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SYSTEM ANALYSIS AND DESIGN

FINAL DOCUMENTATION

Clinic Management System

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ABSTRACT

The Clinic Management System (CMS) is an advanced web app that aims to make healthcare clinics run smoother. This system responds to the changing demands of managing healthcare by offering a central hub for complete patient care, handling medical records and doing admin work. The CMS has features like New Prescription, Add Patients, Patient History, Add Medicine, Medicine Details, and Reports. These tools are meant to boost productivity and make the system easy to use for clinic staff.

CHAPTER 1 – INTRODUCTION

1.1 Introduction

In today's healthcare management scene, tech plays a key role. The Clinic Management System project aims to make clinic tasks easier. It offers features like New Prescription, Add Patients, Patient History, Add Medicine, Medicine Details, and Reports. Doctors, nurses, and clinic staff will use this system to boost patient care, cut down on paperwork, and make things run smoother. The system comes into play at different points. Clinic staff use it to sign up new patients. Doctors use it during check-ups to write prescriptions and look at patient histories. Nurses use it to update info about patient care. This system isn't just for doctors. It's made for many different jobs in the clinic to cover all aspects of clinic management. You can access it at the front desk, in doctors' offices, at nursing stations, and online for clinic staff who need to use it from elsewhere. This makes managing the clinic flexible and easy, which helps improve service quality.

1.2 Problem Statement

Healthcare facilities play a pivotal role in the provision of essential medical care to local communities. However, conventional approaches to clinic management are often plagued by inefficiencies, redundancies, and a lack of streamlined processes. The critical issues that have been identified in this domain include:

Manual and Error-Prone Processes:

The traditional approach to patient record and prescription management primarily relies on paper-based systems and manual data entry, which can lead to human errors. These errors may result in inaccurate patient information, lost records, and prescription mistakes, ultimately jeopardizing patient safety. For instance, a misspelled drug name or an incorrect dosage could have severe implications for a patient's well-being. In a bustling clinical setting, the sheer volume of paperwork and manual record handling can impede processes, causing delays in patient care and administrative functions. To mitigate these risks, the implementation of a Clinic Management System aims to automate record-keeping and prescription management, thereby enhancing precision and productivity.

Fragmented Data Management:

Healthcare facilities frequently employ a variety of distinct systems to handle various tasks, such as utilizing one system for scheduling appointments, another for billing, and an additional system for maintaining patient medical histories. This fragmented approach leads to operational inefficiencies, as staff must navigate through multiple systems to access comprehensive patient data. The lack of integration among these disparate systems makes it challenging to compile a complete overview of a patient's health records, potentially resulting in gaps in the continuity of care. For instance, a clinician may not have immediate access to a patient's full medical history during a consultation, which can impact the quality of care provided. A centralized Clinic Management System resolves this issue by consolidating all patient-related information into a single, unified platform, thereby streamlining data management and improving accessibility.

Limited Accessibility and Collaboration:

In the absence of a centralized system, both administrative staff and healthcare providers face difficulties in efficiently accessing and exchanging critical patient information. Patient records may be stored in physical files or spread across different digital platforms within a traditional framework, making it challenging to promptly retrieve and share information. This limitation hinders collaboration among healthcare providers, as they may not have immediate access to the most recent patient data. For instance, when a patient consults multiple specialists, each specialist may not have access to the latest treatment updates from the others. The introduction of a Clinic Management System ensures that all authorized personnel can access current patient information from any location within the clinic, facilitating improved communication and coordination among staff members and ultimately enhancing the quality of patient care.

1.3 Project Scope**1.3.1 System Scope**

The Clinic Management System (CMS) incorporates essential functionalities to enhance clinic operations and enhance patient care. Streamlining patient registration simplifies the process of entering new patient information quickly and accurately. Efficient appointment scheduling reduces wait times and optimizes clinic resources. Automated prescription management streamlines the process of writing and storing prescriptions, minimizing errors and ensuring timely updates. Comprehensive medical record management centralizes patient data, making it easily accessible for healthcare providers. Reporting features enable the generation of various reports, providing valuable insights into clinic performance and patient health trends.

The project scope encompasses the following functionalities:

Patient Management:

Comprehensive patient profiles and streamlined patient registration work together to enable efficient and accurate data entry for new patients. This ensures that all patient information is systematically stored and easily retrievable.

Appointment Scheduling:

Timely availability notifications for administrative personnel aid in minimizing patient waiting periods and maximizing the efficiency of clinic resources. This leads to a more structured and effective appointment scheduling system.

Prescription Management:

The integration of an automated prescription generation system with a comprehensive medicine database serves to reduce prescription errors and guarantee that updates are made in a timely manner. This functionality facilitates the effective management of patient prescriptions and medication records.

Medical Record Keeping:

The secure storage and retrieval of patient medical records facilitates the consolidation of all patient information, allowing for convenient access by medical professionals. This process is essential for maintaining comprehensive and accurate patient histories.

Medicine Database:

It offers in-depth information about dosage, administration, and potential side effects, which helps to ensure accurate and safe prescription practices. This also ensures the availability of all medication-related information.

Reporting and Analytics:

The comprehensive reporting system provides valuable insights into clinic operations and patient health patterns, facilitating strategic decision-making. This functionality enables the creation of a wide range of analytical reports to assess clinic performance.

Features - add, delete, edit

User Authentication and Access Control:

The implementation of secure user authentication and role-based access control is crucial in safeguarding sensitive patient data and restricting access to authorized personnel only. This feature plays a significant role in bolstering the security and confidentiality of patient information.

1.4 Objective

The CMS project is driven by a set of objectives:

To automate clinic processes:

It is crucial to incorporate functionalities for patient registration, prescription generation, and medical record management to reduce errors and improve operational efficiency. This automation will reduce the need for manual paperwork and decrease the time spent by staff on administrative tasks, allowing them to focus more on patient care. Additionally, automated processes will ensure consistency and compliance across all clinic operations, ultimately enhancing the level of service delivered.

To integrate patient data:

Creating a centralized repository for patient data will ensure efficient access for administrative personnel. This consolidation will enhance collaboration among healthcare professionals, enabling better-informed decision-making. Furthermore, a unified patient data system will strengthen data security and confidentiality, safeguarding delicate health information.

To enhance prescription management:

Design and implement a prescription system that is user-friendly, improving the effectiveness of the prescription procedure while ensuring accuracy. This system will include features such as automatic dosage calculations and alerts for potential drug interactions to reduce the likelihood of medication mistakes. By providing accurate and easy-to-understand prescriptions, the system will promote patient safety and adherence to prescribed treatments.

1.5 Target User

The intended users of the CMS include:

Administrative Staff

Administrative staff includes receptionists, clinic administrators, and other team members responsible for managing the day-to-day operations of the clinic.

Character of the user:

Administrative personnel demonstrate strong organizational skills, attention to detail, and effectiveness. They exhibit proficient communication abilities and are adept at multitasking.

Tasks:

- Patient Registration: Entering new patient information into the system and updating existing records.
- Appointment Scheduling: Scheduling appointments, arranging patient bookings, and issuing appointment reminders.
- Reporting: The production of reports regarding clinic operations, patient appointments, and financial data is crucial in aiding decision-making processes.

Doctors

Doctors are the primary healthcare providers responsible for diagnosing and treating patients.

Character of the user:

Doctors are knowledgeable, empathetic, and detail oriented. They have strong problem-solving skills and the ability to make quick, informed decisions.

Tasks:

- Consultations: Conducting patient consultations, diagnosing conditions, and formulating treatment plans
- Prescription Management: Writing and managing patient prescriptions using the system.
- Medical Record Keeping: Reviewing and updating patient medical histories and treatment records.
- Patient Follow-Up: Monitoring patient progress and adjusting treatment plans as necessary.

Nurses

Nurses provide essential support to doctors and care for patients, handling both clinical and administrative tasks.

Character of the user:

Nurses are compassionate, attentive, and highly skilled inpatient care. They excel in multitasking and have strong communication abilities.

Tasks:

- Patient Care: Assisting with patient examinations, administering medications, and providing post-treatment care.
- Updating Patient Information: Recording patient vital signs, symptoms, and updates to the patient's medical record.
- Coordination: Coordinating with doctors and administrative staff to ensure smooth clinic operations.
- Patient Education: Educating patients about their conditions, treatment plans, and medication instructions.

different user should
have different
level of access

1.6 Project Schedule


The project schedule is planned as follows:

1.6.1 WORK BREAKDOWN STRUCTURE (OUTLINE VIEW)

1. Clinic Management System
 - 1.1. Background Research and Learning New Skills
 - 1.1.1. Research CMS Systems
 - 1.1.2. Learn Required Technologies
 - 1.1.3. Document Findings
 - 1.1.4. Team Knowledge Sharing
 - 1.2. Requirements Gathering and Investigation
 - 1.2.1. Stakeholder Interviews
 - 1.2.2. User Story Workshops
 - 1.2.3. Write User Stories
 - 1.2.4. Create Acceptance Criteria
 - 1.3. Product Design
 - 1.3.1. Design Sprints
 - 1.3.2. Develop Wireframes
 - 1.3.3. Design Reviews
 - 1.3.4. Iterate Designs
 - 1.4. Product Development
 - 1.4.1. Break Down User Stories
 - 1.4.2. Development Sprints
 - 1.4.3. Continuous Integration
 - 1.4.4. Daily Stand-ups
 - 1.5. Product Evaluation
 - 1.5.1. Sprint Reviews
 - 1.5.2. Feature Demonstration
 - 1.5.3. Usability Testing
 - 1.5.4. Backlog Updates
 - 1.6. Final Report Preparation

- 1.6.1. Documentation Tasks
- 1.6.2. Write Documentation
- 1.6.3. Finalize Report
- 1.7. Re-testing the System
 - 1.7.1. Plan Regression Testing
 - 1.7.2. Automate Tests
 - 1.7.3. Exploratory Testing
 - 1.7.4. Update User Stories

1.6.2 WORK BREAKDOWN STRUCTURE (TABULAR VIEW)



Level 1	Level 2	Level 3	Resources
1. Clinic Management System	1.1. Background Research and Learning New Skills	1.1.1. Research CMS Systems	Daniel
		1.1.2. Learn Required Technologies	Haikal
		1.1.3. Document Findings	Safdar
		1.1.4. Team Knowledge Sharing	Hafizam
	1.2. Requirements Gathering and Investigation	1.2.1. Stakeholder Interviews	Haikal
		1.2.2. User Story Workshops	Daniel
		1.2.3. Write User Stories	Hafizam
		1.2.4. Create Acceptance Criteria	Safdar
	1.3. Product Design	1.3.1. Design Sprints	Safdar
		1.3.2. Develop Wireframes	Haikal
		1.3.3. Design Reviews	Hafizam
		1.3.4. Iterate Designs	Daniel
	1.4. Product Development	1.4.1. Break Down User Stories	Hafizam
		1.4.2. Development Sprints	Daniel
		1.4.3. Continuous Integration	Haikal
		1.4.4. Daily Stand-Ups	Safdar
	1.5. Product Evaluation	1.5.1. Sprint Reviews	Haikal
		1.5.2. Feature Demonstration	Safdar
		1.5.3. Usability Testing	Hafizam
		1.5.4. Backlog Updates	Daniel
	1.6. Final Report Preparation	1.6.1. Documentation Tasks	Hafizam
		1.6.2. Write Documentation	Haikal
		1.6.3. Finalize Report	Safdar
	1.7. Re-testing the System	1.7.1. Plan Regression Testing	Daniel
		1.7.2. Automate Tests	Haikal
		1.7.3. Exploratory Testing	Hafizam
		1.7.4. Update User Stories	Daniel

Figure 1.6.2 WBS Tabular View

1.6.3 Gant Chart

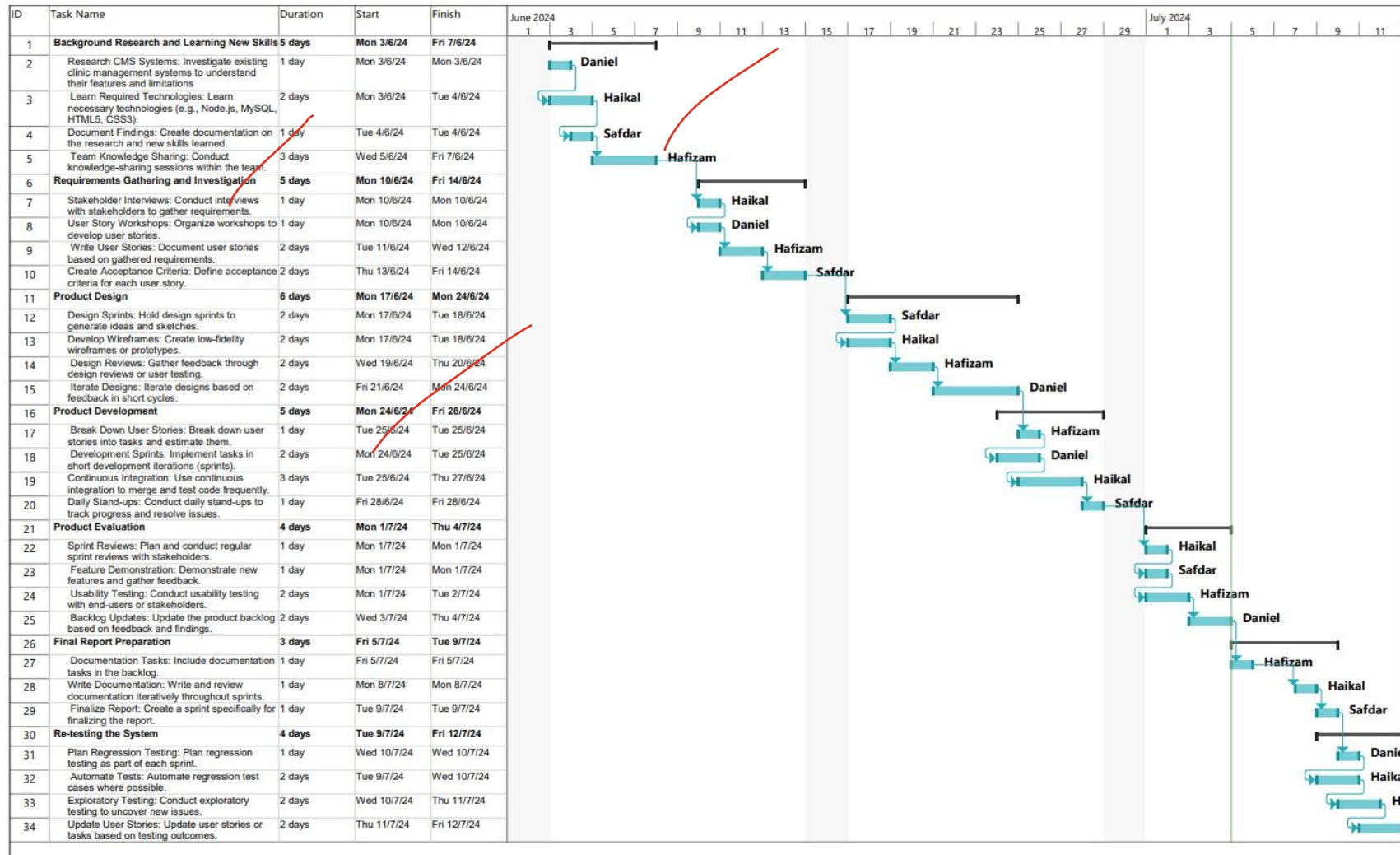


Figure 1.6.3 Gant Chart

1.7 Conclusion

The Clinic Management System (CMS) is a significant advancement in clinical operations, integrating patient care and administrative tasks seamlessly. It reduces wait times and improves patient satisfaction by streamlining patient registration and appointment scheduling. The automated prescription management system minimizes errors, ensuring accurate and timely medication updates for enhanced patient safety. Secure medical record keeping allows easy access to patient histories, enabling healthcare professionals to make informed decisions. The detailed medicine database and robust reporting capabilities offer valuable insights into clinic operations and patient health trends, aiding in strategic planning and performance evaluation. With secure user authentication and role-based access control, the CMS protects sensitive patient information, upholding privacy and regulatory compliance. In conclusion, the CMS is a comprehensive solution that optimizes clinic efficiency, improves patient care, and contributes to the long-term success of healthcare facilities.

CHAPTER 2 – ANALYSIS

2.1 Introduction

This chapter covers the analysis phase of the Clinic Management System (CMS) project, which is critical in understanding the requirements and laying the groundwork for the system's development. It outlines the system development process, requirement analysis, and system modeling, ensuring a comprehensive approach to capturing all necessary details. Through this phase, we aim to establish a clear and detailed understanding of the project's technical and functional needs. This chapter sets the stage for a systematic and well-organized development process, ensuring the project's success.

2.2 System Development Process

The system development process is guided by the Agile methodology, facilitating iterative development and continuous feedback. This methodology guarantees the system's flexibility to meet changing requirements and offer a user-centric solution.

2.3 Requirement Analysis

2.3.1 Hardware, Scripting Language, and Software Requirement

Hardware Requirements:

- Server: Dual-core processor, 8 GB RAM, 100 GB storage.
- Database Server: Quad-core processor, 16 GB RAM, 500 GB storage.
- Networking: Minimum 100 Mbps Ethernet connection.
- Client Devices: Desktops and laptops with modern web browsers, 4 GB RAM.

Software Requirements:

- Operating System: Windows 10 Home Single Language Version 22H2.
- Database Server: MySQL.
- Web Server: Apache.

Programming Languages:

- Server-side: Node.js with Express.js, Client-side: HTML5, CSS3, JavaScript.
- Database Management System: MySQL.
- Version Control: Git.
- Development Tools: Integrated Development Environment (IDE) such as Adobe Dreamweaver.

2.4 System Modeling

2.4.1 Use Case Diagram

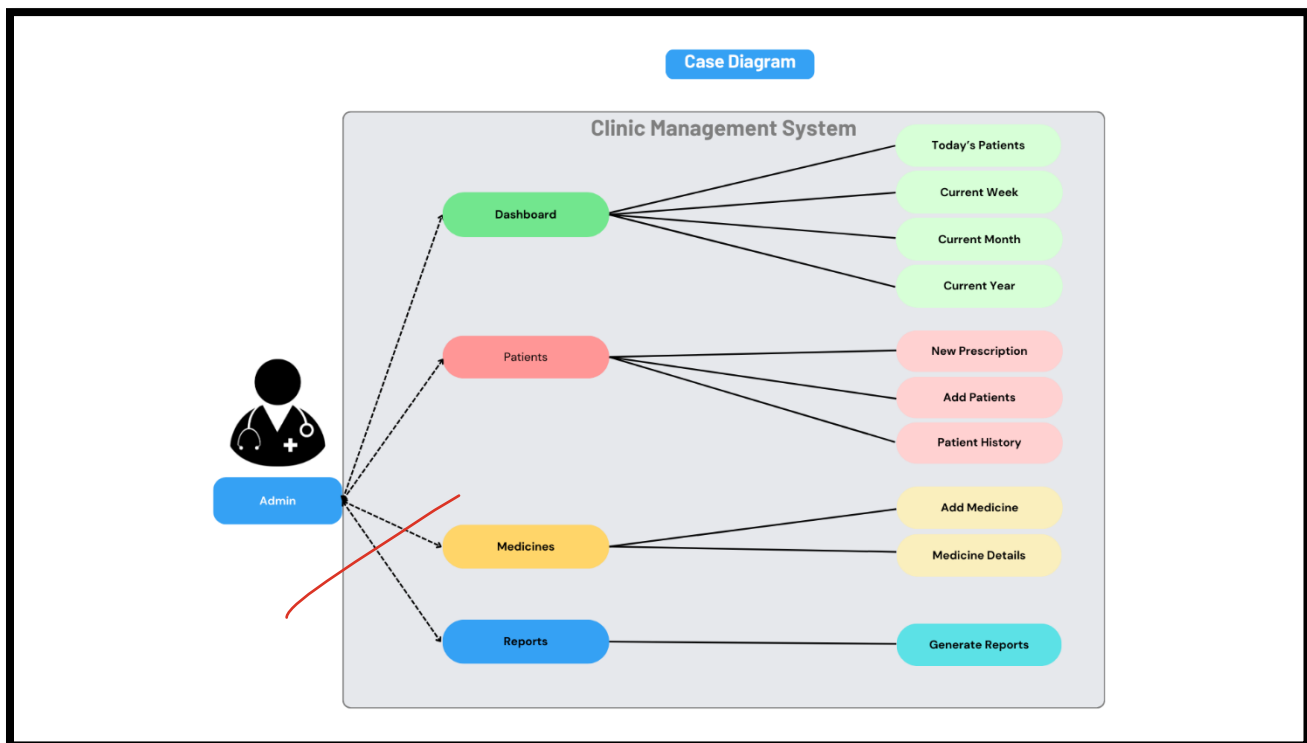


Figure 2.4.1 Use Case Diagram

2.4.2 Class Diagram

info

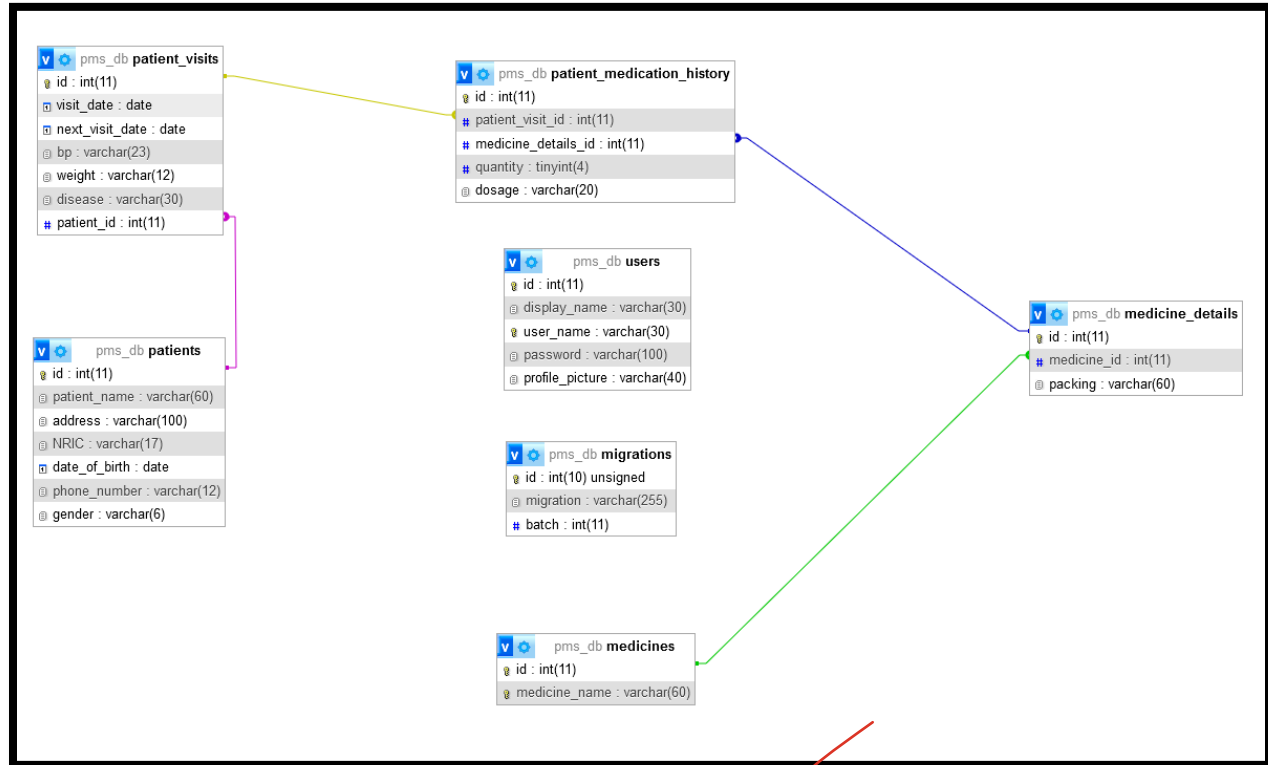


Figure 2.4.2 Class Diagram

2.4.3 Activity Diagram

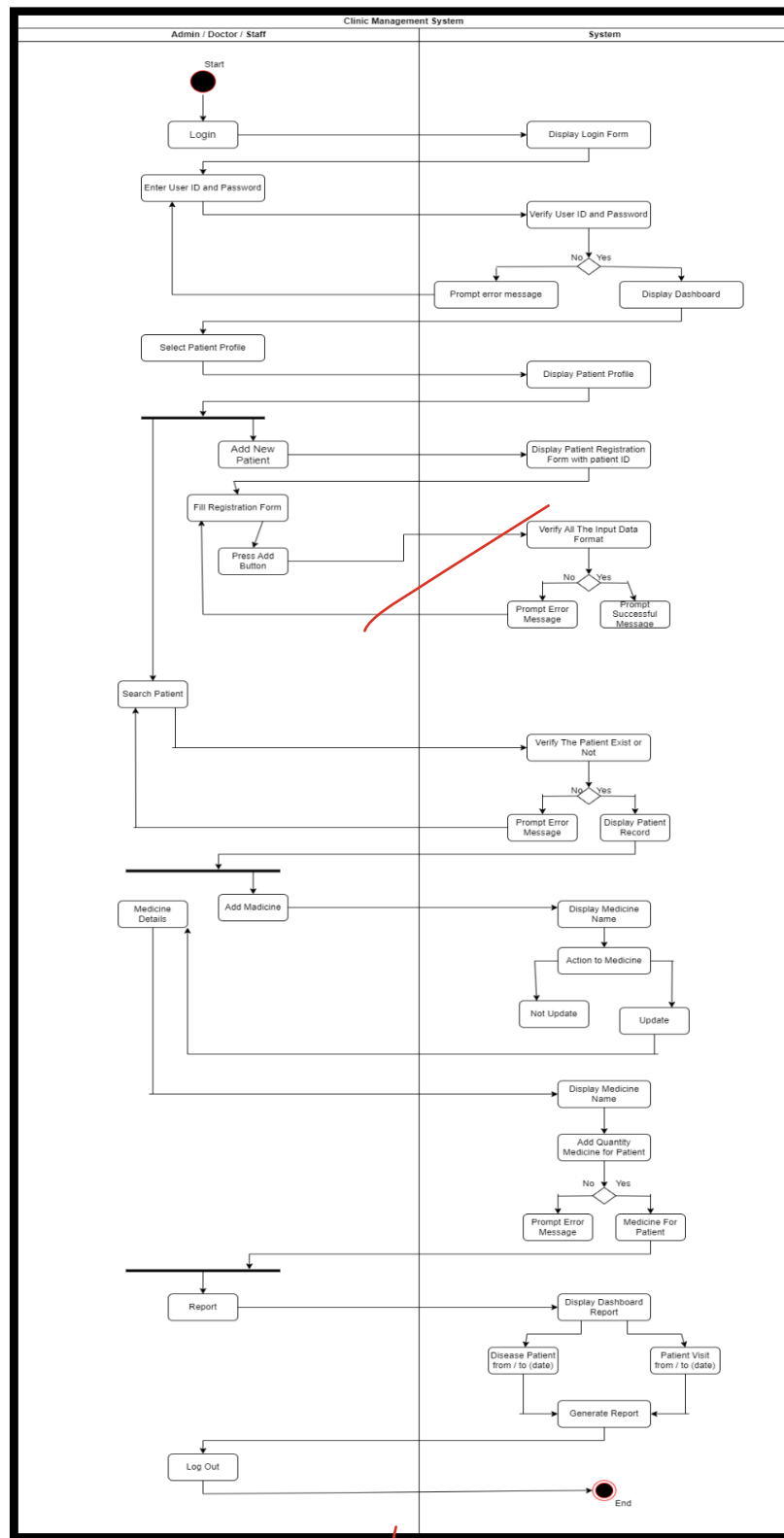


Figure 2.4.3 Activity Diagram

2.5 Conclusion

The analysis phase of the Clinic Management System (CMS) project has yielded a comprehensive comprehension of the system requirements, development process, and modeling. Through a meticulous requirement analysis, a sturdy foundation of hardware and software components essential for the system's operation has been established. The thorough documentation of system requirements guarantees that the needs of all stakeholders are met, minimizing the risk of project scope expansion. Furthermore, the utilization of system modeling techniques, such as use case, class, and activity diagrams, has furnished an extensive blueprint for the system's architecture and functionality. These models promote transparent communication among the development team and stakeholders, ensuring a shared understanding of the system. Consequently, the project is well-prepared to progress into the design and implementation phases, armed with a strong framework to steer development. Ultimately, this detailed analysis phase sets the stage for a successful Clinic Management System that fulfills the clinic's operational requirements while enhancing patient care.

CHAPTER 3 – DESIGN

3.1 Introduction

This chapter outlines the design phase of the Clinic Management System (CMS) project, focusing on the overall system architecture and user interface design. It provides a detailed blueprint for constructing the system, ensuring that all requirements are translated into a comprehensive design. Key elements include the architecture design and database design, as well as the creation of user-friendly screens and interfaces. This phase ensures that the system's structure and user experience are well-defined and aligned with the project goals.

3.2 System Design

The system design phase involves translating the requirements into a blueprint for constructing the system. Key design elements include:

Architecture Design

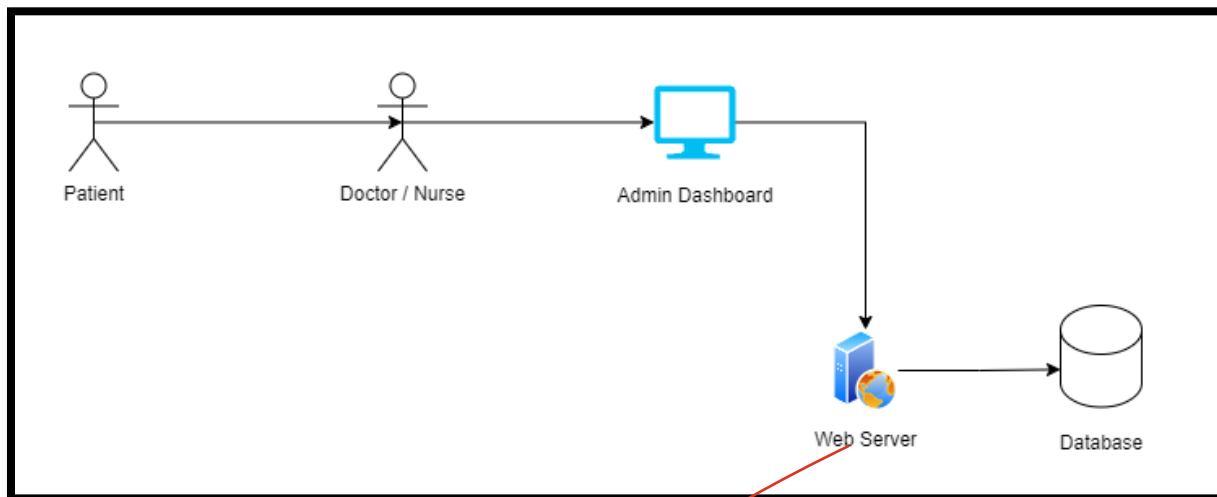


Figure 3.2.1 The CMS is designed using a three-tier architecture consisting of the presentation layer, application layer, and database layer

Database Design:

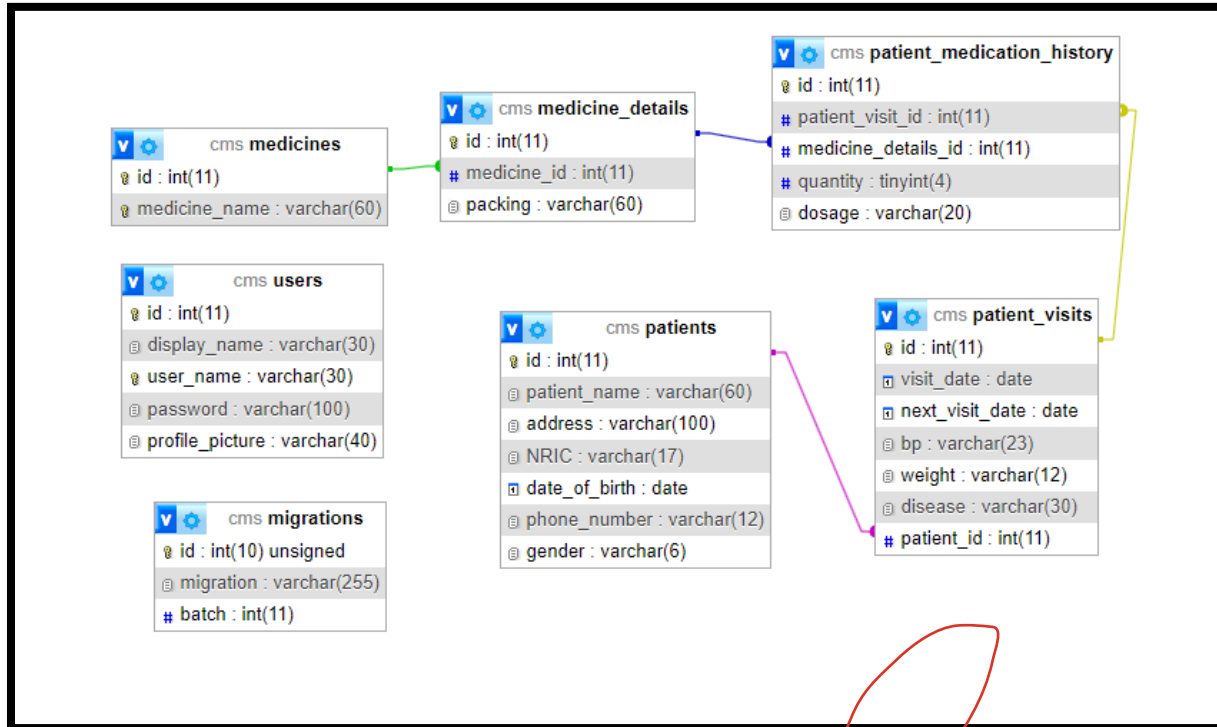


Figure 3.2.2 A relational database design is employed to store and manage patient records, prescriptions, and other clinic-related data.

..

3.3 Screen and Interface Design

The screen and interface design focuses on creating an intuitive and user-friendly interface for the CMS. Key elements include:

Dashboard

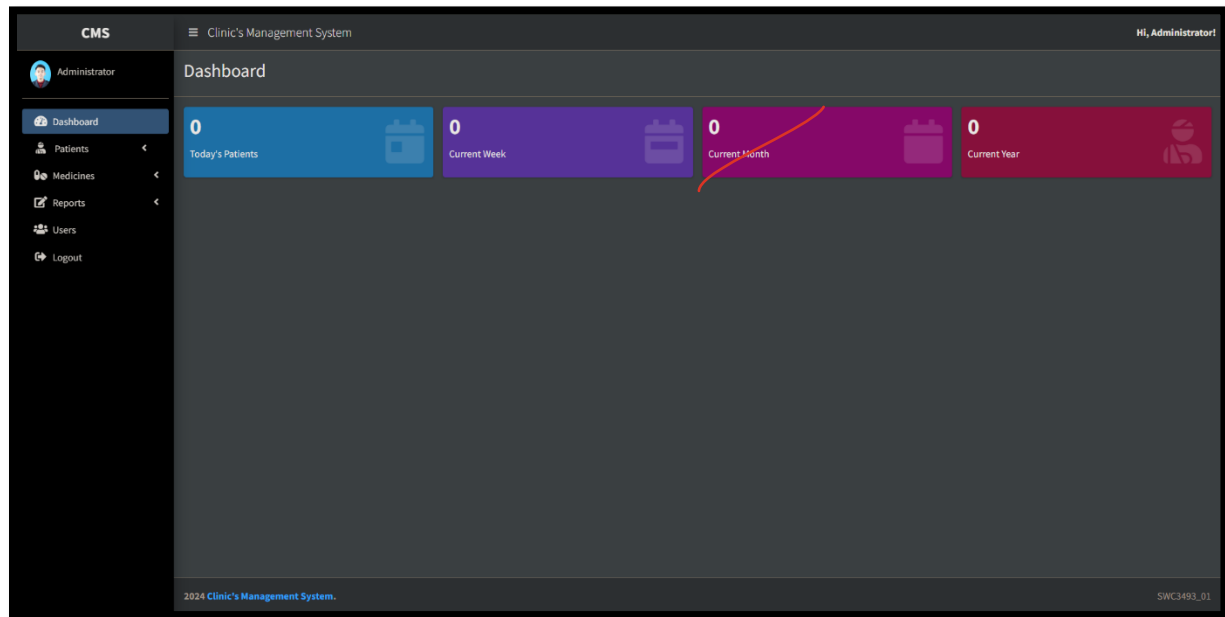


Figure 3.3.1 A comprehensive dashboard for administrative staff to access various functionalities.

Patient Management:

Screens for patient registration, profile updates, and history access.

CMS

Hi, Administrator!

Administrator

Dashboard

Patients

New Prescription

Add Patients

Patient History

Medicines

Reports

Users

Logout

Clinic's Management System

Patients

Add Patients

Patient Name

Address

NRIC

Date of Birth

Phone Number

Gender

Select Gender

Save

Total Patients

Copy

CSV

Excel

PDF

Print

Column visibility

Search:

S.No	Patient Name	Address	NRIC	Date Of Birth	Phone Number	Gender	Action
1	Daniel	Seremban	010626040493	26 Jun 2001	01169704271	Male	
2	Haikal	Kelantan	010721039563	21 Jul 2001	01332542213	Male	
3	Oji	Kedah	020821025528	15 Nov 2002	016783213243	Female	
4	Safdar Cyclone	Kelantan	00201203124	12 Dec 2000	012312451231	Male	

2024 Clinic's Management System.

SWC3493_01

Figure 3.3.2 Patients Registration

CMS

Hi, Administrator!

Administrator

Dashboard

Patients

New Prescription

Add Patients

Patient History

Medicines

Reports

Users

Logout

Clinic's Management System

Patients

Update Patients

Patient Name

Address

CNIC

Date of Birth

Phone Number

Gender

Daniel

Seremban

010626040493

06/26/2001

01169704271

Male

Save

2024 Clinic's Management System.

SWC3493_01

Figure 3.3.3 Update Patients

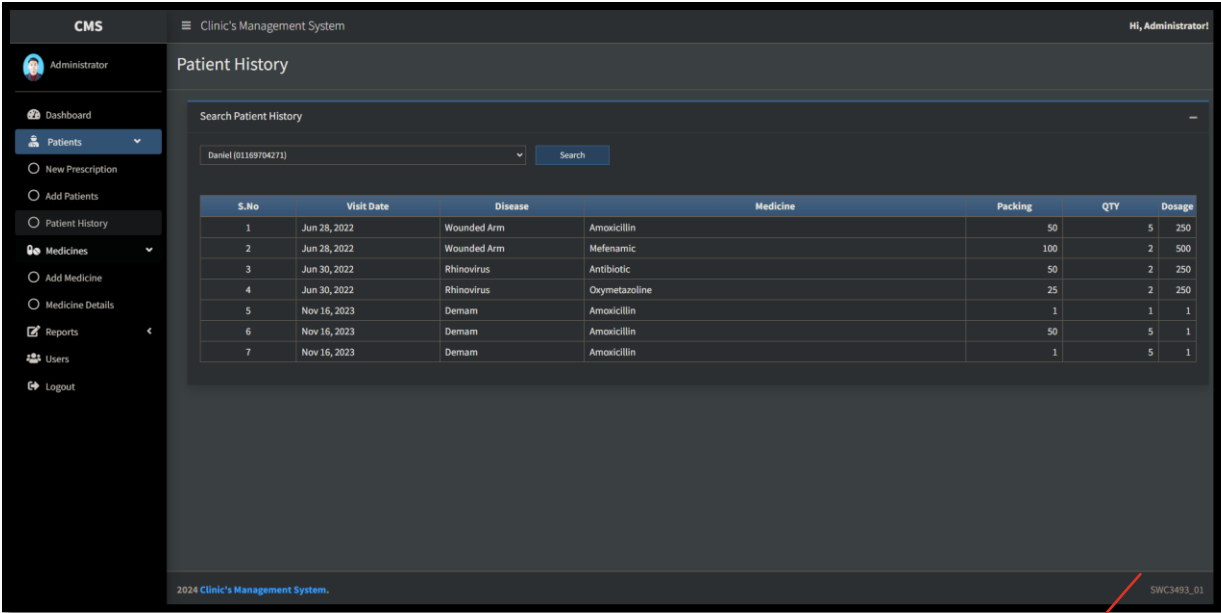


Figure 3.3.4 Patient History

Prescription Management:

A streamlined interface for creating and managing prescriptions.

CMS

Hi, Administrator!

Administrator

Dashboard

Patients

New Prescription

Add Patients

Patient History

Medicines

Reports

Users

Logout

Clinic's Management System

New Prescription

Add New Prescription

Select Patient

Visit Date

Next Visit Date

BP

Weight

Disease

Select Medicine

Select Packing

Quantity

Dosage

S.No	Medicine Name	Packing	QTY	Dosage	Action
------	---------------	---------	-----	--------	--------

Save

2024 Clinic's Management System.

SWC3493_01

Figure 3.3.5 An interactive interface for scheduling and managing appointments.

Medicine Database:
A detailed view of medicine information.

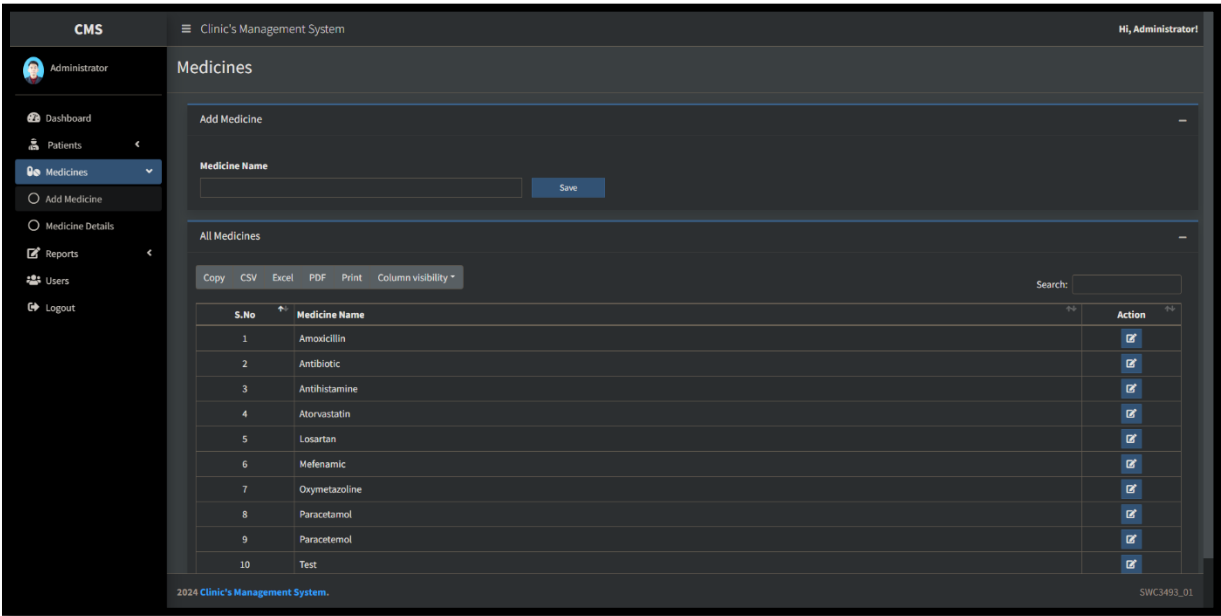


Figure 3.3.6 Add Medicines

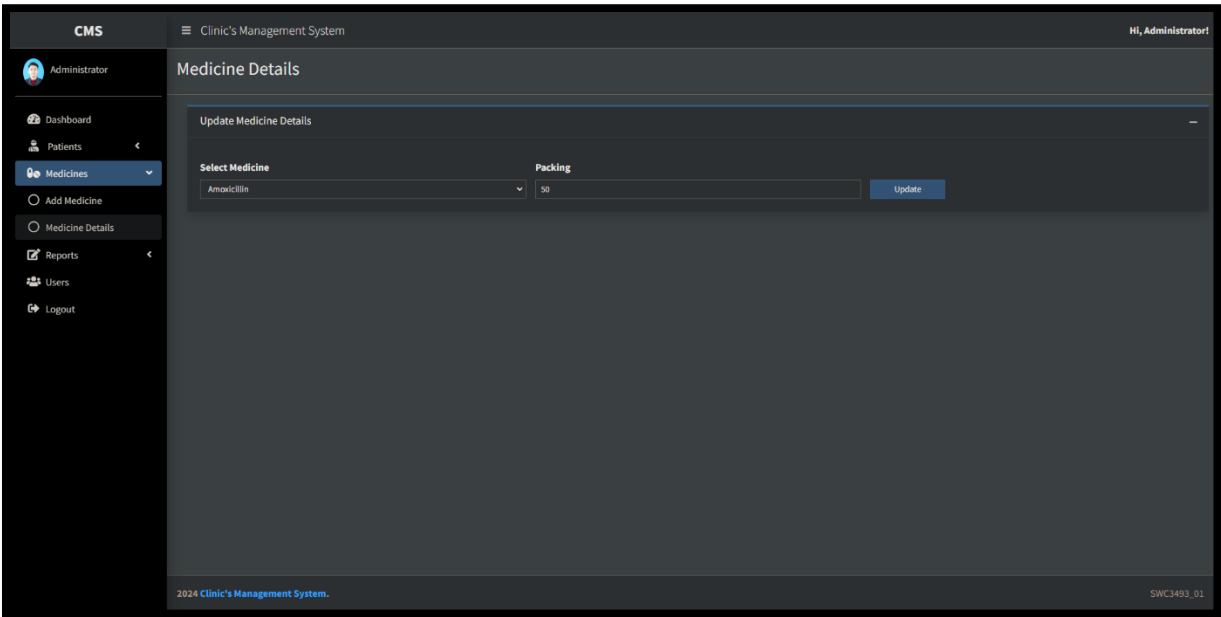


Figure 3.3.7 Medicine Update Details

Reports:

An interface for generating and viewing reports.

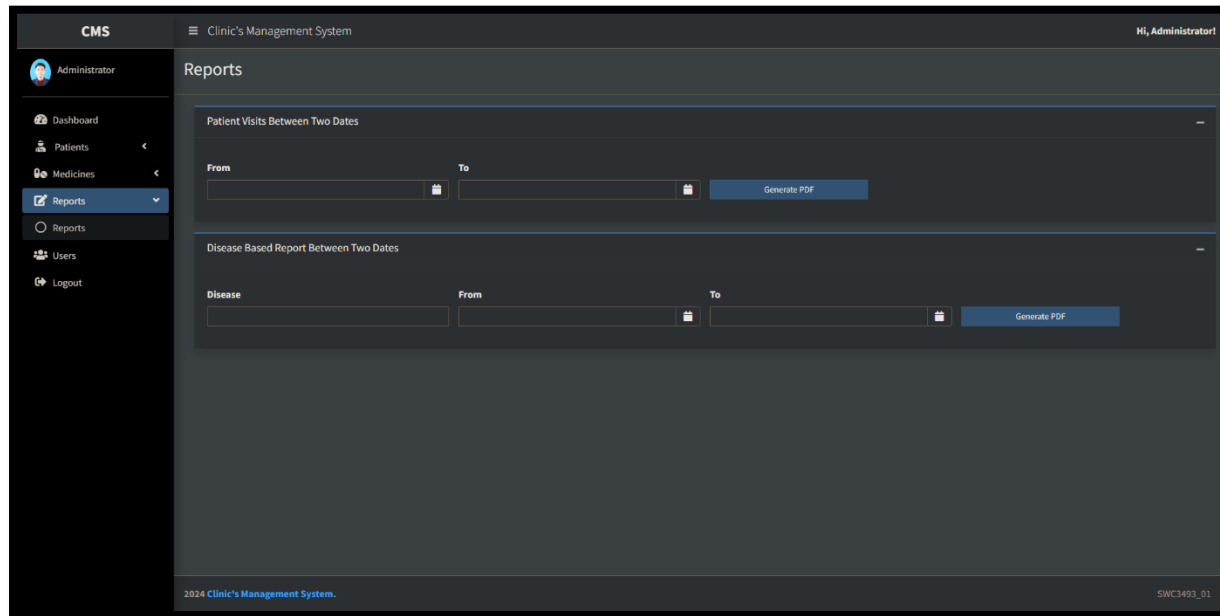


Figure 3.3.8 Generate Reports

3.4 Conclusion

The design phase has resulted in a detailed blueprint for the Clinic Management System (CMS), ensuring that all functionalities are well-defined, and the user interface is designed to be intuitive and efficient. By focusing on both system architecture and interface design, this phase provides a clear and structured approach to the system's development. The comprehensive design documentation facilitates seamless communication among the development team and stakeholders, paving the way for successful implementation. This meticulous design phase ensures that the CMS will meet the operational needs of the clinic while enhancing user experience and patient care.

CHAPTER 4 – IMPLEMENTATION AND TESTING

4.1 Introduction

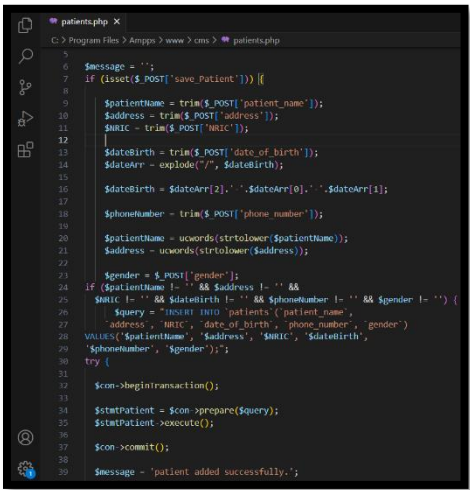
The Clinic Management System (CMS) is being implemented using a methodical and organized approach to ensure smooth integration and effective functioning throughout the clinic's activities. The implementation process includes the creation of important features such as patient registration, appointment scheduling, prescription management, and medical record maintenance, all of which are based on a strong and adaptable framework. Agile methodologies, which involve iterative development and continuous integration, are being utilized to support flexible planning, gradual development, and early delivery. A comprehensive testing strategy is a crucial part of this process, encompassing unit testing, integration testing, system testing, and user acceptance testing (UAT) to verify the functionality, performance, and security of the system. Both automated testing tools and manual testing procedures are being used to identify and address any issues, ensuring that the system meets the necessary standards and provides a dependable, user-friendly experience for clinic staff. This thorough approach to implementation and testing ensures that the CMS enhances operational efficiency and improves the quality of patient care.



4.2 System Implementation

During the implementation phase, the focus is on the development and integration of the different elements of the CMS in accordance with the design requirements. This stage involves coding development and bringing together the various components to ensure they function cohesively within the system.

- Patient Management

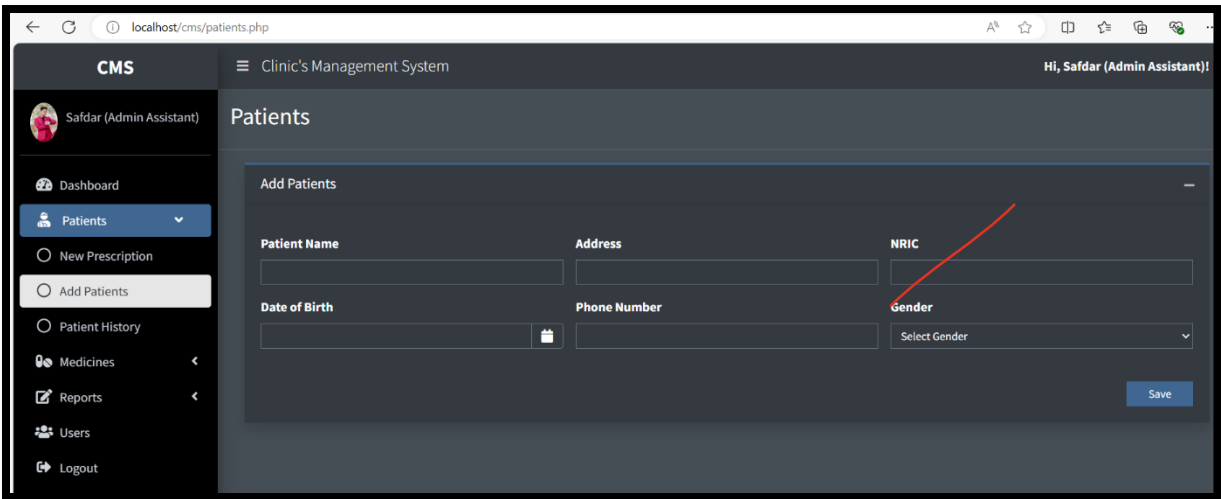


```
1  patients.php
2  C:\Program Files\Xampp> www > cms > patients.php
3
4  $message = '';
5
6  if (isset($_POST['save_Patient'])) {
7
8      $patientName = trim($_POST['patient_name']);
9      $address = trim($_POST['address']);
10     $nric = trim($_POST['NRIC']);
11
12     $dateBirth = trim($_POST['date_of_birth']);
13     $dateArr = explode('/', $dateBirth);
14
15     $dateBirth = $dateArr[2].'-'.$dateArr[0].'-'.$dateArr[1];
16
17     $phoneNumber = trim($_POST['phone_number']);
18
19     $patientName = ucwords(strtolower($patientName));
20     $address = ucwords(strtolower($address));
21
22     $gender = $_POST['gender'];
23
24     if ($patientName != '' && $address != '' && $phoneNumber != '' && $gender != '') {
25         $query = "INSERT INTO `patients`(`patient_name`,
26         `address`, `NRIC`, `date_of_birth`, `phone_number`, `gender`)
27         VALUES('".$patientName."','".$address."','".$nric."','".$dateBirth',
28         '".$phoneNumber."','".$gender "')";
29
30         try {
31             $con->beginTransaction();
32
33             $stmtPatient = $con->prepare($query);
34             $stmtPatient->execute();
35
36             $con->commit();
37
38             $message = 'patient added successfully.';
39         }
40     }
41 }
```

Figure 4.2.1

The figure of coding above shows that patients details are managed properly in the system upon successful completion of filling the form designated. “Patient added successfully” will be the sign that the details are stored in the database of the system.

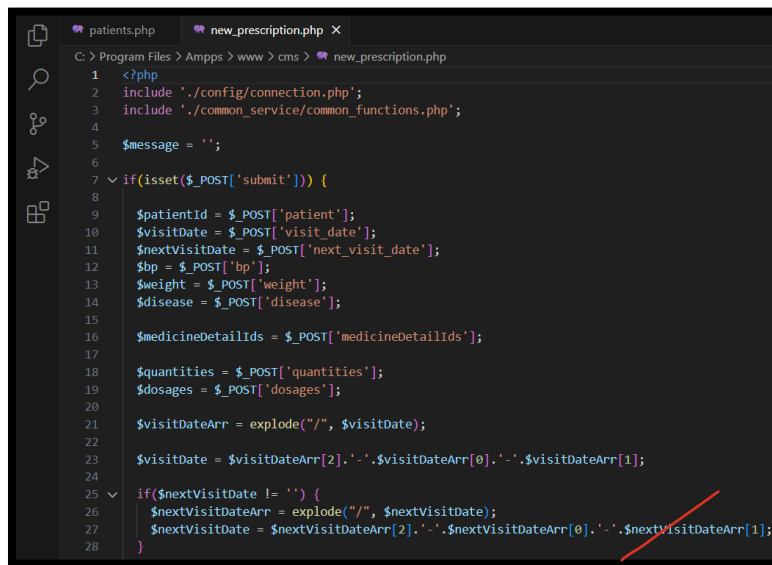
The coding structured will display the form that is compulsory to be filled to add patients as follows:



The screenshot shows a web browser at localhost/cms/patients.php. The page has a sidebar with a 'CMS' header and a 'Clinic's Management System' title. The user is logged in as 'Safdar (Admin Assistant)'. The main content area is titled 'Patients' and contains an 'Add Patients' form. The form has five input fields: 'Patient Name', 'Address', 'NRIC', 'Date of Birth', and 'Phone Number'. There is also a 'Gender' dropdown menu with the option 'Select Gender'. A red arrow points to the 'NRIC' field. A 'Save' button is located at the bottom right of the form.

Figure 4.2.2

- Appointment Scheduling



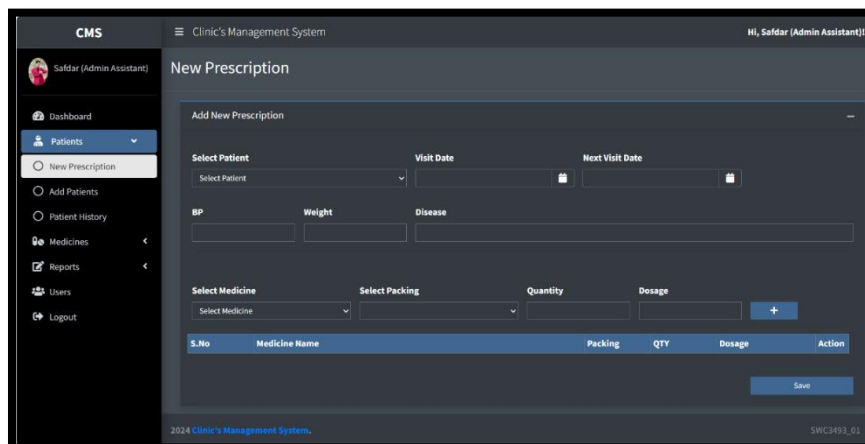
```

1 <?php
2 include './config/connection.php';
3 include './common_service/common_functions.php';
4
5 $message = '';
6
7 if(isset($_POST['submit'])) {
8
9     $patientId = $_POST['patient'];
10    $visitDate = $_POST['visit_date'];
11    $nextVisitDate = $_POST['next_visit_date'];
12    $bp = $_POST['bp'];
13    $weight = $_POST['weight'];
14    $disease = $_POST['disease'];
15
16    $medicineDetailIds = $_POST['medicineDetailIds'];
17
18    $quantities = $_POST['quantities'];
19    $dosages = $_POST['dosages'];
20
21    $visitDateArr = explode("/", $visitDate);
22
23    $visitDate = $visitDateArr[2].'-'. $visitDateArr[0].'-'. $visitDateArr[1];
24
25    if($nextVisitDate != '') {
26        $nextVisitDateArr = explode("/", $nextVisitDate);
27        $nextVisitDate = $nextVisitDateArr[2].'-'. $nextVisitDateArr[0].'-'. $nextVisitDateArr[1];
28    }

```

Figure 4.2.3

The code supplied is designed to facilitate the scheduling of appointments and the management of prescriptions within a Clinic Management System. It encompasses capabilities for the storage of patient visit information and medication history. The code is capable of capturing patient data, visit dates, and medical specifics including blood pressure, weight, and disease diagnosis. It enables the selection and dosage of prescribed medications, ensuring the accurate preservation of all details in the database. Furthermore, the code incorporates functionalities for the dynamic addition of medicines to the current visit list and the validation of input prior to storage, offering a comprehensive solution for the management of patient appointments and prescriptions. The output will be as follows:



CMS Clinic's Management System HI, Safdar (Admin Assistant)

New Prescription

Add New Prescription

Select Patient Visit Date Next Visit Date

BP Weight Disease

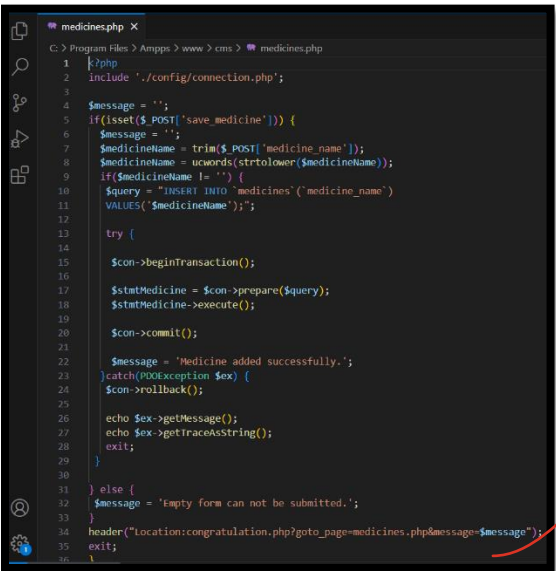
Select Medicine Select Packing Quantity Dosage

S.No	Medicine Name	Packing	QTY	Dosage	Action
<input data-bbox="1112 1680 1161 1701" type="button" value="Save"/>					

2024 Clinic's Management System. SWC3493_01

Figure 4.2.4

- Medicine Management



```
medicines.php
C:\Program Files\Ampm\www>cms> medicines.php
1 <?php
2 include './config/connection.php';
3
4 $message = '';
5 if(isset($_POST['save_medicine'])) {
6     $message = '';
7     $medicineName = trim($_POST['medicine_name']);
8     $medicineName = ucwords(strtolower($medicineName));
9     if($medicineName != '') {
10         $query = "INSERT INTO 'medicines'('medicine_name')
11             VALUES('$medicineName')";
12
13         try {
14             $con->beginTransaction();
15
16             $stmtMedicine = $con->prepare($query);
17             $stmtMedicine->execute();
18
19             $con->commit();
20
21             $message = "Medicine added successfully.";
22         } catch(PDOException $ex) {
23             $con->rollback();
24
25             echo $ex->getMessage();
26             echo $ex->getTraceAsString();
27             exit;
28         }
29     } else {
30         $message = 'empty form can not be submitted.';
31     }
32     header("Location:congratulation.php/goto_page=medicines.php$message=$message");
33     exit;
34 }
35
```

Figure 4.2.5

The code snippet provided is a crucial part of the Medicine Management module created for a Clinic's Patient Management System. Its main functions include adding new medicines to a database and displaying a comprehensive list of all available medicines. Users can input a medicine name through a form, which is then validated and stored in the database. The code also ensures that each medicine name is unique by checking the database before submission. Additionally, the system has a user-friendly interface for viewing all stored medicines and allows for individual medicine records to be modified. By using PHP, HTML, and JavaScript, the system enables dynamic interactions and efficient data management for effective medicine handling. The output will be as follows:

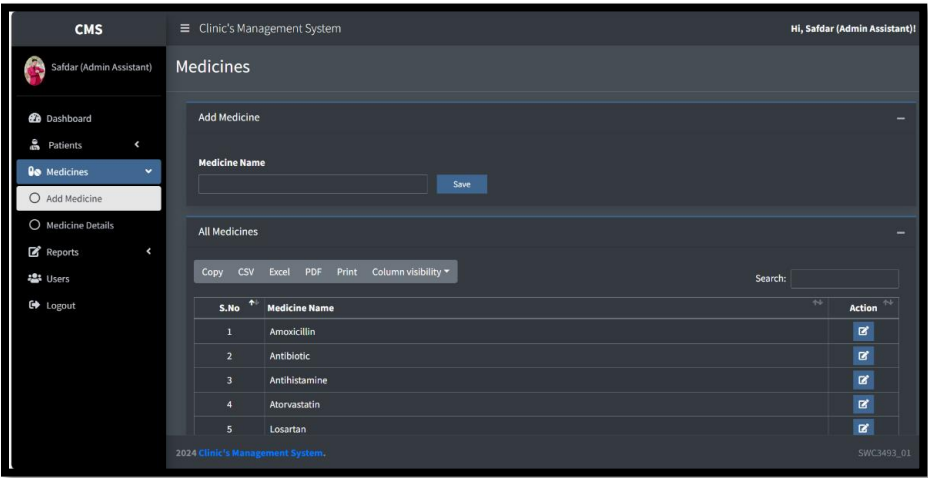
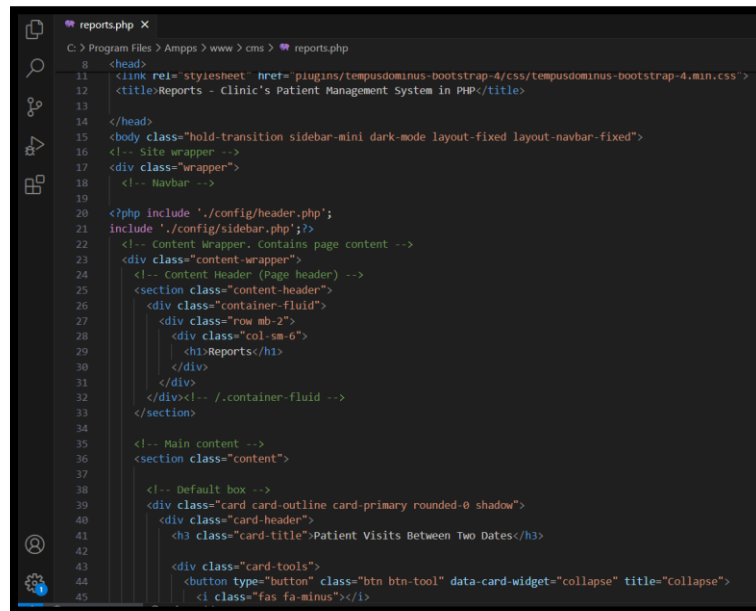


Figure 4.2.6

- Reports



```

8 <head>
9 <link rel="stylesheet" href="plugins/tempusdominus-bootstrap-4/css/tempusdominus-bootstrap-4.min.css">
10 </head>
11 <body class="hold-transition sidebar-mini dark-mode layout-fixed layout-navbar-fixed">
12 <!-- Site wrapper -->
13 <div class="wrapper">
14 <!-- Navbar -->
15 <?php include './config/header.php';
16 include './config/sidebar.php';
17 <!-- Content wrapper. Contains page content -->
18 <div class="content-wrapper">
19 <!-- Content Header (Page header) -->
20 <section class="content-header">
21 <div class="container-fluid">
22 <div class="row mb-2">
23 <div class="col-sm-6">
24 <h1>Reports</h1>
25 </div>
26 </div>
27 </div>
28 <!-- Main content -->
29 <section class="content">
30 <!-- Default box -->
31 <div class="card card-outline card-primary rounded-0 shadow">
32 <div class="card-header">
33 <h3 class="card-title">Patient Visits Between Two Dates</h3>
34 <div class="card-tools">
35 <button type="button" class="btn btn-tool" data-card-widget="collapse" title="Collapse">
36 <i class="fas fa-minus"></i>
37 </div>
38 </div>
39 <div class="card-body">
40 <div class="row">
41 <div class="col">
42 <div class="form-group">
43 <input type="text" value="From" />
44 </div>
45 <div class="form-group">
46 <input type="text" value="To" />
47 </div>
48 <div class="form-group">
49 <button type="button" class="btn btn-primary" value="Generate PDF" />
50 </div>
51 </div>
52 </div>
53 <div class="card">
54 <div class="card-header">
55 <h3 class="card-title">Disease Based Report Between Two Dates</h3>
56 <div class="card-tools">
57 <button type="button" class="btn btn-tool" data-card-widget="collapse" title="Collapse">
58 <i class="fas fa-minus"></i>
59 </div>
60 </div>
61 <div class="card-body">
62 <div class="row">
63 <div class="col">
64 <div class="form-group">
65 <input type="text" value="Disease" />
66 </div>
67 <div class="form-group">
68 <input type="text" value="From" />
69 </div>
70 <div class="form-group">
71 <input type="text" value="To" />
72 </div>
73 <div class="form-group">
74 <button type="button" class="btn btn-primary" value="Generate PDF" />
75 </div>
76 </div>
77 </div>
78 </div>
79 </div>
80 </div>
81 </div>
82 </div>
83 </div>
84 </div>
85 </div>
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91 </div>
92 </div>
93 </div>
94 </div>
95 </div>
96 </div>
97 </div>
98 </div>
99 </div>
100 </div>

```

Figure 4.2.7

The provided code snippet signifies a component of the Reports module designed for a Clinic's Patient Management System. It is responsible for facilitating the creation of reports regarding patient visits and disease incidents within designated time frames. Through the user interface, users can choose date ranges and particular diseases to produce PDF reports accordingly. Utilizing PHP, HTML, JavaScript, and jQuery, the code establishes date picker functionalities, manages user inputs, and generates reports in new browser windows. The incorporation of date-time pickers serves to improve the user interface, simplifying the selection and administration of report parameters. The output will be as follows:

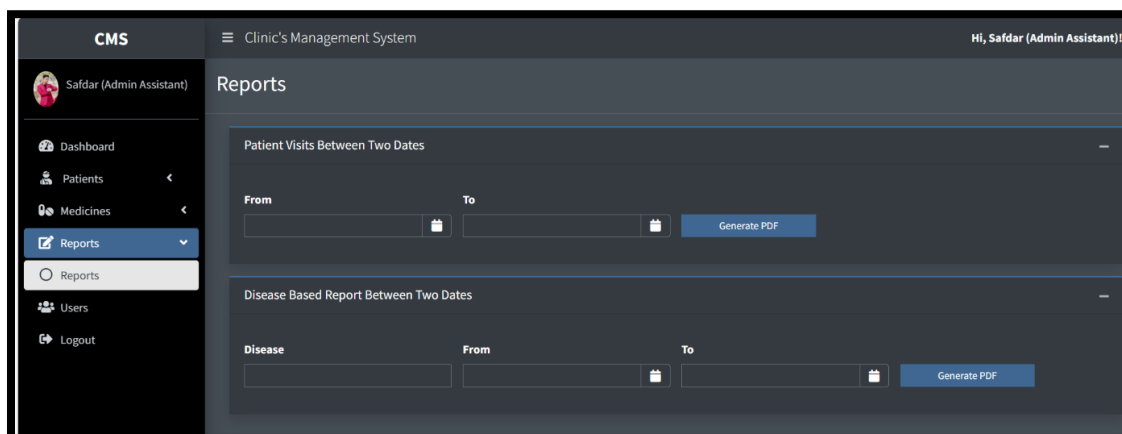


Figure 4.2.8

- Integration of the database with the components

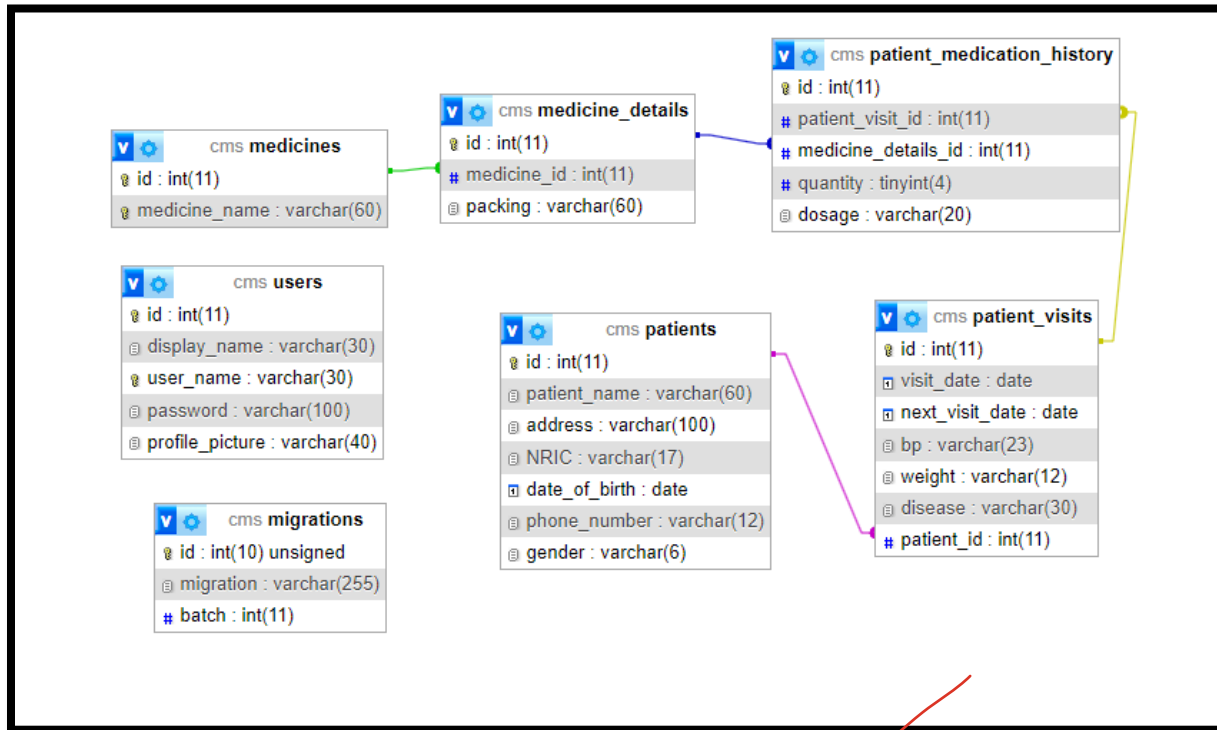


Figure 4.2.9

In this project, integration involves connecting the database and application layer to ensure a smooth flow of data in the Clinic's Patient Management System. This process includes syncing the backend database, which stores information on medications, patient appointments, and illnesses, with the frontend user interface for efficient data retrieval and modification. By using prepared statements and transaction management in PHP, the system ensures secure and reliable data interactions. Additionally, dynamic date pickers and form validation are incorporated to improve the user experience, ensuring accurate and timely data input and retrieval for seamless system operation.

- Deployment of the system

Deployment involves turning on the AMPPS server to host the Clinic's Patient Management System, ensuring the MySQL database is properly linked and configured for seamless data flow. Once the server environment is up and running, the next step is to verify database connectivity to ensure all components interact correctly. Finally, users can access the website through a web browser, where they can efficiently manage medicines, generate patient visit reports, and track disease information, ensuring a smooth and secure user experience as follows:

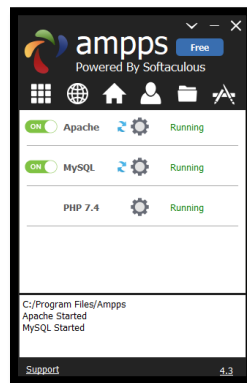


Figure 4.2.10

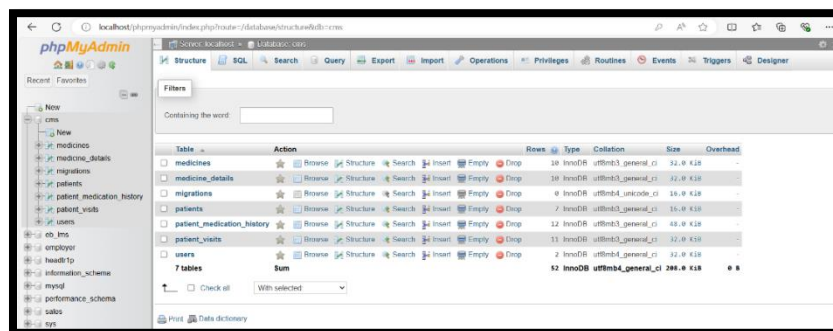


Figure 4.2.11

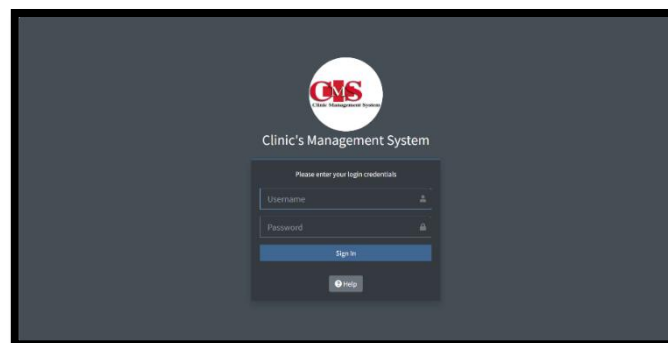


Figure 4.2.12

4.3 System Testing

- Authorized User Successfully Login

User is prompt to fill in username and password according to his credentials:

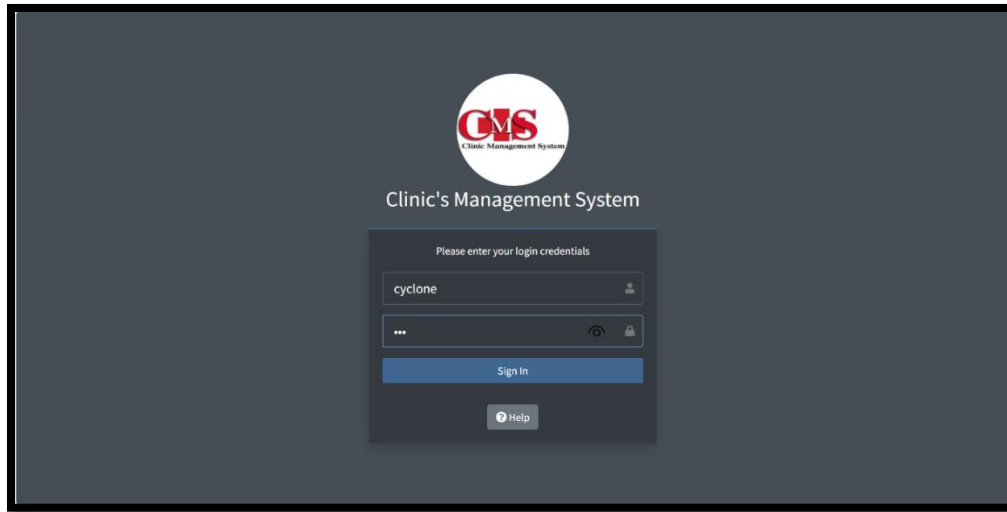


Figure 4.3.1

Upon correct credentials inserted, user will be able to access the dashboard:

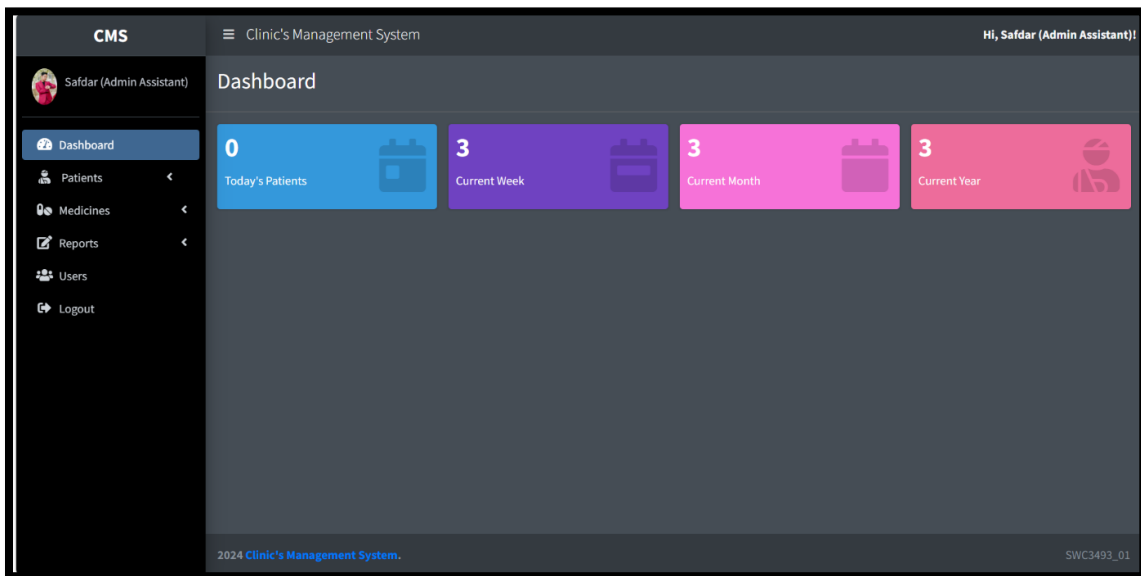


Figure 4.3.2

From the dashboard, authorized users may access the patients, medicines, reports and users' function. They also may keep track of the number of patients based on the timeline set.

- Unauthorized Attempt to Access

The system will authenticate the user credentials upon attempt to access. If detected incorrect credentials, it will be as follows:

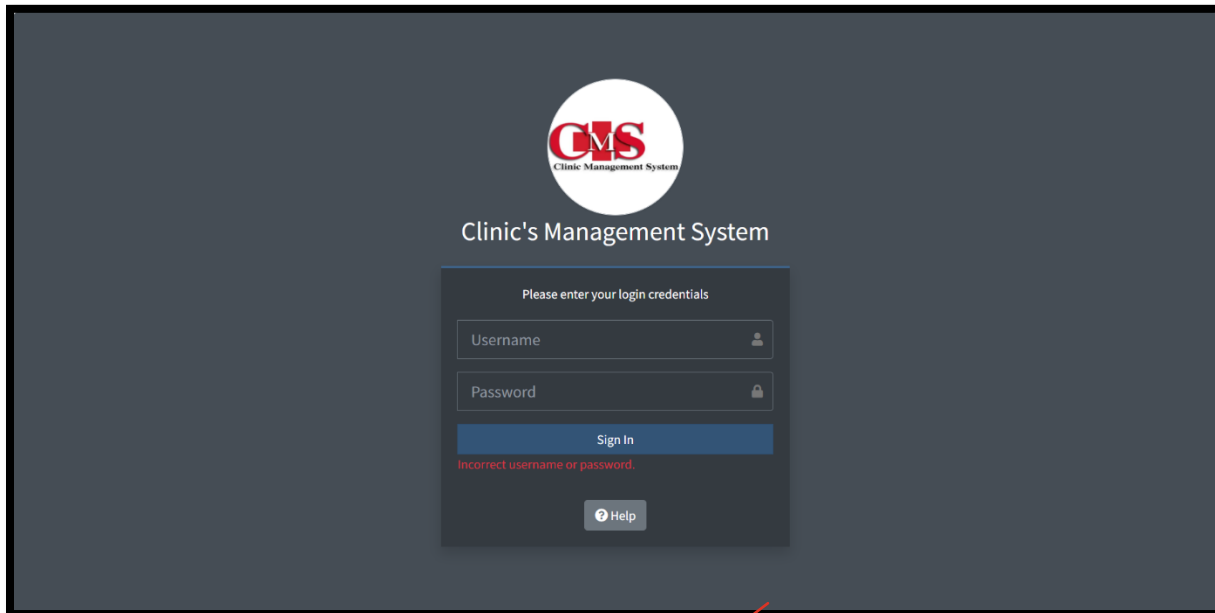


Figure 4.3.3

User may click upon the help button if continuously failed to access even though the credentials are correct:

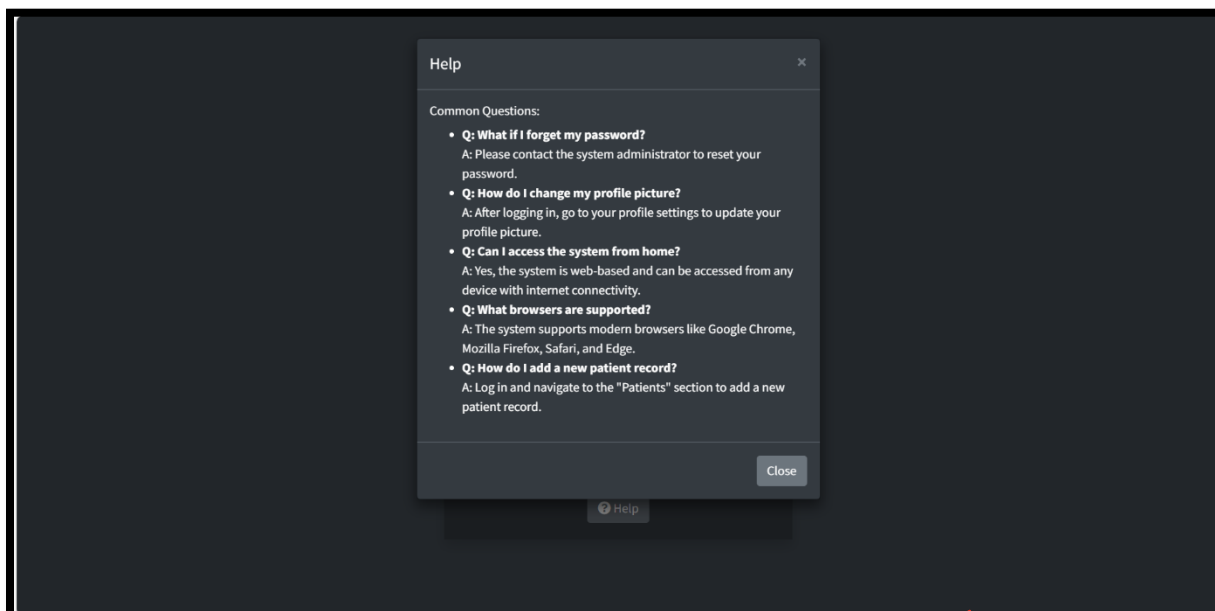


Figure 4.3.4

- Adding New Patient

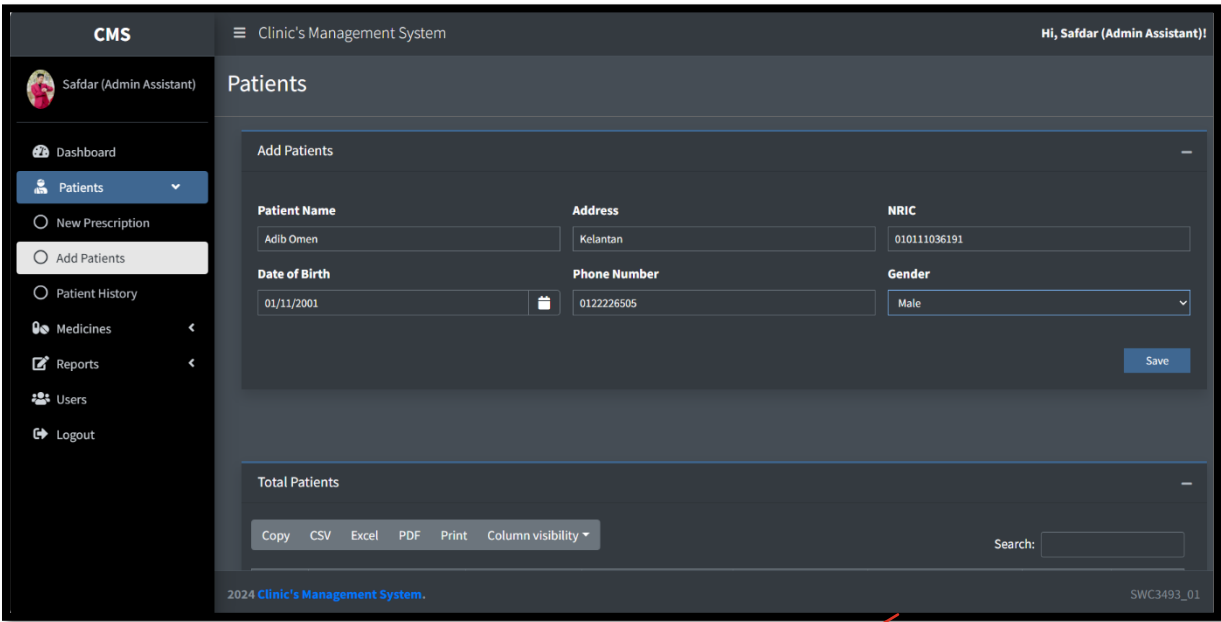


Figure 4.3.5

Users need to save the patient details by clicking on the designated icon to ensure that the data is stored in the database. After that, a pop-out message will be shown and the patient details will be shown in the total patient list as follows:

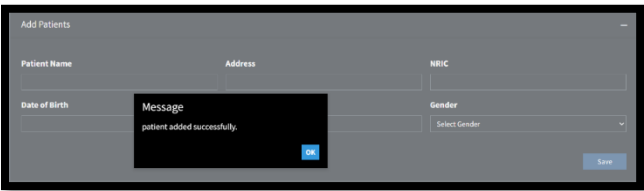


Figure 4.3.6

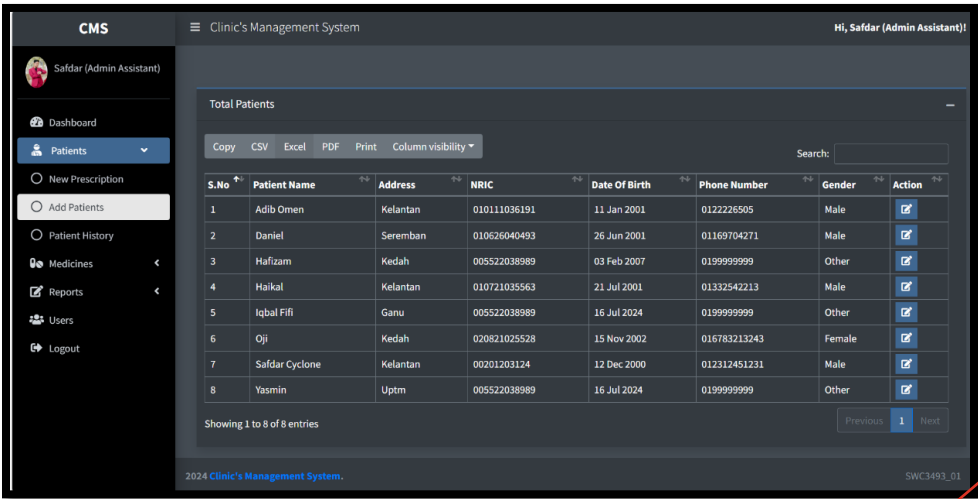


Figure 4.3.7

- Assignment of Prescription

CMS Clinic's Management System Hi, Safdar (Admin Assistant)!

Safdar (Admin Assistant)

Dashboard

Patients

New Prescription

Add Patients

Patient History

Medicines

Reports

Users

Logout

Add New Prescription

Select Patient: Adib Omen (0122226505) Visit Date: 07/10/2024 Next Visit Date: 07/17/2024

BP: 120/81 Weight: 65 Disease: Severe Hallucination

Select Medicine: Oxymetazoline Select Packing: 25 Quantity: 3 Dosage: 250

S.No	Medicine Name	Packing	QTY	Dosage	Action
	Oxymetazoline	25	3	250	

Save

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Figure 4.3.8

Doctors can select their patients from the new prescription form and prescribe the correct medication. Once click upon “+” icon, the medication will be listed first before it is sent to the database in case there are more medications needed to be listed.

CMS Clinic's Management System Hi, Safdar (Admin Assistant)!

Safdar (Admin Assistant)

Dashboard

Patients

New Prescription

Add Patients

Patient History

Medicines

Reports

Users

Logout

Add New Prescription

Select Patient: Adib Omen (0122226505) Visit Date: 07/10/2024 Next Visit Date: 07/17/2024

BP: 120/81 Weight: 65 Disease: Severe Hallucination

Select Medicine: Select Medicine Select Packing: Select Packing Quantity: Dosage: +

S.No	Medicine Name	Packing	QTY	Dosage	Action
1	Oxymetazoline	25	3	250	X

Save

2024 Clinic's Management System. SWC3493_01

Figure 4.3.9

Once saved, it will show as follows:

Message

Patient Medication stored successfully.

OK

Figure 4.3.10

- Patient History

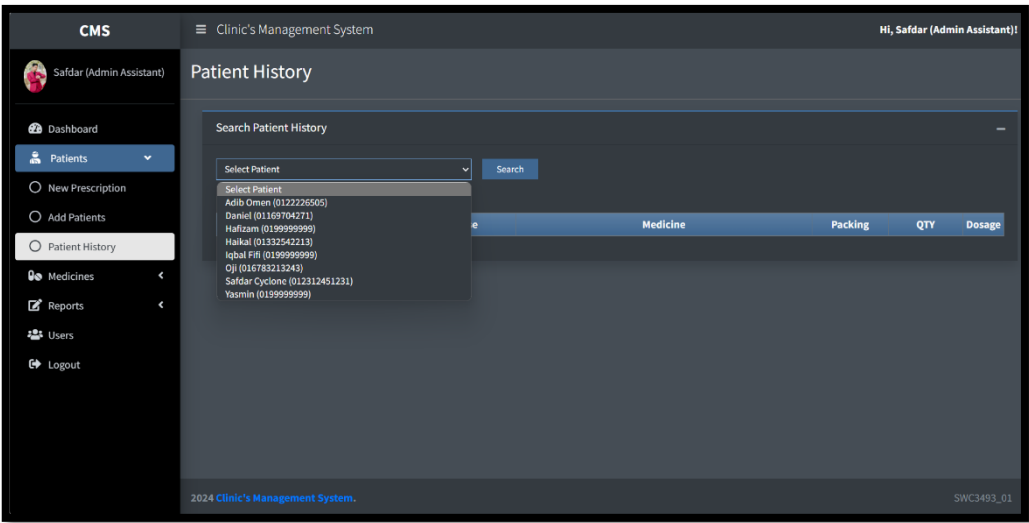


Figure 4.3.11

Authorized users can check each of the patient history including their prescribed medicine details as follows:

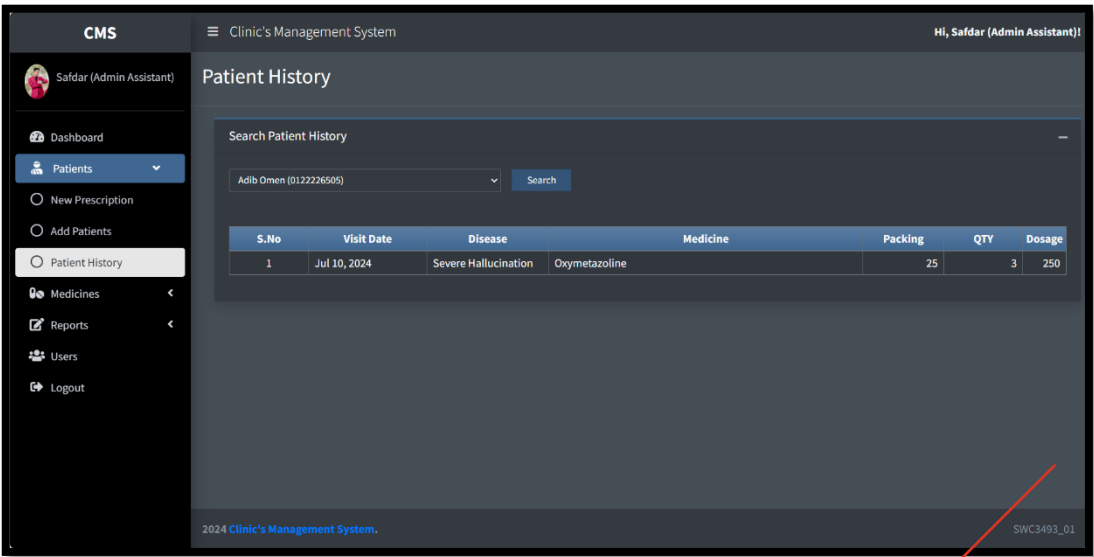


Figure 4.3.12

- Medicine Management

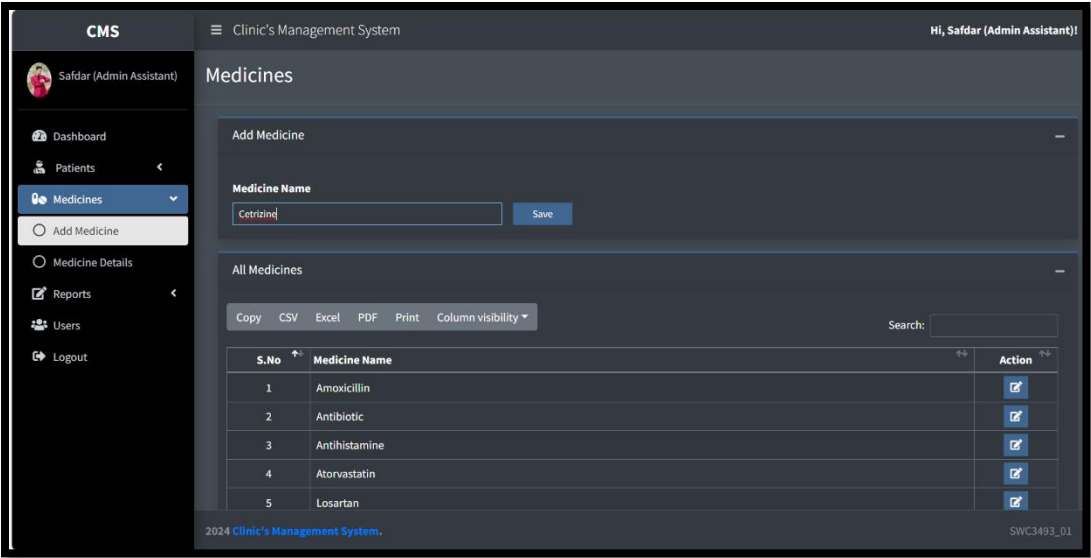


Figure 4.3.13

In the system, users can add new medicine through the website which will be stored inside the database once a pop-out message has come out and the new medicine will be listed together with the other medicines in the table as follows:

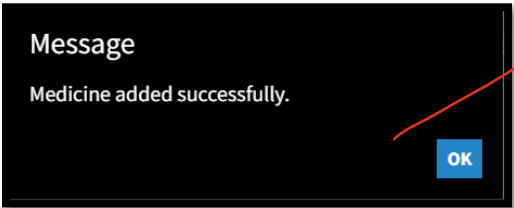


Figure 4.3.14

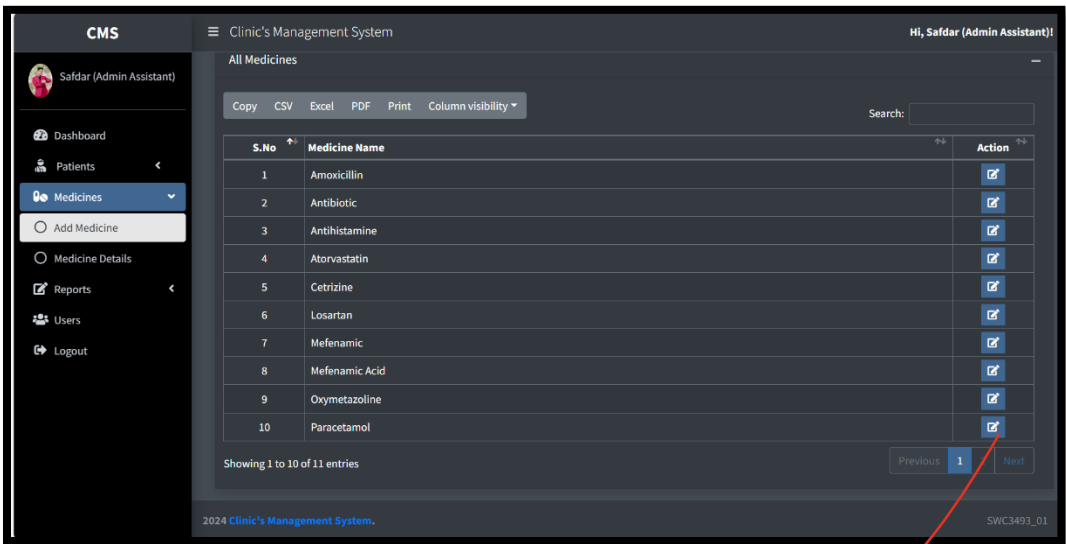


Figure 4.3.15

- Medicine Details

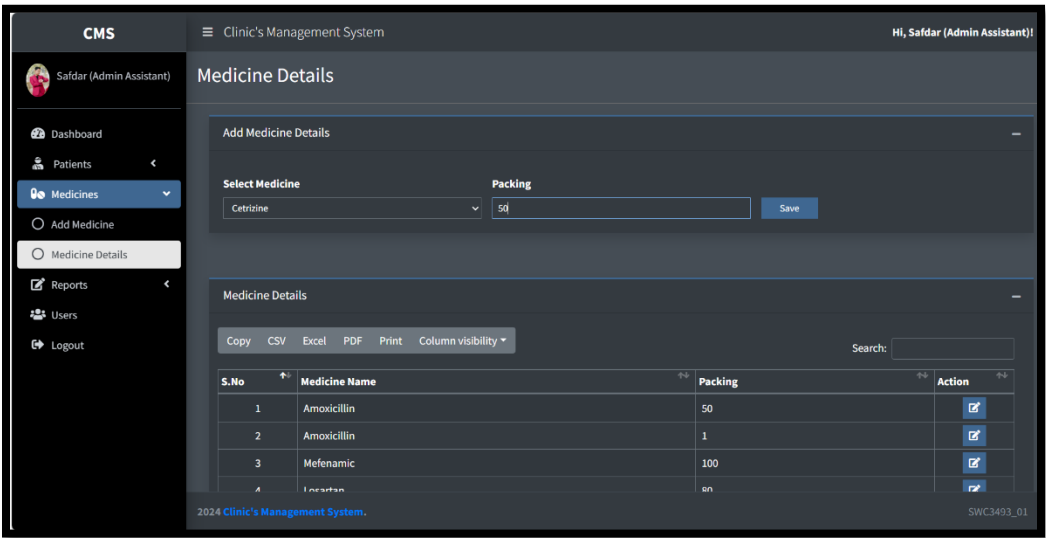


Figure 4.3.16

The inventory of the medicine packaging can be managed through medicine details. User is prompt to select the medicine intended for updating the remaining available stocks. The result will be as follows:

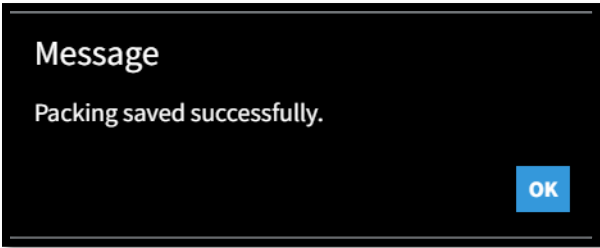


Figure 4.3.17

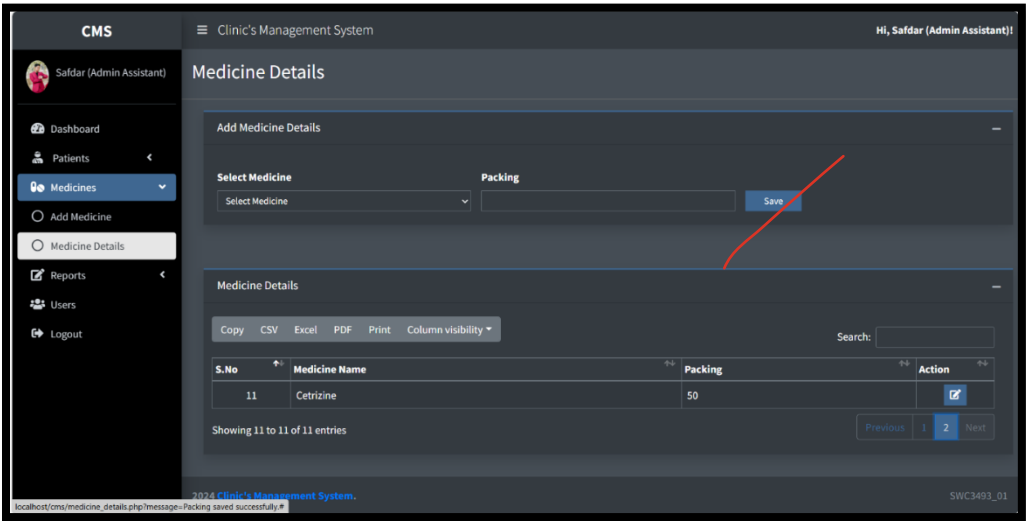


Figure 4.3.18

- Reports

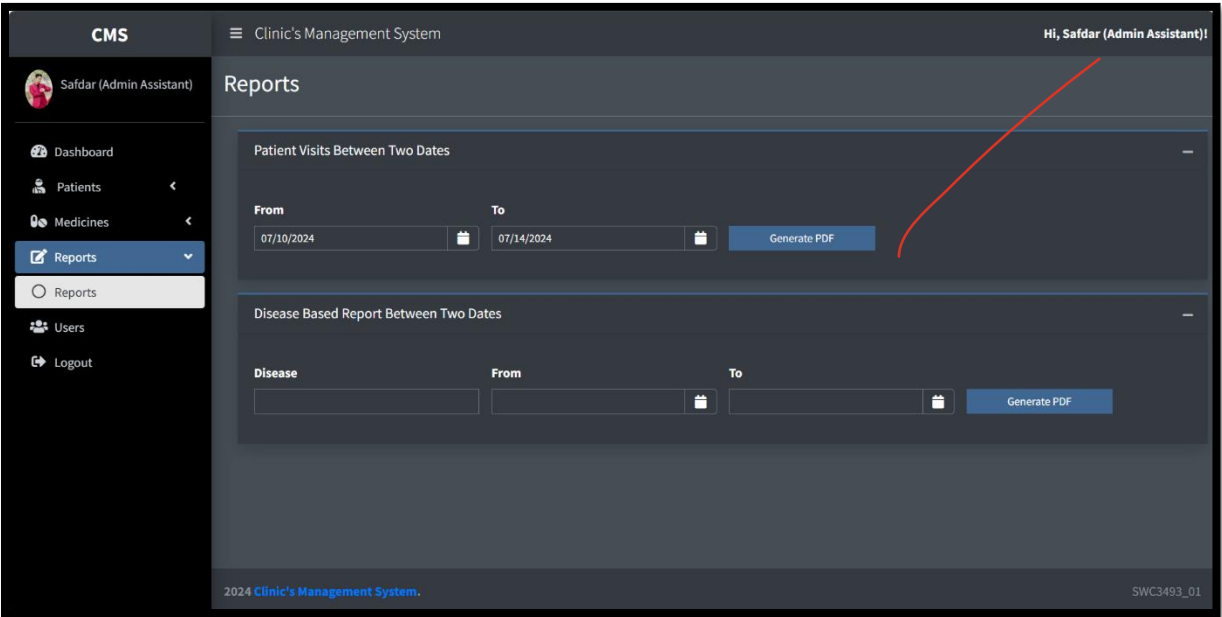



Figure 4.3.19

User can view reports of the patient by selecting dates of their visit or by inserting the names of their diseases between two dates. Once generated, the result will be as follows:



Patient Management System

Patients Visits

From 07/10/2024 to 07/14/2024

S.No	Visit Date	Patient Name	Address	Contact#	Disease
1	2024-07-10	Iqbal Fifi	Ganu	0199999999	Split Personality Disorder
2	2024-07-10	Iqbal Fifi	Ganu	0199999999	Split Personality Disorder
3	2024-07-10	Adib Omen	Kelantan	0122226505	Severe Hallucination
4	2024-07-11	Hafizam	Kedah	0199999999	Fever

Figure 4.3.21

- Update User

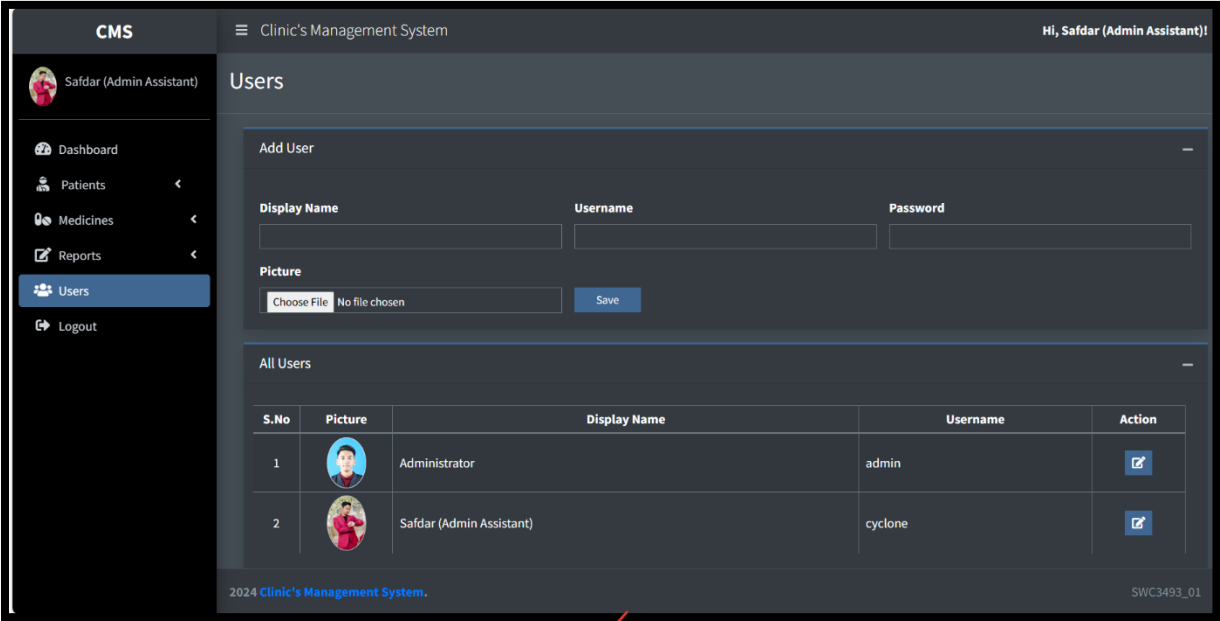


Figure 4.3.21

Admin and the administrator assistant can update users who are allowed to access the website. Name, username, password and picture of the new user are compulsory for enabling them to access the CMS.

4.4 Conclusion

In summary, the effective execution and thorough examination of the Clinic's Patient Management System have played a crucial role in establishing a dependable and efficient platform. The initial phase involved seamlessly integrating the database with the application layer to ensure continuous data flow between components. This integration was vital for maintaining the consistency and integrity of data across the entire system.

Comprehensive system testing was then conducted, covering both functional and non-functional aspects. This stage was essential for identifying and resolving any potential issues, thereby enhancing the overall stability and performance of the system. The testing process encompassed unit tests, integration tests, and user acceptance tests, all of which contributed to the strength and reliability of the final product.

By addressing potential issues during testing, we have improved the stability and usability of the system, making it well-prepared for a seamless deployment. This meticulous approach ensures that the system is capable of meeting user requirements and effectively managing real-world scenarios. The outcome is a trustworthy and user-friendly system that significantly enhances the management of patient data and streamlines clinic operations.

CHAPTER 5 – CONCLUSION

5.1 Introduction

This section provides an overview of the Clinic Management System (CMS) project, summarizing its strengths, weaknesses, and overall conclusion. The primary objective of the CMS project was to optimize different facets of clinic operations, such as patient management, appointment scheduling, and medicine tracking. By executing a thorough system implementation and conducting rigorous testing, the project has showcased numerous significant strengths and pinpointed specific areas that need improvement. The chapter aims to present a comprehensive analysis of these discoveries, shedding light on the accomplishments of the project and the potential areas that could benefit from additional refinement.

5.2 Strengths

The CMS project has demonstrated numerous strengths that have had a significant impact on clinic operations and efficiency. One of the key strengths lies in the user-friendly interface of the system, which simplifies tasks for both clinic staff and patients. The intuitive design of the interface enables users to navigate through various functions easily, reducing the learning curve and increasing the adoption rates of the system. Moreover, the integration of the database with the application layer ensures smooth data flow between components, facilitating real-time updates and accurate record-keeping, which is essential for maintaining up-to-date patient information and managing clinic operations effectively.

Another notable strength of the CMS is its robust reporting capabilities, allowing for the generation of detailed reports on patient visits, diseases, and other essential metrics. These reports offer valuable insights into clinic operations, enabling better decision-making and resource allocation. The inclusion of automated notification features, such as appointment reminders and follow-up alerts, enhances patient engagement and adherence to treatment plans. Furthermore, the security measures implemented in the CMS, including user authentication and data encryption, safeguard sensitive patient information from unauthorized access and breaches, ensuring patient confidentiality and trust.

Lastly, the flexibility and scalability of the CMS project are commendable strengths that set it apart. The system is designed to cater to the unique needs of various clinics, regardless of their size or specialization. Its modular architecture allows for easy customization and expansion, ensuring that the system can adapt and grow with the clinic's requirements. This adaptability not only future-proofs the investment but also guarantees that the CMS can continue to deliver value as the clinic evolves and expands its services. In conclusion, the strengths of the CMS project highlight its potential to significantly improve clinic operations and overall efficiency.

5.3 Weaknesses

The CMS project, while possessing several strengths, also exhibits weaknesses that must be rectified to achieve peak efficiency. A key weakness lies in the intricate setup process, which demands a considerable level of technical proficiency, especially in database configuration and seamless application layer integration. This complexity may present difficulties for healthcare facilities lacking IT resources or technical know-how, leading to potential delays in implementation and initial user dissatisfaction.

An additional weakness worth noting is the reliance on consistent internet connectivity for specific functions. Although the system is structured to support real-time data updates and accessibility, any interruption in internet service could impede the prompt retrieval or modification of patient data. This dependence may pose significant challenges for clinics situated in regions with unreliable internet connections, impacting the system's dependability and usability during critical scenarios. Implementing offline capabilities or enhancing the system's ability to handle connectivity issues more effectively could help alleviate this vulnerability.

Moreover, the content management system (CMS) may demand regular upkeep and enhancements to uphold its security and operational efficiency. The necessity for frequent updates could burden clinics, particularly those lacking dedicated IT personnel to oversee these responsibilities. In the absence of timely updates, the system may become susceptible to security risks or fail to integrate new functionalities and enhancements, potentially diminishing its overall performance. This continuous maintenance requirement may strain resources and influence the long-term viability of the system.

Lastly, despite the CMS's flexibility and scalability, there may exist constraints in terms of customization options. Certain clinics with distinct or intricate workflows might discover that the system's default configurations do not align with their requirements. Tailoring the system to accommodate these specialized needs could prove to be time-consuming and expensive, potentially restricting its suitability for specific healthcare providers. Addressing these customization obstacles through more intuitive and comprehensive configuration alternatives could enhance the system's adaptability and broaden its utility within the healthcare sector.

5.4 Conclusion

In conclusion, the Clinic Management System (CMS) initiative marks a notable advancement in the optimization of clinic procedures and the enhancement of patient care quality. By executing a thorough system deployment and conducting rigorous testing procedures, the CMS has proven its capability to enhance efficiency, precision, and overall administration within a clinical environment. The robust functionalities of the CMS, such as its comprehensive patient management tools, appointment scheduling features, and medical record maintenance capabilities, underscore its significance as a potent resource for healthcare providers.

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