COMP225 – 006 SOFTWARE REQUIREMENTS ENGINEERING

Project Title: Pharmacy Management Systems

Part A

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COMP225 – Pharmacy Management Systems

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Pharmacy Management System

Software Requirements Specification (SRS)

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Section 1: Introduction

1.1 Purpose

This new software product will address the problem of the existing hospital software.

This innovative subsystem software solution aims to streamline hospital management processes by seamlessly integrating pharmacy management systems with the existing hospital system. It represents a cutting-edge version 1.0.0 of the software, specifically designed to cater to the diverse needs and challenges of the healthcare industry. This new subsystem has the purpose of efficiently and practically implementing the hospital system, providing the delivery of medicines to patients referred by doctors.

1.2 Document Conventions:

1. SQL – Structured query language

2. HL7- Health Level 7

3. FR – Functional Requirements

4. NFR – Non-Functional Requirements

5. HIPAA – Health Insurance Portability and Accountability Act

6. EHR – Electronic Health Record

1.3 Intended Audience and Reading Suggestions:

This document is intended for developers, project managers, marketing staff, hospital administrators, doctors, nurses, patients, support staff, system testers, pharma workers, and documentation writers.

1.4 Project Scope

The pharmacy management system is a software solution designed to streamline and automate various operations within a pharmacy, including inventory management, prescription processing, sales, and billing, patient management, and reporting. The scope of the project involves developing a comprehensive pharmacy management system that caters to the specific needs of a pharmacy.

1. Objectives: The primary objectives of the pharmacy management system project include:

- Automating the inventory management process to ensure accurate tracking of medication stock levels, expiration dates, and reordering.
- Simplifying the prescription processing workflow by efficiently capturing and storing prescription details, facilitating quick retrieval and dispensing.

- Enhancing sales and billing operations by generating accurate invoices, managing payment transactions, and integrating with external payment gateways.
- Improving patient management through features like patient registration, prescription history tracking, and personalized notifications.
- Providing comprehensive reporting and analytics capabilities to derive insights into sales, inventory, and other key performance indicators (KPIs).

1.5 References:

1. Your guide to writing a Software Requirements Specification (SRS) document. Relevant Software. (2023, March 23). https://relevant.software/blog/software-requirements-specification-srs-document/

2. GeeksforGeeks. (2023, March 17). How to write a good SRS for your project. GeeksforGeeks. https://www.geeksforgeeks.org/how-to-write-a-good-srs-for-your-project/

3. Software engineering: a practitioner's approach - Pressman, R. S. (2999). Software engineering: A practitioner's approach. McGraw Hill.

Section 2: Overall Description

2.1 Product Perspective

- This pharmacy management system is an addition to an already existing hospital software system.
- The purpose of this software is to assist hospitals in enhancing their operational efficiency, patient care, and overall performance by integrating pharmacy management into them.
- It provides a comprehensive solution for managing various aspects of hospital operations, including patient management, staff scheduling, inventory management, billing, and reporting.
- While the software system itself is self-contained, it may interface with existing systems within the hospital infrastructure. For example, it could integrate with the hospital's electronic health record (EHR) system to retrieve patient information or with the billing system to generate accurate invoices. These interfaces ensure seamless data exchange and interoperability between the hospital improvement software system and other existing systems.
- Overall, the hospital improvement software system aims to provide a holistic solution for optimizing hospital processes and improving patient care while ensuring seamless integration with existing hospital systems through well-defined interfaces.

2.2 Product Features (Functions)

The main functions of the Pharmacy Management System are:

- Store and display patient records: store patients' medical records with their personal information, data, medical history, health status, diagnoses, treatments, and exams. (Which drugs have already been applied and which aids are needed)

-Edit the patient's record: give the doctor and the nurse the option to edit the patient's record if necessary to add or remove some information about the patient.

-Request for medicines by users: it will be possible to request the necessary medicines and equipment for patients.

- Billing & Invoicing: Generate accurate patient bills and invoices for the drugs and equipment used in the hospital.

- Inventory management: show the pharmacy's stock, the medicines that are out of stock, and the ones most requested by doctors.

-Reporting and Analytics: Generation of various reports, including sales reports, inventory reports, profitability analysis, and other custom reports.

2.3 User Classes and Characteristics:

When designing a pharmacy management project with an online medicine ordering feature, you can consider the following service classes and characteristics:

1. Pharmacists:

Characteristics: Qualified professionals responsible for dispensing medication and providing pharmaceutical care.

Usage: Pharmacists will use the pharmacy management system to manage inventory, track medication orders, verify prescriptions, generate labels, and provide patient counseling.

2. Pharmacy Technicians:

Characteristics: Support staff who assist pharmacists in dispensing medication and managing day-to-day operations.

Usage: Pharmacy technicians will use the system to process medication orders, update patient profiles, manage inventory levels, and generate reports.

3. Medical Professionals:

Characteristics: Doctors, nurses, and other healthcare providers who prescribe medications and collaborate with pharmacists.

Usage: Medical professionals will use the pharmacy management system to electronically transmit prescriptions, review medication histories, check drug interactions, and communicate with pharmacists.

4. Patients:

Characteristics: Individuals who visit the pharmacy to obtain prescription medications or over-the-counter products.

Usage: Patients will use the system to provide personal information, view medication history, request prescription refills, receive medication reminders, and access educational resources.

5. Insurance Providers:

Characteristics: Companies or organizations responsible for managing health insurance coverage and claims.

Usage: Insurance providers will interact with the pharmacy management system to verify coverage, process claims, and receive medication utilization reports.

6. Pharmacy Administrators:

Characteristics: Managers or administrators responsible for overseeing the overall functioning of the pharmacy.

Usage: Pharmacy administrators will utilize the system to monitor inventory levels, track financial transactions, generate business reports, and manage user access and permissions.

7. Regulatory Authorities:

Characteristics: Government agencies or regulatory bodies responsible for enforcing pharmaceutical regulations and standards.

Usage: Regulatory authorities may access the system to review medication records, track controlled substance dispensing, and perform audits or inspections.

8. Suppliers and Distributors:

Characteristics: Companies or individuals responsible for supplying medications and other pharmacy-related products.

Usage: Suppliers and distributors will interact with the system to manage inventory levels, track deliveries, update pricing information, and generate invoices.

9. Researchers and Analysts:

Characteristics: Professionals involved in pharmaceutical research, clinical trials, or data analysis.

Usage: Researchers and analysts may utilize the pharmacy management system to access aggregated medication data, conduct research studies, and analyze trends or outcomes.

2.4 Operating Environment:

The Pharmacy Management System will operate in the same environment as the hospital management system:

- Hardware platform: Windows Server 2023, with client devices running Windows 11.

- Operating system: Windows 11.

- Database: Microsoft SQL Server 2023.

- Web browser support: Chrome, Firefox, Safari, and Microsoft Edge.

2.5 Assumptions and Dependencies:

Assumptions:

Compliance with legal and regulatory requirements: The system assumes adherence to relevant laws and regulations related to pharmaceutical operations, including data privacy, security, and prescription handling.

Integration with external systems: The system can take on integration with other healthcare systems, such as electronic health record (EHR) systems, insurance systems, or billing systems, to exchange relevant data smoothly.

Scalability and performance requirements: The system assumes the ability to handle increasing volumes of data, transactions, and users while maintaining satisfactory performance.

Dependencies:

Data integration: The system may depend on the availability of data from external sources, such as medication databases, insurance providers, or healthcare networks, to populate and update relevant information.

Integration with payment gateways: If the system handles online payments or insurance claims, it depends on the integration with payment gateways or insurance providers' systems to process transactions and claims.

Section 3 “External Interface Requirements”:

3.1 User Interfaces:

1. Patient Registration and Login:
- User-friendly registration form for new patients
- Login interface for existing patients with username and password

2. Dashboard:
- Personalized dashboard for patients with an overview of appointments, prescriptions, and medical history
- Dashboard for doctors displaying patient appointments, schedules, and access to medical records

3. Online Medicine Ordering:
- Medicine catalog with search and filtering options
- Medicine details page with information on dosage, side effects, and pricing
- Shopping cart functionality for patients to add medicines and place orders
- Order tracking interface to monitor the status of medicine delivery

4. Electronic Health Records (EHR):
- User-friendly interface to view and update patient medical records
- Sections for adding diagnosis, treatment details, and prescription information
- Medical history timeline with relevant records and reports

5. Doctor-Patient Communication:
- Secure messaging interface for doctors and patients to communicate
- Notification system for new messages and appointment reminders

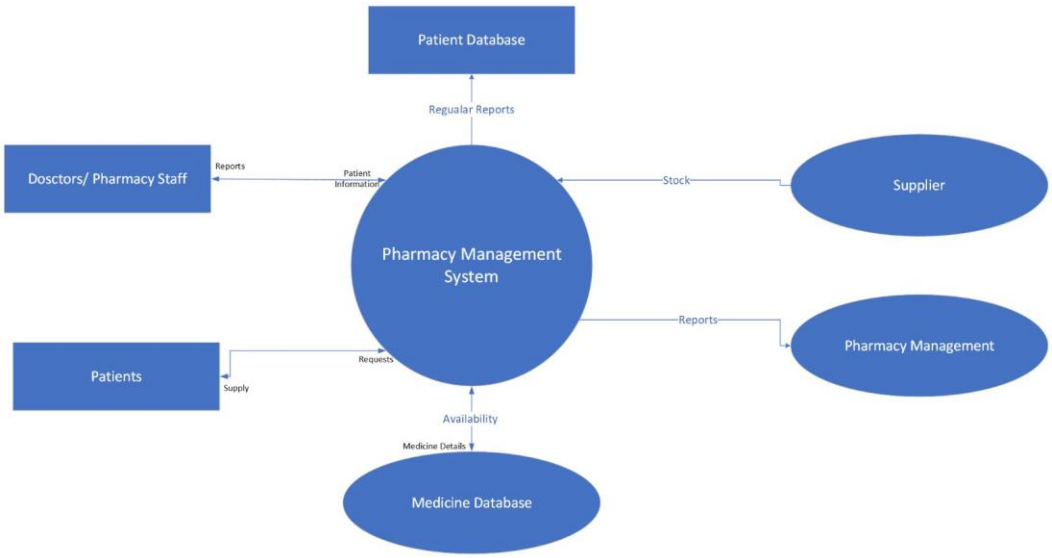
6. Billing and Payment:
- Billing interface displaying detailed invoices for medical services
- Integration with payment gateways for online payments
- Payment history and receipts

7. Reports and Analytics:
- Data visualization interface for generating reports and analytics on patient demographics, appointment statistics, medicine usage, etc.
- Customizable filters and parameters for generating specific reports

8. Admin Panel:
- Administrative interface for managing user accounts, permissions, and system configurations
- Dashboard for administrators to monitor system performance and generate reports

9. Mobile Application:
- Mobile-friendly interfaces for patients and doctors to access the system on their smartphones
- Optimized views for smaller screens and touch-based interactions

3.2 Context Flow Diagram:



CFD For Pharmacy Management System

3.3 Hardware Interface:

1. Computer and Servers:
- Desktop computers for administrative staff and pharmacy personnel
- Servers to host the system and store data securely
- Laptops or tablets for mobile access by doctors and nurses, view patient information and communicate with patients or other healthcare professionals on the go

2. Network Infrastructure:
- Local Area Network (LAN) infrastructure to connect computers and devices within the hospital or clinic premises
- Internet connectivity to enable online features and communication with external systems

3. Point-of-Sale (POS) Terminals:
- Hardware terminals for pharmacy billing and payment processing
- Barcode scanners to scan medicine barcodes for efficient billing

4. Printers and Scanners:
- Printers for generating invoices, receipts, and reports
- Scanners for digitizing physical documents and medical records

5. Barcode Readers:
- Barcode readers or scanners to scan medicine barcodes for inventory management and prescription validation

6. Display Screens and Digital Signage:
- Display screens or monitors for displaying patient queue information, appointment schedules, or general announcements
- Digital signage for promoting pharmacy services, special offers, or health-related information

7. Backup and Storage Devices:
- External hard drives or network-attached storage (NAS) devices for data backup and storage
- Cloud storage solutions for off-site data backup and redundancy

3.4 Software Interface:

1. User Interfaces:
- Web-based interfaces for patients to register, book appointments, order medicines, and access their health records
- Web-based interfaces for doctors to manage appointments, access patient information, prescribe medications, and communicate with patients
- Administrative interfaces for system administrators to manage user accounts, configure settings, and generate reports
- Pharmacy management interfaces for pharmacists to manage inventory, process orders, and generate invoices

-Calendar to keep track of patient's medicine purchase history

2. Application Programming Interfaces (APIs):
- APIs for integrating with external systems, such as lab systems for test results, insurance providers for claims processing, or payment gateways for online transactions
- APIs for communication between different modules or components within the hospital management system, enabling seamless data exchange

3. Database Management System:
- Database management system (DBMS) interfaces for managing and accessing the underlying database that stores patient records, appointment data, medicine inventory, etc.

4. Electronic Health Record (EHR) Integration:
- Interfaces for integrating with existing EHR systems to fetch and update patient health records seamlessly
- APIs or data exchange protocols (such as HL7) to ensure interoperability between the hospital management system and EHR systems

5. Payment Gateway Integration:
- Interfaces to integrate with payment gateways to facilitate online payment processing for medical services and medicine orders

6. Messaging and Communications:
- Interfaces for secure messaging and communication between doctors and patients within the system, ensuring privacy and confidentiality of sensitive information

7. Reporting and Analytics:
- Interfaces for generating reports and analytics on various aspects of the hospital management system, such as appointment statistics, medicine usage, financial reports, etc.
- Customizable filters, parameters, and visualization options to generate meaningful insights from the data

8. Security Interfaces:
- Interfaces for user authentication and access control, ensuring secure access to sensitive patient information and system functionalities
- Encryption interfaces to secure data transmission and storage, protecting patient confidentiality

9. Integration Middleware:
- Middleware interfaces to facilitate seamless integration and data exchange between different modules or components within the hospital management system, such as appointment scheduling, prescription management, and pharmacy inventory

Sec-3A Stakeholder Register

Stakeholder Register					
Stakeholder Name	**Stakeholder Position**	**External/ Internal**	**Stakeholder contact details**	**Operational/ Executive**	**Interest(high, medium, low)**
Harry Simpson	Patients	External	harry.simpson@gmail.com	Operational	high
Camila Cabello	Marketing Staff	Internal	cami.cabello@com.ca	Operational	high
Bob Dylan	IT administrator	Internal	bob@comp.ca	Operational	medium
Gabriel Lan	Developer	Internal	gabriel.lan@comp.ca	Executive	medium
Sara Von	Investor	External	sara.von@xcorp.com	Executive	high
Ben Sullivan	Project Manager	Internal	ben.sulivan@gmail.com	Executive	medium
Alfred Lee	Hospital Administrator	Internal	Alfred.hosp@gmail.com	Operational	high
Luke Vicente	Doctor	Internal	Luke.dr@gmail.com	Operational	medium
Sandy Snnat	Nurser	Internal	sandy@gmail.com	Operational	medium
Willian Nazaca	Support Staff	Internal	willian@gmail.com	Operational	medium
Bill Zanc	System Tester	External	bill@gmail.com	Executive	medium
Paulo Mccarntey	Pharma Worker	Internal	paulo@gmail.com	Executive	medium
Peter Bout	Documentation writer	External	peter@gmail.com	Executive	medium
Sam Musa	IT Security officer	Internal	sam.musa@comp.ca	Executive	low

SEC-3B Interview Questions:

Question	Stakeholder position	Answer
1. How are prescriptions currently managed and processed in the pharmacy? Are there any specific pain points or challenges associated with this process?	Pharmacy Manager	Prescriptions are manually processed, and challenges include high error rates and delays.
2. What are the main challenges you face when it comes to medication verification and ensuring accuracy in dispensing?	Pharmacist	The main challenges in medication verification and ensuring accuracy in dispensing include high prescription volumes and potential errors in manual processes.
3. What are the common tasks and responsibilities that pharmacy technicians perform daily? Are there any repetitive or time-consuming tasks that could be automated?	Pharmacy technician	Common tasks include medication dispensing, prescription processing, inventory management. Repetitive or time-consuming tasks that could be automated include medication counting and label printing.
4. What are the existing IT systems and infrastructure in place at the pharmacy? Are there any limitations or constraints that need to be considered when developing the new pharmacy management application?	IT Manager	Existing IT systems include a network infrastructure, servers, workstations, and pharmacy-specific software. Limitations or constraints include compatibility issues and resource limitations.
5. What are the key inventory management issues that the pharmacy	Pharmacy manager	Inventory management issues include stockouts and overstocking, currently tracked using manual records.

faces? How do you currently track and monitor medication stock levels?		
6. Do you currently have a system in place to check for potential drug interactions or allergies when processing prescriptions? If so, how does it work?	Pharmacist	Yes, we have a system that checks for potential drug interactions and allergies by cross-referencing patient information and medication databases.
7. How do you currently handle medication packaging and labeling? Are there any specific labeling requirements or standards that need to be followed?	Pharmacy technician	Medication packaging and labeling are typically done manually, following specific labeling requirements and standards set by regulatory bodies.
8. How do you currently handle data backups and disaster recovery procedures for critical pharmacy information?	IT Manager	Data backups are performed regularly, and disaster recovery procedures are in place to ensure the availability and integrity of critical pharmacy information.
9. Are there any regulatory or compliance requirements that the pharmacy needs to adhere to when it comes to managing medications and patient records?	Pharmacy manager	Yes, the pharmacy must comply with HIPAA regulations and record-keeping requirements.
10. Are there any specific reporting or analytics requirements that would be helpful for you to have in order to better manage the pharmacy operations?	Pharmacist	Having reporting and analytics capabilities would be helpful for better managing inventory, tracking medication usage, and identifying trends in prescribing patterns.

11. Can you describe the process of medication reconciliation when a patient receives multiple prescriptions from different healthcare providers?	Pharmacy technician	Medication reconciliation involves reviewing and cross-referencing multiple prescriptions to ensure accuracy, identify potential drug interactions, and communicate with healthcare providers to resolve any discrepancies.
12. Are there any specific security measures or access control requirements that need to be implemented in the new software application?	IT manager	specific security measures and access control requirements include user authentication, role-based access, encryption, and compliance with industry regulations (e.g., HIPAA).
13. Can you describe the workflow of medication dispensing from the time a prescription is received to the point of delivering it to the patient?	Pharmacy Manager	Prescription is received, verified, medication is retrieved from inventory, dispensed, and handed to the patient.
14. How do you handle medication recalls or expiration management? Is there a process in place for identifying and removing expired or recalled medications from inventory?	Pharmacist	We follow a process for medication recalls and expiration management, which involves regular inventory checks and immediate removal of expired or recalled medications.
15. Are there any specific challenges or issues that arise when managing and dispensing controlled substances or narcotic medications?	Pharmacy Technician	Managing and dispensing controlled substances or narcotic medications can pose challenges due to strict regulations, additional documentation requirements, and the need for heightened security measures to prevent misuse or theft.
16. What are the preferred technology platforms or	IT Manager	Preferred technology platforms or frameworks should align with the existing infrastructure and IT team's skills, such as

frameworks that align with the existing IT infrastructure and skills of the IT team?		Windows servers, Java development, and Microsoft SQL database.
17. How do you handle patient information, such as their medical history and insurance details? What level of security and privacy measures are in place?	Pharmacy Manager	Patient information is stored in physical files, and security measures include locked cabinets and limited access.
18. Do you have any specific preferences or requirements when it comes to integrating with external systems, such as insurance providers or electronic health record (EHR) system s?	Pharmacist	We prefer seamless integration with external systems, such as insurance providers and EHR systems, to streamline prescription processing and access patient information efficiently.
19. How do you currently handle medication returns or disposal? Is there a process in place to ensure proper disposal of expired or unused medications?	Pharmacy Technician	Medication returns or disposal are handled according to established protocols, which may include the proper disposal of expired or unused medications in accordance with environmental and safety guidelines.
20. Are there any integration requirements with external systems, such as pharmacy benefit managers (PBMs) or drug information databases, that need to be taken into account during the development process?	IT Manager	Integration requirements with external systems may include connecting to pharmacy benefit managers (PBMs) for insurance claims and integrating drug information databases for accurate medication data and interactions.

SEC-4 FUNCTIONAL REQUIREMENTS LIST

REQUIREMENT ID	Requirement Title	Description	Priority	Requestors
FR01	Medication Dispensing	The system should allow pharmacists to dispense medications to patients by accurately tracking the medication quantity, dosage instructions, and patient details.	High	Pharmacists
FR02	Prescription Management	The system should enable medical professionals to electronically transmit prescriptions to the pharmacy, including medication details, dosage instructions, and patient information.	High	Medical Professionals
FR03	Inventory Management	The system should track medication inventory levels, including real-time updates for stock additions, removals, and expiration dates, ensuring accurate stock management.	High	Pharmacy Technicians
FR04	Patient Profile Management	The system should maintain comprehensive patient profiles, including personal information, medical history, allergies, and prescribed medications, enabling efficient patient care and medication management.	High	Pharmacists
FR05	Prescription Refill Requests	The system should provide a functionality for patients to submit prescription refill requests electronically, facilitating easy processing and reducing wait times at the pharmacy.	Medium	Patients
FR06	Drug Interaction Warnings	The system should automatically check for potential drug interactions by analyzing the prescribed medications against the patient's profile, alerting pharmacists and medical professionals to potential risks.	High	Pharmacists, Medical Professionals

FR07	Order Tracking and Delivery	The system should enable pharmacy staff to track medication orders, including order status, expected delivery dates, and confirmation upon receipt, ensuring efficient order fulfillment.	Medium	Pharmacy Technicians, Suppliers
FR08	Reporting and Analytics	The system should generate reports and provide analytics on medication usage, inventory levels, prescription trends, and financial data, aiding in decision-making and regulatory compliance.	Medium	Pharmacy Administrators, Regulatory Authorities
FR09	User Access Control	The system should implement role-based user access control, allowing different levels of permissions and ensuring that only authorized users can access sensitive information and perform specific actions.	High	Pharmacy Administrators
FR10	Billing and Insurance Claims	The system should support billing and insurance claim processing, including capturing insurance information, generating invoices, and facilitating electronic submission of claims for reimbursement.	Medium	Pharmacy Administrators, Insurance Providers
FR06	Frequently asked questions FAQ	The system should have the capability to allow the administrator to setup and manage frequently asked questions.	Exciting	Pharmacy Administrator

SEC-5 NONFUNCTIONAL REQUIREMENTS LIST:

ID#	Requirement Title	Description	Priority (QDF)	Originator
NFR01	Performance	The system should respond quickly to user interactions, ensuring fast retrieval of information and efficient execution of tasks to minimize waiting times.	High	All Users
NFR02	Security	The system should employ robust security measures, including encryption, user authentication, and access control, to protect patient information and ensure data confidentiality and integrity.	High	All Users
NFR03	Reliability	The system should be highly reliable, minimizing system downtime, data loss, and errors to provide uninterrupted access to critical pharmacy management functionalities.	High	All Users
NFR04	Usability	The system should have an intuitive and user-friendly interface, providing clear navigation, helpful prompts, and a consistent layout, facilitating ease of use for all user classes.	Medium	All Users
NFR05	Scalability	The system should be scalable to accommodate an increasing number of users, medication records, and transactions without	Medium	Pharmacy Administrators

		compromising performance, ensuring long-term system viability.		
NFR06	Compliance	The system should adhere to regulatory guidelines, industry standards, and legal requirements, ensuring compliance with pharmacy laws, privacy regulations, and data protection policies.	High	Regulatory Authorities
NFR07	Accessibility	The system should be accessible to users with disabilities, conforming to accessibility standards and providing features like screen readers and keyboard navigation for improved usability.	Medium	Users with Disabilities