System			
Module	Franpos	theCut: Barber Booking App	Mera Saloon	Barbershop Service Booking Application
System Type	POS and mobile base	Android	Android	Android
1. Login and Registration module	Available	Available	Available	Available
2. Booking services module	Available	Available	Available	Available
3. Payment Module	Available	Available	Not available	Available
4. Report module	Available	Not available	Not available	Available
5. Management module	Available	Not available	Not available	Available
6. Edit Profile module	Not available	Available	Not available	Available

The summary of comparisons between the existing system and proposed system, the proposed system integrates all 3 features into one system. Therefore, the system will more reliable to the business so the operating costs could be reduce. The public-based system are too general where less function provided to the owner. Meanwhile, the subscription-based system require pay amount of money to subscribe the company services. The services that company provided may not meet the requirements of the barbershop. Therefore, the system of Barbershop Service Booking Application will have better client and employee management.

3. Methodology

The system development life cycle for the project is prototype model which based on comments and feedback from the user about the working prototype of the software [7]. The methodology is to ensure the activities for the project can meet the requirements within reasonable time frame. The main phases for the project in the system development life cycle, which are planning, analysis, design, development, evaluation, refining, and implementation and testing phases. Table 2 shows the software development phases and its activity.

Table 2 : System Development Flow

Phase	Activity	Deliverables
Planning	Planning what activities and budget for building the project	Produce the proposal and Gantt Chart.
Analysis	Discussion with the owner and customer in order to collect the requirements such as interview and observation.	Generate system requirement specification document.
Design	Discussion on the function will be used by the system such as interaction between function with function, the user interface, and system with database.	The design phase will in the proposal for system include as following: 1. UML diagram, Class diagram, sequence diagram, state chart diagram, and use cases 2. Administrator interface 3. Customer interface 4. Employee interface
Development Prototype	Develop the main system function where collected requirements from the analysis and design phase.	Generate prototype
User Evaluation	Negotiation with the owner and validate and verify the system	Generate requirements validation and verification document.
Refining	Analysis the accepted and declined function. Evaluate the requirements change of the system.	Generate system requirement specification document.
Implementation and Testing	Implement all the function and features by develop the system.	Code program and device setting. Test case will be generated.

3. 1 Analysis and Design

This section describes in detail about the system requirements analysis, system analysis and system design to be developed. In the system requirements analysis section, it contains a description of the functional and non -functional requirements that need to be met in order to develop a successful system. This section also describes the system requirements specification which contains business model, use case diagram, use case description and sequence diagram. In the system design section discusses the

data design involved in the database. The design of the data involved can be illustrated through class diagrams and schematic tables.

3.1.1 System Requirements

System requirements describe the functions and capabilities of the system to be developed accordingly to requirements of the stakeholders. Table 3 shows the system requirements of the proposed system.

Table 3 : System Functional Module

Modules	Functions	User
Login and Registration	– In charge of register first time user procedure. – In charge of the system's user login procedure.	Customer, Employee, Owner
Booking Services	– Booking barber services. – View booked services. – Review satisfaction after the services. – Review barbers' profile.	Customer, Employee, Owner
Payment	– Choose payment method – Make payment	Customer
Report	– Generate monthly sales.	Owner
Management	– Add a new employee. – Release salary. – Apply leaves. – Manage commission for employees. – Schedule barber services	Employee, Owner
User Profile	– Manage current user's profile status.	Customer, Employee, Owner

3.1.2 Functional and non-functional requirements

The functional requirements describes the process of inputs transformation to desired output for the user. The functional requirements of proposed system show in Table 4.

Table 4 : Functional Requirement of the Developed System

No	Modules	Functionalities
1.	Registration and Login Module	• The system should allow the new user to register before login. • The system should show error message when empty field is found. • The system should show error message when duplicate email is entered. • The system should allow the users to login into the system using email address and password. • The system should allow the user to input the valid id and password to be logged in as user. • The system should alert the user for any invalid input.

		• The system should redirect the user to respective dashboard once successful login.

Table 4: (cont)

2.	Booking Services Module	• The system should provide suggestion of barber services for customer. • The system should allow the user to book barber services. • The system should allow the user to check the barber scheduling. • The system should provide filter for user to select the barbers wanted. • The system should generate a QR code when successfully booked the barber services. • The system should allow users to cancel the bookings 1 hour in advance.
3.	Payment Module	• The system should provide payment method for customer to select. • The system should allow customer to make payment online. • The system should alert user when payment not success.
4.	Report Module	• The system should allow users to generate daily sales report. • The system should allow users to generate monthly sale reports.
5.	Management Module	• The system should allow owners to manage the employee lists. • The system should allow employees to apply leave. • The system should allow employees to view work schedule. • The system should allow users to adjust employee salaries and commissions. • The system should able to generate employee salaries.
6.	User Profile Module	• The system should allow users to manage the status of current user's profile. • The system should allow users to change their password. • The system should allow users to view booked barber service schedule.

The non-functional requirements specify the criteria used to determine the operation of a system, rather than explicit practices. Table 5 shows the non-functional of the system.

Table 5 : Non-functional requirements of the proposed system

Requirements	Descriptions
Performance	• The system should be able used for anytime with valid internet.
Operational	• The system should be user friendly. • The system should be able to work on any android version 4.0 or above. • The system should able easily maintained and updated.
Security	• Only owner can generate the report.

	• The users can only access their own account with user id and password.

3.1.3 User requirements

Table 6 shows the software requirements of the proposed system. The user requirements show the details of users' expectations about what functionality from the system.

Table 6 : User requirements for the proposed system

No	User requirements
1.	All users should be able to input the email address and password for registration and login purpose
2.	The customer can update their personal details.
3.	The customer should able to view the barber services.
4.	The customer should able to book the barber services.
5.	The customer should able to view the book schedule.
6.	The customer should able to filter the barber or services on their preference.
7.	The customer should able to cancel the booked barber services 1 hour in advance.
8.	The customer should able to make payment.
9.	The employee can update barber personal details.
10.	The employee should able to view the booked schedule.
11.	The employee should be able to insert the leave apply form.
12.	The owner can display the daily activities for each employee.
13.	The owner can display the daily report and monthly report.
14.	The owner can manage the salary and commission of the employee.
15.	The owner can add, update and delete the employee.
16.	The owner and employee can display the customer schedule.

3.1.4 Software and hardware requirements

The hardware components and software requirements analysis are conducted to define what hardware and software the system needs to support the system. Table 7 show the software requirements.

Table 7 : Software requirements specification

No	Type	Software	Functionality
1.	Programming tool	Android Studio	Develop system

2.	Programming Language	JAVA	Development environment for building system and components using the JAVA programming language

Table 7: (cont)

3.	Server Application	XAMPP	Web server that build and used for access to the database
4.	Database	MySQL	Design and build database
5.	Operating System	Android 4.0 or above	An operating system that used to test for the proposed application.

Table 8 show the hardware requirements of the Barbershop Service Booking with Mobile Application.

Table 8 : Hardware requirements specification

No	Hardware	Specification
1.	CPU(Central Processing Unit)	Intel Core i7-6700HQ @ 2.60GHz
2.	RAM (Random Access Memory)	4 Gigabyte (GB) or more
3.	Hard disk	1 TB HDD

3.1.5 Use Case Diagram

A case diagram is a representation of a user's interaction with a system showing the relationships between users and different use cases. Figure 1 shows the interaction between the two types of users with the system directly.

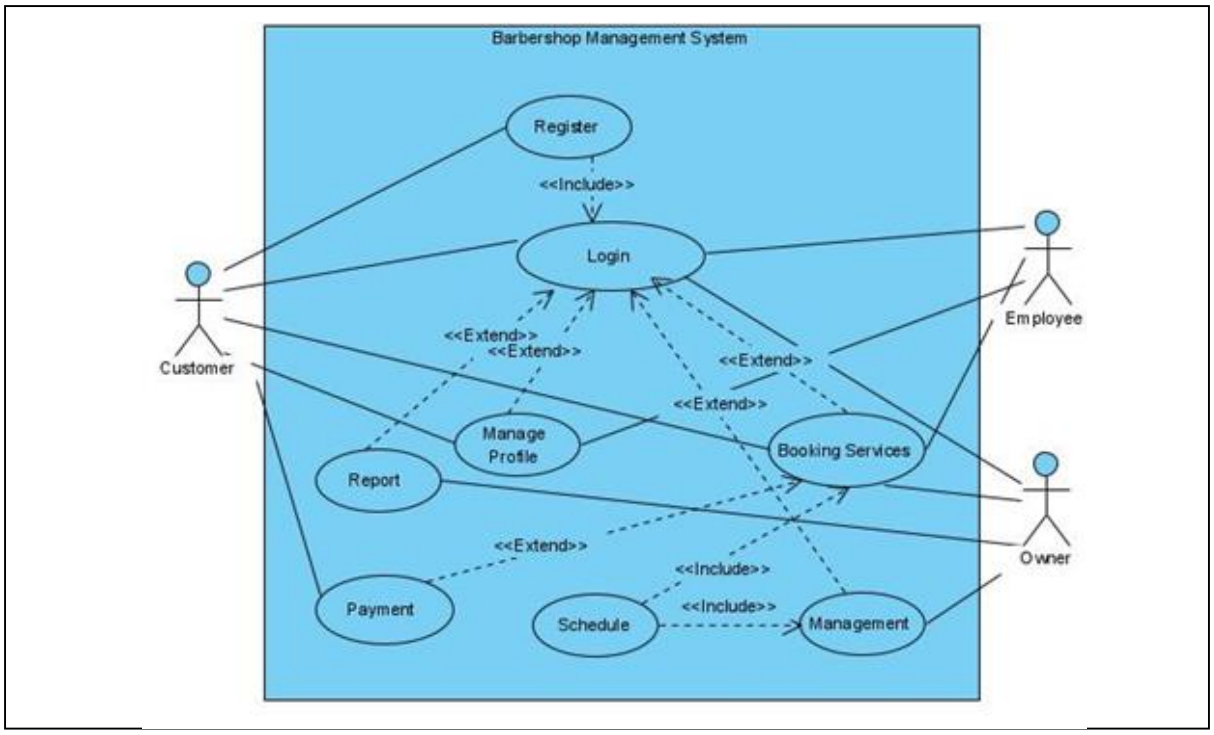

Figure 1 : Use Case Diagram of Proposed System

3.1.6 Class Diagram

A class diagram is a type of static structure diagram that describes the structure of a system by showing system classes, attributes, methods, and relationships between objects. Figure 2 shows class diagram for Barbershop Service Booking on Mobile Application.

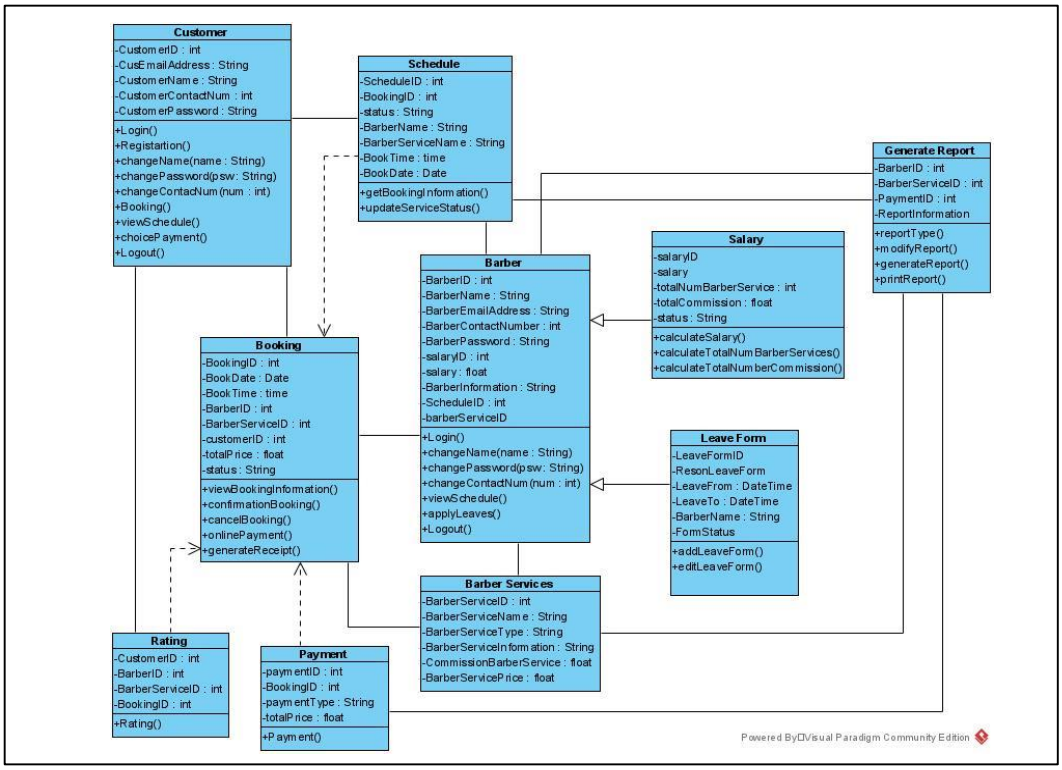

Figure 2 : Class Diagram of Proposed System

4. Implementation and Testing

4.1 Implementation

4.1.1 Login and Registration Module

The login and registration module where require all the user require to register before login into the system. The customer can register by input all the information such as username, email, contact number and password. However, owner require to register the employee before they can login into the system. The user can reset their password if they click the "Forget Password" text and system request user the email they registered. The Figures 3 show the Interface of Login module.

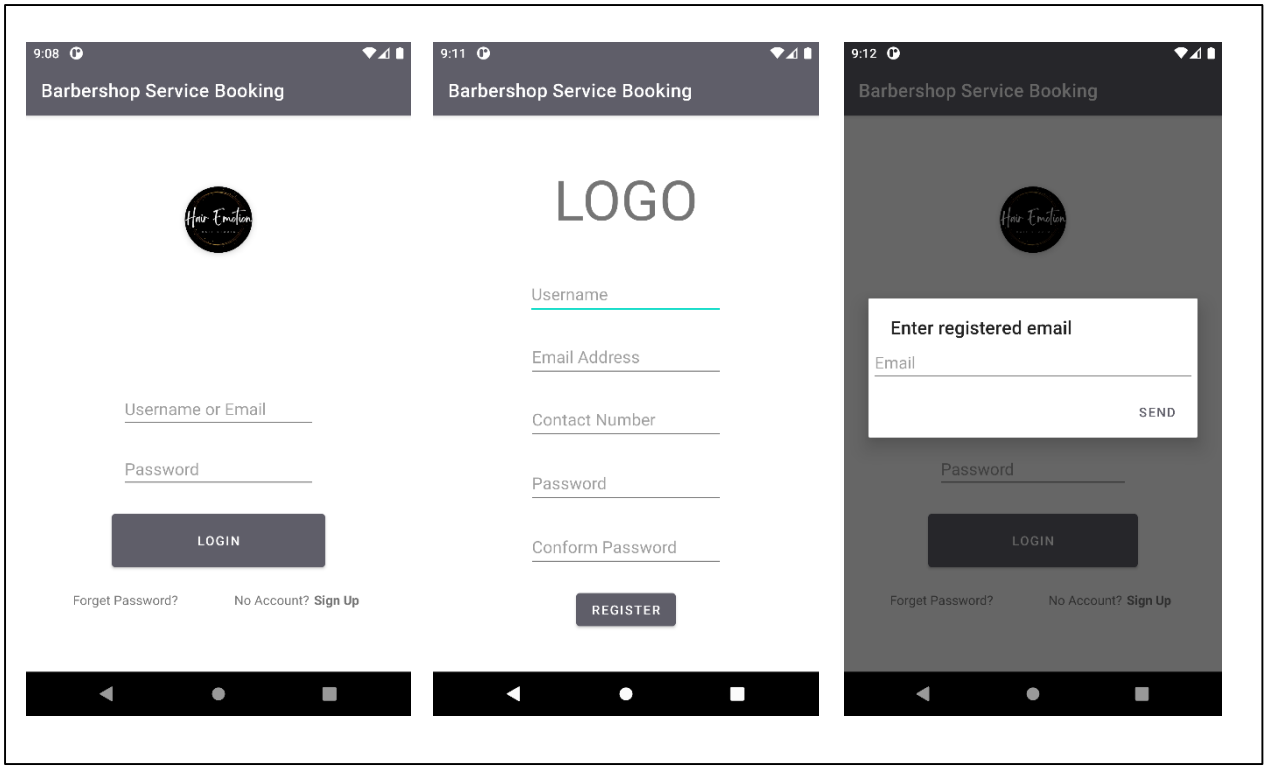

Figure 3 : Login and Registration Interface

4.1.2 Booking Service Module

The booking service module allow customer to make appointment for their barber service. The customer can select the service and barber they prefer whereby they could view the comment and review from previous customer. Customer allow to select the date and time which what time they want to having the service. The customer require to confirm the appointment in the conformation section. Interface for the following are show in figure 4.2.

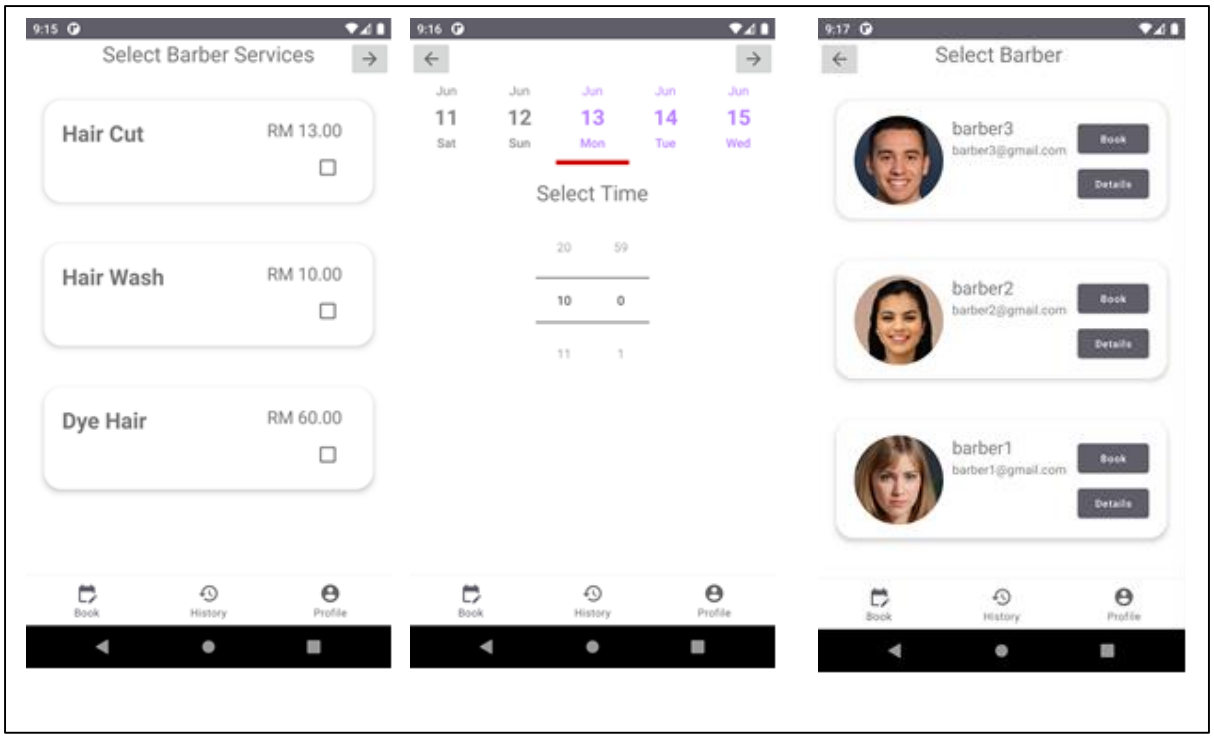

Figure 4 : Booking Service Interface

4.1.3 Payment Module

The payment activity only occurs when they user want to make online payment and the status of appointment is waiting. The user require to enter all the card information to make the payment. The figures 5 show for the payment interface.

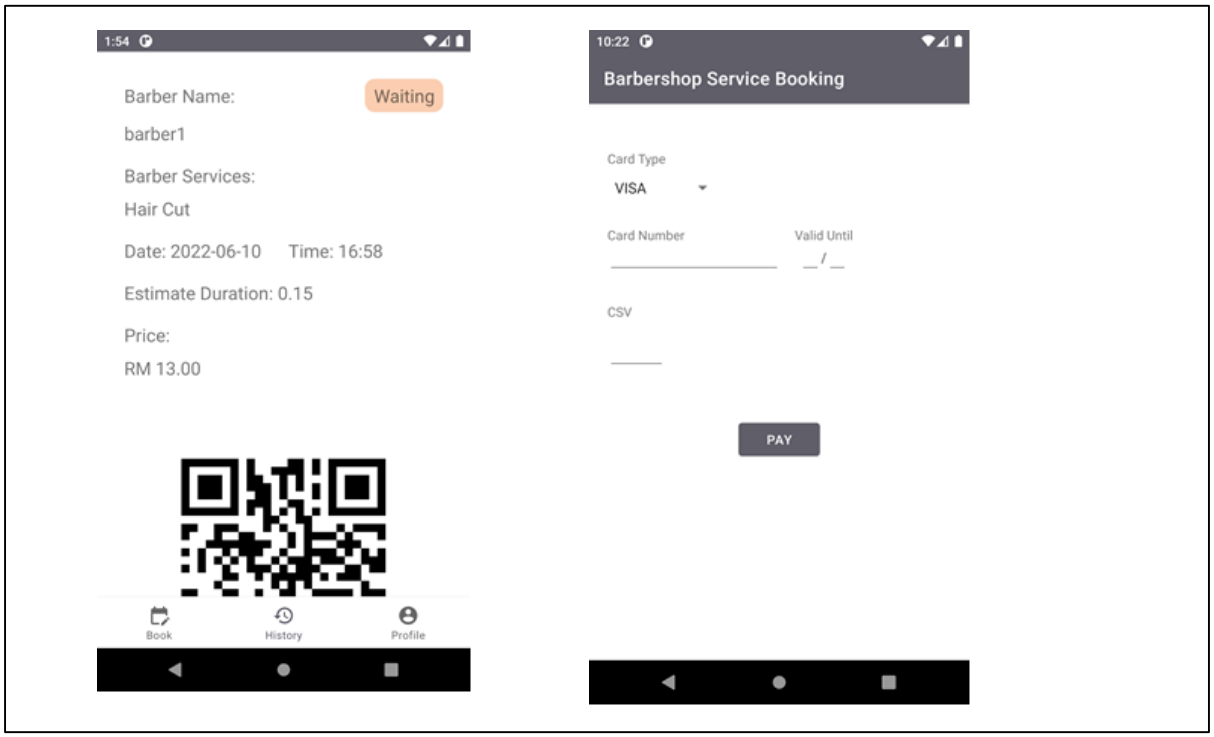

Figure 5 : Payment Interface

4.1.4 Management Module

The management module allow the administrator to make the management for the barbershop. The administrator can edit, add or delete the barber and barber service. Moreover the administrator can edit the status of leave for the barber. The interface of management are show in figures 5

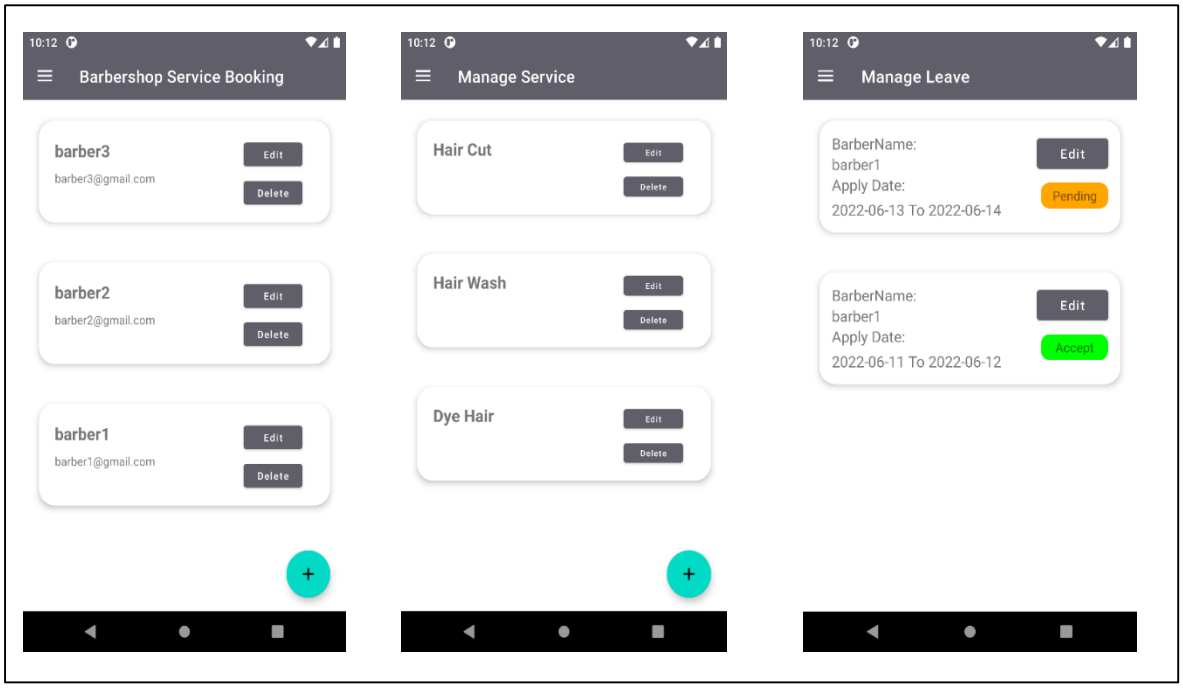

Figure 6 : Management Interface

4.1.5 Report Module

The report module allow the administrator to view the daily or monthly report for the service they provide to the customer. The sale information are show in form of graph where make the user more easily to read. The figure 5 show the interface for report module.

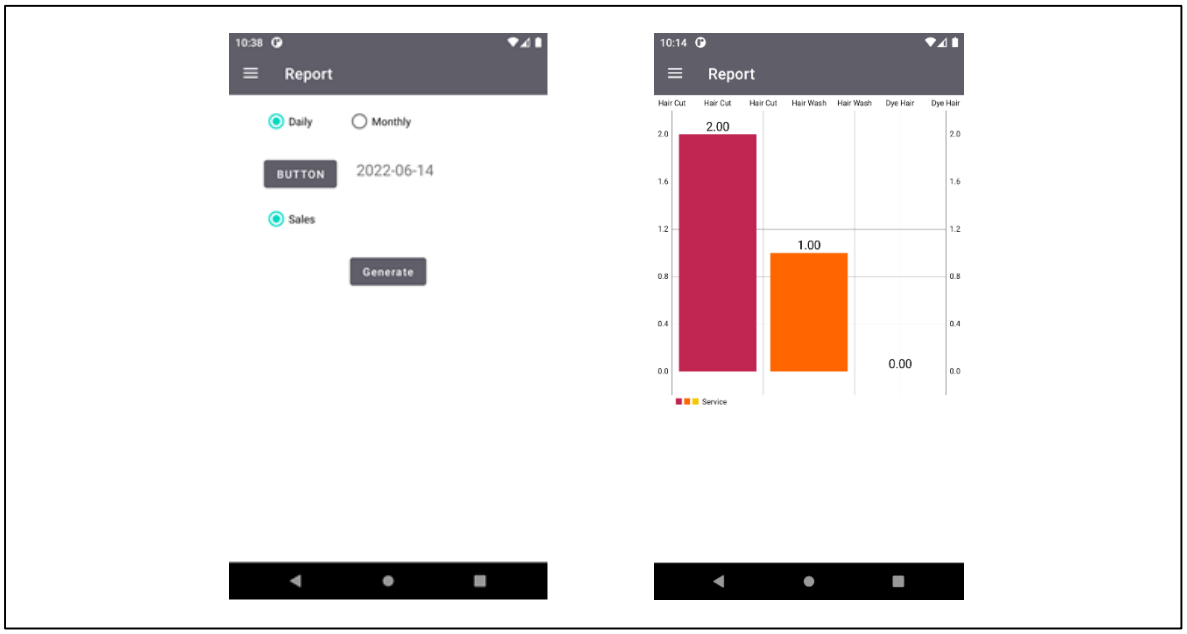

Figure 7 : Report Interface

4.1.6 User Profile Module

The user profile module allow the user to view and manage their personal information such as password, username, contact number, and profile picture. The interface of user profile module are show in the figures 5.

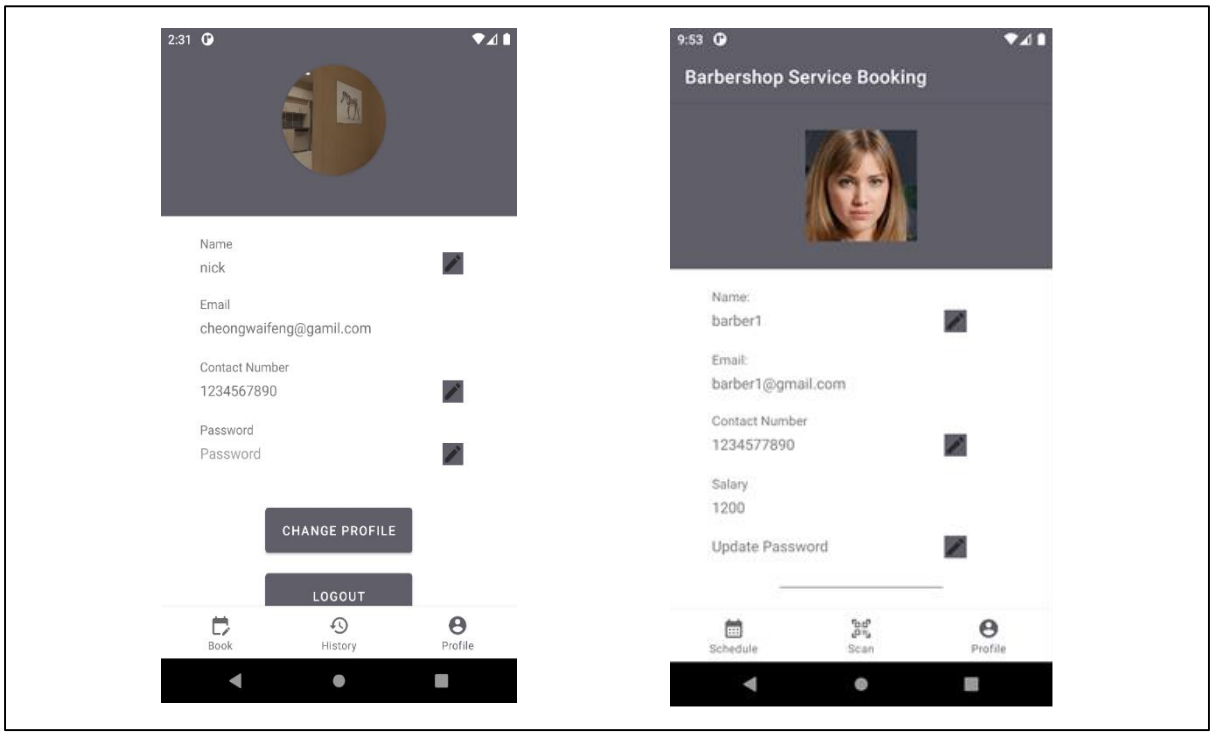

Figure 8 : User Profile Interface

4.2 Testing

The testing case aims to validate and identify the final product where meet the requirements. The table 5.7 shows is Software Testing Traceability Matrix. Each the test case will be related to at least one system function requirement. Therefore, it can be concluded that the resulting test results are SUCCESSFUL shows that each process in the use case involved with testing works well and smoothly.

Table 9 Software Testing Traceability Matrix

Test Case	Software Requirement Specification	Expected Result	Test Result
TC-01	SRS_REQ_100	Login and Registration Module	Pass/ Fail
TC-01-001	SRS_REQ_101	User insert registered email and password and click login button.	Pass
TC-01-002	SRS_REQ_102	User click sign up link and fill in all the information require. System display Registration Successfully and redirect to login page.	Pass

Table 9 : (cont)

TC-01-003	SRS_REQ_103	User click forget password link and user enter registered email. System send change password link to email.	Pass
TC-01-004	SRS_REQ_104	System pop up error message when user not fill in all the information.	Pass
TC-01-005	SRS_REQ_105	System display error message if the registration is not successful.	Pass
TC-02	SRS_REQ_200	Booking Barber Service Module	Pass/ Fail
TC-02-001	SRS_REQ_201	User make appointment by select all the booking information and system display all booking summary.	Pass
TC-02-002	SRS_REQ_202	User click schedule icon and system display the booked schedule.	Pass
TC-02-003	SRS_REQ_203	System display error message if system error and redirect to previous page.	Pass
TC-02-004	SRS_REQ_204	System generate QR code if booking is success.	Pass
TC-02-005	SRS_REQ_205	System display error message if booking not success.	Pass
TC-03	SRS_REQ_300	Payment Module	Pass/ Fail
TC-03-001	SRS_REQ_301	User fill in all the information and Click payment button.	
TC-03-002	SRS_REQ_302	System pop up error message when not success make payment.	Pass
TC-03-003	SRS_REQ_303	User can view the payment they make.	Pass
TC-04	SRS_REQ_400	Management Module	Pass/ Fail

Table 9 : (cont)

TC-04-001	SRS_REQ_401	User manage barber information with input barber data.	Pass
TC-04-002	SRS_REQ_402	User manage barber services with input barber service information.	Pass
TC-04-003	SRS_REQ_403	User add new barber into the system with valid information.	Pass
TC-04-004	SRS_REQ_404	User add new barber service into the system with valid information.	Pass
TC-05	SRS_REQ_500	Report Module	Pass/ Fail
TC-05-001	SRS_REQ_501	Administrator select daily or monthly report wanted to generate.	Pass
TC-05-002	SRS_REQ_502	System display generate sales report.	Pass
TC-05-003	SRS_REQ_503	System display error message if the report is not successful.	Pass
TC-06	SRS_REQ_600	Manage profile Module	Pass/ Fail
TC-06-001	SRS_REQ_601	Customer and Barber manage profile information with valid personal information	Pass
TC-06-002	SRS_REQ_602	Customer and Barber change password with current password and new password.	Pass
TC-06-003	SRS_REQ_603	System display booked barber services information history.	Pass

5. Conclusion

As conclusion, the Barbershop Service Booking on Mobile Application had reach the project objective to allow the owner of the shop for better management for the customer and employee. There are advantages of the application where allow the customer to make an appointment without clash with other customer and the system used authentication method to login into system whereby increase the customer royalty to the shop. The drawback of this system is the platform where only for the Android system. To further improvement for the future system are include the development device for iOS system, the subsystem for managing the employee whereby having the track of daily in and out record so can details up their working hour.

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