Software Requirements Specification

for

Online Hospital Management System

Version 1.0 approved

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1 Introduction

1.1 Purpose/Objective

The primary purpose of the Online Hospital Management System is to revolutionize the healthcare experience by seamlessly integrating technology into every aspect of patient care and administrative operations. This system aims to enhance the efficiency and effectiveness of healthcare services, enabling healthcare professionals to provide superior patient care, streamline administrative tasks, and optimize resource utilization. By offering a centralized platform for patient information, appointment scheduling, medical records, and billing, the system aspires to improve patient outcomes, reduce errors, and foster greater collaboration among medical teams. With a focus on accessibility, security, and convenience, the system seeks to empower patients, medical staff, and administrators alike, ultimately creating a modern healthcare environment that prioritizes exceptional patient care, operational excellence, and adaptability in an ever-evolving medical landscape.

1.2 Document Conventions (Definition, Acronyms, Abbreviations)

1.2.1 Document Format:

- Use a consistent font type and size for the entire document (e.g., Times New Roman, 12pt).
- Maintain consistent spacing and formatting throughout the document.
- Use page numbers and headers/footers for easy navigation.

1.2.2 Section Numbering:

Number the sections and subsections of your SRS using a hierarchical structure (e.g., 1, 1.1, 1.2, 2, 2.1, 2.2, etc.).

1.2.3 Headings and Subheadings:

- Use clear and descriptive headings for each section and subsection.
- Use bold or a larger font size for section headings, and italics or a slightly smaller font size for subheadings.

1.2.4 Acronyms

- **SRS:** Software Requirements Specification
- **API:** Application Programming Interface
- **UI:** User Interface

- **UX:** User Experienc**GUI:** Graphical User Interface
- **SQL:** Structured Query Language
- **DBMS:** Database Management System **HTTP:** Hypertext Transfer Protocol

1.3 Scope

The scope of the Online Hospital Management System encompasses a comprehensive range of functionalities aimed at optimizing the administration, patient care, and operational processes within the hospital. The system's scope includes patient management, appointment scheduling, medical record keeping, doctor and staff management, billing and payment processing, pharmacy and inventory management, laboratory test management, reporting and analytics, and security measures to safeguard sensitive patient data. Additionally, the system will provide interfaces for both healthcare professionals and patients, ensuring seamless interaction and collaboration. While the initial scope focuses on core features, it is designed with extensibility in mind, allowing for future integration with external systems, enhancements, and adaptation to evolving healthcare practices. The system's overarching goal is to enhance patient experiences, streamline healthcare operations, and contribute to more efficient and effective healthcare delivery within the hospital environment.

1.4 References

- "eHospital - A Complete Healthcare Management System" - Ministry of Health and Family Welfare, Government of India
- "National Digital Health Mission (NDHM)" - Ministry of Health and Family Welfare, Government of India
- "Healthcare Management Systems: A Review" - International Journal of Computer Applications
- "Digital India in Healthcare: Potential, Challenges, and Solutions" - ResearchGate

2 History/Background Study (Sources of Domain Knowledge)

1.1 Technical Literature

The technical literature relevant to this Software Requirements Specification (SRS) includes a range of scholarly articles, research papers, and technical documentation that address various aspects of online hospital management systems, software engineering, user experience design, and information retrieval. This literature provides insights into best practices for designing user-friendly interfaces, optimizing search algorithms, ensuring data security, and implementing effective database management. Additionally, studies examining the integration of emerging technologies such as RFID, OCR, and mobile applications within hospital management systems are essential to informing the technical decisions and design considerations outlined in this SRS. By drawing from this technical literature, the SRS aims to incorporate established principles and

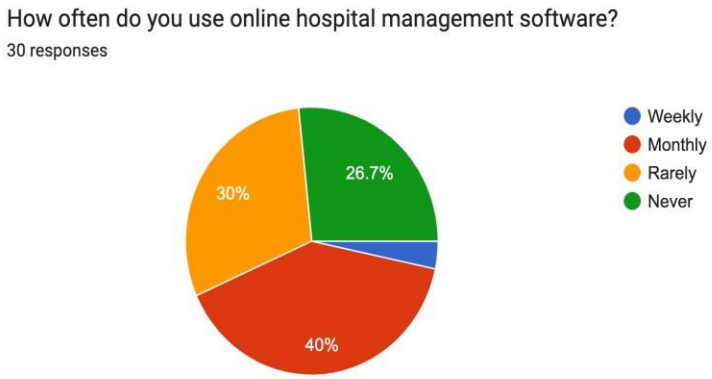
innovative solutions to develop a robust and efficient online hospital management system that meets the needs of both patrons and hospital administrators.

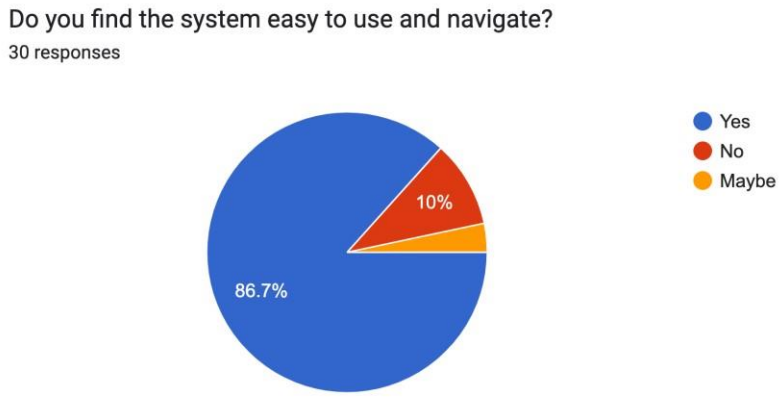
1.2 Existing Applications

- Practo
- Lybrate
- Medlife
- BookMyHealthCheckup

1.3 Customer Surveys

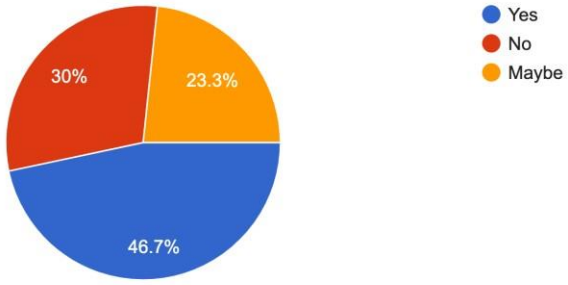
Link: https://docs.google.com/forms/d/1C-0fX_Jl0LO04HIOYRU32xAWL0hp-GrsYypEWo9K7U4/edit#responses





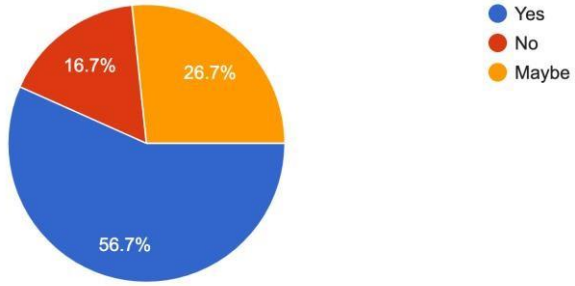
Does the system provide satisfactory recommendations based on your reading history or preferences?

30 responses



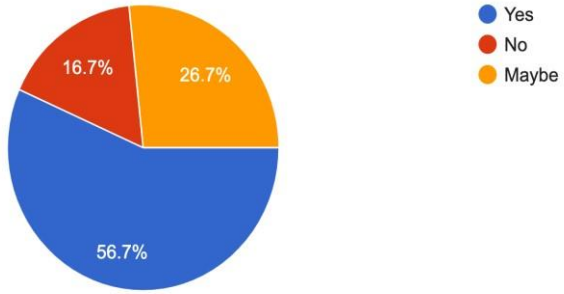
Would you recommend this system to others?

30 responses



Are you able to find resources in your preferred language(s)?

30 responses



1.4 Expert Advice

- **Stakeholder Collaboration**: Involve all relevant stakeholders, including librarians, administrators, and potential end-users, in the requirement-gathering process. Their input is crucial to ensure the system meets the diverse needs of your hospital community.

- **Clear and Precise Requirements**: Write requirements that are specific, measurable, achievable, relevant, and time-bound (SMART). This clarity will help developers implement features accurately.
- **Modularity and Scalability**: Design the system with modularity in mind. This allows for easier maintenance, updates, and potential future enhancements. Ensure the system can scale to accommodate growing collections and users.
- **User-Centered Design**: Prioritize user experience (UX) and user interface (UI) design. The system should be intuitive, easy to navigate, and visually appealing to both tech-savvy and less tech-savvy users.
- **Security and Privacy**: Implement robust security measures to protect user data, including encryption, secure authentication, and access controls. Ensure compliance with relevant data protection regulations.
- **Integration Capabilities**: Consider the potential need for integrating your system with other hospital systems, databases, or external services. An application programming interface (API) can facilitate such integrations.
- **Search and Discovery**: Invest in advanced search and discovery functionalities. Efficient search algorithms and filters can greatly enhance the user experience and aid in finding resources quickly.
- **Reporting and Analytics**: Include reporting features to provide administrators with insights into hospital usage, popular resources, and trends. These insights can guide collection development and resource allocation.
- **Accessibility**: Design the system with accessibility in mind, adhering to accessibility standards (e.g., WCAG). This ensures that users with disabilities can navigate and use the system effectively.
- **Testing and Validation**: Plan thorough testing at various stages of development, including functional, usability, security, and performance testing. This ensures that the system works as intended and is free of critical issues.
- **Documentation**: Create comprehensive documentation that covers user guides, administrator manuals, and technical documentation. This will assist users and administrators in understanding and using the system effectively.
- **Version Control and Change Management**: Implement version control practices to track changes and updates to the system over time. This makes it easier to manage updates and rollbacks.
- **Training and Support**: Plan for training sessions and user support to ensure that hospital staff and patrons can effectively use the system. A well-trained user base leads to better adoption.
- **Feedback Mechanisms**: Include mechanisms for users to provide feedback and suggest improvements. Continuous feedback loops can lead to a more responsive and user-centric system.

1.5 Current/Future requirements

- Implement a user-friendly interface for patients to schedule appointments online, considering doctors' availability and specialties.

- Enhance the system to offer intelligent appointment suggestions based on historical data and predictive analytics.
- Integrate advanced AI algorithms to analyze EHR data, assisting doctors in making informed decisions and suggesting personalized treatment plans.
- Ensure the system can securely exchange data with external labs, pharmacies, and insurance providers.

3 Overall Description

3.1 Product Functions

3.1.1 Hardware Requirement

- Web Server: A robust web server (e.g., Apache, Nginx) to host the application.
- Database Server: A dedicated database server (e.g., MySQL, PostgreSQL) to manage the system's data.
- Application Server: A server to run the application logic and manage user requests.
- Adequate storage space is needed for storing user data, resource records, images, documents, and backups.
- Implement firewalls, intrusion detection systems, and encryption to ensure data security.

3.1.2 Software Requirement

- The system shall provide user authentication using secure username and password credentials.
- The system shall allow users to search for resources using keywords, filters, and sorting options.
- The system shall enable users to borrow and return resources, automatically updating availability status.
- The system shall generate automated notifications for overdue items and reservation pickups.

3.2 Functional Requirements

3.2.1 Registration

Description: The users need to sign in to their account. If the user does not have an account, he/she needs to sign up and create an account. It is a fundamental feature that enables new users to sign up and register on the Hospital Management System. Users can provide necessary details, such as name, email, and password, to create their unique accounts. Once the information is submitted and verified, a new account is successfully established, granting the user access to all the functionalities

3.2.1.1 Sign in:

Description: The user needs to sign in in order to use the system otherwise it will not work. For that username, phone number, password and all other details are required for that sign in.

- **Input**: Enter name, surname, mobile number, email address, password, date of birth, gender. Agree to terms and conditions.
- **Output**: Account created prompt is displayed and verification link is sent to mail and contact number. An error message is displayed if any filled detail is wrong.
- **Error**: Invalid User in case of incorrect details.

3.2.1.2 Sign Up:

Description: New users need to create a new account in order to use the system and its functionalities. For that user need to sign up using their names, passwords, email ID and other required details.

- **Input:** Email or phone number and password.
- **Output**: Send email to user if log in is done from a new device.
- **Error**: Incorrect format of information given.

3.2.2 Booking an Appointment

Description: Patients who want to make an appointment at the hospital must describe their health problem in detail and a specialized doctor will be assigned to them based on their medical conditions.

3.2.2.1 Diagnosis of disease

Description: Patients will use the system for their diagnosis and as a result need to book an appointment with the doctor best suited for the disease.

- **Input**: Patient's symptoms in detail.
- **Output**: Specialized doctor suggested for the patient along with the doctor's details.
- **Error**: Doctor not available or incorrect symptoms.

3.2.2.2 Booking a slot

Description: Patient needs to book a slot for easy appointment according to his/ her convenience.

- **Input**: Specialized doctor searched in terms of their availability.
- **Output**: Appointment ID generated after allotment.
- **Error**; No empty slots available.

3.2.2.3 Online payment

Description: Patients can pay online or offline depending on their preferences. They may choose a specific payment gateway to pay online in the HMS and a payment receipt will be provided upon successful payment.

- **Input**: Patient asked to choose their preferred payment gateway and enter details.
- **Output**: Payment receipt generated.
- **Error**: Payment not successful.

3.2.3 Health Records

Description: patients once logged in with their details will be able to see their health records like hospitalization, test reports, doctor consultations etc.

3.2.3.1 Hospitalization

- **Input**: Patients can choose to see their hospitalization details, test reports, prescription, etc.
- **Output**: The respective information shown.

3.2.3.2 Test Reports

- **Input**: Patients can upload test reports for ease of consultation.
- **Output**: Respective doctors mapped with the patient ID get the previous prescriptions.
- **Error**: No record found.

3.2.3.3 Doctor consultation

- **Input**: Patients can upload prescriptions obtained from consultation with previous doctors.
- **Output**: Respective doctors mapped with the patient ID get the previous prescriptions.
- **Error**: Doctors not available.

3.2.4 Order Online Medicines

Description: Patients who want to order medicines from the hospital can upload or select their prescription from health records and on verification of that prescription medicines will be delivered to the patient.

3.2.4.1 Verification of prescription

- **Input**: Patient asked to upload their respective prescription from their health records.
- **Output**: Verification successful message. **Error**: Invalid prescription.

3.2.4.2 Ordering medicines

- **Input**: Medicines required.
- **Output**: Order from patient taken and based on medicines availability order ID generated. **Error**: Medicine not available.

3.2.4.3 Online payment

Description: Patients have the choice to pay online or offline on the day of delivery to the courier according to their convenience. For paying online, they must choose a specific payment gateway and on successful payment, payment receipt is generated.

- **Input**: Patients asked to enter the amount of money by entering card details and OTP sent to their mobile number linked with their bank account.
- **Output**: Upon successful payment a payment receipt is sent.

3.2.5 Emergency Admission

Description: Admission of a patient in case of medical emergency and identification of any disease or serious medical conditions and adverse health conditions and along with specialized doctors allotted according to the availability.

3.2.5.1 Registration of Patient

Description: Patient needs to register for admission. If the patient has no prior account, he/she needs to create a new account first and then register for admission.

- **Input**: User need to sign in or sign up depending on he/she is a new user or not.
- **Output**: Patient ID generated from the database. **Error**: Incorrect details input.

3.2.5.2 Identification of Medical Emergency

Description: The seriousness of the medical emergency is determined. Then the required doctor is consulted, and the patient is admitted for proper treatment under the doctor.

- **Input**: The medical condition identified according to the symptoms.
- **Output**: The patient is allocated a room along with a specialized doctor.
- **Error**: No allotment possible due to unavailability.

3.2.6 Discharge and Bill Settlements

Description: Details regarding patient discharge and medication issues.

3.2.6.1 Settlement of Bills

- **Input**: Patient ID to fetch all expense incurred starting from the date of admission till the current date.
- **Output**: Bill generated for print out.
- **Error**: No bill due for settlement.

3.2.6.2 Discharge

- **Input**: Patient ID to check whether the bill has been settled.
- **Output**: Patient released after verification.

3.2.7 View prescription and reports

Description: Doctors can view the prescriptions, test reports of only those patients who have been appointed particularly and undergoing treatment under him/her for ease of diagnosis of the patients' disease and health conditions.

3.2.7.1 View Test Report

Description: Doctors need to sign into their account to investigate the test reports and prescriptions of the patients under him/her. If the doctor is not having an account, he/she need to create an account first with his/her correct details.

3.2.7.1.1 Sign in / Sign Up

- **Input**: Doctor's credentials
- **Output**: Profile data of the doctors showing the list of patients under his/her treatment. **Error**: Invalid data.

3.2.7.1.2 Search and View Report

- **Input**: Enter patient ID to fetch details
- **Output**: All test reports related to that patient are displayed
- **Error**: No report found.

3.2.7.2 View Prescription

Description: Doctors need to sign into their account to investigate the test reports and prescriptions of the patients under him/her. If the doctor is not having an account, he/she need to create an account first with his/her correct details.

3.2.7.2.1 Sign in / Sign Up

- **Input**: Doctor's credentials
- **Output**: Profile data of the doctors showing the list of patients under his/her treatment.
- **Error**: Incorrect details.

3.2.7.2.2 Search and View Report

- **Input**: Enter patient ID to fetch details
- **Output**: All prescriptions related to that patient are displayed **Error**: No record found.

3.3 Non-Functional Requirements

3.3.1 Correctness Requirement

- **Accurate Data Storage and Retrieval:** The Online Hospital Management System shall ensure the accuracy of data storage and retrieval operations, minimizing data inconsistencies, duplicates, or data loss. User-generated content, user profiles, and interactions should be reliably saved and accurately presented to users across different platforms and devices.
- **Error Handling and Validation:** The platform shall implement robust error handling and data validation mechanisms to prevent erroneous input and maintain data integrity. It should display informative error messages to guide users in correcting any input errors during account creation, post creation, or other interactions.

3.3.2 Portability requirement

The Portability Requirement for the Online Hospital Management System focuses on ensuring the platform's flexibility and ease of migration across different environments and devices. The system shall be designed and developed to be portable, allowing smooth deployment and operation on various operating systems, web browsers, and hardware configurations. Emphasizing adherence to industry standards and best practices, the Online Hospital Management System should be compatible with multiple platforms, enabling users to access the platform seamlessly from desktop computers, laptops, tablets, and smartphones.

Furthermore, the Portability Requirement encompasses considerations for future scalability and adaptability. The platform should be built with a modular and component-based architecture to facilitate easy updates, enhancements, and integration with emerging technologies. Compatibility with different screen sizes and resolutions ensures a consistent user experience across devices, promoting user engagement and accessibility.

By meeting the Portability Requirement, the Online Hospital Management System can reach a broader audience and adapt to evolving technological landscapes, ultimately positioning itself as a versatile and user-friendly platform in the dynamic world of online social networking.

3.3.3 Efficiency Requirement

- **Response Time and Performance:** The Online Hospital Management System shall strive for optimal response times and efficient performance, ensuring quick page loading, content delivery, and minimal latency for user interactions. The platform

should be capable of handling a large number of concurrent users without significant degradation in response times.

- **Resource Utilization:** The system shall be designed to efficiently utilize computing resources, such as CPU, memory, and network bandwidth, to minimize resource contention and enhance overall system stability. Efficient resource management is crucial for accommodating increased user activity and traffic spikes.
- **Caching and Content Delivery:** Implementing intelligent caching mechanisms and content delivery networks (CDNs) shall enhance the efficiency of content retrieval and reduce server load. Frequently accessed data, images, and other static content should be cached to reduce repetitive data retrieval and improve overall performance.

3.3.4 Usability Requirement

- **Intuitive User Interface:** The Online Hospital Management System shall have an intuitive and user-friendly interface, ensuring that users can easily navigate and access various features without the need for extensive guidance or training. Clear and consistent design elements, such as navigation menus, buttons, and icons, should promote a seamless user experience.
- **Accessibility and Inclusivity:** The platform shall be designed with accessibility in mind, adhering to web accessibility standards to accommodate users with disabilities. Features like keyboard navigation, alternative text for images, and sufficient color contrast contribute to a more inclusive and user-friendly experience.
- **Personalization and Customization:** The Online Hospital Management System shall offer personalization options, allowing users to customize their profiles, content preferences, and notification settings. By empowering users to tailor their experience, the platform can enhance user engagement and satisfaction.

3.3.5 Reusability Requirement

- **Modular Code Architecture:** The Online Hospital Management System shall be developed with a modular code architecture, allowing developers to create reusable components and modules. This design approach facilitates easier maintenance, updates, and the incorporation of new features, promoting code reusability across the platform.

- **API and Integration Support:** The platform shall provide well- documented and standardized APIs (Application Programming Interfaces) to enable seamless integration with external applications, services, and third-party platforms. By offering API support, developers can build complementary applications that interact with the social networking site, enhancing overall system reusability and interoperability.

3.3.6 Reliability Requirement

- **High Availability and Redundancy:** The Online Hospital Management System shall be designed with high availability in mind, incorporating redundancy measures to ensure continuous operation even in the event of hardware failures or system issues. Implementing failover mechanisms and backup systems guarantees minimal downtime and data loss.
- **Error Handling and Recovery:** The platform shall have robust error handling and recovery mechanisms to gracefully handle unexpected errors and exceptions. The system should be able to recover from errors without affecting the overall functionality and user experience, minimizing the impact on users' interactions and content.

3.3.7 Maintainability Requirement

The Maintainability Requirement for the Online Hospital Management System focuses on creating a system that is easy to maintain, modify, and enhance over time. To achieve this, the platform shall be developed with clean, well-documented, and organized code that follows coding best practices and standards. A modular and component-based architecture shall be adopted to facilitate easier updates and modifications to specific features without affecting the entire system.

3.4 User Characteristics

The application does not require any specific computer knowledge to use it except the developers and administrators of it. Standard users are thought to be from any gender and any nationality, but the age restriction is 18+ for females and 22+ for males, who can use just a computer's browser. On the other hand, administrators and potential developers need a high level of expertise to understand web technologies.

3.5 Design & Implementation Constraints

Any update regarding the article will have to be recorded and the correct information must be updated, and all the cost calculations must be done as soon as possible. The backup of all the data must be done on a hard disk. There are not so many strong

firewalls so proper antivirus scans must be done before use. There is no provision for saving incomplete data.

3.6 Assumptions & Dependencies

3.6.1 Assumptions

- **Internet Connectivity:** It is assumed that users accessing the Online Hospital Management System will have a reliable internet connection to interact with the platform.
- **Device Compatibility:** The platform assumes users will access the site using modern web browsers and devices, such as laptops, desktops, smartphones, and tablets.
- **User Authentication:** Users are assumed to provide accurate and valid information during the registration process to create their accounts.
- **Privacy Settings:** Users are responsible for configuring their privacy settings and controlling the visibility of their posts and personal information.
- **Content Moderation:** It is assumed that users will adhere to community guidelines, and content moderation mechanisms will handle any inappropriate or harmful content.

3.6.2 Dependencies

- **Database Management System:** The proper functioning of the site depends on the availability and performance of the selected database management system for storing user data and content.
- **Web Server and Hosting:** The platform relies on a stable and secure web server environment and hosting infrastructure to ensure uninterrupted access and response times.
- **API Integration:** The successful integration of external APIs, such as those for social media sharing or third-party services, depends on the availability and compatibility of the respective APIs.
- **Third-Party Services:** If the platform utilizes third-party services for analytics, payment processing, or other functionalities, their proper functioning and API compatibility are essential for seamless operations.
- **Security Measures:** The platform's security measures, including encryption protocols and firewall configurations, are crucial for safeguarding user data and protecting against potential security breaches.

4 Interface Requirements

4.1 User Interfaces

The program offers a decent graphical interface for the user that can be run on the device by a user, performing the necessary tasks such as posting, reviewing, sharing. a. Login Page B. Home Page C. Page to display connection requests, suggestions, notifications, etc.

4.2 Hardware Interfaces

The system must run over the internet; all the hardware shall be required to connect to the internet. a. WAN - LAN Network b. Ethernet Cross-Cable C. Modem

4.3 Software Interfaces

The system is on the server, so it requires any scripting language PHP, VBScript etc. The system requires a Database also to store any transaction of the system like MYSQL, etc. The system also requires DNS (Domain Name Space) for the naming of the internet. At the last user needs a web browser to interact with the system.

4.4 Communication Interfaces

We will be a completely stand-alone system that lets other platforms connect, fetch and transform data at certain levels. The platform will provide APIs and tools for third-party developers to let them create high-level integrated plugins and programs. The main communication interface with the other platforms will be the application Platform. However, this integration and its level will be set by the user, who wants to integrate their accounts and information with other websites.

5 Conclusion

In conclusion, this Software Requirements Specification (SRS) outlines the essential blueprint for the development of an advanced online hospital management system. By meticulously capturing the needs and expectations of users, administrators, and stakeholders, this document serves as a guiding framework that lays the foundation for a robust and user-centric platform.