



Online Salon Appointment and Management System of FOREVER18 Hair Salon

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Abstract

Currently, FOREVER18 Hair Salon relies on the manual appointment system which leads to scheduling conflicts, inefficiencies and challenges in managing customer preferences. The main objectives is to develop an Online Salon Appointment and Management System of FOREVER18 Hair Salon to track customer preferences and past services that aims to enhance customer satisfaction of FOREVER18 Hair Salon. The methodology used for the development of the proposed system is waterfall methodology which consists of five phases which are planning, analysis, design, implementation and testing. The key findings is the proposed system are able to reduce the missed appointments of customers, get insights of hair services trends and tracking customer preferences. The data obtained will be implement into the modules of proposed system to enhance the functionality of the proposed system.

1. Introduction

The beauty and salon industry's rapid evolution underscores the need for enhanced customer convenience from salon management system. FOREVER18 Hair Salon relies on manual appointments booking which is physical appointment book. This manual process leads to scheduling conflicts and misses appointments. The proposed system is Online Salon Appointment and Management System of FOREVER18 Hair Salon which is aimed to address the problems identified in the existing process by eliminating the scheduling conflicts and missed appointments.

FOREVER18 Hair Salon relies on manual appointments which is phone calls and recorded it in the physical appointments book lead to scheduling conflicts and missed appointments. Manual appointments scheduling relies on the owner of hair salon to maintain and organize appointments books which results in the owner does not having the real-time visibility into the appointment schedule. Besides, FOREVER18 Hair Salon lacks a management system to gain insights into the salon services trends for FOREVER18 Hair Salon. The salon's inability to showcase specific in-demand services results in not being able to keep up with new trends. Lastly, FOREVER18 Hair Salon lacks a system for tracking customer preferences and past services for enhancing customer satisfaction. The customer may feel less valued, leading to a high churn rate as the customer seeks a salon that offers a more personalized experience.

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There are three objectives in the development of the proposed system for FOREVER18 Hair Salon. Firstly, the development focuses on designing an online appointment and management system that eliminates scheduling conflicts and reduces missed appointments. Secondly, the proposed system aims to gain insights into the salon service trends for FOREVER18 Hair Salon. Lastly, the system aims to test system functionality and user acceptance towards the tracking of the customer preferences and past services that aims to enhance customer satisfaction of FOREVER18 Hair Salon.

The Online Salon Appointment and Management System for FOREVER18 Hair Salon aims to enhance customer experience by eliminating scheduling conflicts, reducing missed appointments and tracking customer preferences. Customer modules cover account registration, login, appointment booking and reviews. Administrator modules include account management, appointment handling, service management, customer records, invoicing, reporting, employees and product management, replied to customer reviews and update about us page of FOREVER18 Hair Salon.

The expected outcomes of the proposed system for FOREVER18 Hair Salon include streamlined customer experiences with Online Salon Appointment and Management System. Customers can register, log in, and book salon appointments, providing feedback through the website. Administrators gain tools to review, accept or reject customer appointments, manage salon services, update descriptions and prices, view customer lists, generate sales reports, create invoices, and oversee employee, supplier, and product management. The system enables data-driven decision-making, fostering improved customer satisfaction and operational effectiveness for FOREVER18 Hair Salon.

2. Related Work

The related work that has been done is the research of booking appointments, management system and comparison between the three existing system and proposed system.

2.1 Booking Appointments

The booking appointments system aims to maximize the total number of appointment slots booked by efficiently offering available slots to customers [1]. This is to ensure that the scheduling process is optimized to fill as many slots as possible, thereby increasing the overall utilization of available appointment times. Moreover, the booking appointments system can be enhanced to minimize the percentage of missed appointments [2]. By optimizing the booking patterns, predict customer behavior and adjust schedules dynamically to accommodate changes and maximize efficiency. Online booking systems are widely utilized by public authorities to schedule appointments for services such as visa interviews, driver's licenses and password renewals [3].

2.2 Management System

The management system is designed to enhance overall efficiency by streamlining various operational processes [4]. It integrates different functionalities to provide a cohesive platform for managing resources, scheduling tasks and tracking performance. By automating routine activities, the system reduces the need for manual intervention, thereby saving time and minimizing errors.

2.3 Comparison between existing system and proposed system

The comparative studies were conducted on three existing systems to the proposed system which is Online Salon Appointment and Management System of FOREVER18 Hair Salon. The first system is Natural Feel Hair Salon. In their booking appointment system, the customers are required to input their name, phone number, email and details of the appointments.

The second system is Hon Style Hair Salon. In their booking appointments system, the customers are required to select date and time and each slot of appointments is 30 minutes. The appointment process is continued with the summary of the appointment details. Customers are required to input vital information such as name, phone number and any specific appointment detail or requests.

The third system is Rave Hair Salon. In their booking appointment system, the customers are required to select the hair services first which are provided in a checklist form with the duration of time for every hair services. The appointment process is continued with the selection of date and time and each slot of appointments is 30 minutes. The summary of appointment details is displayed towards the customers and the customers are required to input the name, phone number any appointment details or requests. Table 1 shows the comparison of three existing system and proposed system.

Table 1 Comparison of existing system and proposed system

Features/Hair Salon	Natural Feel Hair Salon	Hon Style Hair Salon	Rave Hair Salon	FOREVER18 Hair Salon (Proposed System)
Register and Login	X	X	X	✓
Booking Appointment	✓	✓	✓	✓
Services	X	X	✓	✓
Customers	✓	✓	✓	✓
Invoices	X	X	X	✓
Reports	✓	✓	✓	✓
Employees	✓	✓	✓	✓
Products	✓	✓	✓	✓
Reviews	✓	✓	✓	✓
Abouts	✓	✓	✓	✓

Ten features have been selected for comparison with the developed system, encompassing 'Register and Login,' 'Booking Appointment,' 'Services,' 'Customers,' 'Invoices,' 'Reports,' 'Employees,' 'Products' and 'Reviews' and 'Abouts' sourced from the three different systems.

According to the table 1, the three existing systems lack the 'Register and Login' feature before the appointment process. In the proposed system, customers are required to register and log in before making appointments. This requirement serves to prevent unauthorized individuals from accessing the appointment system, ensuring that only the intended customers can use it. Besides, only Rave Hair Salon have the features of 'Services' which allows them to display their hair salon services to the public for customer access. Moreover, the three existing systems lack the "Invoices" feature, which includes details of services provided to customers. In contrast, my proposed system will not only generate invoices but also incorporate a comprehensive list of hair salon services and their respective prices.

3. Methodology

The methodology used in the development of proposed system is waterfall methodology. The waterfall model is characterized by its static nature, handling systems development in a linear and sequential fashion where each activity is completed before moving on to the next [5]. This means that each phase in the development process starts only after the preceding phase has been completed [6]. Utilizing the Waterfall Methodology offers advantages such as ensuring that the project scope aligns with the requirements and expectations of all stakeholders, implementing effective cost control and time management for all necessary activities and furnishing comprehensive documentation of the project's governing activities [7]. Figure 1 shows the phases in the waterfall model. The waterfall methodology consists of five phases for the development of proposed system which are planning, analysis, design, implementation and testing.

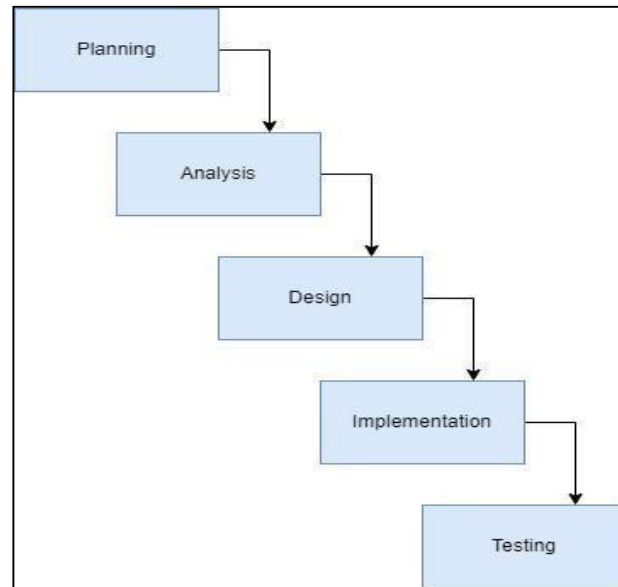


Figure 1: Phases in Waterfall model [8]

3.1 Planning Phase

The planning phase, which is also known as the feasibility phase is the phase where developers strategize and prepare for the impending project. The purpose of the planning phase is to collaboratively gather and comprehend project requirements. The activities conducted in this phase are proposed projects to the supervisor. Besides, the project schedule, activities and output of tasks is determined by developing a Gantt Chart, which can be found in Appendix A. Lastly, the gathering of requirements is a critical step that lays the foundation for the entire project. This involves conducting interviews with stakeholders to extract detailed information about their needs, expectations and objectives related to the project.

3.2 Analysis Phase

The analysis phase is a critical stage in the project lifecycle where a detailed examination of requirements and system specifications takes place. Besides, the activities of analyzed the existing system is conducted to map out the workflow of existing systems to identify bottlenecks and inefficiencies. Additionally, comparison between existing and proposed systems is conducted to identify potential enhancements, address shortcomings and ensure the implementation of a solution that aligns with current and future organizational needs.

3.3 Design Phase

The design phase is a pivotal stage where it involves planning and problem-solving to create a software solution [9]. During this stage system architects and designers create a comprehensive blueprint that outlines the structure, architecture and specifications of the software to be developed. Flowcharts are designed which can be found in Appendix. Additionally, Data Flow Diagrams (DFD) can be found in Appendix C. Lastly, Entity-Relationship Diagrams (ERD) can be found at Appendix D.

3.4 Implementation Phase

The implementation phase follows the design phase and marks the transition from planning to the actual construction of the software. It is a critical stage where the system design specifications are transformed into executable code. The purpose of the implementation phase is to bring the design to life by translating the conceptualized system architecture and functionalities into functional software.

3.5 Testing Phase

The testing phase is a crucial stage where the developed software undergoes systematic evaluation to ensure its quality, functionality and reliability. In the testing phase, various activities are undertaken which are functionality testing and user acceptance testing (UAT).

3.6 Software Development Activities and Output

The waterfall model comprises five phases which are Planning Phase, Analysis Phase, Design Phase, Implementation Phase and Testing Phase. Table 2 shows the software development activities and output in this section methodology.

Table 2 *Software Development Activities and Output*

Phase	Activities	Output
Planning	<ul style="list-style-type: none"> Proposed the project Determine the project schedule, activities and output Interview with owner of FOREVER18 Hair Salon 	<ul style="list-style-type: none"> Project Proposal Develop Gantt Chart Background information of FOREVER18 Hair Salon
Analysis	<ul style="list-style-type: none"> Analyze requirement of proposed system Analyze the existing Comparison between existing system and proposed system 	<ul style="list-style-type: none"> Project Scope and Functionalities of proposed system Analysis Report of existing system Comparison between existing system and proposed system
Design	<ul style="list-style-type: none"> Create flowcharts Design context diagrams Design Data Flow Diagrams (DFD) Design Entity-Relationship Diagrams (ERD) 	<ul style="list-style-type: none"> Flowchart Context Diagram DFD ERD
Implementation	<ul style="list-style-type: none"> Implement developed modules into system Implement database connection into system 	<ul style="list-style-type: none"> Proposed system is developed with all modules required Proposed system is connected to database system
Testing	<ul style="list-style-type: none"> Functionality Testing User Acceptance Testing 	<ul style="list-style-type: none"> Functionality Results User Acceptance Testing Results

4. Analysis and Design

The system analysis was performed prior to the development of the proposed system. This section presents the interface design of FOREVER18 Hair Salon.

4.1 System Requirement Analysis

System Requirement Analysis is referred to the identification of user expectations for a new or modified products. This section presents the functional requirements analysis, non-functional requirements analysis and user requirements analysis.

4.1.1 Functional Requirements

Functional requirements are specific features and capabilities that a proposed system must possess to meet the needs of the users and fulfill the intended purpose. Table 3 shows the functional requirements of proposed system.

Table 3 *Functional Requirements of Proposed System*

No	Module	Description
1	Register account and Login	<ul style="list-style-type: none"> Allow the new customers to register a new account before login Allow the existing customers to login with the username and password Redirect the valid customers to the making appointments process when successful login Redirect the administrator to the dashboard of proposed system
2	Booking Appointment	<ul style="list-style-type: none"> The customers can book the appointment for the hairsalon based on date and time The administrator can manage all the appointments made by customers
3	Services	<ul style="list-style-type: none"> The administrator can manage the services that are publish on the website of the system
4	Customers	<ul style="list-style-type: none"> The administrator can manage the customer list in the proposed system
5	Invoices	<ul style="list-style-type: none"> The administrator can generate the invoices towards the hair salon services of customers
6	Reports	<ul style="list-style-type: none"> The administrator can generate the sales report
7	Employees	<ul style="list-style-type: none"> The administrator can manage the employee information
8	Products	<ul style="list-style-type: none"> The administrator can manage the products of the salon
9	Reviews	<ul style="list-style-type: none"> The customers can give the reviews on website of FOREVER18 Hair Salon The administrator can review and respond the reviews of customers.
10	Abouts	<ul style="list-style-type: none"> The administrator can manage the content of the About Us page of FOREVER18 Hair Salon

4.1.2 Non-Functional Requirements

Non-Functional requirements refers to the aspects of a proposed system that do not pertain to specific behaviors or features but rather describe the overall quantities and functionalities that the proposed system must possess. Table 4 shows the non-functional requirements of proposed system.

Table 4 *Non-Functional Requirements of Proposed System*

No	Requirement	Description
1	Performance	<ul style="list-style-type: none"> The proposed system must consistently deliver responsive and efficient user experiences for ensuring prompt and seamless interactions for all users The system should support a minimum of 1000 concurrent users to ensure optimal performance during peak usage periods
2	Operational	<ul style="list-style-type: none"> The proposed system should load within a maximum of 1 minute which optimizes operational efficiency and ensures a seamless user experience.
3	Security	<ul style="list-style-type: none"> The proposed system is implemented with user-friendly design principles to enhance accessibility while maintaining robust security measures which ensures a balance between usability and system protection.
4	Cultural and political	<ul style="list-style-type: none"> The system should be compatible with various web browsers by promoting inclusivity and accessibility across different cultural and political contexts.

4.1.3 User Requirement Analysis

User requirements, also known as user needs which are the specifications that describe the functionalities and features of a proposed system should have from the perspective of end-users. Table 5 shows the user requirements of the proposed system.

Table 5 *User Requirements of the proposed system*

User	Description
Customers	<ul style="list-style-type: none"> Customers must be able to register a new account with a valid username and password Existing customers should be able to log in using their accounts Customers will be redirected to the appointment booking process after successful login in the proposed system Customers can book appointments for the hair salon based on date, time slot and hair cutter Customers can provide reviews on the salon's website Customers can cancel the appointments of hair salon Customers can track back the appointments history in the system
Administrator	<ul style="list-style-type: none"> Administrators must have a secure account with a valid username and password Administrators will be redirected to the dashboard of the proposed system

Table 5 User Requirements of the proposed system (cont)

- Administrators can manage and view all appointments made by customers
- Administrators can manage the services published on the salon’s website
- Administrators can generate invoices for salon services provided to customers
- Administrators can manage employee information in the proposed system
- Administrators can manage information related to suppliers and products of the hair salon
- Administrators can review and respond the customer reviews

4.2 DFD Context Diagram (DFD CD)

Figure 2 shows the DFD Context Diagrams of Online Salon Appointments and Management System where customers can book appointments while the administrator is responsible for managing the appointments of customers.



Figure 2: DFD Context Diagrams (DFD CD)

5.0 Implementation and Testing

Implementation and Testing are critical phases in development into real-world environments. During implementation, the system is configured and integrated with modules requirements and followed by testing phases to identify and resolve any issues to ensure system’s reliability and performance.

5.1 Implementation

The primary goal of the implementation phase is to ensure that Online Salon Appointment and Management System of FOREVER18 Hair Salon is developed in accordance with the specifications outlined in the system analysis and design phase. Figure 3 shows the interface of the home page in FOREVER18 Hair Salon. It consists of the navigation bar as the header, auto-slideshow advertisements and the footer which contains information of FOREVER18 Hair Salon.

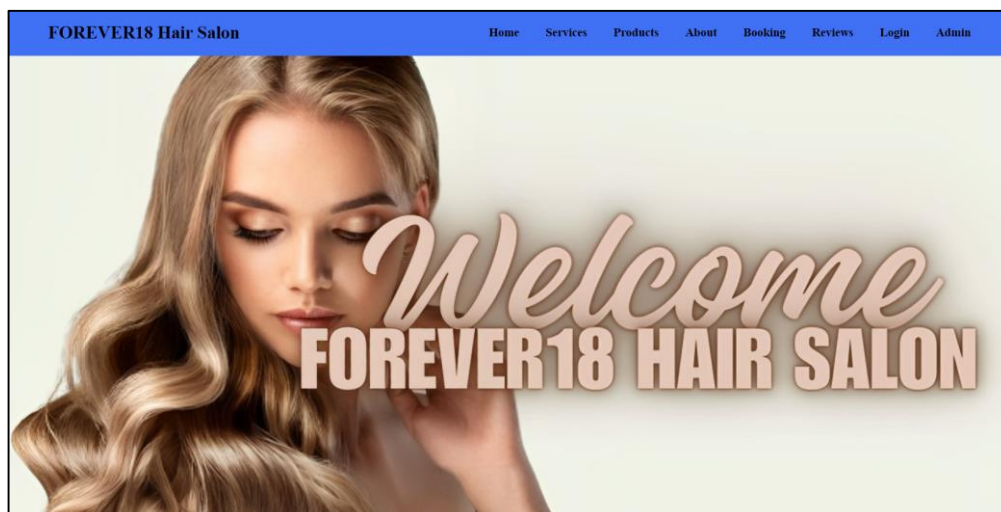


Figure 3: Interface of Home Page Module in FOREVER18 Hair Salon

The process of booking appointments starts from selecting a date in the Calendar System. Figure 4 shows the interface of the calendar system of FOREVER18 Hair Salon.

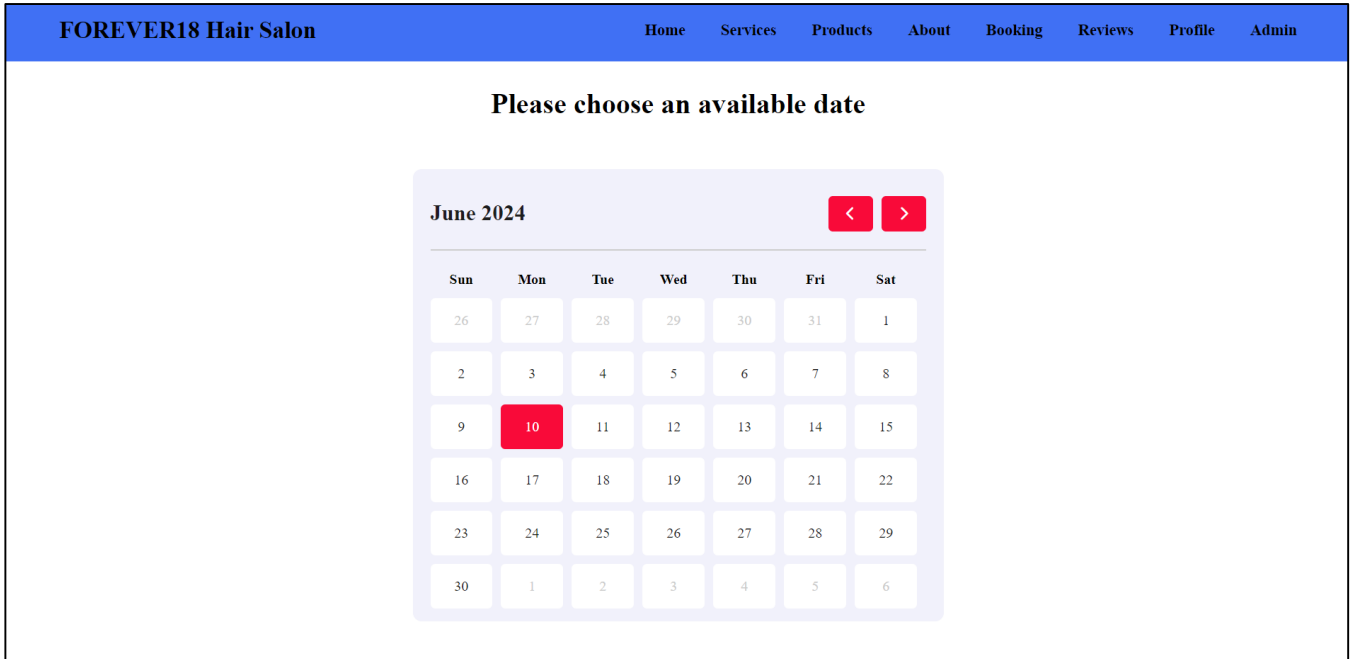


Figure 4: Interface of Calendar System of FOREVER18 Hair Salon

The booking appointments process is continued by selecting the available time slots. Figure 5 shows the interface of time slots of FOREVER18 Hair Salon.

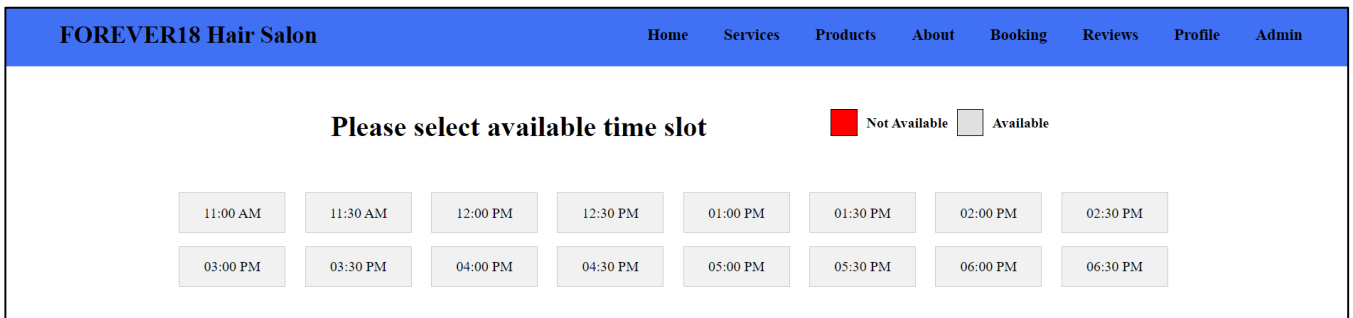


Figure 5: Interface of Time Slots of FOREVER18 Hair Salon

The process of booking appointments then is continued with the selection of hair cutter. Figure 6 shows the interface of hair cutter of FOREVER18 Hair Salon.

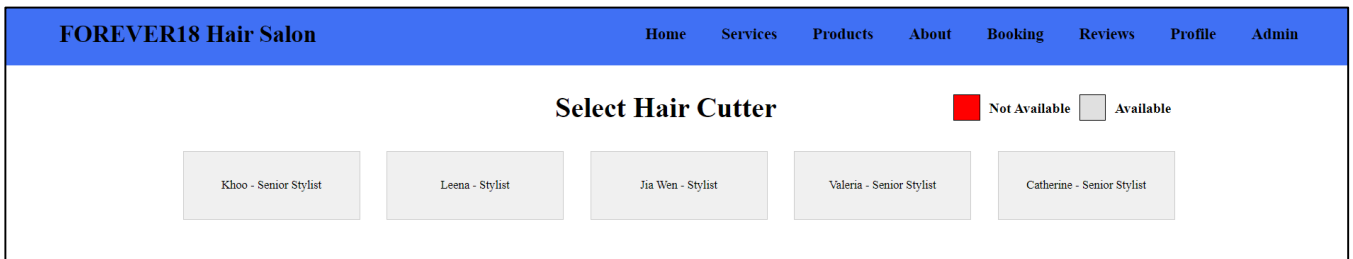


Figure 6: Interface of Hair Cutter of FOREVER18 Hair Salon

The process of booking appointments is lastly navigate to appointments form of FOREVER18 Hair Salon. Figure 7 shows the interface of appointments form of FOREVER18 Hair Salon.

Please filled up this form for booking appointments

Name:

Email:

Others:

Name of Hair Cutter:

Services:

- Hair Cutting
- Hair Colorings
- Hair & Scalp Treatment With Organic Essential Oils

Products:

- Aveda Botanical Repair
- Aveda Be Curly Conditioner
- Aveda Invati Advanced Scalp Revitalizer
- Aveda Color Control Shampoo
- Aveda Rosemary Mint Purifying Shampoo

Phone Number:

Date:

Time:

[Book Appointments](#)

Figure 7: Interface of Appointments Form of FOREVER18 Hair Salon

The booked appointments list is arranged and displayed in the appointment list in the administrator side. This is to provide a better view of appointments of customers for the administrator. Figure 8 shows the interface of booked appointments list of FOREVER18 Hair Salon.

Booked Appointments List Search appointments [Search](#)

Name	Services	Products	Phone	Date	Time	Action
Xuan	Hair Cutting		011-20715887	2024-06-19	11:30 AM	Appointment confirmed!
Xuan	Hair Cutting		011-20715887	2024-06-19	12:30 PM	Appointment confirmed!
Khoo Zi Xuan	Hair Cutting	Aveda Botanical Repair	011-20715887	2024-06-15	05:30 PM	Confirm Delete
Syu	Hair Cutting, Hair & Scalp Treatment With Organic Essential Oils	Aveda Rosemary Mint Purifying Shampoo	011-20715887	2024-06-14	01:00 PM	Appointment confirmed!
oswal8	Hair Cutting	Aveda Botanical Repair	011-20715887	2024-06-12	01:30 PM	Appointment confirmed!
Khoo Zi Xuan	Hair Cutting		011-20715887	2024-06-09	05:30 PM	Confirm Delete

Showing 1 of 7 pages

First Previous 1 2 3 4 5 6 7 Next Last

Figure 8: Interface of Booked Appointments List of FOREVER18 Hair Salon

The customer lists of FOREVER18 Hair Salon are arranged and displayed in the customer list. In this module, the administrator are able to sold products and generate invoices to the customers. Figure 9 shows the interface of customer lists of FOREVER18 Hair Salon.

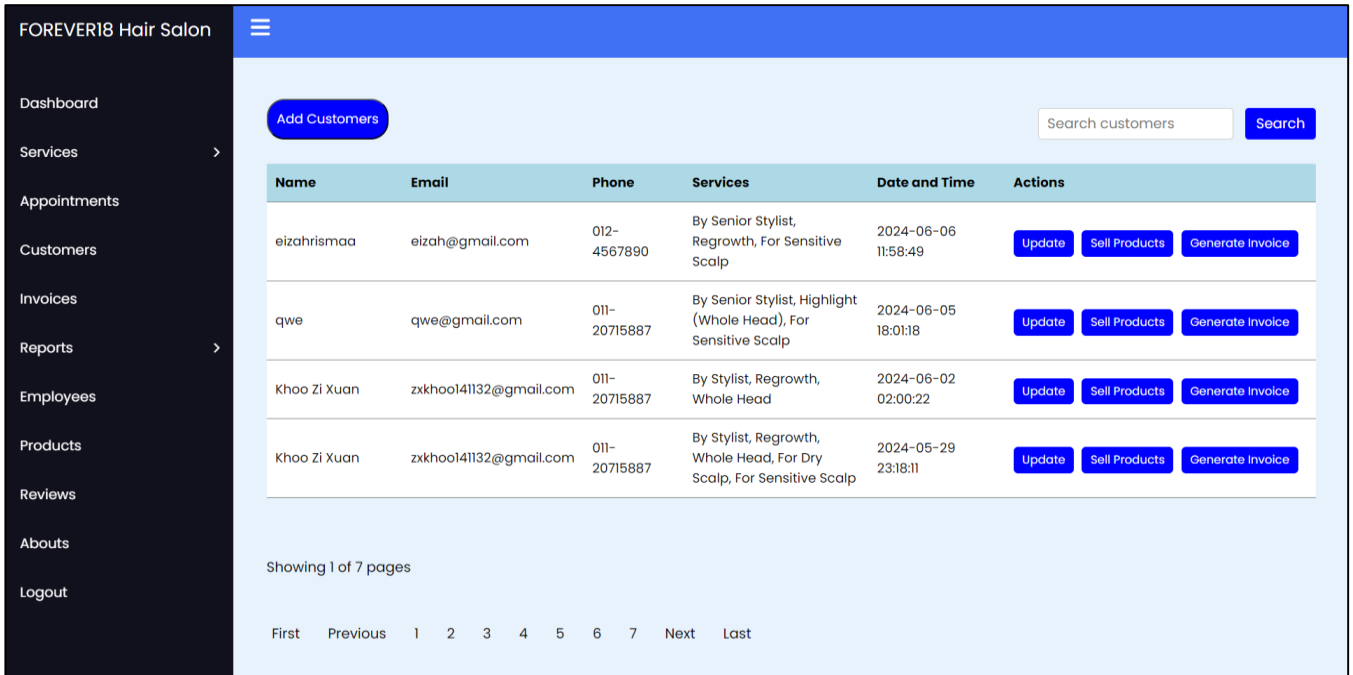


Figure 9: Interface of Customer Lists of FOREVER18 Hair Salon

The invoices generated to the customers are displayed in the invoices list. In the invoices, the personal information of customers, services assigned and product sold is shown along with the respective price and total price. Figure 10 shows the interface of invoices lists of FOREVER18 Hair Salon.

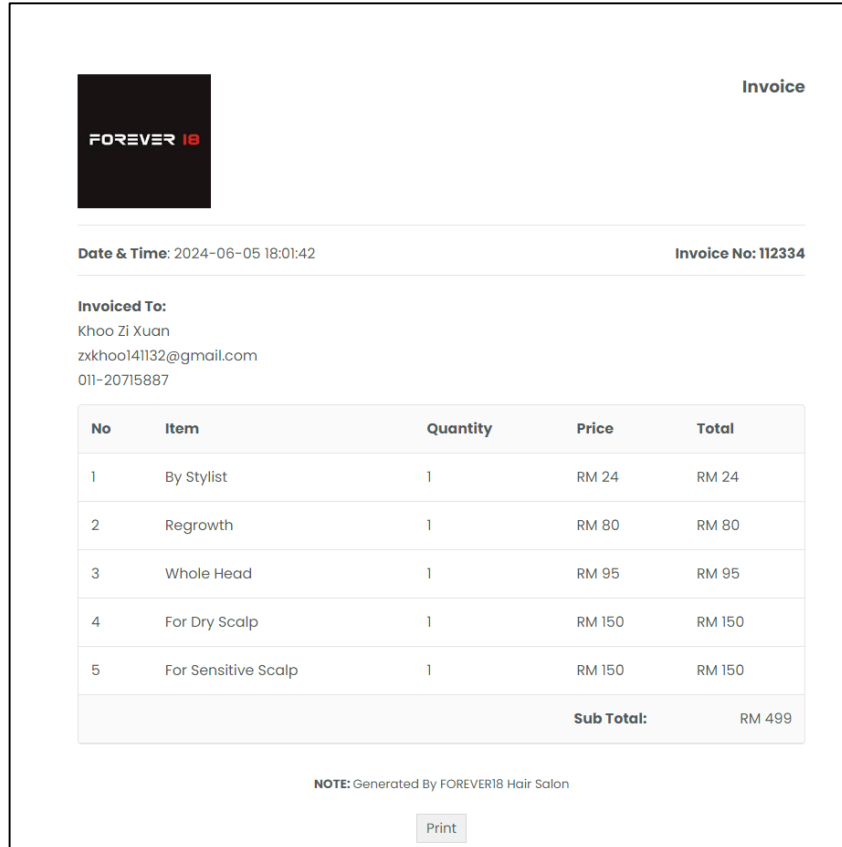


Figure 10: Interface of Invoices Lists of FOREVER18 Hair Salon

The system is able to track the service popularity trends by using the pie chart for a better data visualization. Figure 11 shows the interface of Service Popularity Trends in Pie Chart of FOREVER18 Hair Salon.

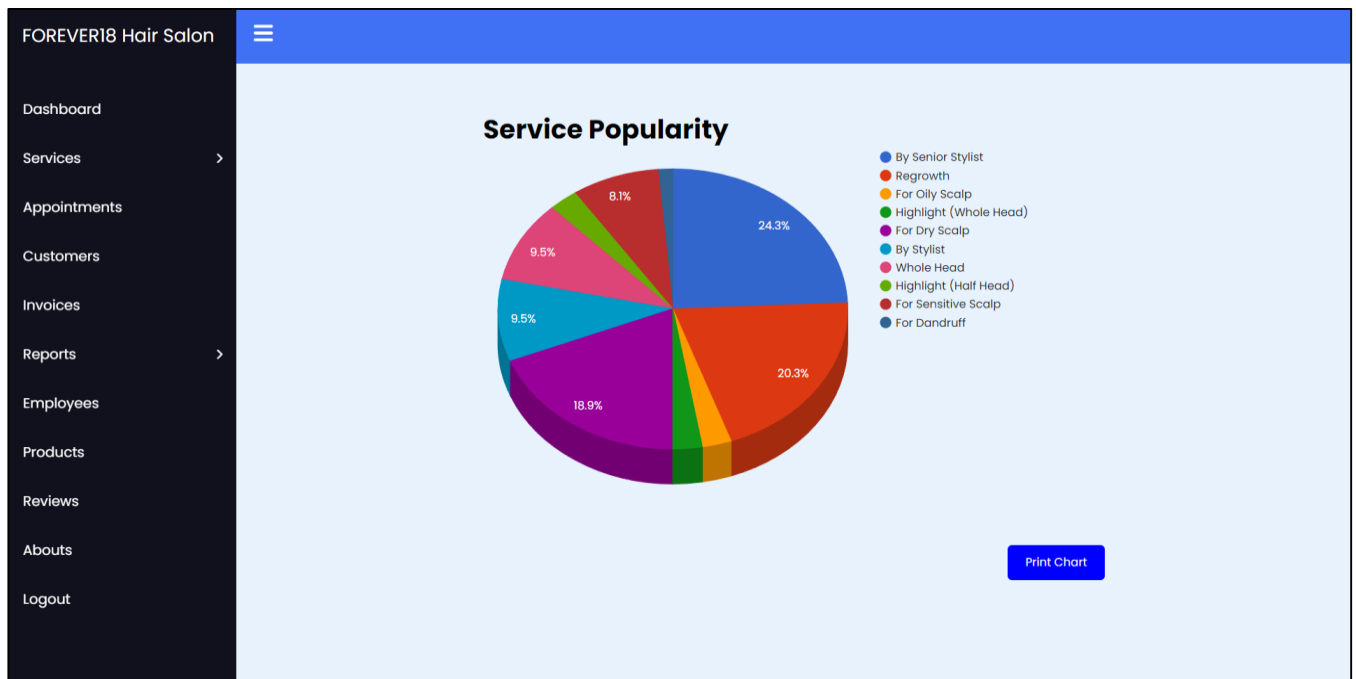


Figure 11: Interface of Service Popularity Trends in Pie Chart of FOREVER18 Hair Salon

5.2 System Functionality

The system testing encompasses two types of testing which are functional testing and user acceptance testing.

5.2.1 Functional Testing

Functional testing examines all modules and functions of the system to ensure that the system operates exactly as defined in the earlier phase. The test plan is used to support functional testing. The following sections describe the test plans developed for the system testing.

5.2.1.1 Test Plan of Booking Appointments Module

The booking appointments of customers is based on the date, time slots and hair cutter availability. Table 6 shows the test plan for booking appointments module in FOREVER18 Hair Salon.

Table 6 Test Plan for Booking Appointments Module

Test Cases	Expected Output	Actual Output
T6-1 Booking appointments for at least one day forward	The customers are able to book appointments based on available date, time slots and hair cutter.	Success
T6-2 Booking appointments for past dates	Alert messages appear with message "The past dates cannot be booking for appointments"	Success
T6-3 Booking appointments for present dates	Alert messages appear with message "Please select a date at least one day forward"	Success

5.2.1.2 Test Plan of Appointments Module of Administrator Side

The appointments module enables the administrator to manage the operation of confirming the attendance of customers and deletion of customers from the appointments list. Table 7 shows the test plan for appointments module of administrator side in FOREVER18 Hair Salon.

Table 7 Test Plan for Appointments Module of Administrator Side

	Test Cases	Expected Output	Actual Output
T7-1	Confirm appointments	Bring the administrator to the Customer Module for assigning hair services	Success
T7-2	Delete appointments	Alert messages appear with message "Delete appointments successfully"	Success

5.2.1.3 Test Plan of Customers Module

The customers module enables the administrator to manage the operation of adding customers, update services assigned to customers, sold hair salon products to customers and generate invoices to customers. Table 8 shows the test plan for customers module in FOREVER18 Hair Salon.

Table 8 Test Plan for Customers Module

	Test Cases	Expected Output	Actual Output
T8-1	Adding online booking customers and walk in customers	Alert messages appear with message "New customers insert successfully"	Success
T8-2	Update services assigned to customers	Alert messages appear with message "Update services successfully"	Success
T8-3	Sold hair salon products to customers	Alert messages appear with message "Product sold successfully"	Success
T8-4	Generate invoices to customers	The invoices which consists of customers' information, hair services assigned and product sold together with the total price	Success

5.3 User Acceptance Testing

The user acceptance testing is carried out to make sure the developed system fulfill the client needs and requirements. There are ten users which involved in this user acceptance testing. The questionnaires is divided into two sections which are Section A and Section B. Section A is asked directly towards the system functionality on the customer side while Section B is pointed towards the functionality in administrator side. This questionnaire contains the scale with 1 = very disagree, 2 = disagree, 3 = moderate, 4 = agree and 5 = very agree. The respondents are required to answer the questionnaire based on the scale provided. The feedback collected from the respondents will be analyzed in this section.

5.3.1 User Acceptance Testing of Section A

There are seven questions that has been asked towards the respondents. Table 9 shows the user acceptance result of section A which is customers side.

Table 9 User Acceptance Result of Section A

User Acceptance Testing	Number of respondents (1 – 5 Scale Rating)				
	1	2	3	4	5
Did you able to login into system without any issues	0	0	0	2	8
Did you able to book the appointments based on the available date, time slots and hair cutters	0	0	0	4	6
Did you able to review back your appointments in the system	0	0	0	5	5
Did you able to add reviews in the system	0	0	0	2	8
Did you receive an email notification for resetting password account	0	0	0	2	8
Did the system has user-friendly interface	0	0	0	4	6
Did the system prevent SQL Injection	0	0	0	4	6

5.3.2 User Acceptance Testing of Section B

There are five questions that has been asked towards the respondents. Table 10 shows the user acceptance result of section B which is administrator side.

Table 10 User Acceptance Result of Section B

User Acceptance Testing	Number of respondents (1 – 5 Scale Rating)				
	1	2	3	4	5
Did the dashboard clearly display the information to be read	0	0	0	5	5
Did the progress from booking, assigning hair services and generate invoices to customers work smoothly	0	0	0	4	6
Did the reports modules clearly track the current trends of hair services	0	0	0	5	5
Did the system has user-friendly interface	0	0	1	3	6
Did the system prevent SQL Injection	0	0	2	2	6

6.0 Conclusion

In conclusion, the development of Online Salon Appointment and Management System of FOREVER18 Hair Salonare developed to eliminate scheduling conflicts and missed appointments. Besides, the proposed system able to help the owner of FOREVER18 Hair Salon to gain insights into the salon service trends. Lastly, the proposed system is developed to track the customer preferences and past services to provide a more personalized services to enhance the customer satisfaction. For the suggestion of the continuation of the proposed system, the integration of payment gateway API features to enhance the overall functionality of the system.

6.1 Achievement of the Overall Objectives

The achievement of the overall objectives are the Online Salon Appointment and Management System are able for the customers to book appointments and administrator are able to manage all the hair salon operation and tracking hair services trends. The system's ability to analyze and report on service popularity and customer preferences

provides valuable insights, enabling better strategic decisions.

6.2 System Advantages

The advantages of the system are the system reduces the missed appointments and scheduling conflicts of the appointments of customers. Besides, the system can help to gain insights of the hair service trends by tracking the service popularity and product popularity to enhance the salon operation benefits. Besides, the personalized services based on the customer appointment history have improved the customer satisfaction and loyalty.

6.3 System Disadvantages

The disadvantages of the system are the system does not show an alert message or notifications to the administrator with real time booking appointments of the customers, which could delay response to the customer needs. The potential solution is to integrate the real-time notification features to keep administrator informed instantly.

6.4 Recommendations

The recommendations of the system are implementing the payment gateway API that enables the customers to directly paid towards the hair services and hair salon products that the customer booked. Besides, the account lockout policy can be implemented into Online Salon Appointment and Management System of FOREVER18 Hair Salon to avoid brute-force attack. Lastly, adding the real-time notifications for booking appointments will ensure administrators are immediately aware of new bookings.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

This journal requires that all authors take public responsibility for the content of the work submitted for review. The contributions of all authors must be described in the following manner:

*The authors confirm contribution to the paper as follows: **study conception and design:** Khoo Zi Xuan, Nurul Aswa Binti Omar; **data collection:** Nurul Aswa Binti Omar; **analysis and interpretation of results:** Khoo Zi Xuan, Nurul Aswa Binti Omar; **draft manuscript preparation:** Nurul Aswa Binti Omar. All authors reviewed the results and approved the final version of the manuscript.*

An author name can appear multiple times, and each author name must appear at least once. For single authors, use the following wording:

The author confirms sole responsibility for the following: study conception and design, data collection, analysis and interpretation of results, and manuscript preparation.

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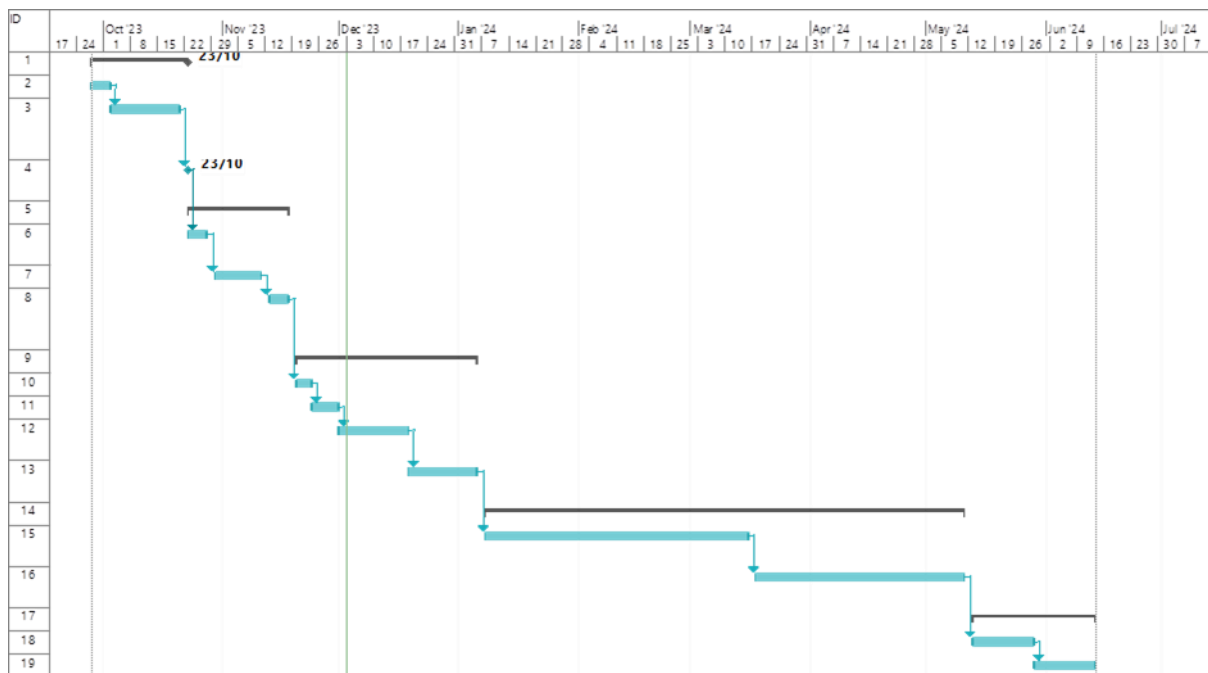
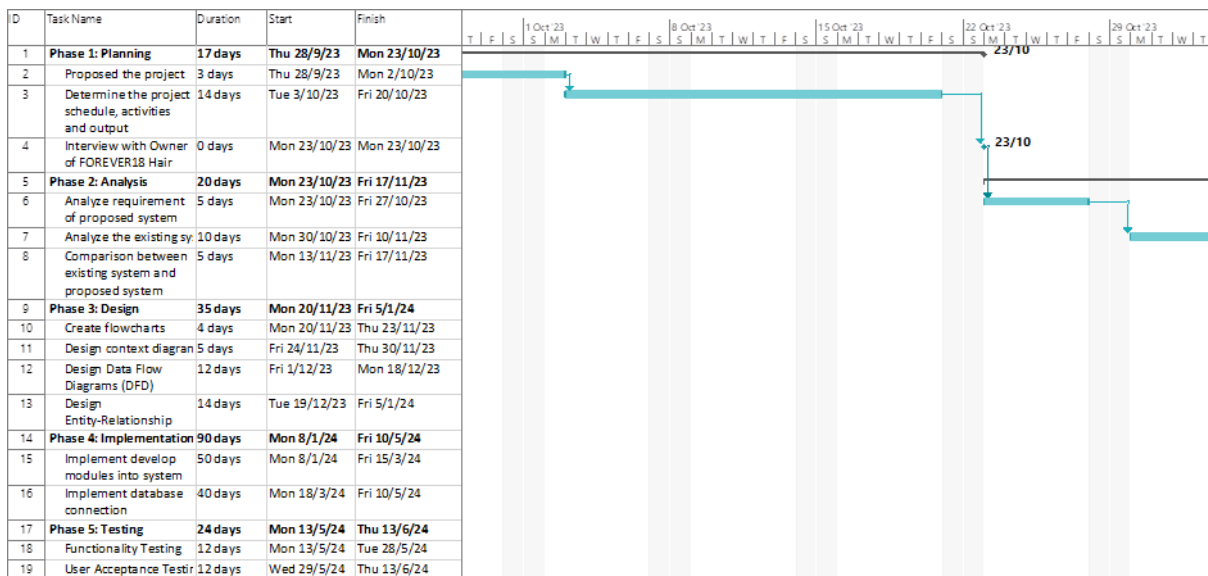
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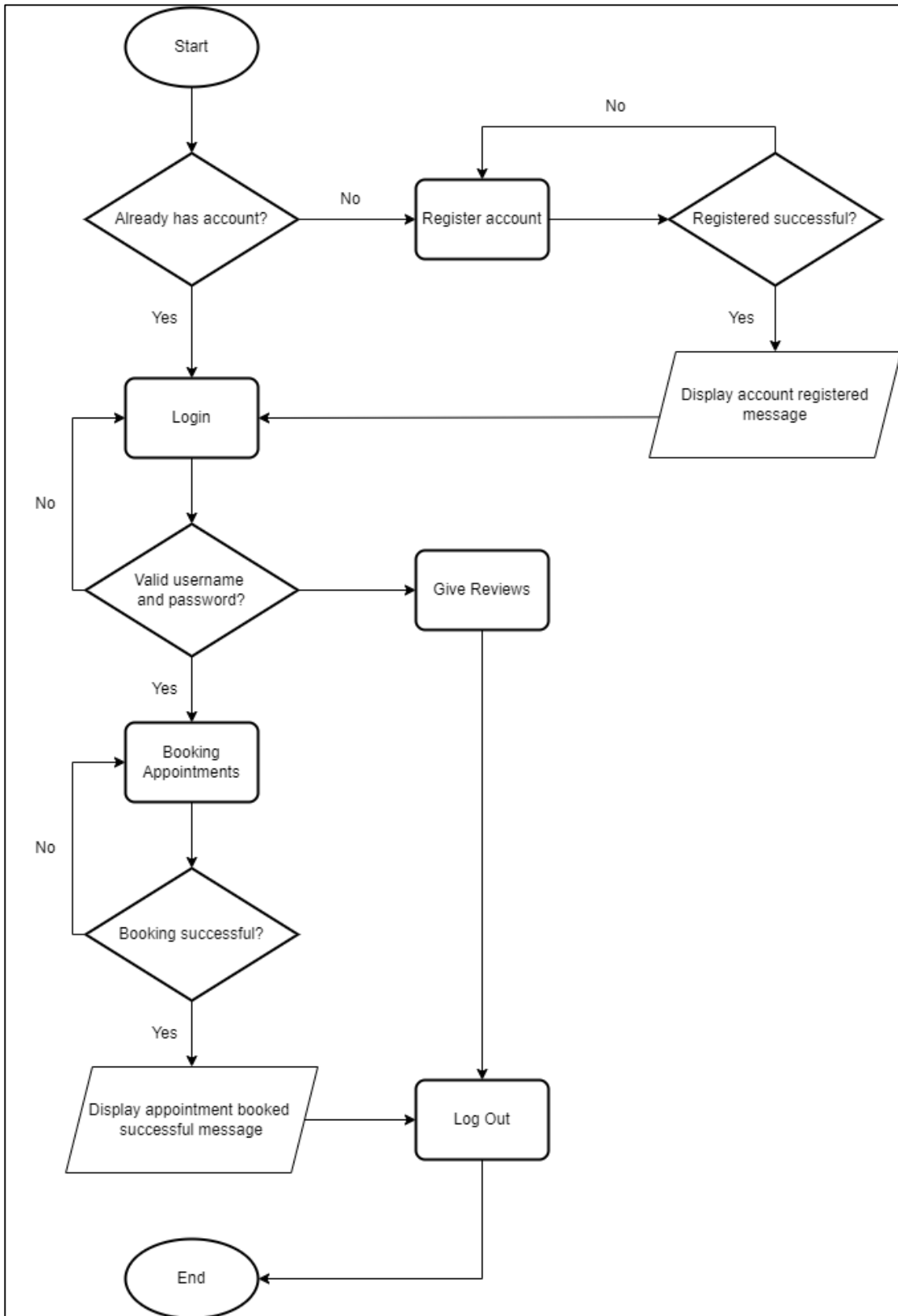
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Appendix A: Gantt Chart



Appendix B: Flowchart



Flowchart of Customer Side

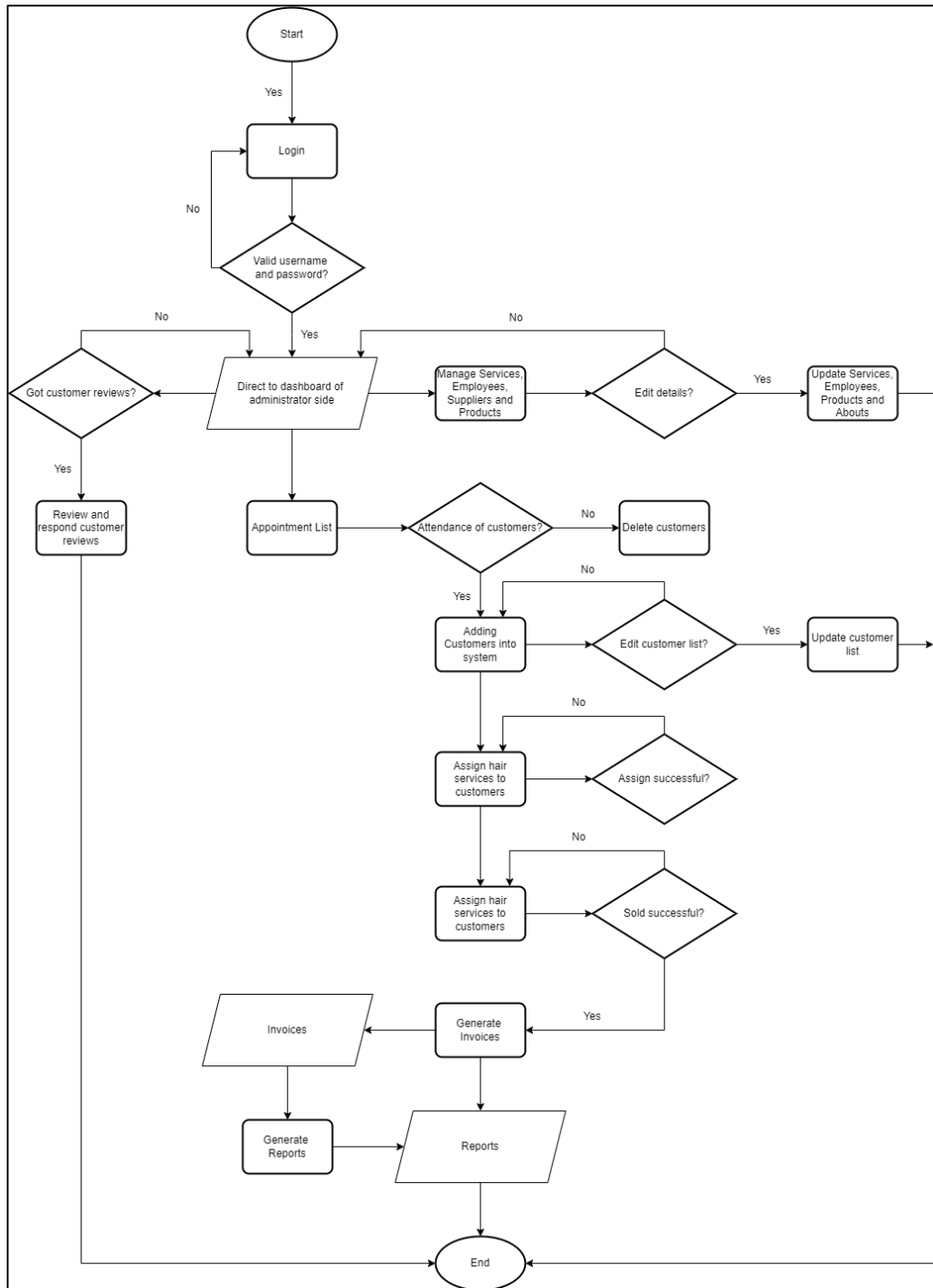
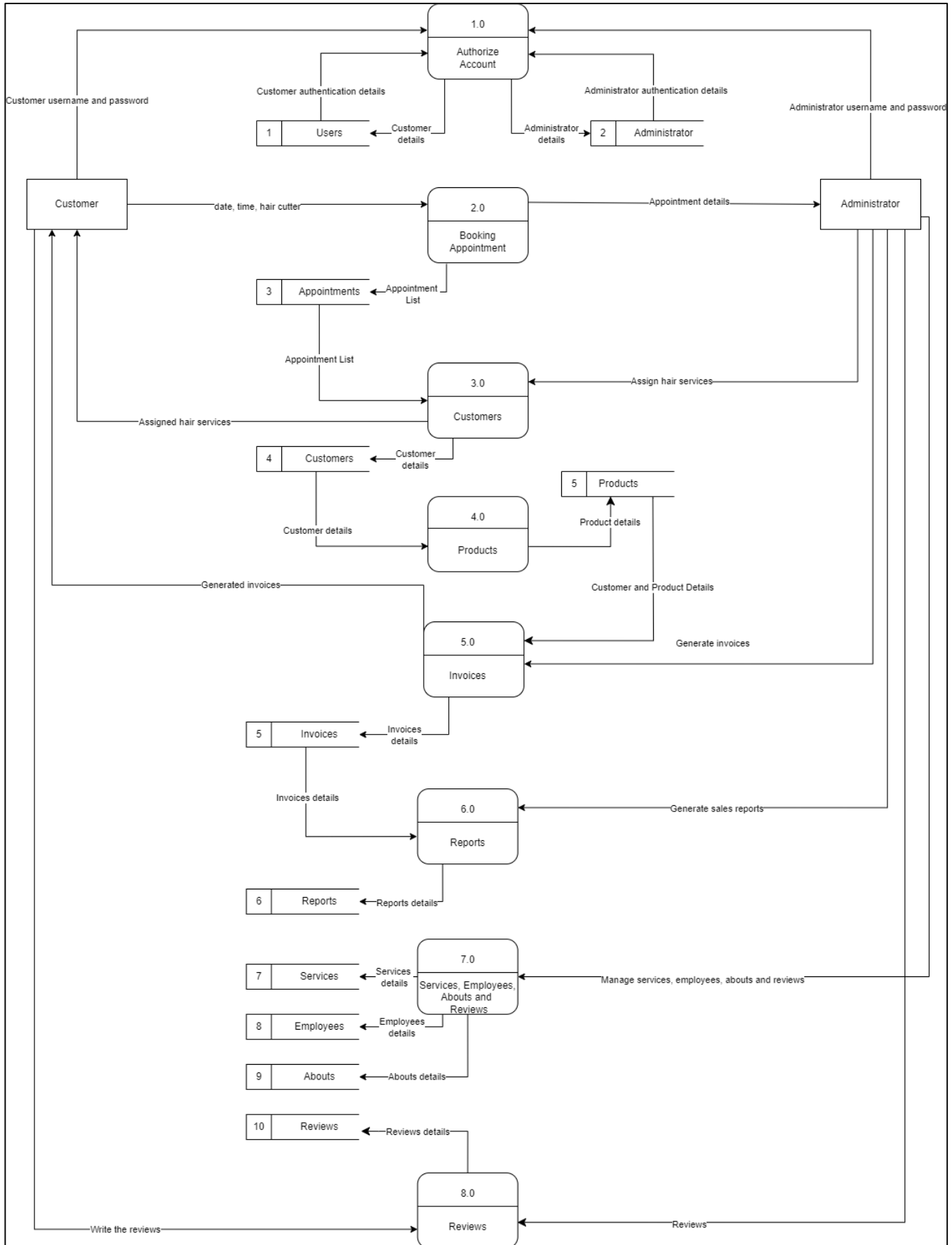


Figure: Flowchart of Administrator Side

Appendix C: Data Flow Diagram Level 0



Appendix D: Entity-Relationship Diagram

