Software Requirements Specification

for

Patient Management System

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# Introduction

## Purpose

The purpose of the Patient Management System (PMS) is to digitalize and streamline the management of patient-related information and healthcare processes. By providing an integrated platform, healthcare professionals can efficiently access and manage patient data, appointments, medical history, billing, and reporting.

## Product Scope

The scope of the PMS includes a wide range of functionalities to support healthcare facilities, including:

* Patient registration and demographic information storage.
* Comprehensive medical record management for each patient.
* Efficient scheduling, rescheduling, and cancelation of appointments.
* Billing for services rendered to patients and payment processing.
* Reporting and data analysis to aid decision-making processes.

# Overall Description

## Product Perspective

The project would be a standalone web application. It would be complete in itself, would not be a part of any bigger project, and shall be created from scratch.

## Product Functions

* Provide secure login mechanisms and role-based access control to ensure data privacy and proper system usage.
* Enables healthcare professionals to register patients, capturing essential demographic and insurance information, and assigns a unique patient identifier.
* Allows healthcare professionals to create, update, and access patient medical records, including diagnoses, treatments, medications, allergies, and test results.
* Provides functionality for scheduling, modifying, and canceling patient appointments, along with sending automated notifications to patients.
* Generates bills for services rendered to patients, processes various payment methods, and maintains a payment history for each patient.
* Generates predefined and custom reports, covering patient demographics, appointment history, revenue reports, medical trends, and provides data analysis tools for informed decision-making.

## User Classes and Characteristics

There are three User Classes :

1. Doctor :

* Access and update patient medical records.
* Generate and review medical reports.

1. Patient :

* Register for healthcare services and provide personal information.
* View personal medical records and appointment history.
* Access billing information and make payments.

1. Admin :

* Register new patients and manage patient demographics.
* Schedule, modify, or cancel patient appointments.
* Generate bills, process payments, and maintain payment records.

## Operating Environment

The system being web-based in nature, it will be compatible with the majority of the devices having a Web Browser and Internet access. The website would be highly efficient so that it can even work on low-end devices.

## Design and Implementation Constraints

The UI/UX of an app plays a very crucial role in its success, so we have to make sure that UI/UX should be very easy to interact with so that the masses would be able to use it without any hassle, the user should be able to navigate through the site with ease.

## Assumptions and Dependencies

* User Availability : It is assumed that healthcare professionals, administrative staff, and patients will have regular and reliable access to the internet to use the system effectively.
* Data Accuracy : The accuracy and completeness of the data entered by users, including patient information and medical records, are assumed to be the responsibility of the respective users.
* Legal Compliance : It is assumed that the users and administrators will comply with all applicable laws and regulations related to healthcare data privacy and security while using the system.
* Third-Party Integration : The availability and proper functioning of third-party integrations, such as electronic health record systems and payment gateways, are assumed for seamless system operation.
* Network Infrastructure : The proper functioning and performance of the system are heavily dependent on a reliable network infrastructure to facilitate data exchange and communication between clients and the central server.

# External Interface Requirements

## User Interfaces

* Healthcare Professional Interface: Streamlined dashboard for healthcare professionals to access patient records, manage appointments, tasks, and view reports.
* Administrative Staff Interface: Intuitive interface enabling administrative tasks such as patient registration, billing, appointment management, and reporting.
* Patient Interface: Patient-centric interface providing access to medical records, appointment scheduling, billing information, and support options.

## Hardware Interfaces

* Electronic Health Record (EHR) Systems: Integration for seamless data exchange and synchronization of patient medical records between PMS and EHR systems.
* Payment Gateway: Integration to securely process patient payments for healthcare services within the PMS.

## Software Interfaces

* Database Management System (DBMS) : Provide a reliable and efficient platform for storing, managing, and accessing patient data, medical records, and system information.
* Third-Party APIs : Enable integration with external systems, such as payment gateways and Electronic Health Record (EHR) systems, for seamless data exchange and enhanced functionality.
* Communication Protocols : Facilitate secure and efficient communication between different components and users of the system for real-time updates, notifications, and data exchange.
* Web Services : Provide a means to access specific functionalities and data within the system through standardized web interfaces.
* Reporting Tools : Generate a variety of reports for healthcare professionals and administrators to analyze data, track performance, and make informed decisions.
* Authentication Services : Manage user authentication and authorization processes, ensuring secure access control based on roles and permissions.

## Communications Interfaces

* Email and SMS Notifications: Automated notifications to patients regarding appointments through email and SMS, enhancing communication.

# System Features

1. User Authentication and Authorization :

* The system will have a secure login mechanism that requires username and password authentication for healthcare professionals and administrative staff.
* It will implement role-based access control (RBAC) to ensure different user roles have specific permissions and access levels.
* User passwords will be securely encrypted using industry-standard encryption algorithms to protect user data.

1. Patient Registration :

* The system will allow authorized healthcare professionals to register new patients by entering their demographic and insurance information into a structured form.
* The system will validate the input data to ensure accuracy and completeness during the registration process.

1. Medical Records Management

* Healthcare professionals will be able to input and update patient medical records, including diagnoses, treatments, medications, allergies, and test results.
* The system will maintain a comprehensive history of medical record updates, enabling tracking of changes made over time.

1. Appointment Management :

* Authorized users will be able to schedule, reschedule, and cancel patient appointments, considering healthcare provider availability and patient preferences.
* The system will prevent double bookings and conflicts in appointment scheduling by alerting users of overlapping schedules.

1. Billing and Payments :
   * The system will calculate bills based on services rendered and applicable billing rates.
   * It will generate bills and itemize the charges for transparency.
   * The system will record all payment transactions, providing a detailed payment history for each patient.
2. Reporting and Analysis :

* The system will allow users to select predefined report templates or define custom report criteria.
* It will generate reports in various formats (e.g., PDF, Excel) for ease of use and sharing.
* Users will have the ability to export reports and share them via email or other communication channels.

# Other Nonfunctional Requirements

## Performance Requirements

* Response Time: System response within 2 seconds for user interactions.
* Concurrent User Handling: Support a concurrent access of multiple users without significant performance degradation.
* Data Retrieval: Retrieve patient medical records within 3 seconds.
* Data Processing: Process billing and payment transactions within 5 seconds.
* Load Time: System should load within 5 seconds for a typical user.
* Error Handling: Display meaningful error messages within 3 seconds.

## Safety Requirements

The database may get crashed at any certain time due to bugs or operating system failure. Therefore, it is required to take database backup so that the data is not lost and can be recovered in case of any system failures.

## Security Requirements

* Data Encryption : Encrypt all sensitive patient data, including medical records, during storage and transmission using strong encryption algorithms.
* Access Control : Implement role-based access control, allowing access to system features and patient data based on user roles and responsibilities.
* Secure Authentication :Utilize secure authentication mechanisms such as multi-factor authentication (MFA) to verify user identities before granting access

## Software Quality Attributes

* Adaptability : Design the system to easily adapt to changing healthcare regulations, industry standards, and emerging technologies.
* Availability : Maintain at least 99.9% uptime, ensuring the system is consistently accessible to users.
* Correctness : Ensure the system operates accurately, providing correct and reliable results in all functionalities.
* Flexibility : Design the system with a flexible architecture, allowing for easy modifications and customizations to suit varying healthcare facility needs.
* Maintainability : Develop the system with well-structured and documented code, enabling efficient maintenance, updates, and enhancements.
* Portability : Design the system to be platform-independent, allowing it to run smoothly on various devices and operating systems.
* Reliability : Ensure the system operates consistently and performs as expected, providing dependable service to users.
* Reusability : Develop the system using modular components and frameworks to promote code reusability for future development.
* Robustness : Ensure the system can gracefully handle unexpected inputs or situations without crashing, providing a robust and stable user experience.
* Usability : Design an intuitive and user-friendly interface, making the system easy to learn and efficient to use for all types of users.

Appendix A: Glossary

1. PMS : Patient Management System
2. EHR : Electronic Health Record Systems
3. UI : User Interface
4. UX : User Experience
5. RBAC : Role Based Access Control
6. MFA : Multi Factor Authentication

Appendix B: To Be Determined List

References :

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