

HOSPITAL MANAGEMENT SYSTEM BI

Report submitted in partial fulfilment of the requirement for the degree of



Bachelor of Technology

In

Computer Science and Engineering(Data Science)

Under the supervision of

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DECLARATION

This is to certify that Synopsis Report Entitled “**Hospital Management System BI**” which is submitted in partial fulfilment of the requirement for the award of degree B.Tech. in Computer Science and Engineering to MPEC Kanpur, Dr. A.P.J. Abdul Kalam Technical University, Lucknow comprises only original work and studies carried out by students himself. The matter embodied in this synopsis has not been submitted for the award of any other degree.

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ABSTRACT

A **Hospital Management System BI** is an integrated software application designed to streamline the day-to-day operations of a hospital. It provides an efficient way to manage various administrative, medical, financial, and clinical tasks, improving the overall management of healthcare services. The system enhances the coordination between departments and ensures smooth communication between healthcare providers and patients.

The **HMS** typically features modules for patient registration, appointment scheduling, medical records management, billing, inventory management, and staff management. It allows hospital staff to access and update patient information, track appointments, record medical history, prescribe medications, and generate billing information with ease.

The system also supports management of doctors' schedules, enabling them to manage appointments, patient records, and treatment plans. For patients, the HMS offers features like appointment booking, access to medical records, and easy payment options for services rendered.

The key benefits of a **Hospital Management System** include:

1. **Efficiency:** Automates routine tasks and reduces paperwork, saving time and effort for hospital staff.
2. **Accuracy:** Reduces human errors in patient records, prescriptions, and billing, ensuring accuracy in healthcare delivery.
3. **Data Security:** Protects sensitive patient information with secure access controls, ensuring privacy and compliance with healthcare regulations.
4. **Real-time Access:** Provides real-time access to patient data, enabling healthcare professionals to make informed decisions quickly.
5. **Cost-Effective:** Optimizes hospital resources and operations, leading to cost savings and improved financial management.

By integrating all hospital functions into a single platform, the **Hospital Management System** enhances the quality of healthcare services, improves patient satisfaction, and streamlines the workflow, making it an essential tool for modern hospitals.

INTRODUCTION :-

Hospital management is a vital aspect of the healthcare system that focuses on organizing, directing, and overseeing the operations of hospitals and other medical facilities. It encompasses a wide range of responsibilities aimed at ensuring the efficient delivery of healthcare services while maintaining high standards of patient care. As healthcare systems grow more complex due to technological advancements and the increasing demand for medical services, effective hospital management has become essential to meet these challenges and deliver optimal outcomes.

The primary goal of hospital management is to create a cohesive environment where medical professionals, administrative staff, and support teams can collaborate effectively to address the needs of patients. This requires a well-coordinated approach that balances clinical care, resource allocation, financial management, and regulatory compliance. By integrating healthcare expertise with management principles, hospital management ensures that hospitals operate seamlessly, providing timely, high-quality, and affordable care.

In today's rapidly changing healthcare landscape, hospital management also plays a crucial role in adopting innovations, such as telemedicine, electronic health records (EHR), and artificial intelligence (AI). These advancements help improve operational efficiency, enhance patient experiences, and enable facilities to remain competitive in an ever-evolving industry. Moreover, hospital management ensures that healthcare facilities are equipped to respond to emergencies and unforeseen challenges, such as pandemics or natural disasters.

Ultimately, hospital management serves as the backbone of modern healthcare, bridging the gap between medical excellence and administrative efficiency. It is a dynamic field that continues to evolve, adapting to the changing needs of society and driving the transformation of healthcare systems worldwide.

Objective:-

The primary objective of hospital management is to ensure the efficient delivery of high-quality healthcare services while maintaining a patient-centric approach. This involves organizing and coordinating all hospital resources and activities to achieve optimal outcomes for patients, healthcare professionals, and the institution itself. Here are some key objectives of hospital management:

1. **Enhancing Patient Care and Satisfaction:**
A central goal is to provide excellent medical care that meets or exceeds patient expectations. This includes maintaining a safe and hygienic environment, offering prompt services, and ensuring empathetic communication with patients and their families.
2. **Optimizing Operational Efficiency:**
Hospital management aims to streamline workflows, reduce delays, and improve the utilization of resources, including staff, equipment, and facilities. Efficient operations ensure better patient outcomes and reduced operational costs.
3. **Financial Sustainability:**
Managing hospital finances effectively is essential to ensure long-term sustainability. This includes budgeting, cost control, revenue generation, and identifying funding opportunities without compromising the quality of care.
4. **Staff Management and Development:**
Ensuring that the hospital staff, including doctors, nurses, and administrative personnel, are well-trained, motivated, and adequately supported is a key focus. Continuous professional development and a positive work environment are critical to achieving this objective.
5. **Adopting Technological Innovations:**
Embracing modern healthcare technologies, such as electronic health records, telemedicine, and automated systems, is vital to improve accuracy, efficiency, and accessibility in patient care.
6. **Regulatory Compliance:**
Hospital management ensures adherence to healthcare regulations and standards to maintain legal and ethical practices in patient care and administration.
7. **Crisis Management and Emergency Preparedness:**
Hospitals must be equipped to handle emergencies, whether natural disasters, pandemics, or large-scale accidents. Efficient crisis management ensures quick responses and effective resource allocation.

By achieving these objectives, hospital management not only improves the quality of healthcare but also contributes to the overall advancement of the healthcare system.

Literature Used :-

The field of hospital management draws on a variety of literature from healthcare, business administration, organizational behaviour, and information systems to ensure efficient and effective management of healthcare institutions. Below are the key types of literature and their contributions:

1. Healthcare Administration Books

- Provide foundational knowledge on hospital operations, patient care systems, and administrative processes.
- Examples: *"Healthcare Operations Management"* by Daniel B. McLaughlin and John R. Olson; *"The Well-Managed Healthcare Organization"* by Kenneth R. White and John R. Griffith.

2. Management and Leadership Literature

- Covers strategic management, leadership styles, human resource management, and organizational behaviour.
- Examples: *"Principles of Management"* by Peter Drucker; *"Leadership in Organizations"* by Gary Yukl.

3. Research Journals and Articles

- Peer-reviewed journals provide insights into the latest trends, challenges, and advancements in healthcare management.
- Examples: *Journal of Healthcare Management*, *Health Services Management Research*.

4. Healthcare Policy and Ethics

- Addresses compliance, legal frameworks, and ethical guidelines crucial for hospital administration.
- Examples: *"Healthcare Ethics and Law"* by Donna K. Hammaker and Thomas M. Knadig.

5. Technology and Information Systems

- Explores the integration of IT in healthcare, such as electronic health records (EHR) and telemedicine.
- Examples: *"Healthcare Information Technology Exam Guide for CHTS and CAHIMS Certifications"* by Kathleen McCormick.

6. Crisis and Emergency Management Literature

- Focuses on disaster management, risk assessment, and preparedness in hospitals.
- Examples: *"Hospital Emergency Response Teams"* by Jan Glarum.

7. Financial Management Books

- Examines budgeting, cost control, and financial planning in hospital settings.
- Examples: *"Financial Management for Public, Health, and Not-for-Profit Organizations"* by Steven A. Finkler.

8. Case Studies and Best Practices

- Highlight real-world scenarios and successful strategies employed by hospitals worldwide.
- Sources: World Health Organization (WHO) reports, industry-specific whitepapers.

Problem Statement :-

The **Hospital Management System (HMS)** faces several challenges in managing various hospital operations effectively. These challenges are critical to ensuring smooth healthcare delivery, operational efficiency, and patient satisfaction. The following issues are commonly encountered in traditional hospital management systems:

1. Manual Record Keeping:

- Many hospitals still rely on paper-based systems to manage patient information, medical records, and administrative data. This method is prone to human error, time-consuming, and inefficient, leading to difficulties in quickly accessing or updating patient data when needed.

2. Lack of Integration:

- Existing systems may not integrate well across departments such as billing, patient management, doctor scheduling, and inventory control. This lack of integration results in fragmented workflows, where information is often duplicated or inconsistent between different departments, creating confusion and delays.

3. Inefficient Appointment Scheduling:

- Without a proper scheduling system, appointment bookings can overlap, leading to underutilized or overcrowded schedules. Patients may face long waiting times or even miss their appointments, affecting overall hospital efficiency and patient satisfaction.

4. Difficulty in Managing Patient Information:

- Hospitals often struggle with keeping patient information up-to-date and accessible. Misplacing or losing important medical records can delay diagnosis and treatment, leading to potential health risks for patients. Additionally, retrieving past patient data manually takes time, especially in emergency situations.

5. Financial Management Challenges:

- Hospitals typically face challenges in managing patient billing, tracking insurance claims, and monitoring financial transactions efficiently. Inaccurate billing, delayed payments, and lack of transparency in pricing can cause dissatisfaction among patients and staff, and impact the hospital's revenue stream.

6. Inventory Management Issues:

- Managing hospital supplies such as medicines, medical equipment, and consumables manually can lead to stockouts or wastage. Inefficient inventory tracking can result in delays in patient care due to lack of necessary resources.

7. Limited Reporting and Analytics:

- Many hospitals lack efficient reporting tools that help in analyzing key metrics, patient outcomes, and operational performance. The absence of data-driven insights makes it difficult to identify areas for improvement and strategic decision-making.

Proposed Solution :-

The Hospital Management System (HMS) will be developed to address the above challenges by automating core hospital functions, integrating different departments, and providing efficient tools for managing patient records, scheduling, billing, inventory, and reporting. The system will:

- Provide a **centralized database** for storing patient records, appointments, medical history, and more, ensuring easy and secure access to data.

- Include a **comprehensive appointment management system** that allows patients to book appointments online, and enables staff to manage and schedule doctor visits efficiently.
- Integrate **billing and financial management** to streamline patient invoicing, insurance claims, and payment tracking, ensuring accuracy and timeliness.
- Facilitate **inventory management** with real-time tracking of hospital supplies and automatic restocking notifications.
- Generate detailed **reports** to monitor hospital performance, patient outcomes, and staff workload, improving decision-making and operational management.

By automating manual processes, improving data accuracy, and enhancing interdepartmental communication, the proposed HMS aims to improve overall hospital efficiency, reduce operational costs, and provide better service to patients.

Advantages:-

1. Efficient Resource Management
 - Ensures optimal utilization of human, financial, and material resources.
 - Reduces waste and improves cost-efficiency.
2. Enhanced Patient Care
 - Streamlined operations result in better coordination among healthcare providers.
 - Leads to timely diagnosis, treatment, and follow-ups.
3. Improved Organizational Structure
 - Defines roles and responsibilities clearly, fostering accountability.
 - Encourages smoother workflow and communication among staff.
4. Integration of Technology
 - Incorporates tools like Electronic Health Records (EHR), telemedicine, and automated billing systems.
 - Enhances data accuracy and reduces administrative burdens.
5. Regulatory Compliance

- Ensures adherence to healthcare laws, ethical standards, and safety protocols.
- Helps in building a trustworthy reputation for the hospital.
- 6. Better Financial Planning
 - Facilitates budgeting, financial forecasting, and cost control.
 - Improves profitability and sustainability of the institution.
- 7. Crisis Management
 - Prepares the organization for emergencies like pandemics, natural disasters, or mass casualty events.
- 8. Employee Satisfaction
 - Offers structured training programs and career growth opportunities.
 - Creates a positive work environment, reducing staff turnover.

Disadvantages:-

1. High Initial Costs
 - Implementation of advanced management systems and technology can be expensive.
 - Requires significant investment in infrastructure and training.
2. Complexity in Integration
 - Combining traditional practices with modern systems may face resistance from staff.
 - Can lead to temporary disruptions in services.
3. Overdependence on Technology
 - Heavy reliance on digital systems can pose risks during technical failures or cyberattacks.
4. Time-Consuming Processes
 - Developing and executing management strategies requires time and detailed planning.
 - May delay immediate improvements in some areas.
5. Bureaucratic Challenges

- Overregulation or excessive administrative layers can slow decision-making processes.
- 6. Limited Accessibility for Small Hospitals
 - Smaller hospitals or clinics may lack the resources to adopt sophisticated management systems.
- 7. Data Privacy Concerns
 - Handling sensitive patient information increases the risk of breaches.
 - Requires stringent cybersecurity measures.
- 8. Staff Resistance to Change
 - Employees may be hesitant to adopt new systems or workflows.
 - Requires robust training programs and change management strategies.

Proposed Hospital Management System

The proposed hospital management system (HMS) aims to transform the way hospitals operate by leveraging modern technology and efficient management practices. This system will serve as a comprehensive solution for handling administrative, clinical, and operational tasks in a streamlined and integrated manner. The goal is to improve patient care, optimize resource utilization, and ensure compliance with regulatory standards.

1. Patient Management

- **Registration and Records:** A centralized database to store and manage patient details, including personal information, medical history, test results, and prescriptions.
- **Appointment Scheduling:** A user-friendly interface to allow patients to book appointments and check availability of doctors.

2. Doctor and Staff Management

- Maintain a roster of medical and non-medical staff, their schedules, and workload distribution.
- Ensure effective communication among teams for seamless care delivery.

3. Electronic Health Records (EHR)

- Digital storage of patient data for quick access and better clinical decision-making.

- Integration with diagnostic labs and pharmacies for real-time updates.

4. Billing and Financial Management

- Automated billing for consultations, treatments, and other services.
- Track payments, generate invoices, and provide cost transparency to patients.

5. Inventory and Resource Management

- Monitor availability of medical supplies, equipment, and medications.
- Automate reordering processes to prevent shortages.

6. Emergency and Crisis Handling

- Enable rapid response mechanisms for emergencies like mass casualties or pandemics.
- Provide real-time updates to staff and allocate resources effectively.

7. Data Analytics and Reporting

- Generate insights on patient trends, treatment outcomes, and resource utilization.
- Aid in strategic decision-making and improving hospital performance.

8. Compliance and Security

- Ensure adherence to healthcare regulations and data protection laws.
- Implement robust cybersecurity measures to safeguard patient information.

9. Patient Engagement Tools

- Features like telemedicine, online consultation, and chat support for remote care.
- Provide reminders for appointments, follow-ups, and medication.

10. Multi-Branch Connectivity

- For hospitals with multiple branches, ensure integrated data sharing and resource allocation across locations.

Implementation Plan :-

1. Frontend Development: HTML and CSS

- **HTML** is used to design the structural components of the system, such as forms, tables, and navigation bars.
- **CSS** is used to style and format the interface for a user-friendly experience, ensuring responsive design for compatibility across devices.
- Key Modules:
 - **Login and Registration Pages:** Secure access for patients, doctors, and staff.
 - **Patient Records Dashboard:** Display patient details using styled tables and cards.
 - **Appointment Scheduling Forms:** User-friendly forms for scheduling and managing appointments.

2. Database Management: MySQL

- MySQL serves as the backend database to store and manage data.
- Key Database Tables:
 - **Patients:** Stores patient details (ID, name, age, gender, contact, etc.).
 - **Doctors:** Maintains doctor profiles (ID, name, specialization, schedule, etc.).
 - **Appointments:** Tracks appointment details (patient ID, doctor ID, date, time, status).
 - **Billing:** Manages billing details (patient ID, services, amount, payment status).
- **Techniques:**
 - Use Structured Query Language (SQL) for CRUD (Create, Read, Update, Delete) operations.
 - Normalize tables to ensure data integrity and avoid redundancy.

3. Data Visualization: Power BI

- Power BI provides dynamic dashboards and reports for data analysis.
- Steps:
 - Connect Power BI to the MySQL database.
 - Create reports and dashboards for:
 - Patient demographics.

- Appointment trends.
 - Revenue insights.
 - Doctor performance metrics.
- Use interactive charts and graphs to visualize KPIs (Key Performance Indicators).
- **Features:**
 - Real-time data updates for decision-making.
 - Drill-down capabilities for detailed analysis.
 - Exportable reports for stakeholders.

4. Integration and Workflow

- **Frontend-Database Interaction:**
 - Use forms created with HTML to collect data (e.g., patient registration, appointment booking).
 - Use PHP or a similar server-side scripting language to connect the frontend with the MySQL database.
 - Validate user input on the client side (using JavaScript) and server side.
- **Database-Power BI Integration:**
 - Set up a connection using Power BI's MySQL connector.
 - Schedule data refreshes in Power BI to ensure dashboards display the latest data.

5. Security and Accessibility

- **Security Measures:**
 - Use HTTPS for secure communication.
 - Sanitize database inputs to prevent SQL injection.
 - Implement role-based access control (RBAC) for different user roles (admin, doctor, patient).
- **Accessibility Features:**
 - Use responsive design principles with CSS to ensure mobile compatibility.
 - Ensure WCAG compliance for accessibility to individuals with disabilities.

Techniques for Implementation

1. HTML & CSS

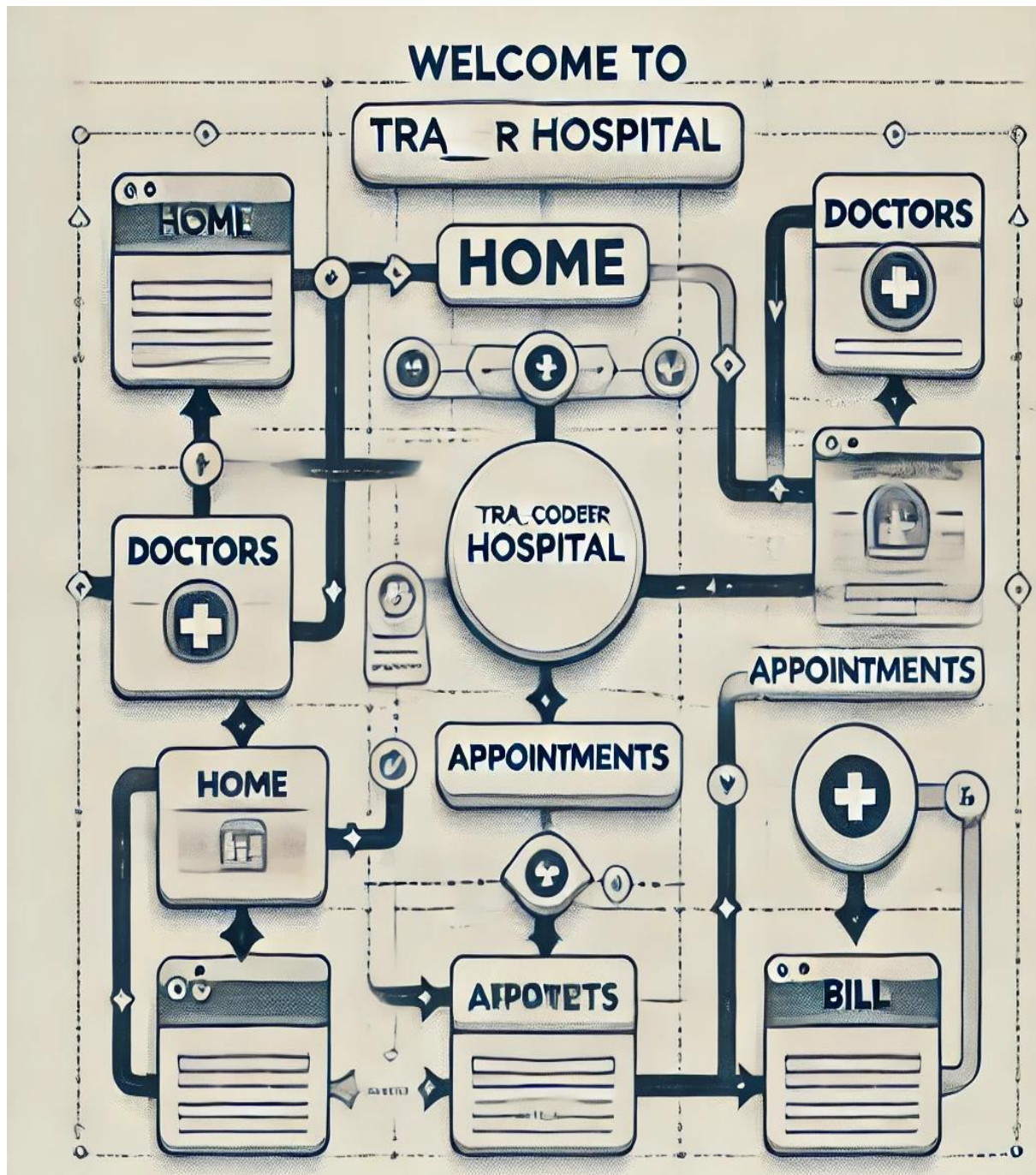
- **Responsive Design:** Use CSS media queries to make the system accessible on mobile and desktop devices.
- **Semantic HTML:** Use meaningful tags (e.g., <header>, <nav>, <main>) for better structure and SEO.

2. MySQL

- **Stored Procedures:** Use for complex queries to improve performance and reusability.
- **Triggers:** Implement triggers for automatic actions, such as updating appointment status when a patient checks in.
- **Backups:** Schedule regular database backups to prevent data loss.

3. Power BI

- **Custom Visuals:** Create visuals tailored to healthcare metrics.
- **Data Gateway:** Set up an on-premise gateway for secure data transfer between MySQL and Power BI.
- **Scheduled Refresh:** Automate data refresh to keep dashboards updated.



Code:-

Index.Html

```
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">

  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <title>Hospital Management</title>

  <link rel="stylesheet" href="styles.css">

</head>

<body>

  <header>

    <div class="header-content">

      <h1>Welcome to Tra_Coder Hospital</h1>

    </div>

    <nav>

      <a href="index.html">Home</a>

      <a href="doctors.html">Doctors</a>

      <a href="appointments.html">Appointments</a>

      <a href="Bill.html">Bill</a>

    </nav>

  </header>

  <main>

    <div class="navsearch">

      <input placeholder="Welcome to Tra_Coder Hospital" size="85" style="border-radius: 40px;">

    </div>

  </main>

  <section class="bb">

    <section class="ab">
```

<h2 >Our Specialties</h2>

Endocrinologist

Neurologist

Cardiologist

Psychiatrist

Gastroenterologist

Paediatrician

Nephrologist

Allergist

Ophthalmologist

Surgeon

Geriatrician

</section>

<section id="services" class="services-section">

<h2 class="our">Our Services</h2>

<div class="service-cards">

<div class="service-card">

<h3>Emergency Care</h3>

<p>24/7 Emergency services for critical care.</p>

</div>

<div class="service-card">

<h3>Pediatrics</h3>

<p>Specialized care for infants and children.</p>

</div>

<div class="service-card">

<h3>Cardiology</h3>

<p>Advanced heart care and treatments.</p>

</div>

```
<div class="service-card">

  <h3>Neurology</h3>

  <p>Expert care for neurological conditions.</p>

</div>

</div>

</section>
```

```
</section>
```

```
<footer id="contact" class="footer">
```

```
<div class="footer-content">

  <h3>Contact Us</h3>

  <p>046 MPEC, Mandhana</p>

  <p>Phone: +1 234 567 890</p>

  <p>Email: info@tracoderhospital.com</p>

</div>
```

```
<div class="footer-bottom">

  <p>&copy; 2024 Tra_Coder Hospital. All rights reserved.</p>

</div>

</footer>
```

```
</body>

</html>
```

Appointments.html

```
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">
```

```
<meta name="viewport" content="width=device-width, initial-scale=1.0">

<title>Book an Appointment</title>

<link rel="stylesheet" href="styles.css">

</head>

<body class="appoint">

  <header>

    <h1>Book an Appointment</h1>

    <nav>

      <a href="index.html">Home</a>

      <a href="doctors.html">Doctors</a>

      <a href="appointments.html">Appointments</a>

      <a href="Bill.html">Bill</a>

    </nav>

  </header>

  <main class="appoint-color">

    <form id="appointmentForm" onsubmit="return validateForm(event)">

      <label for="name">Name:</label>

      <input type="text" id="name" name="name" required placeholder="Enter your name">

      <label for="doctor">Choose Doctor:</label>

      <select id="doctor" name="doctor" required>

        <option value="">Select Doctor</option>

        <option value="Alok Kumar Singh">Dr. Alok Kumar Singh</option>

        <option value="Akash Yadav">Dr. Akash Yadav</option>

        <option value="Rajendra Kumar">Dr. Rajendra Kumar</option>

        <option value="Rakesh">Dr. Rakesh</option>

      </select>

      <label for="date">Appointment Date:</label>

      <input type="date" id="date" name="date" required>

      <button type="submit">Book Appointment</button>

    </form>
```

```
</main>

<footer>

  <p>&copy; 2024 Hospital Management. All rights reserved.</p>

</footer>

<script src="script.js"></script>

</body>

</html>
```

Bill.html

```
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">

  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <title>Contact Us</title>

  <link rel="stylesheet" href="styles.css">

</head>

<body class="billing">

  <header>

    <h1>Bill Generator</h1>

    <nav>

      <a href="index.html">Home</a>

      <a href="doctors.html">Doctors</a>

      <a href="appointments.html">Appointments</a>

      <a href="Bill.html">Bill</a>

    </nav>

  </header>

  <main class="bill-color">

    <form id="billingForm" onsubmit="return handleSubmit(event)">

      <label for="name">Name:</label>
```

```
<input type="text" id="name" name="name" placeholder="Enter your name" required>

<div class="bil-dis">

  <label for="mobile">Mobile No.:</label>

  <input id="mobile" type="number" name="mobile" size="10px" placeholder="Enter your mobile
number" required></input>

  <div name="hello">Gender:

    <select name="Gender">

      <option name="Male">Male</option>

      <option value="Female">Female</option>

      <option value="Transgender">Transgender</option>

    </div>

    </select>

  </div>

  <label for="disease">Disease:</label>

  <input type="disease" id="disease" name="disease" required>

  <label for="Total Amount">Total Amount:</label>

  <input type="number" id="Total Amount" name="Total Amount" required></input>

  <label for="address">Address:</label>

  <textarea id="address" name="address" required></textarea>

  <button type="submit">Print</button>

</form>

</main>

<footer>

  <p>&copy; 2024 Hospital Management. All rights reserved.</p>

</footer>

<script src="script.js"></script>

</body>

</html>
```

Styles.css

```
body{
```

```
background-image: url('Hosp.jpg');
background-repeat: no-repeat;
background-size: cover;
}
.ab{
display: flex;
background-color: #ced984;
width: 350px;
border-radius: 30px;

flex-direction: column;
background-image: url('medical-speciality.jpg');
background-size: cover;
}
.ab h2{
margin-left: 30px;
}

.ab: hover {
background-color: #f0f0f0;
transform: scale(1.01);
box-shadow: 0 0 10px rgba(0, 0, 0, 0.2);
}
.doctor{
background-image: url('doct2.jpg');
background-size: cover;
}
.doc{
background-color: #fbfb66;
display: flex;
margin: 40px;
```



```
border-radius: 20px;

justify-content: space-between;

align-items: center;
}

.docs:hover{

text-decoration: underline;

border: 3px solid yellow;
}


.services-section {

padding: 50px 20px;

text-align: center;
}

.service-cards {

display: flex;

flex-wrap: wrap;

justify-content: center;

gap: 20px;
}

.service-card {

background: #fff;

border: 1px solid #ddd;

border-radius: 5px;

padding: 20px;

width: 250px;

text-align: center;

opacity: 0.7;

}

.service-card:hover{

background-color: rgb(180, 219, 203);
```

```
color: black;
border: 2px solid #23c26d;
}
```

```
.service-card h3 {
margin-bottom: 10px;
}
```

```
.service-card p {
color: #555;
}
```

```
.appoint{
background-image: url("Appointment.jpg");
}
```

```
.appoint-color{
background-color: rgb(209, 209, 176);
max-width:400px;
display:flex;
```

```
justify-content: center;
opacity:0.9;
border:solid 1px black;
}
```

```
.billing{
background-image: url(bill.jpg);
display: inline;
background-size: cover;
border-radius: 2px;
}
```

```
.bill-color{  
  background-color: rgb(209, 209, 176);  
  display:flex;  
  max-inline-size:260px;  
  justify-content:center;  
  opacity:0.9;  
}
```

```
.navsearch{  
  display:flex;  
  justify-content:space-evenly;  
  width: 600px;  
  height:40px;  
  border-radius:4px;  
  
}
```

```
body {  
  font-family: Arial, sans-serif;  
  margin: 0;  
  padding: 0;  
  background-color: #f4f4f4;  
}
```

```
header {  
  background-color: #2a7398;  
  color: white;  
  padding: 10px 0;  
  text-align: center;  
}
```

```
nav a {
  margin: 0 15px;
  color: white;
  text-decoration: none;
}
main {
  padding: 3px;
  max-width: 600px;
  margin: auto;
  background-color: #243642;
  border-radius: 17px;
  display: flex;
  box-shadow: 0 0 10px rgba(5, 196, 11, 0.1);
}
form label, form input, form select, form textarea {
  display: block;
  margin: 10px 0;
  width: 100%;
}
button {
  background-color: #28a745;
  color: white;
  padding: 10px;
  border: none;
  border-radius: 5px;
  cursor: pointer;
}
button:hover {
  background-color: #ff0000;
}
footer {
```

```
text-align: center;
padding: 10px;
background-color: rgb(28, 50, 91);
color: white;
position: fixed;
width: 100%;
bottom: 0;
}
```

```
.header-content {
display: flex;
text-align: center;
gap: 350px;
}
```

```
.logo {
width: 150px;
height: 100px;
border-radius: 100%;
}
```

```
footer {
background-color: #333;
color: #fff;
padding: 20px 10px;
text-align: center;
}
```

```
.footer-content {
display: flex;
justify-content: space-around;
flex-wrap: wrap;
margin-bottom: 10px;
}
```

```
.footer-content div {  
  margin: 10px;  
}  
  
footer a {  
  color: #4CAF50;  
  text-decoration: none;  
}  
  
footer a:hover {  
  text-decoration: underline;  
}  
  
footer p {  
  margin: 0;  
}  
  
.bb{  
  display:flex;  
}  
  
.services-section {  
  padding: 50px 20px;  
  text-align: center;  
}  
  
.service-branch {  
  display: flex;  
  flex-wrap: wrap;  
  justify-content: center;  
  gap: 20px;  
}  
  
.service-card {  
  background: #fff;  
  border: 1px solid #ddd;  
  border-radius: 5px;  
  height:180px;
```

```
padding-top: 1px;
width: 250px;
text-align: center;
opacity: 0.7;
margin:auto;
}
.service-card:hover{
background-color: rgb(201, 230, 206);
color: black;
border: 2px solid #1b1e16;
}
.service-card h3 {
margin-bottom: 10px;
}
.service-card p {
color: #555;
}
.Agra {
background-image: url('Agra.jpg');
background-size: cover;
background-position: center;
color: rgb(255, 255, 255);
padding: 20px;
height: 150px;
text-align: center;
border-radius: 10px;
font-family: Arial, sans-serif;
font-size: 30px;
font-weight: bold;
}
```

Script.js

```
async function validateForm(event) {

    event.preventDefault(); // Prevent the default form submission behavior


    const name = document.getElementById("name").value;
    const doctor = document.getElementById("doctor").value;
    const date = document.getElementById("date").value;


    if (!name || !doctor || !date) {
        alert("Please fill in all fields.");
        return false;
    }


    // Create the payload object
    const appointmentData = {
        patient_name: name,
        doctor_name: doctor,
        appointment_date: date
    };


    try {
        console.log(appointmentData);
        // Make a POST request to the API
        const response = await fetch("http://localhost:3000/appointments", {
            method: "POST",
            headers: {
                "Content-Type": "application/json"
            },
            body: JSON.stringify(appointmentData)
```



```
});

console.log(response);

if (response.ok) {
    const result = await response.json();
    alert("Appointment successfully booked for " + name);
    console.log("Appointment Response:", result);
} else {
    const error = await response.text();
    // alert("Failed to book appointment: " + error);
}
} catch (error) {
    console.error("Error booking appointment:", error);
    // alert("An error occurred while booking the appointment.");
}

return false;
}

async function handleSubmit(event) {
    event.preventDefault();

    // Collect form data
    const name = document.getElementById("name").value;
    const mobile = document.getElementById("mobile").value;
    const gender = document.querySelector('select[name="Gender"]').value;
    const disease = document.getElementById("disease").value;
    const totalAmount = document.getElementById("Total Amount").value;
    const address = document.getElementById("address").value;
```

```
if (!name || !mobile || !gender || !disease || !totalAmount || !address) {  
    alert("Please fill in all fields.");  
    return false;  
}
```

```
// Create payload object
```

```
const billingData = {  
    patient_name: name,  
    mobile_no: mobile,  
    gender: gender,  
    disease: disease,  
    total_amount: totalAmount,  
    address: address  
};
```

```
try {  
    // Send data to the backend API  
    const response = await fetch("http://localhost:3000/patients", {  
        method: "POST",  
        headers: {  
            "Content-Type": "application/json"  
        },  
        body: JSON.stringify(billingData)  
    });
```

```
    if (response.ok) {  
        const result = await response.json();  
        alert("Billing record created successfully!");  
        console.log("Response:", result);  
    } else {  
        const error = await response.text();
```

```

        alert("Failed to create billing record: " + error);
    }
} catch (error) {
    console.error("Error:", error);
    alert("An error occurred while submitting the billing record.");
}
return false;
}

```

server.js

```

const express = require('express');
const bodyParser = require('body-parser');
const db = require('./Database/db.js');

const app = express();
app.use(bodyParser.json());

const cors = require('cors');
app.use(cors());

app.post('/patients', (req, res) => {
    const { patient_name, mobile_no, gender, disease, total_amount, address } = req.body;

    if (!patient_name || !mobile_no || !gender || !disease || !total_amount || !address) {
        return res.status(400).send('All fields are required.');
```

```

    }

    const query = `
        INSERT INTO patient_records
        (patient_name, mobile_no, gender, disease, total_amount, address)
    
```

```
VALUES (?, ?, ?, ?, ?, ?)');
```

```
db.query(
  query,
  [patient_name, mobile_no, gender, disease, total_amount, address],
  (err, results) => {
    if (err) {
      console.error(err);
      return res.status(500).send('Error adding patient record.');
```

```
    }
    res.status(201).send({ message: 'Patient record added successfully', id: results.insertId });
  }
);
});

app.get('/patients', (req, res) => {
  const query = 'SELECT * FROM patient_records';

  db.query(query, (err, results) => {
    if (err) {
      console.error(err);
      return res.status(500).send('Error retrieving patient records.');
```

```
    }
    res.status(200).json(results);
  });
});

app.post('/appointments', (req, res) => {
  const { patient_name, doctor_name, appointment_date } = req.body;

  console.log('Appointment');
```

```
  if (!patient_name || !doctor_name || !appointment_date) {
    return res.status(400).send('All fields are required.');
```

```
}
```

```
const query = `
```

```
  INSERT INTO appointments
```

```
  (patient_name, doctor_name, appointment_date)
```

```
  VALUES (?, ?, ?)`;
```

```
db.query(
```

```
  query,
```

```
  [patient_name, doctor_name, appointment_date],
```

```
  (err, results) => {
```

```
    if (err) {
```

```
      console.error(err);
```

```
      return res.status(500).send('Error adding appointment.');
```

```
    }
```

```
    res.status(201).send({ message: 'Appointment added successfully', id: results.insertId });
```

```
  }
```

```
);
```

```
});
```

```
app.get('/appointments', (req, res) => {
```

```
  const query = 'SELECT * FROM appointments';
```

```
  db.query(query, (err, results) => {
```

```
    if (err) {
```

```
      console.error(err);
```

```
      return res.status(500).send('Error retrieving appointments.');
```

```
    }
```

```
    res.status(200).json(results);
```

```
  });
```

```
});
```

```
const PORT = 3000;

app.listen(PORT, () => {
  console.log(`Server is running on http://localhost:${PORT}`);
});
```

db.js

```
const mysql = require('mysql2');

const db = mysql.createConnection({
  host: 'localhost',
  user: 'root',
  password: 'root',
  database: 'Hospital_Management',
  port: 3306
});

db.connect((err) => {
  if (err) {
    console.error('Database connection failed: ' + err.stack);
    return;
  }
  console.log('Connected to MySQL database.');
```

```
});

module.exports = db;
```

Conclusion :-

The Hospital Management System (HMS) built using HTML, CSS, MySQL, and Power BI represents an integrated approach to optimizing healthcare management processes. By utilizing modern web technologies and business intelligence tools, this system streamlines hospital operations, enhances the user experience, and provides actionable insights for decision-makers.

Frontend Development with HTML and CSS:

HTML and CSS serve as the backbone for the user interface, providing an intuitive and visually appealing layout. HTML structures the content, while CSS enhances the design with responsive, mobile-friendly features. The use of these technologies ensures that the hospital's staff and patients can easily navigate the system, whether for booking appointments, viewing medical records, or managing administrative tasks.

Backend Database with MySQL:

MySQL plays a crucial role in the system by storing and managing the hospital's data. It ensures data integrity, scalability, and security. Patient records, staff information, appointment schedules, billing details, and more are stored in well-structured tables. By using SQL queries, users can easily retrieve, update, and manage this information, improving operational efficiency and service delivery.

Business Intelligence with Power BI:

Power BI is leveraged to analyze data and generate insightful reports for hospital management. Through Power BI's interactive dashboards and data visualization capabilities, administrators can track key performance indicators (KPIs) such as patient satisfaction, staff performance, resource utilization, and financial metrics. This helps in making data-driven decisions that can optimize hospital operations, improve patient care, and reduce costs.

In conclusion, the combination of HTML, CSS, MySQL, and Power BI creates a comprehensive Hospital Management System that improves hospital efficiency, ensures accurate data management, and provides the necessary tools for healthcare professionals to make informed decisions. This integrated approach not only boosts operational productivity but also enhances patient experience and satisfaction.

Future Scope :-

The **Hospital Management System (HMS)** project aims to automate and streamline the operational, administrative, and clinical functions of a hospital, ensuring a seamless flow of information and improved decision-making. The scope of the project encompasses the development of a comprehensive system that integrates various hospital functions using HTML, CSS, MySQL, and Power BI. Below are the key areas covered within the scope of this project:

1. Patient Management

- **Patient Registration:** Allows for the collection and storage of essential patient information such as personal details, medical history, and emergency contacts.
- **Appointment Scheduling:** Patients can book, modify, or cancel appointments with doctors, and the system will manage the scheduling and availability of healthcare providers.
- **Medical History and Records:** Storing and managing patient records, diagnoses, treatments, and medication history for easy access by doctors and healthcare professionals.

2. Staff Management

- **Staff Registration and Profiles:** Records details of hospital staff including doctors, nurses, technicians, and administrative personnel.
- **Shift Management:** Enables scheduling of shifts and work hours for staff members, ensuring proper staff coverage and reducing scheduling conflicts.

3. Billing and Financial Management

- **Billing and Invoicing:** Tracks patient charges for services rendered, medications, and consultations. The system generates invoices and manages payments, including insurance billing.
- **Financial Reports:** Generates detailed financial reports, including revenue, expenses, and profitability, to help administrators make informed decisions.

4. Inventory and Resource Management

- **Inventory Tracking:** Manages the stock of medicines, medical equipment, and other hospital supplies. The system provides real-time tracking of stock levels, expiry dates, and reordering alerts.
- **Resource Allocation:** Monitors and manages the use of hospital facilities like rooms, equipment, and operating theaters, ensuring optimal utilization.

5. Hospital Performance Analytics (Power BI Integration)

- **Data Visualization:** Power BI dashboards provide real-time insights into various aspects of hospital performance, such as patient admission rates, staff productivity, and financial health.
- **Reports Generation:** Decision-makers can generate reports on key performance indicators (KPIs) like patient satisfaction, average wait times, and resource utilization.
- **Predictive Analytics:** Using historical data, the system can forecast trends and help in resource planning, such as anticipating patient inflows or identifying areas for operational improvement.

Research Question :-

A well-defined research question is crucial to guide the development, implementation, and evaluation of a Hospital Management System (HMS). Below are a few examples of research questions that could be relevant to the project:

1. **How can the integration of a Hospital Management System (HMS) improve operational efficiency and reduce costs in a healthcare setting?**
 - This question explores the impact of an automated HMS on the hospital's daily operations, focusing on the time and cost savings achieved through streamlined processes like patient registration, appointment scheduling, and billing.
2. **What is the role of data visualization tools like Power BI in enhancing decision-making and performance monitoring in a Hospital Management System?**
 - This question examines how business intelligence tools, specifically Power BI, can contribute to better decision-making by offering real-time analytics, dashboards, and performance insights for hospital administrators.
3. **How does the use of a centralized database (MySQL) in a Hospital Management System ensure data integrity, security, and accessibility?**
 - This research question looks at the technical aspects of data management in a hospital, evaluating how MySQL helps ensure the security and integrity of sensitive health data while making it accessible for authorized users.
4. **What are the challenges and benefits of implementing a web-based Hospital Management System with a responsive design for healthcare professionals and patients?**

- This question delves into the usability and accessibility of a web-based system, addressing how a responsive design allows for easy use by hospital staff and patients across various devices, and what challenges may arise during implementation.
5. **How does a Hospital Management System affect patient satisfaction and overall healthcare quality?**
- This question focuses on the end-user experience, evaluating how the implementation of an HMS can improve patient care, reduce wait times, and enhance the overall patient experience by offering seamless access to services and information.
6. **What impact does the automation of billing and financial management through an HMS have on a hospital's revenue cycle?**
- This question looks into the financial management side of the HMS, analyzing how automated billing, invoicing, and payment tracking improve revenue cycle efficiency and reduce errors or delays in financial processes.
7. **How can a Hospital Management System support real-time monitoring and optimization of hospital resources such as staff, equipment, and patient beds?**
- This research question investigates the efficiency of resource management through the HMS, focusing on how real-time data on hospital resources can prevent bottlenecks and improve overall service delivery.

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- Addresses challenges in ensuring privacy and security in HMS.

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- Describes the role of Power BI in healthcare analytics and reporting.

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- Offers guidelines for implementing HMS in healthcare settings.