

# Sri Lanka Institute of Information Technology



## Requirements Engineering Activity

### Practice Management System

#### For Innobot Heath

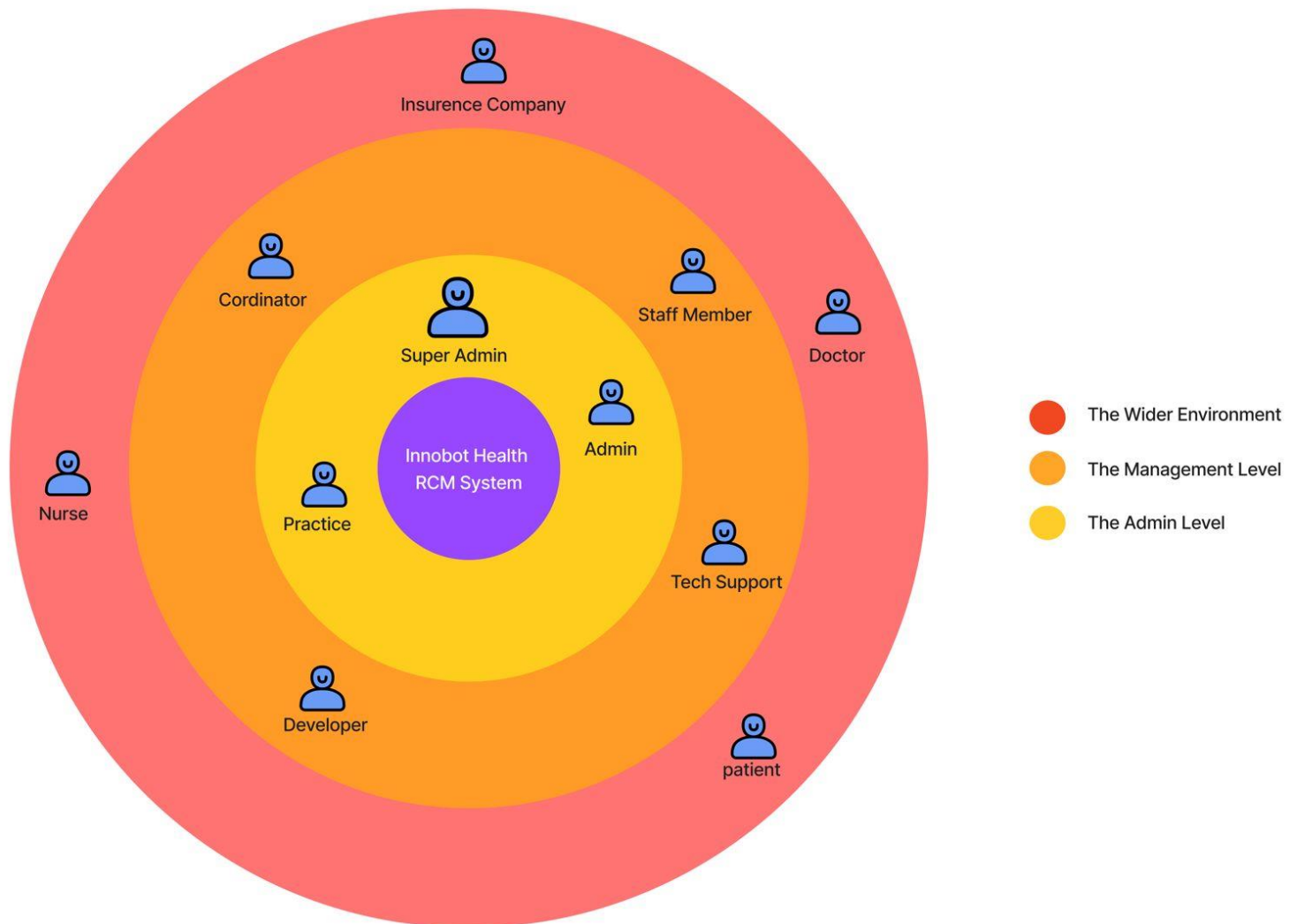
#### ITPTW32 ITP\_B2\_W10

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#### IT2080 – Information Technology Project

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## Onion Diagram



## Stakeholders

- ♦ Doctors/Nurse
- ♦ Coordinators
- ♦ Tech Support
- ♦ Insurance Company
- ♦ Staff Members

# **Inventory Management System**

## **User Stories**

### **An Inventory Manager's Story,**

- ♦ As an inventory manager (Practice's staff),  
I want to view the real-time quantity and status (available, low stock, out of stock, etc.) of medical supplies, equipment, and pharmaceuticals, so that I could be able proactively manage inventory levels and prevent stockouts.
- ♦ As an inventory manager (Practice's staff),  
I want to add, edit, and delete supplier information in the database, so that helps to maintain an accurate list of vendors.
- ♦ As an inventory manager (Practice's staff),  
I want to assign different access levels to staff members based on their roles and responsibilities, so that it helps to control data access and security.

## **Functional Requirements**

1. View real-time inventory levels and status of medical supplies, equipment, and pharmaceuticals. Receive low-stock notifications.
2. Manage supplier information by adding, editing, and deleting details, upload and oversee contracts, and track supplier performance through key metrics.
3. Perform inventory management functions by adding, editing, and deleting items, and implement search and filtering options for inventory data based on various criteria.
4. The system should integrate seamlessly with barcode scanning technology to enhance accuracy in data entry, streamline the tracking process, and facilitate efficient inventory management.
5. The system should support the management of inventory across multiple locations, allowing for accurate tracking of stock levels, movement, and replenishment in various warehouses or facilities.

## **Non – Functional Requirements**

1. Ensure a fast and responsive system with minimal loading times, achieving near real-time inventory updates and scans.
2. Implement robust authentication and authorization mechanisms while ensuring the encryption of sensitive data, including supplier contracts and inventory levels.
3. The system should be highly available with minimal downtime for maintenance or upgrades.
4. Provide a well-documented and easily maintainable system, equipped with efficient troubleshooting and debugging tools.

# **Notification Management System**

## **User Stories**

### **A Doctor's Story,**

- ♦ As a doctor,  
I want staff members to input my available days and times into the system,  
So that I can manage efficient scheduling of patient appointments and optimal use of my time.
- ♦ As a doctor,  
I want coordinators or staff members to input and update patient information in the system,  
So that I can ensure that patient records are accurate and up to date, supporting high-quality care delivery.
- ♦ As a doctor,  
I want to collaborate with billing and coding specialists (Tech Support, Developers) who use the RCM system to document patient encounters and select appropriate codes,  
So that I can ensure accurate billing practices and timely reimbursement for services provided.

### **A Nurse's Story,**

- ♦ As a nurse,  
I want to collaborate with administrative staff who have access to patient billing and insurance information within the RCM system,  
So that I can provide patients with accurate financial guidance and support during their healthcare journey.

### **An Insurance Company's Story,**

- ♦ As an insurance company,  
I want to collaborate with coordinators or staff members who utilize the RCM system to accurately document patient encounters and select appropriate billing codes,  
So that I can ensure fair and accurate reimbursement for covered services.

### **A Patient's Story,**

- ♦ As a Patient,  
I want coordinators or staff members to utilize the RCM system to accurately document my medical encounters and select appropriate billing codes,  
So that I can ensure transparency and accuracy in my medical billing and insurance claims.

### **A Coordinator's Story**

- ♦ As a Coordinator,  
I want to utilize the scheduling and appointment management features of the RCM system,  
So that I can optimize provider schedules and improve patient access to care.
- ♦ As a Coordinator in the USA Healthcare System,  
I want to utilize the reporting and analytics features of the RCM system,  
So that I can monitor key performance indicators and identify opportunities for process improvement.

### **A Staff Member's Story**

- ♦ As a Staff Member,  
I want to utilize the patient registration and demographic entry features of the RCM system,  
So that I can ensure accurate and up-to-date patient information for efficient care delivery.

### **A Tech Support Member's Story**

- ♦ As a Tech Support Personnel,  
I want to provide technical assistance and troubleshooting support for the RCM system,  
So that I can ensure uninterrupted operation and usability for healthcare providers and staff.

### **A Developer's Story**

- ♦ As a Developer,  
I want to enhance and optimize the functionality of the RCM system,  
So that I can improve efficiency, accuracy, and user experience for healthcare providers and staff.

### **A Medical Practice's Story**

- ♦ As a Medical Practice in the USA,  
I want to implement and utilize the RCM system to streamline billing processes and optimize revenue collection,  
So that I can ensure financial sustainability and focus on providing quality patient care.

### **An Admin's Story**

- ♦ As an Administrator,  
I want to oversee the configuration, maintenance, medical practice and user management of the RCM system,  
So that I can ensure smooth operation, data integrity, and compliance within the healthcare organization.

## **Functional Requirements**

1. Allow users to set their notification preferences based on their role and responsibilities within the healthcare organization.
2. Options should include email notifications, SMS alerts, in-system notifications.
3. Define triggers for various events within the RCM system, such as registration, appointment scheduling, claim submission, payment posting, or denial notifications.
4. Ensure that notifications are delivered in real-time or near real-time to users to keep them informed of important events and updates.
5. Maintain an audit trail of all notifications sent and received within the system.

## **Non – Functional Requirements**

1. The system should be highly reliable, with minimal downtime or service disruptions.
2. Notifications should be delivered consistently and reliably, without loss of data or delays.
3. The system should be scalable to accommodate a growing number of users, notifications, and system interactions.
4. It should be able to handle increased loads during peak usage periods without performance degradation.
5. The system should comply with industry-standard security protocols and regulations, such as HIPAA, to protect sensitive patient information.
6. The system should be resilient to various types of failures, including hardware failures, network outages, and software crashes.

# **Staff Management System**

## **User Stories**

### **A Practice Administrator's Story**

- ♦ As a practice admin,  
I would like to set up a new staff management policy for each registered user cluster.
- ♦ As a Practice Admin,  
I would like to see a record of each staff activity.
- ♦ As a Practice Admin,  
I want to manage employee data by adding, deleting, updating, and reading Staff information.

### **A Coordinator's Story**

- ♦ As a Coordinator,  
I want to allocate staff and coordinators in the initial setup.
- ♦ As a Coordinator,  
I want to grant specific access and privileges to selected users.

### **A Back-office Staff's Story**

- ♦ As a Back-office staff/Biller,  
I want to see user details of front office staff and communicate.

## **Functional Requirements**

1. Enrolling new practices with dedicated staff management systems.
2. Allocating coordinators and staff during the initial setup.
3. Granting specific access and privileges to staff members.
4. Staff ability to see/hide their staff base.
5. Sending messages to all logged users by selected users.
6. Viewing staff activity logs.
7. Viewing KPIs (Key performance Indicators)
8. Managing staff data (Creating Users, Deleting Users, Updating Users, Updating User privileges, Read Users)

## **Non – Functional Requirements**

1. Scalability for handling multiple sub systems within the practice and User clusters.
2. Data confidentiality and security.
3. Efficient messaging functionality for internal communication.
4. Activity log tracking for auditing purposes.

# **Appointment Scheduling System**

## **User Stories**

### **A Patient's Story,**

- ♦ As a patient,  
I want to easily navigate to the appointment making portal through Innobot, so that I can request a healthcare appointment conveniently.
- ♦ As a patient,  
I want the system to verify my eligibility based on insurance and other relevant criteria, ensuring that I am eligible for the requested appointment.
- ♦ As a patient,  
I want the system to display available appointment slots, allowing me to choose a suitable time for my healthcare appointment.
- ♦ As a patient,  
I want the system to display available appointment slots, allowing me to choose a suitable time for my healthcare appointment.
- ♦ As a patient,  
I want the system to notify my healthcare provider about the scheduled appointment.

### **A Healthcare Provider's Story,**

- ♦ As a healthcare provider,  
I want to be notified about scheduled appointments.
- ♦ As a healthcare provider,  
I want to be aware of any changes or cancellations made by patients.

## **Functional Requirements**

1. The system should be able to store and manage patient information, including personal details, contact information, and relevant medical history.
2. The system should allow patients to submit appointment requests.
3. The system must verify the eligibility of patients for appointments based on insurance information.
4. The system should check the availability of the requested healthcare provider and display available appointment slots to the patient.
5. If the requested time is unavailable, the system should suggest alternative appointment slots.
6. The system should support the cancellation of appointments by patients and update the records accordingly.
7. The system must send timely reminders to both patients and healthcare providers leading up to the scheduled appointment.



## **Non – Functional Requirements**

1. Performance-The system should display available appointment slots within a response time of seconds or less.
2. Scalability-The system must be scalable to accommodate a growing number of users and appointments without significant degradation in performance.
3. Availability: appointment scheduling system should be available 24/7 to accommodate patient requests and healthcare provider availability at any time.
4. Data Backup and Recovery-Regular data backups should be performed.
5. Compatibility-The system should be compatible with various devices and browsers to ensure accessibility for a wide range of users.

# **Insurance Management System**

## **User Stories**

### **An Insurance Administrator's Story,**

- ♦ As an Insurance Administrator,  
I want to log into the system and creates a new insurance record for a recently partnered provider.
- ♦ As an Insurance Administrator,  
I want to input the necessary details and fee schedules for relevant CPT codes, ensuring accurate billing information.
- ♦ As an Insurance Administrator,  
I need quick access to insurance portals for verification. Using the system, finds that all insurances are linked to their respective portals, providing seamless and convenient access for the medical billing team.

## **Functional Requirements**

1. System should allow users to create new insurance records.
2. Users should be able to delete or archive insurance records when necessary.
3. Users should be able to update and modify details of existing insurance records.
4. System should enable administrators to define and manage fee schedules for different CPT codes.
5. Users with the appropriate permissions should be able to update fee schedules to reflect changes in allowed amounts.
6. The system should generate insurance records reports and provide analytics features for users to identify trends and patterns.

## **Non – Functional Requirements**

1. System should implement robust security measures to protect sensitive information.
2. Access to sensitive functionalities and data should be restricted based on user roles and permissions.
3. The system should be designed to scale horizontally to accommodate an increasing number of insurance records and users.
4. system should be available and reliable, with minimal downtime for maintenance.
5. Backups and recovery mechanisms should be in place to prevent data loss in case of system failures.

# **Claim Management System**

## **User Stories**

### **An Admin's Story**

- ♦ As an admin,  
I want to generate detailed reports on claim status, processing times, and any bottlenecks in the system, allowing me to identify areas for improvement and optimize claim management efficiency.

### **A Doctor's Story**

- ♦ As a doctor,  
I want a user-friendly interface to submit detailed and accurate information about patient diagnoses, treatments, and procedures, ensuring smooth claim processing without errors.
- ♦ As a doctor,  
I want the ability to view a patient's insurance coverage details within the system, enabling me to make informed decisions about treatment options and communicate effectively with patients regarding their insurance benefits.

### **An Insurance Coordinator's Story**

- ♦ As an insurance coordinator,  
I want to efficiently manage the scheduling and coordination of patient appointments, ensuring that all relevant information is captured in the system for accurate claim submissions.
- ♦ As an insurance coordinator,  
I want access to a dashboard that provides a comprehensive overview of pending claims, approved claims, and any outstanding issues, helping me prioritize tasks and manage the workflow effectively.

### **A Patient's Story**

- ♦ As a patient,  
I want to easily provide and update my insurance information through a patient portal, ensuring accurate and up-to-date details for seamless claim processing.
- ♦ As a patient,  
I want to receive notifications or alerts when additional documentation is required for a claim, facilitating quick response, and minimizing delays in processing.

### **A Staff Member's Story**

- ♦ As a staff member,  
I want to be able to verify patient insurance eligibility in real-time, reducing claim rejections and improving the accuracy of billing information.

### **A Billing Specialist Story**

- ♦ As a billing specialist,  
I want the ability to easily generate itemized bills and invoices for patient visits, including detailed information on procedures and services rendered, to support accurate claim submissions.
- ♦ As a billing specialist,  
I want to track the status of submitted claims and receive alerts for claims that are pending approval, rejected, or require additional information, enabling timely follow-up and resolution.

### **A Developer's Story**

- ♦ As a developer,  
I want to implement robust and secure APIs for seamless integration with external systems, such as insurance providers and billing services, ensuring efficient data exchange and interoperability.

### **A Tech Support Member's Story**

- ♦ As a tech support member,  
I want to provide timely and effective support to users experiencing technical issues with the Claim Management System, ensuring minimal disruption to their workflow.

## **Functional Requirements**

1. Implement role-based access control to ensure that the users only have access to functionalities and data relevant to their roles.
2. Ability to track status of submitted claims, including approvals, rejections, or pending requests for additional information.
3. Functionality to integrate with external systems, such as insurance databases and billing services, to facilitate seamless data exchange and interoperability.
4. Establish customizable workflows for claim approval, allowing organizations to define approval processes based on their specific policies and procedures.
5. Ability to generate comprehensive reports to claim status, processing times and financial performance.

## **Non – Functional Requirements**

1. The system should guarantee a response time of less than three seconds. It should also be scalable, allowing for at least 1000 concurrent users without experiencing appreciable performance loss.
2. Sensitive data, such as patient and claim information, must be transmitted, and stored using industry-standard encryption.
3. Strict access restrictions should be enforced by the system, granting only authorized workers access to sensitive data.
4. For improved user experience and fewer training requirements, the user interface must remain consistent throughout system modules.
5. The system should have fault-tolerant measures to reduce downtime and guarantee quick recovery in the case of a system failure without data loss.

## **Procedure and Diagnosis System**

### **User Stories**

#### **For Procedures:**

As a privileged user, I want to be able to:

- ◆ Add, update, and delete procedure codes from the system.
- ◆ Associate each procedure code with a clear and detailed description.
- ◆ Search and filter procedures by code, description, or keyword.
- ◆ View a list of all existing procedures with their respective details.

As office staff /biller, I want to be able to:

- ◆ Select a procedure code from the system when documenting a patient's treatment plan.
- ◆ Access a concise and user-friendly summary of the selected procedure's description, risks, and expected outcomes.

#### **For Diagnoses:**

As a privileged user, I want to be able to:

- ◆ Add, update, and delete diagnosis codes from the system.
- ◆ Associate each diagnosis code with a clear and detailed description.
- ◆ Search and filter diagnoses by code, description, or keyword.
- ◆ View a list of all existing diagnoses with their respective details.

As office staff /biller, I want to be able to:

- ◆ Select a diagnosis code from the system when documenting a patient's medical history.
- ◆ View a concise and user-friendly summary of the selected diagnosis's description, potential causes, and associated treatments.

## **Functional Requirements**

### Procedure Codes:

1. Add new procedure codes with descriptions, including mandatory fields like code, name, and description.
2. Update existing procedure codes with new descriptions or other relevant information.
3. Delete procedure codes.
4. Search for procedure codes by code, name, keyword, or description.
5. Display a list of all existing procedure codes with their details.
6. Associate procedure codes with diagnosis codes when applicable.

### Diagnosis Codes:

1. Add new diagnosis codes with descriptions, including mandatory fields like code, name, and description.
2. Update existing diagnosis codes with new descriptions or other relevant information.
3. Delete diagnosis codes.
4. Search for diagnosis codes by code, name, keyword, or description.
5. Display a list of all existing diagnosis codes with their details.
6. Associate diagnosis codes with procedure codes when applicable.

## **Non – Functional Requirements**

1. Respond to user actions within 2 seconds on average.
2. Handle concurrent access from a specified number of users without significant performance degradation.
3. Authenticate and authorize all user access based on assigned roles and permissions.
4. Encrypt patient data and sensitive information at rest and in transit.
5. Provide an intuitive and easy-to-navigate user interface for users with varying technical expertise.
6. Maintain 99.5% availability during business hours.
7. Perform regular data backups and store them securely off-site.

# **Patient Management System**

## **User Stories**

### **A Staff Member's Story,**

- ♦ As a Staff Member,  
I want to add a new patient to the system, so that they can be easily identified, and their information is readily available.
- ♦ As a Staff Member,  
I want to update an existing patient's information, so that it is accurate and reflects any changes.
- ♦ As a Staff Member,  
I want to search for and access patient information quickly and easily, so that I could be able to manage the record so easily.
- ♦ As a staff member,  
I want to delete a patient's information from the system, when necessary, so that I can be able to manage the patient records accurately (Duplicated record, patient request, inactivate for a specific period).

## **Functional Requirements**

1. Register new patients by entering patient details.
2. Verify insurance details.
3. Search and access patient information.
4. View, update patient records as needed.
5. Manage patient records (Delete duplicated records).
6. Store and manage patient records (Details).

## **Non – Functional Requirements**

1. System should be fast and responsive.
2. The system should be Reliable & accurate.
3. Implement strong access control to secure patient's details.
4. Ability to Encrypt sensitive data.
5. The system should be able to easy to maintain and update.
6. The system should be able to easy to maintain and update.



## **Technical Requirements**

- ❖ The system should be built using a client-server architecture.
- ❖ The system should be compatible with different web browsers and devices.
- ❖ The system should be hosted on a secure and reliable web server.
- ❖ The programming languages – Java, JavaScript
- ❖ Frameworks – React, Spring Boot
- ❖ Third-Party analytical tools – Google Analytics – Firebase, SMSHub.LK SMS gateway
- ❖ Containerizing technologies – Docker
- ❖ Load balancer/Reverse-proxy – Nginx
- ❖ Databases- MongoDB
- ❖ Other practices and methodologies – GitHub CI/CD

# Practice Management System











