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Development of a Web-based Application to Enhance Salon Management for L Six Hair Studio

Lim Ka Huat[1], Rosmamalmi Mat Nawi[1*]

[1]Fakulti Sains Komputer dan Teknologi Maklumat,
Universiti Tun Hussein Onn Malaysia, Parit Raja, Batu Pahat, 86400, MALAYSIA

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Abstract: The L Six Hair Studio Management System is a web-based solution designed to streamline operations for employers, employees, and customers in the hairdressing business. This study aims to assess the effectiveness of the system in improving operational efficiency and customer experience. The research objectives include evaluating the system's impact on appointment management, inventory management, and overall operational efficiency. The study employs the waterfall methodology, following a sequential approach that involves requirements gathering, system design, implementation, testing, and deployment. Data for the study is collected through interviews with studio owners, employees, and customers, as well as system-generated data. Key findings indicate that the L Six Hair Studio Management System significantly enhances operational efficiency, streamlines appointment handling, and optimizes inventory management. The discussion highlights the importance of user-friendly interfaces and efficient functionalities and suggests future work to explore system customization and its long-term impact on the hairdressing business.

Keywords: Hair Salon Management System, Programming Language, Web-based, Online appointment booking, Revenue tracking and reporting

1. Introduction

This comprehensive management system played a pivotal role in organizing L Six Hair Studio's architecture and processes, enabling systematic actions, and ensuring smooth operations to achieve planned results in today's modern business environment [1]. However, the barber shop located in Kluang Johor, Malaysia, faced several challenges due to the absence of a comprehensive management system. The studio relied on manual record-keeping, where staff and employers manually input and managed data using traditional paper-based methods. This outdated approach not only diminished work efficiency but also posed environmental concerns. Moreover, manual data entry errors were prone to occur, hindering accurate information management. Recognizing the need for an efficient and sustainable solution, the L Six Hair Studio Management System was developed to assist the employer in effectively managing the business.

**Corresponding author: rosmamalmi@uthm.edu.my*

The L Six Hair Studio Management System offered a digitalized approach to data management, eliminating the risk of manual data entry errors and ensuring the security and accessibility of crucial information. By transitioning from traditional paper management to this advanced system, the studio significantly enhanced its operational efficiency. Employers could effortlessly access and view historical data, track appointments, manage staff schedules, and monitor salon performance from a centralized platform. The system streamlined appointment handling, mitigating the occurrence of overlapping appointments, which often adversely affected the studio's reputation and led to longer guest waiting times and potential loss of repeat customers.

Moreover, the L Six Hair Studio Management System empowered both the employer and staff by providing a comprehensive toolset to optimize salon operations. From automated appointment booking for customers to improved inventory management and real-time analytics, this innovative system equipped the studio with the necessary features to enhance its competitive edge. By allowing customers to book appointments conveniently online and offering a seamless and modern salon experience, L Six Hair Studio attracted and retained a larger customer base, thus boosting its overall competitiveness within the dynamic hairdressing industry.

The implementation of the L Six Hair Studio Management System offered a transformative solution to the challenges faced by L Six Hair Studio. This advanced web-based system not only eliminated manual data entry errors and improve operational efficiency but also enhanced the studio's competitiveness by providing a seamless customer experience. By embracing this comprehensive management system, L Six Hair Studio positioned itself at the forefront of the industry, delivering exceptional services while staying ahead of evolving market trends.

The rest of the paper is structured as follows. In Section 2, the existing system and the proposed system will be compared in their features. Section 3 will outline the methodology employed in this project. Moving on to Section 4, the analysis and design, implementation, and functional testing results will be defined. Lastly, the conclusion section will provide a summary and final remarks for this project.

2. Literature Review

This section will discuss the traditional manual record method, Software Development Life Cycle (SDLC), and Comparison with the Existing Related System. The next section will discuss the

2.1 Traditional manual record method

Despite its familiarity, L Six Hair Studio still relies on a paper-based recording method, which poses numerous drawbacks for users. This traditional approach lacks the ability to back up data, potentially leading to the loss of valuable customer information unless additional copies are painstakingly made. Furthermore, retrieving historical records becomes a cumbersome task as users must manually search through pages. In contrast, a computerized management system offers swift keyword-based searches, allowing instant access to customer information and appointment records. Additionally, during peak hours or festive seasons such as Hari Raya Aidilfitri, Chinese New Year, and Deepavali, manually accepting appointments over the phone and recording them on paper becomes challenging. To overcome these limitations, our computerized L Six Hair Studio system provides secure data storage, and automatic data backups, and greatly enhances efficiency and productivity by streamlining information retrieval and managing customer appointments effectively.

2.2 Software Development Life Cycle (SDLC)

The Software Development Life Cycle (SDLC) is a vital framework that outlines the project's journey from inception to completion, ensuring a smooth and well-organized development process. L Six Hair Studio Development System has opted to utilize the Waterfall model as its SDLC approach. The Waterfall model operates on a sequential basis, where each stage follows the completion of the previous

one in a linear fashion. This model is characterized by a clear progression from one phase to another, resembling a waterfall flowing downwards. In the context of the L Six Hair Studio Management System, the Waterfall model proves suitable due to its absence of overlapping phases, making it easier to plan and manage the development process efficiently. The key stages involved in this model, such as Requirement Gathering and Analysis, System Design, Implementation, Integration and Testing System, Deployment, and Maintenance, are systematically executed one after another, ensuring a comprehensive and controlled development process.

By adopting the Waterfall model for the development of the L Six Hair Studio Management System, the team benefits from a simplified and straightforward approach. The model's linear structure allows for a clear understanding of the project's progress, as each stage must be completed before moving on to the next. This simplicity makes it easier to plan and allocate resources effectively, ensuring a smooth development process. Additionally, the Waterfall model is well-suited for projects like L Six Hair Studio Management System, where the phases do not overlap and have well-defined requirements. With its systematic and logical progression, the Waterfall model provides a solid foundation for the successful development and implementation of the management system, meeting the specific needs and requirements of L Six Hair Studio.

2.3 Comparison with the Existing Related System

The features between the four existing related systems which are ELLE Hair Studio [2], Hareta Hair Studio [3], Studio M KSL [4], and M Concept Hair Salon [5], and the proposed system are compared in Table 1 as shown below.

Table 1: Comparison with the Existing Related System

Features	ELLE	Hareta	Studio M	M Concept	Proposed System
Login	X	X	X	X	✓
Logout	X	X	X	X	✓
Service	✓	✓	✓	✓	✓
Appointment	✓	X	X	X	✓
Product	X	X	X	X	✓
Contact Us	✓	✓	✓	✓	✓
Achievement	✓	X	X	X	X
About Us	✓	✓	✓	✓	✓
Gallery	✓	✓	✓	X	X
News & Event	✓	X	X	X	X

Comparing the proposed system to the four existing systems, there are no login and logout features for the admin and three of the existing systems do not have appointment features. Besides that, there is only one existing system that sells products on client-server. Most of the existing systems also do not include achievements, news, and event characteristics.

Based on the comparison between the existing related systems, the conclusion that can be made is that all of the existing related systems do not have the ‘Login’ and ‘Logout’ features for admin but the ‘Services’ feature have existed for all existing related systems and the proposed system. Furthermore,

there is only one existing related system and the proposed system will have the feature of 'Appointment'. After that, the only existing system, the M concept, and the proposed system will have a 'Product' feature to allow customers to buy the hair studio's products. Moreover, all of the existing related systems and proposed systems do not have the 'Achievement' feature except ELLE Hair Studio. Then, all of the existing related systems will have the features, 'Contact Us' and 'About Us' included in the proposed system. In addition, all of the existing related systems have the feature of 'Gallery' except M concept Hair Studio and the proposed system. Last but not least, there is no 'news & event' feature for all existing related systems and the proposed system except ELLE Hair Studio.

3. Methodology

This chapter focuses on the implementation of the Waterfall Model as the chosen Software Development Life Cycle (SDLC) approach for this project. The Waterfall Model follows a sequential and linear progression, ensuring a well-structured and organized development process. The chapter also explores the System Development Workflow, outlining the key stages involved, from requirement gathering to deployment and maintenance, to ensure a disciplined and efficient development of the software solution.

3.1 Waterfall Model

The Waterfall Model was the initial process model introduced in software development, often referred to as a "linear-sequential life cycle model" [6]. It is highly user-friendly and easy to comprehend. In the waterfall model, there is no overlap between stages [7], as each phase must be completed before the next one can commence. This model serves as the foundation for the first-ever SDLC methodology in software development, presenting a clear and linear sequential flow of the development process. The distinct characteristic of the waterfall model is its non-overlapping stages, ensuring a systematic and orderly progression.

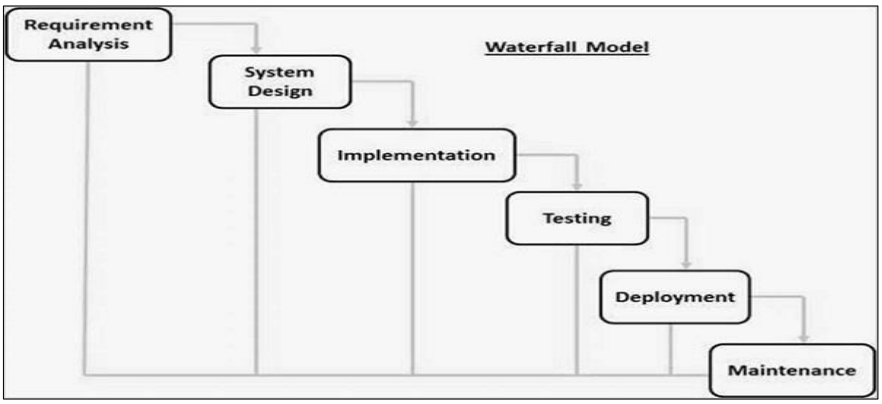

Figure 1: Waterfall Model

3.2 System Development Workflow

There are a total of six phases in the Waterfall model as shown in Table 2, each phase has its assignment and output that need to be produced during the entire project development. Besides that, the output had been completed within the specific days that have been given.

Table 2: System Development Workflow

Phase	Task	Output
Planning	• Proposed the project • Determine the project planning, problem statement, and expected outcome • Run an effective meeting with users	• Project proposal • Develop a Gantt Chart based on the project planning • Analysis of requirements of the management system to the admin
Analysis	• Compare four similar existing systems with the proposed systems • Analyze the interview and survey result	• Survey results face to face • Comparison of four similar existing systems with the proposed system
Design	• Analysis of hardware and software needed • Make sure hardware fulfills the minimum requirement of software • Deciding the programming language that will be used to develop the management system	• The hardware meets the minimum requirements of the software • PHP language was selected to develop the web-based management system
Implementation	• Implement coding based on user requirements	• Design a friendly user interface • All of the functional modules work well.
Testing	• Verify that the management system meets user requirement • Make sure the code can be executed well	• Fix bugs and errors in coding • Fulfill all of the user requirements
Deployment	• Public the customer site • Teach the user to manipulate the management system	• Fix bugs ad errors in coding • Fulfill all user requirements
Maintenance	• Solve problems that exist in the client's environment • Identify mistakes that were missed in the testing phase	• Release a patch to fix bugs in the client's environment

4. Analysis and Design

This section will cover key components of the project, including functional requirements, non-functional requirements, user requirement analysis, flowchart, context diagram, DFD level 0, and DFD level 1. Functional requirements define specific features and functionalities necessary to meet user needs, while non-functional requirements address aspects such as performance, security, and usability. User requirement analysis involves gathering and analyzing user needs to ensure alignment with their expectations. Flowcharts, context diagrams, and DFD levels 0 and 1 provide visual representations of the system's flow and data processing. Together, these components form the basis for effective system design and development.

4.1 Functional Requirement

The functional requirements for customers in the L Six Hair Studio Management System include online appointment reservations, checking service prices, purchasing products, accessing information about the management system, and contacting the admin. For the admin, the requirements include a dashboard with appointment and product overviews, CRUD operations for hair services, products, users, messages, orders, workers, and appointments, a schedule for managing appointments, customer management, generating sales reports, viewing and printing invoices, and search functionalities for appointments and invoices based on specific criteria.

Table 3: Functional Requirements for Customers

No	Module	Functionality / Description
1	Reservation	Customers can make an online appointment by filling out their information
2	Services	Customers are able to check hair services price
3	Product	Customers are able to buy L Six Hair Studio’s products
4	Orders	Customers are able to refer back to which product they had purchased
5	About	Customers are able to know the information about the L Six Hair Studio Management system
6	Contact	Customers are able to contact the admin

Table 4: Functional Requirements for Admin (Appointment)

No	Module	Functionality / Description
1	Dashboard	Show an overview of appointments (Total Customers, Total Appointments, Accepted, and Rejected Appointments, Sales for yesterday, last seven days, and Total sales)
2	Services	CRUD (Create, Read, Update, and Delete) hair services
3	Worker	CRUD (Create, Read, Update, and Delete) workers
4	Appointment	CRUD (Create, Read, Update, and Delete) Appointment for new, accepted, and rejected appointments
5	Schedule	Timetable that allows admin to check appointments
6	Customer	CRUD (Create, Read, Update, and Delete) Customer
7	Reports	Create a sales report from date to date

No	Module	Functionality / Description
8	Invoice	View and print the Invoices
9	Search Appointment	Search appointments based on Appointment number, customer name, and customer contact number
10	Search Invoice	Search Invoices based on the Invoice number and billing number

Table 5: Functional Requirements for Admin (Product and Contact)

No	Module	Functionality / Description
1	Dashboard	Show an overview of products (Total pending, completed orders, orders placed, products added, total users, total admins, total accounts, and total messages)
2	Products	CRUD (Create, Read, Update, and Delete) products
3	Orders	Read, update, and delete the placed orders
4	Users	Read and delete users
5	Messages	View the message sent by users and able to delete

4.2 Non-Functional Requirement

A non-Functional Requirement is a set of details that depict the system's operational capabilities and limitations and attempt to move forward its usefulness such as performance, usability, security, and operational which will be shown in Table 6.

Table 6: Non-Functional Requirement

Requirement	Functionality / Description
Performance	Fast loading time and response time are always less than five seconds and 24/7 available
Usability	User-friendly management system and easy to use
Security	Keep sensitive information securely
Operational	Management Systems can be accessed by any browser like Google Chrome, Microsoft Edge, Mozilla Firefox, and Internet Explorer over the internet.

4.3 Context Diagram

A valuable tool within Functional Modeling, the Context Diagram stands as an independent component with unique significance [8]. Figure 2 shows a Context Diagram for L Six Hair Studio Management System. There are two scopes of users included in this management system which are customer and admin. First of all, customers can see the displayed product, checkout summary, hair studio's address, contact number, email, and working hours. Customers can also fill out the reservation form to book an appointment, then a random appointment number will be given to the customer. Then, the customer can refer to a random appointment to check whether his appointment is accepted or rejected through email. In addition, customers also can add their favorite products to their shopping cart. For booking an appointment, customers need to select services, dates, and times and fill out their name, email, and phone number.

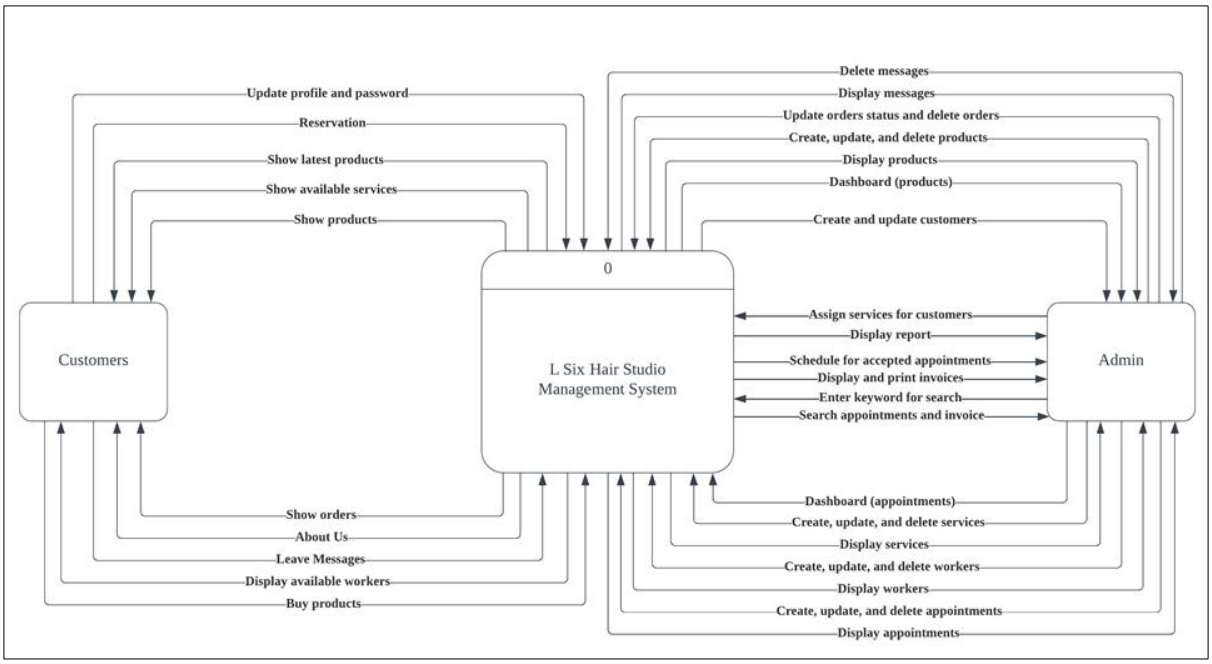

Figure 2: Context Diagram of L Six Hair Studio Management System (L6MS)

4.4 Data Flow Diagram Level 0 (DFD 0)

Figure 3 shows the Data Flow Diagram (DFD) Level 0, which includes two users, ten modules, and seven tables of the database.

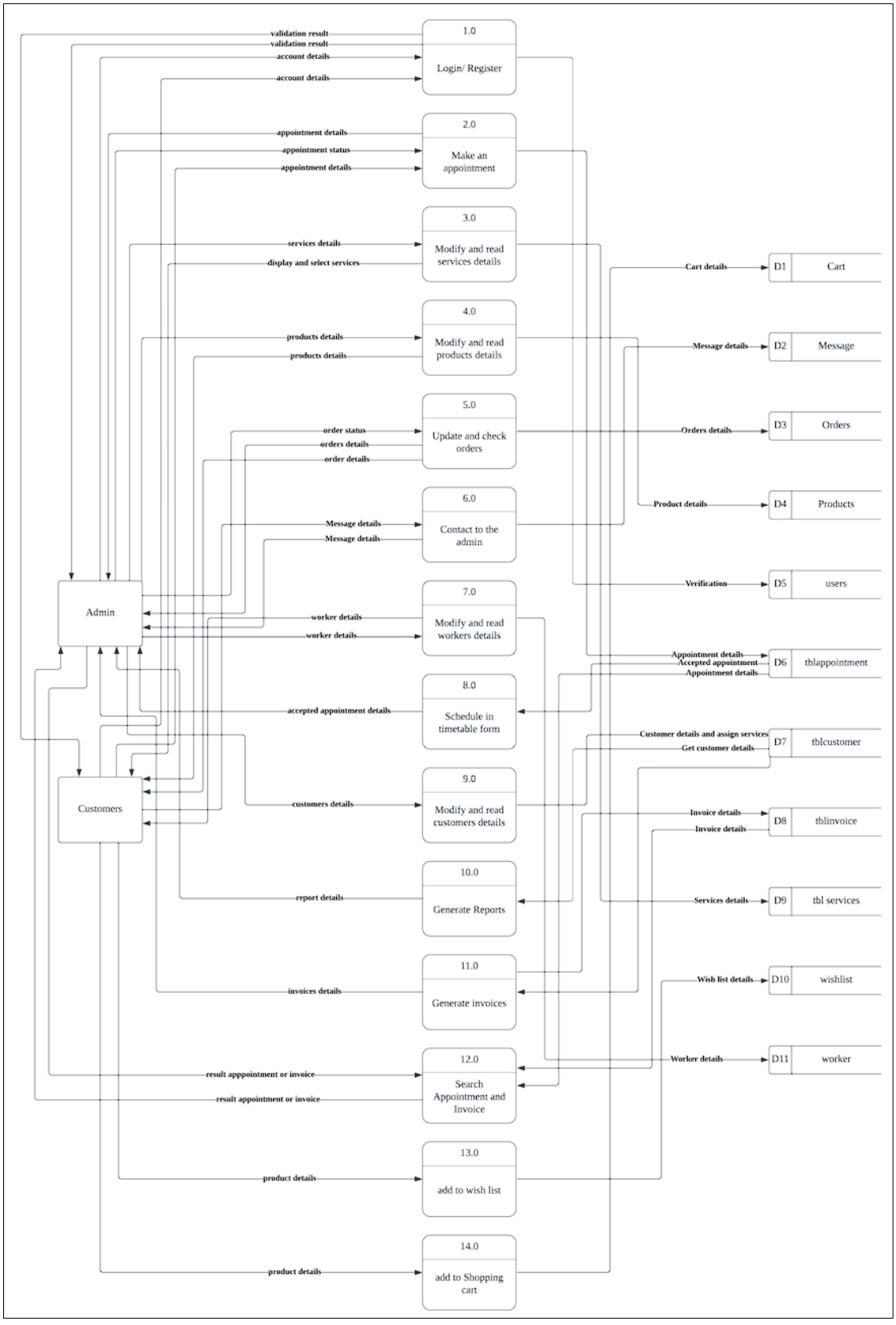

Figure 3: Data Flow Diagram Level 0 (DFD 0)

4.5 Entity Relationship Diagram

An entity relationship diagram (ERD) in Figure 4 shows the relationship between the table of the database which is mainly used in storing and creating data for a system.

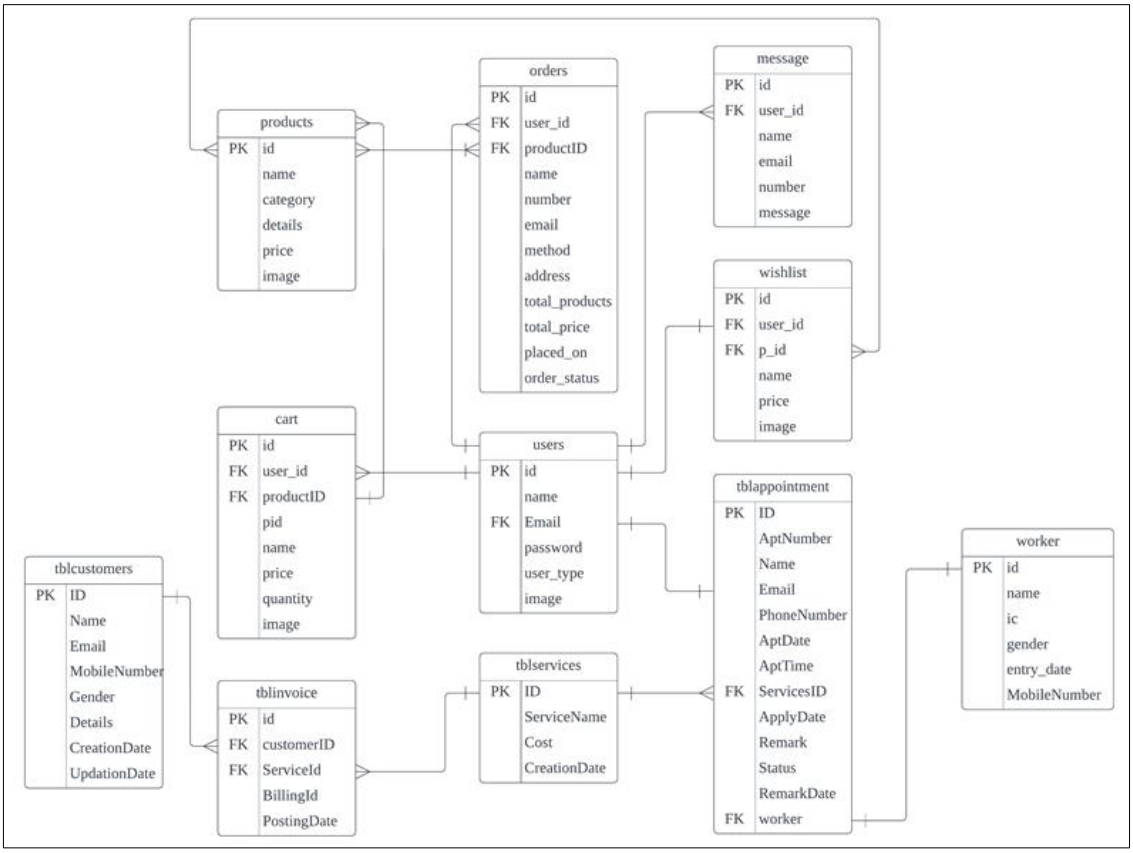

Figure 4: Entity Relationship Diagram

4.6 Implementation and testing

Program testing primarily concentrates on verifying the functionality and accuracy of programs within a controlled environment, ensuring they perform as intended. On the other hand, acceptance testing specifically emphasizes the system's utilization by its intended users [9]. In the implementation section of the L Six Hair Studio Management System, the focus will be on discussing the coding aspects and user interfaces of the system. This will involve describing the programming languages, frameworks, and technologies used to develop the system, as well as providing insights into the design and structure of the codebase. Additionally, the user interfaces of various modules and functionalities will be described, highlighting the layout, design, and usability aspects. In the testing section, the main objective is to ensure that the system functions as intended and meets the specified requirements. This involves conducting various tests to validate the system's functionality, performance, and reliability. One important aspect of testing is checking the system's ability to handle different scenarios and edge cases, including the display of error messages to users. This ensures that users are appropriately informed and guided when encountering errors or issues within the system.

4.6.1 Implementation

Figure 5 depicts the user interface of the reservation homepage for logged-in users, providing them with the capability to make reservations for hair services. On the other hand, Figure 6 showcases the algorithms of the user interface of the reservation for logged-in users.

Figure 5: User Interface of Reservation on the Homepage

Algorithm 1

Start

1 If customers wish to make an appointment, customer need to enter their name, services, worker, date, time, and phone number

2 Validate the format of customer inputs for making appointments

```
if (isset($_POST['submit'])) {
   $name = $_POST['name'];
   $email = $_POST['email'];
   $services = $_POST['services'];
   $adate = $_POST['adate'];
   $atime = $_POST['atime'];
   $phone = $_POST['phone'];
   $aptnumber = mt_rand(100000000, 999999999);
   $selectedServices = implode(", ", $services);
   $worker_name = $_POST['worker_name'];
   $query = mysqli_query($con, "INSERT INTO tblappointment
(AptNumber, Name, Email, PhoneNumber, AptDate, AptTime, Services,
worker) VALUES ('$aptnumber', '$name', '$email', '$phone',
'$adate', '$atime', '$selectedServices', '$worker_name')");
   if ($query) {$ret = mysqli_query($con, "SELECT AptNumber FROM
tblappointment WHERE Email='$email' AND PhoneNumber='$phone' AND
Name='$name' AND Services='$selectedServices' AND AptDate='$adate'
AND AptTime='$atime'");
       $result = mysqli_fetch_array($ret);
       $_SESSION['aptno'] = $result['AptNumber'];
       echo "<script>window.location.href='thank-
you.php'</script>";
   } else {$msg = "Something Went Wrong. Please try again";}}
```

3 Click the ‘Make an Appointment’ button

4 A random appointment number will be generated for customers

End

Figure 6: Algorithms of Reservation form on the homepage

Figure 7 depicts the user interface of the Create, Read, Update, and Delete services for the admin. On the other hand, Figure 8 showcases the algorithms of the service's functionality of services for the admin.

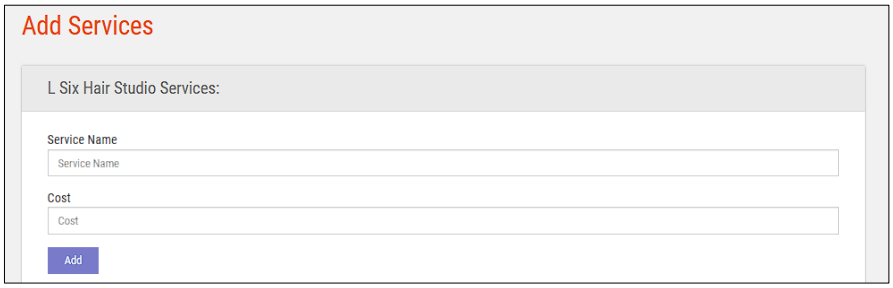

Figure 7: User Interface of Services for the Admin

Algorithm 2

Start

1 If the admin wishes to add new services, the admin needs to fill out the services name and price and then click the 'Add' button

2 After clicking the 'Add' button

```
if(isset($_POST['submit']))
  {$sername=$_POST['sername'];
    $cost=$_POST['cost'];
    $query=mysqli_query($con, "insert into
tblservices(ServiceName,Cost) value('$sername','$cost')");
    if ($query) {
         echo "<script>alert('Service has been
added.');</script>";
                echo "<script>window.location.href = 'add-
services.php'</script>";
    $msg="";
  }
  else
    {
    echo "<script>alert('Something Went Wrong. Please try
again.');</script>";
    }
}
```

3 If the admin wishes to update the service

```
if(isset($_POST['submit']))
  {
    $sername=$_POST['sername'];
    $cost=$_POST['cost'];
 $eid=$_GET['editid'];
    $query=mysqli_query($con, "update  tblservices set
ServiceName='$sername',Cost='$cost' where ID='$eid' ");
    if ($query) {
    $msg="Service has been Updated.";
  }  else{$msg="Something Went Wrong. Please try again";}}
```

4 If the admin wishes to delete services

```
if(isset($_POST['submit']))
  {
    $sername=$_POST['sername'];
    $cost=$_POST['cost'];
```

```
            $eid=$_GET['delid'];
                $query=mysqli_query($con, "DELETE From tblservices where
            ID='$eid' ");
                if ($query) {
                $msg="Service has been Deleted.";
              }
              else
                {
                  $msg="Something Went Wrong. Please try again";
                }
        }
```

End

Figure 8: Algorithms of Reservation

Figure 9 depicts the user interface of the Create, Read, Update, and Delete workers for the admin. On the other hand, Figure 10 showcases the algorithms of the worker's functionality of services for the admin.

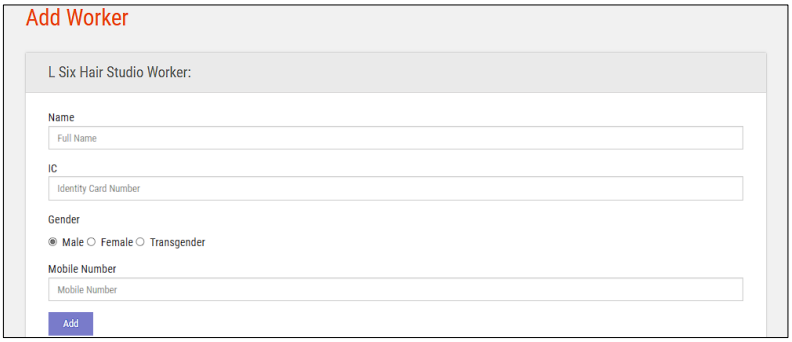

Figure 9: User Interface of Worker for the admin

Algorithm 3

Start

1 If the admin wishes to add new workers, the admin needs to fill out worker details including worker name, identity card number, gender, and phone number

2 Then click the 'Add' button

```
            if (isset($_POST['submit'])) {
                    $name = $_POST['name'];
                    $ic = $_POST['ic'];
                    $gender = $_POST['gender'];
                    $mobileNumber = $_POST['mobileNumber'];
                    $entry_date = date('Y-m-d H:i:s');
                    $query = mysqli_query($con, "INSERT INTO worker (name, ic,
            gender, mobileNumber, entry_date) VALUES ('$name', '$ic',
            '$gender', '$mobileNumber', '$entry_date')");
                    if ($query) {
                   echo "<script>alert('Worker has been added.');</script>";
                        echo "<script>window.location.href = 'add-
            worker.php'</script>";
                    } else {
                        echo "<script>alert('Something went wrong. Please try
            again.');</script>";
                    }
                }
```

3 If the admin wishes to update worker details

```
if (isset($_POST['submit'])) {
        $name = $_POST['name'];
        $mobilenum = $_POST['mobilenum'];
        $gender = $_POST['gender'];
        $ic = $_POST['ic'];
        $eid = $_GET['editid'];
        $query = mysqli_query($con, "UPDATE worker SET
Name='$name', MobileNumber='$mobilenum', gender='$gender',
IC='$ic' WHERE ID='$eid'");
        if ($query) {$msg = "Worker detail has been updated.";
        } else {$msg = "Something went wrong. Please try again.";}
         }
```

4 If the admin wishes to delete workers from the database

```
if (isset($_POST['submit'])) {
        $wid = $_GET['delid'];
        $query = mysqli_query($con, "DELETE FROM worker WHERE
ID='$wid'");
        if ($query) {$msg = "Worker has been deleted
successfully.";} else {$msg = "Something went wrong. Please try
again.";}}
```

End

Figure 10: Algorithms of Worker for the admin

Figure 11 depicts the user interface of the Create, Read, Update, and Delete customers for the admin. On the other hand, Figure 12 showcases the algorithms of the customer functionality of services for the admin.

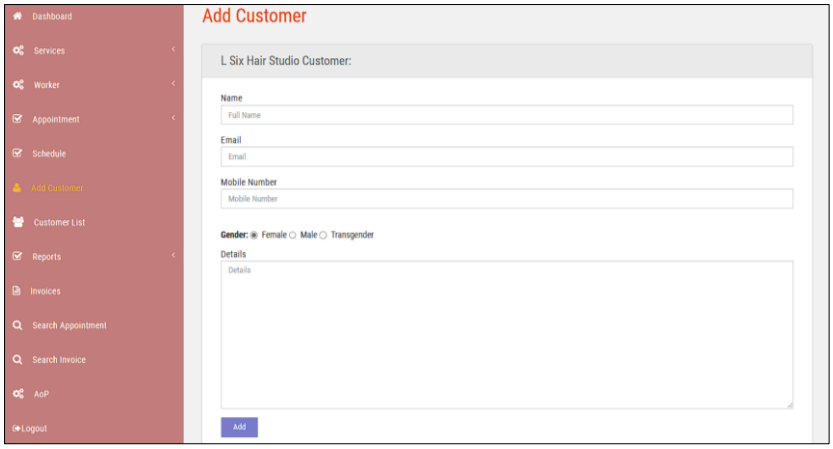

Figure 11: User Interface of customers for the admin

Algorithm 4

Start

1 If the admin wishes to add a new customer, the admin needs to fill out customer information including the customer's name, email, phone number, gender, and details

2 Then, the admin can click the ‘Add’ button

```
if(isset($_POST['submit']))
  {$name=$_POST['name'];
    $email=$_POST['email'];
   $mobilenum=$_POST['mobilenum'];
    $gender=$_POST['gender'];
$details=$_POST['details'];
```

```
    $query=mysqli_query($con, "insert into
tblcustomers(Name,Email,MobileNumber,Gender,Details)
value('$name','$email','$mobilenum','$gender','$details')");
    if ($query) {
echo "<script>alert('Customer has been added.');</script>";
echo "<script>window.location.href = 'add-customer.php'</script>";
 } else {echo "<script>alert('Something Went Wrong. Please try
again.');</script>";} }
```

3 If the admin wishes to update customers' details

```
if(isset($_POST['submit']))
  {$name=$_POST['name'];
    $email=$_POST['email'];
   $mobilenum=$_POST['mobilenum'];
    $gender=$_POST['gender'];
$details=$_POST['details'];
$eid=$_GET['editid'];
    $query=mysqli_query($con, "update  tblcustomers set
Name='$name',Email='$email',MobileNumber='$mobilenum',Gender='$gender',Det
ails='$details' where ID='$eid' ");
    if ($query) {$msg="Customer Detail has been Updated.";}
  else{$msg="Something Went Wrong. Please try again";}}
```

4 If the admin wishes to delete customers from the database

```
if(isset($_POST['submit']))
  {$eid=$_GET['delid'];
   $query=mysqli_query($con, "Delete FROM tblcustomers where ID='$eid' ");
    if ($query) {
echo "<script>alert('Customer has been deleted.');</script>";
echo "<script>window.location.href = 'customer-list.php'</script>";
 } else {echo "<script>alert('Something Went Wrong. Please try
again.');</script>";} }
```

End

Figure 12: Algorithms of the customer for the admin

Figure 13 depicts the user interface of the Create, Read, Update, and Delete workers for the admin. On the other hand, Figure 14 showcases the algorithms of workers' functionality of services for the admin.

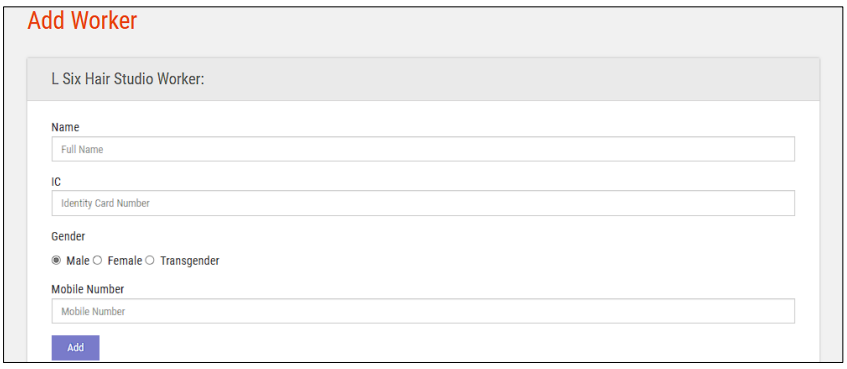

Figure 13: User Interface of Worker for the admin

Algorithm 5

Start

1 If the admin wishes to add new workers, the admin needs to fill out worker details including worker name, identity card number, gender, and phone number

2 Then click the 'Add' button

```
if (isset($_POST['submit'])) {$name = $_POST['name'];
        $ic = $_POST['ic'];
        $gender = $_POST['gender'];
        $mobileNumber = $_POST['mobileNumber'];
        $entry_date = date('Y-m-d H:i:s');
        $query = mysqli_query($con, "INSERT INTO worker (name, ic,
gender, mobileNumber, entry_date) VALUES ('$name', '$ic',
'$gender', '$mobileNumber', '$entry_date')");
        if ($query) {echo "<script>alert('Worker has been
added.');</script>";
            echo "<script>window.location.href = 'add-
worker.php'</script>";
        } else {echo "<script>alert('Something went wrong. Please
try again.');</script>";}}
```

3 If the admin wishes to update worker details

```
if (isset($_POST['submit'])) {$name = $_POST['name'];
        $mobilenum = $_POST['mobilenum'];
        $gender = $_POST['gender'];
        $ic = $_POST['ic'];
        $eid = $_GET['editid'];
        $query = mysqli_query($con, "UPDATE worker SET
Name='$name', MobileNumber='$mobilenum', gender='$gender',
IC='$ic' WHERE ID='$eid'");
        if ($query) {$msg = "Worker detail has been updated.";
        } else {$msg = "Something went wrong. Please try
again.";}}
```

4 If the admin wishes to delete workers from the database

```
if (isset($_POST['submit'])) {$wid = $_GET['delid'];
        $query = mysqli_query($con, "DELETE FROM worker WHERE
ID='$wid'");
     if ($query) {$msg = "Worker has been deleted successfully.";
        } else {$msg = "Something went wrong. Please try
again.";}}
```

End

Figure 14: Algorithms of Worker for the admin

Figure 15 depicts the user interface of the Create, Read, Update, and Delete customers for the admin. On the other hand, Figure 16 showcases the algorithms of the customer functionality of services for the admin.

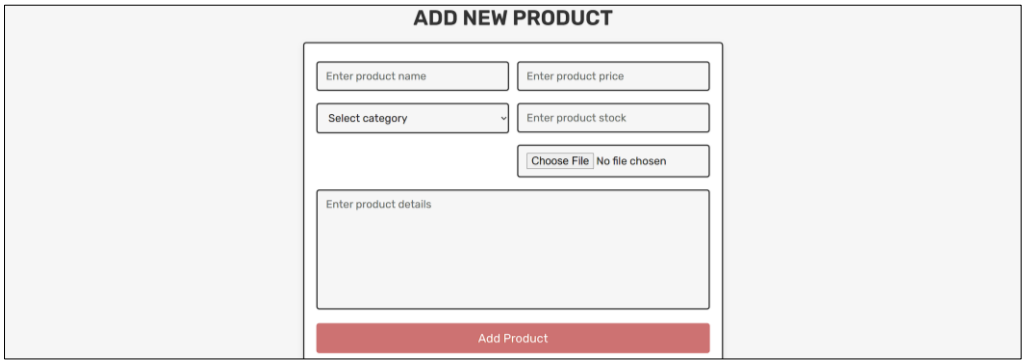

Figure 15: User Interface of products for the admin

Algorithm 6

Start

1 If the admin wishes to add new products that will be displayed to the customer, the admin needs to enter the product name, price, category, stock, image, and details

2 Then, the admin needs to click 'Add Product' to add products to the database

```
if (isset($_POST['add_product'])) {
    $name = $_POST['name'];
    $name = filter_var($name, FILTER_SANITIZE_STRING);
    $price = $_POST['price'];
    $price = filter_var($price, FILTER_SANITIZE_STRING);
    $category = $_POST['category'];
    $category = filter_var($category, FILTER_SANITIZE_STRING);
    $details = $_POST['details'];
    $details = filter_var($details, FILTER_SANITIZE_STRING);
    $stock = $_POST['stock'];
    $stock = filter_var($stock, FILTER_SANITIZE_NUMBER_INT);
    $image = $_FILES['image']['name'];
    $image = filter_var($image, FILTER_SANITIZE_STRING);
    $image_size = $_FILES['image']['size'];
    $image_tmp_name = $_FILES['image']['tmp_name'];
    $image_folder = 'uploaded_img/' . $image;
    $select_products = $conn->prepare("SELECT * FROM `products`
WHERE name = ?");
    $select_products->execute([$name]);
    if ($select_products->rowCount() > 0) {
        $message[] = 'Product name already exists!';
    } else {
        $insert_products = $conn->prepare("INSERT INTO
`products`(name, category, details, price, stock, image)
VALUES(?,?,?,?,?,?)");
        $insert_products->execute([$name, $category, $details,
$price, $stock, $image]);
    }
}
```

3 If the admin wishes to update products details, the admin can click the 'Update' button

```
if(isset($_POST['update_product'])){
   $update_product = $conn->prepare("UPDATE `products` SET name
= ?, category = ?, details = ?, price = ?, stock = ? WHERE id
= ?");
   $update_product->execute([$name, $category, $details, $price,
$stock, $pid]);}}}}
```

4 If the admin wishes to remove a product, the admin can click the 'Delete' button

```
if (isset($_GET['delete'])) {
    $delete_id = $_GET['delete'];
    $select_delete_image = $conn->prepare("SELECT image FROM
`products` WHERE id = ?");
    $select_delete_image->execute([$delete_id]);
    $fetch_delete_image =
$select_delete_image->fetch(PDO::FETCH_ASSOC);
    unlink('uploaded_img/' . $fetch_delete_image['image']);
    $delete_products = $conn->prepare("DELETE FROM `products`
WHERE id = ?");
    $delete_products->execute([$delete_id]);
    }
```

End

Figure 16: Algorithms of products for the admin

4.6.2 Testing

During the testing phase, it is crucial to assess the error messages displayed to users in order to prevent the potential leakage of sensitive information. The verbose failure messages should be carefully evaluated to avoid vulnerabilities, such as being targeted by SQL injection attacks.

Table 7: Testing for Login, Register, Reservation, and Admin Panel forms

No	Test Case	Expected Output	Actual Output
1	Enter Invalid Input	Display error message for related situation	Display error message for related situation
2	Press submit button without any input	Display the error message "Please Fill out this field"	Display the error message "Please Fill out this field"
3	Enter valid Input	Action taken	Action Taken
4	Add data to the database	Display "Data added successfully"	Display "Data added successfully"
5	Update data to database	Display "Data updated successfully"	Display "Data updated successfully"
6	Delete data from the database	Show the data that will be deleted and ask for confirmation from users	Show the data that will be deleted and ask for confirmation from users

5. Conclusion

In conclusion, the implementation of the L Six Hair Studio Management System offers a wide range of benefits to the employer and customers alike. By embracing this technology-driven solution, the employer gains a competitive edge in the digital era, efficiently managing their business operations and staying ahead of competitors. The system's features, such as online reservations and product purchasing, enhance the customer experience, driving customer satisfaction and fostering repeat business. Additionally, the ability to update service prices based on market trends and manage products systematically improves efficiency, productivity, and revenue generation. Overall, the L Six Hair Studio Management System revolutionizes the way the business operates, positioning it as a modern and customer-centric establishment in today's market.

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