

**Kombolcha Institute of Technology**

**College of Informatics**

**Department of Software Engineering**

**We here by Submitted a project in “EtDev Inspo” in partial fulfilment of bachelor’s Degree in Software Engineering**

**Submitted to the departments of Informatics**

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**DD/MM/YYYY**

**Discriminations**

We hereby declare that our project in titled “EtDev Inspo” is original and not submitted/Published by any individual/ Organization.

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**Acknowledgement**

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# 2.1 Background (Overview)

The Pharmacy Finder System is conceived to address the growing need for an efficient and user-friendly platform that streamlines the process of medication access for patients, enhances prescription management for doctors, and optimizes inventory control for pharmacies. The system brings together four main actors: patients, doctors, pharmacies, and administrators, each playing a crucial role in the overall system.

**2.1.1 Scope**

The primary objective of the Pharmacy Finder System project is to design and implement a comprehensive web and mobile-based platform that enhance the accessibility and efficiency of medication procurement. The system is specifically tailored to address the challenges within the healthcare domain, offering a user-friendly solution for prescription management, pharmacy operations, and administrative control.

The key functionalities within the scope of the project include:

**Project Goals:**

* **Efficient Medication Access:** Facilitate efficient access to prescribed medications for patients by connecting them with nearby pharmacies that have the required medications in stock.
* **Streamlined Prescription Management** Provide doctors with a user-friendly web application for creating, managing, and securely communicating prescriptions.
* **Optimized Pharmacy Operations:** Empower pharmacies with a robust web application for inventory management, order processing, and other tasks.
* **Administrative Control:** Enable administrators to oversee and manage user registrations, validate the legitimacy of pharmacies and doctors, and ensure compliance with regulations.

**Deliverables:**

* **Mobile App for Patients:** A user-friendly mobile application for patients to scan QR codes, manage prescriptions, and locate nearby pharmacies.
* **Web Application for Doctors and Pharmacies:** Web applications for doctors and pharmacies with features for prescription management, inventory control, and secure communication.
* **Administrative Dashboard:** A centralized administrative dashboard for administrators to oversee user registrations, validate credentials, and monitor system performance
* **Documentation:** Comprehensive documentation covering system architecture, user manuals, and technical specifications.

**Tasks:**

* System Design: Define the architecture and user interfaces for the patient app, doctor web app, pharmacy web app, and administrative dashboard.
* Development: Implement the mobile and web applications, ensuring functionality, security, and usability.
* Integration: Connect the various components to ensure seamless communication and data flow between patients, doctors, pharmacies, and administrators.
* Testing: Conduct thorough testing of the system to identify and resolve any bugs or issues.

The successful completion of these key functionalities within the four-month timeline will result in a fully functional Pharmacy Finder System, meeting the project goals and delivering a valuable solution for patients, doctors, pharmacies, and administrators. This comprehensive scope will serve as a roadmap, ensuring successful implementation and alignment with the envisioned Pharmacy Finder System.

**2.1.2 Purpose**

The purpose of the Pharmacy Finder System project is rooted in the recognition of existing inefficiencies within the healthcare landscape, particularly concerning medication access, prescription management, and overall communication among stakeholders. The driving force behind this project is a commitment to revolutionize the conventional healthcare model, introducing an integrated, interconnected system designed to overcome the challenges prevalent in the current paradigm.

At its core, the project aims to create a seamless healthcare ecosystem by meticulously defining its scope within the Software Requirements Specification (SRS). This document serves as a foundational guide, aligning the project's purpose with specific development endeavors, namely the creation of a patient-focused mobile application, web applications tailored for doctors and pharmacies, and an administrative dashboard curated for system administrators.

The overarching goals of the project are multifaceted and tailored to address the distinct needs of patients, doctors, pharmacies, and administrators. The envisioned system seeks to empower patients by simplifying access to prescribed medications through efficient connections with nearby pharmacies. For doctors, the project promises a user-friendly platform that not only streamlines prescription management but also ensures secure communication with patients and pharmacies. Pharmacies, in turn, are equipped with real-time inventory tools and streamlined order processing capabilities to enhance their operational efficiency. System administrators benefit from an administrative dashboard that provides centralized oversight, allowing for effective management of user registrations, compliance, and support requests.

The essence of the project's purpose lies in establishing a user-friendly, secure, and efficient solution. The envisioned Pharmacy Finder System is poised to elevate the overall healthcare experience by addressing key pain points – improving medication accessibility, optimizing prescription workflows, and fostering effective communication among patients, doctors, pharmacies, and administrators. The detailed requirements meticulously outlined in the SRS serve as a strategic roadmap, ensuring that the developed system aligns seamlessly with the needs and expectations of all stakeholders involved, ultimately driving positive change within the healthcare domain.

**2.1.3 Document Convention**

We have used the IEEE standard for writing this SRS document. This standard is chosen by the department of software engineering staffs as it is the most popular and convenient standard and we also have followed that to write this SRS document. In addition to the standard, we formulate the following conventions for readers of this document.

Entire document should be justified.

* Convention for chapter title
* Font face: Times New Roman
* Font style: Bold
* Font Size: 16
* Convention for Sub title
* Font face: Times New Roman
* Font style: Bold
* Font Size: 14
* Convention for body
* Font face: Times New Roman
* Font Size: 12
* Requirement priority
* Each requirement has its own priority
* Language
* English
* Page Color
* White
* Font color
* Black

**2.1.4 Intended Audience and Suggested Readings**

The Software Requirements Specification (SRS) for the Pharmacy Finder System is designed to cater to a diverse audience, including:

1. **Developers:**
   * Developers will find detailed technical specifications, system architecture, and requirements that guide the development of the Pharmacy Finder System. They will gain insights into the software design, functionalities, and implementation details.
2. **Project Managers:**
   * Project managers can use the SRS to understand the overall scope, objectives, and deliverables of the Pharmacy Finder System. This document will assist in project planning, resource allocation, and timeline management.
3. **Marketing Staff:**
   * Marketing staff can leverage the SRS to comprehend the features and functionalities of the Pharmacy Finder System. This understanding will aid in crafting marketing strategies, highlighting the system's benefits for potential users.
4. **Users (Patients, Doctors, Pharmacies):**
   * End-users, including patients, doctors, and pharmacies, will gain insights into the functionalities and user interfaces tailored to their specific roles. This information will help them understand how the system enhances their respective experiences.
5. **Testers:**
   * Testers will find detailed information about the expected system behavior, functional requirements, and acceptance criteria. This will guide the testing process, ensuring comprehensive coverage of system functionalities.
6. **Documentation Writers:**
   * Documentation writers can use the SRS as a foundation for creating user manuals, training materials, and other documentation. It provides a comprehensive overview of the system's features and functionalities.

Reading Suggestions:

1. Overview Sections:

Start with the Executive Summary and Introduction sections to gain a high-level understanding of the Pharmacy Finder System, its goals, and the context of the project.

1. Developers:

Developers should focus on sections detailing system architecture, technical specifications, and software design. Dive into the Functional Requirements and Technical Requirements sections for in-depth information.

1. Project Managers:

Project managers can gain insights into project scope, objectives, and deliverables by reviewing sections related to project overview, timelines, and resource requirements. Pay special attention to the Project Scope and Timeline sections.

1. Marketing Staff:

Marketing staff should explore sections detailing system features, benefits, and potential user impacts. The Functional Requirements and System Features sections will be particularly relevant.

1. Users (Patients, Doctors, Pharmacies):

Users should focus on sections tailored to their roles, such as the Patient Mobile App, Doctor Web App, and Pharmacy Web App sections. These will provide insights into the specific functionalities relevant to each user group.

1. Testers:

Testers should refer to sections outlining functional requirements, acceptance criteria, and test scenarios. The Testing and Quality Assurance sections will guide the testing process.

1. Documentation Writers:

Documentation writers can gather information for creating user manuals and training materials from sections related to user interfaces, functionalities, and system usage. The User Interfaces and User Training sections will be valuable.

2.2 Overall Description of Software Requirements

In the dynamic landscape of healthcare, the Pharmacy Finder System is envisioned to be a transformative solution that addresses the pressing challenges associated with medication access, prescription management, and communication within the healthcare ecosystem. This comprehensive Software Requirements Specification (SRS) serves as the foundational document that delineates the intricacies of the system, ensuring a tightly elaborated set of requirements that strategically align with our working environment and competitive goals.

**Rationale for Requirement Specifications:**

1. **Enhancing Cost Efficiency:**
   * The requirement specifications are meticulously detailed to optimize cost efficiency. By precisely defining the scope, functionalities, and technical aspects of the Pharmacy Finder System, we ensure streamlined development processes, minimizing unnecessary expenditures and maximizing the return on investment.
2. **Ensuring Unparalleled Quality:**
   * The stringent requirement specifications aim to uphold the highest standards of quality. By clearly articulating functional and non-functional requirements, we establish a robust framework that prioritizes system reliability, security, and user experience. This commitment to quality positions the Pharmacy Finder System as a dependable and trustworthy healthcare solution.
3. **Strategic Timing Dimensionality:**
   * The timing aspect is crucial in the competitive healthcare landscape. The requirement specifications are strategically crafted to adhere to a four-month project timeline, ensuring timely delivery without compromising on quality. This approach enables us to gain a competitive advantage by swiftly introducing a transformative solution to the market.
4. **Competitive Edge through Innovation:**
   * The tight elaboration of requirement specifications is driven by a commitment to innovation. By addressing inefficiencies in medication access and prescription management, the Pharmacy Finder System is positioned as a cutting-edge solution that distinguishes us from competitors. The specifications encourage innovation at every level, fostering a solution that aligns with evolving healthcare needs.
5. **User-Centric Approach:**
   * The requirement specifications prioritize a user-centric approach, emphasizing the needs and experiences of patients, doctors, pharmacies, and administrators. By understanding and addressing the specific requirements of each user group, the Pharmacy Finder System aims to enhance user satisfaction, setting us apart as a customer-focused solution provider.
6. **Agility and Adaptability:**
   * The agile nature of the requirement specifications ensures adaptability to changing healthcare landscapes. With a focus on modularity and scalability, the Pharmacy Finder System is designed to evolve in tandem with emerging technologies and healthcare trends, reinforcing our competitive edge in an ever-evolving industry.

In summary, the overall description of software requirements for the Pharmacy Finder System revolves around a strategic and forward-thinking approach. The meticulously crafted requirement specifications are driven by a commitment to cost efficiency, unparalleled quality, strategic timing, competitive innovation, user-centricity, and adaptability. This approach positions the Pharmacy Finder System as a transformative solution that not only meets the current healthcare challenges but also secures a competitive advantage across dimensions of cost, quality, and timing in our dynamic working environment.

2.2.1 Product Perspective

The Pharmacy Finder System represents a new, self-contained product designed to revolutionize the healthcare industry by addressing challenges in medication access, prescription management, and communication among stakeholders. It is not a replacement for existing systems but a pioneering solution crafted to enhance the overall healthcare experience.

**Context and Origin:** The Pharmacy Finder System emerges as a response to the inefficiencies present in traditional healthcare models. It is conceived as an independent and innovative product that seamlessly integrates into the existing healthcare ecosystem, providing a cohesive platform for patients, doctors, pharmacies, and administrators. This system is not a part of an existing product family but stands alone as a transformative solution tailored to meet specific healthcare needs.

**Subsystem Interconnections and External Interfaces:** The major components of the overall system include:

1. **Patient Mobile Application:** Facilitates medication access and pharmacy location for patients.
2. **Doctor Web Application:** Empowers doctors in efficient prescription management and secure communication.
3. **Pharmacy Web Application:** Streamlines inventory control and order processing for pharmacies.
4. **Administrative Dashboard:** Provides centralized oversight and management for system administrators.

The subsystems interact through secure communication channels, ensuring seamless data flow and real-time updates. External interfaces include APIs for integration with external systems, such as payment gateways and prescription databases.

**Product Features/Functions:** The functional requirements from various user perspectives include:

1. **Patients:**
   * Scan QR codes for prescriptions.
   * View medication details.
   * Locate nearby pharmacies.
2. **Doctors:**
   * Create and manage prescriptions.
   * Communicate securely with patients and pharmacies.
3. **Pharmacies:**
   * Manage real-time inventory.
   * Process prescription orders.
4. **Administrators:**
   * Manage user registrations and validations.
   * Monitor system usage and compliance.
   * Handle support requests.

The Pharmacy Finder System, as depicted in this product perspective, envisions a holistic solution that seamlessly connects various subsystems, fostering efficient communication and enhancing healthcare services for all stakeholders.

2.2.2 User Characteristics

To ensure that the application effectively meets the needs of its users, it’s essential to identify various user classes, each characterized by specific traits and requirements. Below are the key classes for the Pharmacy Finder System:

1. **Patients:**
   * Frequency of Use: Patients may use the system intermittently, primarily when they need to access prescribed medications.
   * Subset of Functions: Patients will utilize features such as scanning QR codes, viewing medication details, and locating nearby pharmacies.
   * Technical Expertise: The system is designed to be user-friendly, requiring minimal technical expertise.
   * Security/Privilege Levels: Patients have basic access privileges, mainly focusing on their personal health information and prescription details.
   * Educational Level/Experience: The system caters to users with varying educational levels and experiences in healthcare technology.
2. **Doctors:**
   * Frequency of Use: Doctors will use the system regularly for prescription management and communication with patients and pharmacies.
   * Subset of Functions: Doctors will heavily rely on functionalities related to prescription creation, patient communication, and access to patient profiles.
   * Technical Expertise: Doctors are expected to have a higher level of technical expertise, familiar with digital prescription systems.
   * Security/Privilege Levels: Doctors possess elevated security and privilege levels, enabling them to manage sensitive patient information.
   * Educational Level/Experience: Doctors are assumed to have a higher educational background and professional experience in healthcare.
3. **Pharmacies:**
   * Frequency of Use: Pharmacies will use the system regularly for managing inventory, processing orders, and communicating with doctors.
   * Subset of Functions: Key functionalities include real-time inventory management, order processing, and secure communication with doctors.
   * Technical Expertise: Pharmacists should have a moderate level of technical expertise, especially in handling inventory systems.
   * Security/Privilege Levels: Pharmacies will have privileged access levels, particularly in managing medication stock and order processing.
   * Educational Level/Experience: Pharmacists are expected to have a relevant educational background and experience in pharmacy operations.
4. **Administrators:**
   * Frequency of Use: Administrators will use the system regularly for overseeing user registrations, compliance, and system performance.
   * Subset of Functions: Administrative functions include managing user accounts, monitoring system usage, and handling support requests.
   * Technical Expertise: Administrators should have a higher level of technical expertise, particularly in overseeing system operations.
   * Security/Privilege Levels: Administrators possess the highest security and privilege levels, ensuring control over system management.
   * Educational Level/Experience: Administrators are expected to have a relevant educational background and experience in healthcare administration.

**Distinguishing Importance:**

* Priority: The most important user classes are Doctors and Patients, as they represent the primary users who directly interact with the core functionalities of the Pharmacy Finder System.
* Secondary: Pharmacies and Administrators are secondary but crucial user classes, ensuring the system's seamless operation, security, and overall management.

By identifying and understanding the characteristics of each user class, the Pharmacy Finder System can be tailored to meet the specific needs and expectations of diverse stakeholders, enhancing user satisfaction and system effectiveness.

2.3 General Constraints

2.3.1 Software Constraints

Operating Environment

The Pharmacy Finder System operates within a healthcare environment that necessitates seamless communication and efficient prescription management. It relies on a robust network infrastructure, ensuring high-speed internet and reliable mobile data networks for real-time communication. The system is designed for modern smartphones and web browsers, emphasizing compatibility and accessibility. Backend server infrastructure and database management adhere to scalability and security standards. Regulatory compliance, particularly with healthcare regulations like HIPAA, is integral to protect patient privacy and ensure legal standards in data management.

Design and Implementation

The Pharmacy Finder System will be developed using the MERN stack, where the frontend will be built with React, providing a component-based architecture for a responsive user interface. The backend, powered by MongoDB as the NoSQL database, Express.js, and Node.js, will handle data storage, server-side logic, and execution. User authentication and authorization will follow industry standards, ensuring secure access, and the system will adhere to strict security protocols. External interfaces will facilitate seamless integration with payment gateways and external databases. Leveraging the inherent scalability of the MERN stack, the system aims for optimal performance, with deployment on cloud services for accessibility. This comprehensive design aims to deliver a secure, scalable, and user-friendly Pharmacy Finder System tailored to the specific needs of patients, doctors, pharmacies, and administrators within the healthcare ecosystem.

Other constraints

In addition to technology stack constraints, the Pharmacy Finder System must adhere to corporate policies and regulatory requirements. Compliance with healthcare regulations, such as HIPAA, will shape data handling practices. Corporate policies may influence coding standards, version control, and documentation procedures, ensuring alignment with organizational guidelines. Data retention policies, hardware compatibility considerations, and adherence to accessibility standards may be mandated, reflecting the need for comprehensive system design. Internationalization, localization, and adherence to change management processes will contribute to the system's global usability and stability. Audit trails, logging mechanisms, and user training features may be essential to meet regulatory and corporate demands. Lastly, restrictions on third-party software usage must be considered, addressing licensing and security concerns. These constraints collectively guide the software development process, ensuring the Pharmacy Finder System aligns with both technical specifications and broader corporate and regulatory frameworks.

2.3.2 Hardware Constraints

The Pharmacy Finder System, developed within the MERN stack framework, presents minimal hardware constraints due to its reliance on cloud-based services and the inherently scalable nature of the chosen technology stack. The optional nature of accessing specific hardware apparatus implies flexibility, allowing the project to adapt to available resources. While the cloud-based deployment mitigates the need for extensive on-premise hardware, considerations may arise for hardware compatibility in healthcare facilities, particularly if interfacing with existing medical devices or infrastructure. However, the system's feasibility remains intact, emphasizing the adaptability and feasibility of the project, even if immediate access to specific hardware is not guaranteed. This flexibility aligns with the dynamic nature of cross-discipline projects, where hardware requirements may evolve throughout the development lifecycle.

2.3.3 Assumptions and Dependencies

1. **Cloud Service Reliability:**
   * *Assumption:* The system assumes reliable and uninterrupted access to cloud services (e.g., AWS, Heroku) for deployment. Any disruptions or downtime of these services may impact system availability.
   * *Dependency:* The system's functionality relies on continuous access to cloud resources for hosting, data storage, and scalability. Any interruption in cloud service availability could affect the overall system performance and user experience.
2. **Internet Connectivity:**
   * *Assumption:* Users, including patients, doctors, and pharmacies, are assumed to have stable internet connectivity to access the system through web and mobile interfaces.
   * *Dependency:* The successful operation of the system depends on users having consistent internet access. Issues such as poor connectivity may impact real-time communication and data retrieval, affecting the system's responsiveness.
3. **Security Compliance:**
   * *Assumption:* The system assumes compliance with healthcare regulations, such as HIPAA, and follows industry-standard security practices to protect sensitive health information.
   * *Dependency:* Failure to adhere to security standards and regulatory compliance may result in legal implications and compromise patient privacy. It is crucial to maintain security measures throughout development and operation.
4. **External API Integrations:**
   * *Assumption:* The system integrates with external APIs, such as payment gateways and prescription databases, for seamless functionality.
   * *Dependency:* Any changes or disruptions in the APIs' availability or structure may impact the system's ability to process transactions, retrieve prescription information, or communicate with external systems.
5. **User Training and Familiarity:**
   * *Assumption:* Users, especially doctors and pharmacies, are assumed to have a certain level of familiarity with digital platforms, and minimal training may be required for efficient system usage.
   * *Dependency:* If users lack the expected familiarity, additional training resources may be needed to ensure optimal use of the system. Failure to provide adequate training may result in suboptimal utilization of system features.
6. **Corporate Policies and Change Management:**
   * *Assumption:* The development process aligns with corporate policies, and any changes adhere to established change management procedures.
   * *Dependency:* Deviations from corporate policies or change management processes may lead to disruptions in the development workflow, affecting the quality, stability, and timely delivery of the system.
7. **Hardware Compatibility in Healthcare Facilities:**
   * *Assumption:* The system assumes compatibility with existing hardware infrastructure in healthcare facilities, especially if interfacing with medical devices.
   * *Dependency:* Any discrepancies or limitations in hardware compatibility may require adjustments in system design or additional interfaces, impacting the integration with healthcare facility infrastructure.
8. **Regulatory Approval:**
   * *Assumption:* The system assumes that it complies with relevant regulatory requirements and receives necessary approvals for deployment in the healthcare domain.
   * *Dependency:* Failure to obtain regulatory approvals may prevent the system from being deployed or could lead to legal consequences. It is crucial to align with healthcare regulations throughout the development process.

These assumptions and dependencies, if not acknowledged or addressed, may significantly impact the fulfillment of requirements outlined in the Software Requirements Specification (SRS). Regular communication and transparency regarding these factors are essential for successful system development and operation.

2.3.4 User Documentations

To ensure effective distribution and accessibility of user documentation for the Pharmacy Finder System, a comprehensive approach will be implemented, considering the diverse needs of customers and product users.

1. **Online Documentation Portal:**
   * A centralized online documentation portal will be created, accessible through a web browser. This portal will serve as the primary repository for all user documentation related to the Pharmacy Finder System. Users can navigate through different sections, including user guides, FAQs, and video tutorials.
2. **Downloadable PDFs:**
   * Users will have the option to download PDF versions of the documentation for offline reference. This allows users to have a portable and printable version of the documentation, enhancing accessibility and convenience.
3. **In-App Help Section:**
   * The Pharmacy Finder System will feature an in-app help section accessible directly from the user interface. Context-sensitive help buttons and tooltips will provide immediate assistance, guiding users through various features and functionalities.
4. **Email Notifications and Newsletters:**
   * Periodic email notifications and newsletters will be sent to users, highlighting updates, new features, and links to relevant documentation. This ensures that users are informed about the latest information and resources available.
5. **Training Webinars and Workshops:**
   * Interactive training webinars and workshops will be conducted periodically, providing users with hands-on experience and a deeper understanding of the system. Recorded sessions will be made available for later reference.
6. **Community Forums and Discussion Boards:**
   * An online community forum or discussion board will be established, allowing users to interact, ask questions, and share experiences. Moderated by support staff, these forums will serve as a collaborative space for users to seek assistance from peers and experts.
7. **Mobile App Onboarding Screens:**
   * For users accessing the system through the mobile app, onboarding screens will provide a guided tour of key features upon initial login. This interactive onboarding process will familiarize users with the app's functionalities.
8. **Customer Support Chat:**
   * An embedded chat support feature within the system will enable users to seek real-time assistance from customer support representatives. This direct communication channel will address immediate queries and provide instant help.
9. **Social Media Platforms:**
   * Official social media platforms will be utilized to share tips, announcements, and links to documentation. Users can follow these channels to stay updated and engage with the community.
10. **Feedback Mechanism:**
    * A feedback mechanism will be integrated into the documentation portal, allowing users to provide comments, suggest improvements, and report issues. This ensures a continuous feedback loop for enhancing the quality and relevance of the documentation.

# 2.4 Specific Requirements

2.4.1 User requirements

The user requirements for the Pharmacy Finder System are crafted to address the critical business needs and expectations of users within the healthcare ecosystem. These specifications are outlined early in the validation process to serve as a foundation for system development, ensuring alignment with the identified business needs.

1. **User Authentication and Profiles:**
   * Users, including patients, doctors, and pharmacies, require a secure and streamlined authentication process. Each user should have a dedicated profile where personal and professional information can be managed.
2. **Prescription Management for Doctors:**
   * Doctors need a user-friendly interface to efficiently manage prescriptions. This includes the ability to create, edit, and track prescriptions, as well as generate QR codes for prescribed medications.
3. **QR Code Scanning for Pharmacies:**
   * Pharmacies require a scanning mechanism to read QR codes generated by doctors. The system should provide instant access to prescription details, facilitating efficient medication dispensing.
4. **Real-Time Medication Availability:**
   * Patients need real-time information on medication availability at nearby pharmacies. The system should display accurate and up-to-date inventory information, aiding users in making informed decisions.
5. **Intuitive Medication Search for Patients:**
   * Patients should be able to easily search for prescribed medications within the system. The search functionality should be intuitive, allowing users to find pharmacies that stock the required medications.
6. User-Friendly Mobile App Interface:

* Patients accessing the system through the mobile app require a user-friendly interface. The app should have intuitive navigation, clear visual cues, and onboarding processes to enhance the overall user experience.

1. Administrative Dashboard for System Admins:

* System administrators need a comprehensive dashboard for overseeing user registrations, verifying pharmacy and doctor credentials, and managing overall system health. The dashboard should provide insights into system usage and performance.

1. Integration with External APIs:

* The system should seamlessly integrate with external APIs for functionalities such as payment processing and prescription databases. This ensures smooth interoperability with existing healthcare infrastructure.

1. Data Security and Compliance:

* Users across roles emphasize the paramount importance of data security. The system must adhere to healthcare regulations, ensuring the confidentiality and integrity of patient and prescription information.

1. Training Resources and Onboarding Support:

* Users, particularly doctors and pharmacies, require access to training resources and onboarding support to familiarize themselves with system functionalities. These resources should be easily accessible within the system.

1. Feedback Mechanism:

* A feedback mechanism should be incorporated into the system, allowing users to provide comments, suggestions, and report issues. This ensures continuous improvement and responsiveness to user needs.

These user requirements serve as a foundational guide for the development of the Pharmacy Finder System, ensuring that the envisioned solution aligns with the identified business needs and enhances the overall healthcare experience for patients, doctors, pharmacies, and system administrators.

2.4.2 Functional Requirements

1. **User Registration (FR-1):**
   * Users should be able to create accounts by providing necessary information, including name, contact details, and a secure password.
   * The system must validate and ensure the uniqueness of user credentials.
   * Appropriate error messages should be displayed for invalid inputs, and users should be guided through the registration process.
2. **User Authentication (FR-2):**
   * The system must authenticate users during the login process, verifying their credentials against stored data.
   * Invalid login attempts should trigger account lockout mechanisms for security purposes.
   * Users must receive clear notifications for successful or unsuccessful login attempts.
3. **Doctor Prescription Generation (FR-3):**
   * Doctors should have the capability to generate prescriptions for patients within their secure dashboard.
   * Prescriptions must include details such as prescribed medications, dosage instructions, and patient information.
   * The system must validate the completeness of prescription information and provide alerts for any missing details.
4. **QR Code Generation (FR-4):**
   * After prescription creation, the system should generate a unique QR code representing the prescribed medication information.
   * QR codes must be securely linked to the specific prescription and patient data.
   * QR code generation should be instantaneous and available for download or display.
5. **Patient Medication Search (FR-5):**
   * Patients must be able to search for nearby pharmacies that have the prescribed medications using the generated QR code.
   * The system should provide a user-friendly interface for entering or scanning the QR code.
   * Clear and concise results, including pharmacy details and medication availability, should be presented to the patient.
6. **Pharmacy Medication Scanning (FR-6):**
   * Pharmacies should have the capability to scan patient-generated QR codes to access prescription details.
   * The system must verify the authenticity of QR codes and retrieve corresponding prescription information.
   * Clear indicators should notify pharmacies of successful or unsuccessful QR code scans.
7. **Inventory Management for Pharmacies (FR-7):**
   * Pharmacies should be able to manage their inventory, updating the availability of medications.
   * The system must provide alerts for low stock levels or expired medications.
   * Updates to inventory should reflect in real-time and be visible to both pharmacies and patients.
8. **Administrator Approval for Pharmacies and Doctors (FR-8):**
   * Administrators should have the authority to approve or reject pharmacy and doctor registrations.
   * The system must notify administrators of pending registrations and provide a streamlined approval process.
   * Rejected registrations should trigger notifications with appropriate reasons to the concerned entities.
9. **Error Handling and Logging (FR-9):**
   * The system must implement robust error handling mechanisms, providing clear error messages for users.
   * Error logs should be maintained for system administrators to diagnose and resolve issues efficiently.
   * Error notifications should be sent to administrators for critical issues affecting system functionality.
10. **Mobile App User Onboarding (FR-10):**
    * Mobile app users should experience a guided onboarding process, introducing key features and functionality.
    * Onboarding screens must be informative and user-friendly, ensuring a smooth introduction to the app.
    * Users should have the option to skip onboarding but access it later from the app settings.

These functional requirements outline the specific capabilities and behaviors expected from the Pharmacy Finder System, focusing on user needs and ensuring a robust and user-friendly experience. Each requirement is uniquely identified, and placeholders (TBD) indicate areas where further information may be needed during the development process.

2.4.3 Non-Functional Requirements

1. **Performance (NFR-01):**
   * The system shall respond to user interactions within 3 seconds to ensure a responsive and efficient user experience.
   * Under peak load conditions, the system must maintain a response time of under 5 seconds for critical functionalities.
2. **Security (NFR-02):**
   * User data, especially health-related information, must be encrypted during transmission and storage to comply with security standards.
   * The system shall implement user authentication and authorization mechanisms, ensuring that only authorized individuals can access sensitive data.
3. **Scalability (NFR-03):**
   * The system architecture must support scalability to accommodate an increasing number of users, pharmacies, and doctors.
   * Scalability testing should be conducted, and the system must handle a 20% increase in user load without significant performance degradation.

These non-functional requirements are essential for ensuring that the Pharmacy Finder System not only meets the functional needs but also delivers a reliable, secure, and efficient user experience.

**2.5 External Interface Requirements**

2.5.1 User Interfaces

2.5.2 Hardware Interfaces

2.5.3 Software Interfaces

2.5.4 Communication Interface

**2.6 System requirements Modeling**

# Chapter Three: Requirement Analysis Modeling

**3.1 Overview of Analysis Model**

The Analysis Model for the Pharmacy Finder System serves as a pivotal stage in the software development lifecycle, expanding upon the foundational requirements established in the earlier requirement elicitation phase. This chapter delves into various requirements modeling approaches to provide a detailed and technical representation of the proposed system. The primary objective is to capture and elaborate on the identified system requirements from Chapter 2, laying the groundwork for the subsequent design phase.

**Requirements Modeling Approaches:**

1. **Information Modeling:**
   * **Objective:** Define and represent data entities, attributes, and their relationships within the Pharmacy Finder System.
   * **Purpose:** Facilitate a clear understanding of the data structures essential for patient profiles, prescription details, pharmacy information, and related components.
2. **Behavioral Modeling:**
   * **Objective:** Describe system behavior through use cases and scenarios involving different actors such as patients, doctors, and pharmacies.
   * **Purpose:** Illustrate how users interact with the system to accomplish tasks like prescription management, QR code generation, and medication search.
3. **Functional Modeling:**
   * **Objective:** Break down overall system functionality into manageable components, each serving a specific purpose.
   * **Purpose:** Clarify how users will interact with the system to carry out essential tasks, ensuring a detailed understanding of functional requirements.
4. **Architectural Modeling:**
   * **Objective:** Provide a high-level representation of the system's architecture, outlining major components and their interrelationships.
   * **Purpose:** Establish a blueprint for the overall structure of the Pharmacy Finder System, guiding subsequent design decisions.
5. **Component-Level Design:**
   * **Objective:** Specify detailed design for individual components, modules, or services within the system.
   * **Purpose:** Define the responsibilities of each component and how they collaborate to fulfill the system's functional requirements.
6. **Interface-Level Design:**
   * **Objective:** Define interfaces between different system components, ensuring seamless communication and data exchange.
   * **Purpose:** Clarify how different parts of the system interact, including user interfaces for various actors.

**Rationales Behind Model Construction:**

* **Complexity Management:**
  + **Reasoning:** Models are constructed to manage the inherent complexity of the system. They provide a structured representation that aids in understanding and handling intricate details.
* **Multi-Purpose Use:**
  + **Reasoning:** Once constructed, models serve various purposes throughout software development, including analysis, specification, code generation, design, visualization, and testing.
* **Graphical Models:**
  + **Reasoning:** Graphical models are preferred for their clarity and ease of construction. They offer an intuitive representation that is easily understandable by stakeholders.

**Outcome and Future Application:**

The outcome of the Analysis Model for the Pharmacy Finder System is a set of detailed, clear, and unambiguous models that document the design and analysis results. These models serve as a foundation for subsequent phases in software development, providing valuable insights for design decisions, code generation, testing, and overall system comprehension. The graphical nature of the models enhances their utility, making them an effective tool for both analysis and design procedures.

# 3.2 System use case Diagram

# 3.3 Sequence Diagram

# 3.4 Activity Diagrams

# 3.5 Communication diagram if any

# 3.6 Conceptual class diagram

# Chapter Four System Design

# 4.1 Overview