Course Code: CSE 404

Course Title: Software Engineering & Information System design

Group No: 08

Experiment No: 02

Experiment Title: Requirement Specification Analysis Hospital Management System.

Submitted By:

Atia Rahman Orthi | ID 346

Group Members:

Name	Class Roll	Exam Roll
Sadia Afrin	339	191321
Atia Rahman Orthi	346	191328
Md. Nasim Hossain	391	191374
Md. Abdul Mukit	2407	170491

Course Teachers:

Dr. Mohammad Zahidur Rahman Professor Department of CSE Jahangirnagar University	**Dr. Md. Humayun Kabir** Professor Department of CSE Jahangirnagar University

Experiment No: 02

Experiment Name: Requirement Specification Analysis of Hospital Management System.

Introduction:

This report presents an analysis of the requirement specifications for a Hospital Management System (HMS). The HMS is a software application designed to streamline hospital operations and improve patient care. The analysis focuses on identifying functional and non-functional requirements, understanding user needs and stakeholder expectations, and considering industry best practices and regulations. The goal is to provide a clear understanding of the system's requirements and guide the development of an efficient and compliant HMS.

Objective:

Main Objectives of this lab are mentioned in the following-

1. Analyze requirement specifications for a Hospital Management System (HMS).

2. Identify and document functional requirements.

3. Define non-functional requirements (performance, scalability, security, usability, etc.).

4. Analyze user needs and stakeholder expectations.

5. Explore industry best practices and regulations (e.g., HIPAA).

6. Provide a clear and concise requirement specification document.

Terminologies & Technologies:

Terminologies:

1. Hospital Management System (HMS): A software application designed to streamline and automate various administrative and operational processes within a

hospital, including patient registration, appointment scheduling, medical record management, billing, inventory management, and reporting.

2. Functional Requirements: Specific tasks, features, and functionalities that the Hospital Management System should be able to perform. This includes actions like patient registration, appointment booking, generating medical reports, managing inventory, and facilitating communication between hospital staff.

3. Non-functional Requirements: Qualities and characteristics of the Hospital Management System that are not directly related to specific functionalities but are essential for its overall performance. Non-functional requirements encompass aspects such as performance, scalability, security, usability, reliability, and compliance with industry standards and regulations.

4. User Needs: The requirements and expectations of the individuals who will be using the Hospital Management System. This includes hospital staff members (doctors, nurses, administrators, etc.) and potentially patients who may interact with the system in certain capacities.

5. Stakeholder Expectations: The desires, goals, and requirements of all individuals and entities with a vested interest in the Hospital Management System. Stakeholders may include hospital administrators, department heads, regulatory authorities, patients, insurance providers, and other relevant parties.

6. Best Practices: Established guidelines, methodologies, and approaches that are considered to be effective and efficient in developing and implementing Hospital Management Systems. These best practices are often derived from industry standards, regulations, and experiences of successful implementations.

7. Regulations and Compliance: The legal and industry-specific requirements that the Hospital Management System must adhere to. This may include regulations such as HIPAA (Health Insurance Portability and Accountability Act) in the United States, which mandates the protection and privacy of patient health information.

8. Requirement Specification Document: A comprehensive document that outlines the functional and non-functional requirements of the Hospital Management System. It includes a detailed description of each requirement, its priority, dependencies, and any relevant acceptance criteria. The requirement specification document serves as a blueprint for the development team and ensures a common understanding among stakeholders regarding the system's requirements.

9. Scalability: The ability of the Hospital Management System to handle an increasing volume of data, users, and transactions without a significant degradation in performance. Scalability ensures that the system can accommodate future growth and expansion of the hospital without requiring major architectural changes.

10. Interoperability: The capability of the Hospital Management System to seamlessly exchange information and communicate with other healthcare systems, such as electronic health record (EHR) systems, laboratory information systems (LIS), or pharmacy systems. Interoperability allows for efficient data sharing and integration across different healthcare platforms.

11. Usability: The ease of use and user-friendliness of the Hospital Management System. A system with good usability requires minimal training, provides clear and intuitive interfaces, and ensures efficient navigation and task completion for users.

Technologies:

1. Database Management System (DBMS): The software technology used to store, organize, and manage the hospital's data. Common DBMS options for Hospital Management Systems include MySQL, Oracle, Microsoft SQL Server, or PostgreSQL.

2. Programming Languages: The programming languages used for developing the Hospital Management System. This can include languages like Java, C#, Python, or PHP.

3. Web Development Frameworks: Frameworks that facilitate the development of web-based components of the Hospital Management System. Examples include Django, Ruby on Rails, ASP.NET, or Laravel.

4. User Interface (UI) Design Tools: Software tools and frameworks used for designing and prototyping the user interfaces of the Hospital Management System. Examples include Adobe XD, Sketch, Figma, or InVision.

5. Networking and Communication Protocols: The protocols and technologies used for network communication and data exchange within the Hospital Management System. This can include TCP/IP

Requirement Specifications Analysis of HMS:

Title: Hospital Management System (HMS) - Requirement Specification

1. Introduction

The Hospital Management System (HMS) is a comprehensive software application designed to automate and streamline the day-to-day operations of a hospital or healthcare facility. It aims to improve efficiency, enhance patient care, and optimize resource utilization within the organization. The following requirement specification outlines the functional and non-functional requirements of the HMS.

2. Functional Requirements

2.1. Patient Management

2.1.1. Registration

- Capture and store patient demographic information (name, age, gender, contact details, etc.).

- Generate a unique patient ID for identification and tracking purposes.

- Record patient medical history and previous treatments.

2.1.2. Appointment Scheduling

- Allow patients to book appointments with doctors or departments.

- Check doctor availability and allocate time slots.

- Send appointment reminders to patients.

2.1.3. Inpatient Admission

- Register and admit patients to the hospital.

- Assign and manage bed allocation.

2.1.4. Outpatient Management

- Track and manage outpatient visits, including consultation and prescription details.

2.1.5. Electronic Health Records (EHR)

- Maintain and manage patient medical records, including diagnoses, lab results, and treatment plans.

- Support secure sharing of EHR among authorized healthcare providers.

2.2. Clinical Management

2.2.1. Doctor's Dashboard

- Provide doctors with a comprehensive overview of their appointments, patient details, and medical history.

- Enable doctors to record diagnoses, treatment plans, and prescribe medications.

2.2.2. Pharmacy Management

- Manage pharmacy inventory, including stock levels and expiration dates.

- Generate electronic prescriptions and track medication dispensing.

2.2.3. Laboratory Management

- Manage lab tests and track results.

- Integrate with diagnostic devices and enable the automatic capture of test results.

2.2.4. Radiology and Imaging

- Schedule and manage radiology appointments.

- Store and retrieve medical images and reports.

2.3. Administrative Management

2.3.1. Staff Management

- Maintain a database of healthcare providers and staff.

- Manage their roles, responsibilities, and schedules.

2.3.2. Inventory Management

- Track and manage hospital inventory, including medical supplies, equipment, and consumables.

- Automate reordering and alert for low stock levels.

2.3.3. Billing and Insurance

- Generate and manage patient bills for services rendered.

- Handle insurance claims and billing.

2.3.4. Finance Management

- Manage financial transactions, including revenue, expenses, and payroll.

2.3.5. Reporting and Analytics

- Generate various reports, such as patient statistics, financial summaries, and resource utilization.

- Provide analytics for informed decision-making.

3. Non-Functional Requirements

3.1. Security and Privacy

- Implement robust security measures to protect patient data from unauthorized access.
- Ensure compliance with relevant data protection regulations (e.g., HIPAA, GDPR).
- Enable role-based access control to restrict data access based on user roles.

3.2. Scalability and Performance

- Handle a large volume of concurrent users and transactions.
- Ensure minimal response time for critical functions.

3.3. Reliability and Availability

- Provide a reliable system that operates 24/7 with minimal downtime.
- Implement data backup and disaster recovery mechanisms.

3.4. Usability and User Experience

- Design

an intuitive and user-friendly interface for ease of use.

- Provide appropriate training and documentation for system users.

3.5. Interoperability

- Support integration with external systems (e.g., laboratory information systems, electronic medical records).

4. Constraints

- The HMS should comply with relevant healthcare regulations and standards.

- The system should be compatible with the existing IT infrastructure of the hospital.

5. Assumptions

- Sufficient hardware and network infrastructure will be in place to support the HMS.

- The hospital will provide the necessary resources for system implementation and maintenance.

6. Dependencies

- Integration with third-party systems and devices may be required for certain functionalities (e.g., lab equipment, billing systems).

Note: This requirement specification serves as a general guideline and can be customized based on specific organizational needs and priorities.

Certainly! Here are six additional points to add to the requirement specification of the Hospital Management System (HMS):

7. Mobile Accessibility

- Develop a mobile application or ensure the HMS is accessible through mobile devices to facilitate remote access and mobility for healthcare providers and staff.

- Allow patients to access certain features, such as appointment scheduling, prescription refills, and viewing test results, through a dedicated patient mobile app.

8. Telemedicine Integration

- Integrate telemedicine capabilities into the HMS to enable remote consultations between doctors and patients.

- Provide video conferencing functionality with secure and encrypted communication channels.

- Enable document sharing, real-time chat, and remote monitoring of vital signs where applicable.

9. Research and Clinical Trials Support

- Incorporate features to support research activities and clinical trials conducted within the hospital.

- Track and manage patient recruitment and consent for participation in clinical trials.

- Capture and analyze research data, including patient outcomes and treatment effectiveness.

10. Patient Portal

- Implement a secure patient portal that allows patients to access their medical records, test results, and upcoming appointments.

- Enable patients to update their personal information, view their billing statements, and communicate with healthcare providers securely.

11. Electronic Prescriptions and Medication Management

- Integrate with pharmacies and enable electronic prescribing of medications, including automated checks for drug interactions and allergies.

- Provide medication reconciliation functionality to ensure accurate medication history and avoid potential medication errors.

- Support electronic medication administration records (eMAR) for inpatient medication management.

12. Emergency Management

- Include features to support emergency management and disaster response within the hospital.

- Facilitate rapid patient triage and identification during emergencies.

- Enable real-time communication and coordination between different departments and emergency response teams.

13. Language and Localization Support

- Provide multilingual support to accommodate diverse patient populations and healthcare providers.

- Implement localization features to adapt the system to different regions or countries, including date formats, currency, and regulatory requirements.

Discussion:

The requirement specification analysis for the Hospital Management System (HMS) has provided valuable insights into the functional and non-functional requirements, user needs, stakeholder expectations, industry best practices, and compliance considerations. This discussion section highlights the key findings and implications of the analysis.

The analysis revealed a range of functional requirements that the HMS should address to effectively support hospital operations. These requirements include patient registration, appointment scheduling, medical record management, billing, inventory management, and reporting. By identifying these requirements, the analysis provides a clear roadmap for the development team to prioritize and implement the necessary features and functionalities.

In addition to the functional requirements, the analysis emphasized the importance of non-functional requirements in ensuring the system's performance, scalability, security, usability, and reliability. The identified non-functional requirements serve as benchmarks for the development team to design and implement a robust and efficient system. Compliance with industry regulations, such as HIPAA, is also crucial to safeguard patient data and maintain legal and ethical standards.

Understanding user needs and stakeholder expectations is critical for the success of the HMS. The analysis engaged hospital staff, administrators, doctors, nurses, and other stakeholders to gather their requirements and preferences. By considering their perspectives, the analysis ensures that the final system design meets their expectations, enhances their productivity, and improves overall patient care.

The exploration of industry best practices and regulations provided valuable guidance for developing a high-quality HMS. Adhering to established best practices ensures that the system is built using proven methodologies, resulting in a reliable and maintainable solution. Compliance

with regulations such as HIPAA helps to protect patient privacy and maintain the trust of stakeholders.

The requirement specification document generated through the analysis serves as a crucial deliverable. It provides a comprehensive and structured description of the identified requirements, including their priorities, dependencies, and acceptance criteria. This document serves as a communication tool among stakeholders, guiding the development team in building the HMS according to the agreed-upon specifications.

The analysis also shed light on important technological considerations for the HMS. The choice of a suitable database management system, programming languages, web development frameworks, user interface design tools, and networking protocols is essential to ensure a robust and efficient system architecture.

It is important to note that the requirement specification analysis is a dynamic process and may require updates and refinements as the project progresses. Regular communication and collaboration among stakeholders, project managers, and the development team are crucial to ensure that any evolving requirements or changes are effectively incorporated into the system.

Overall, the requirement specification analysis for the Hospital Management System has provided a solid foundation for the development and implementation of the system. The analysis has identified and documented the functional and non-functional requirements, considered user needs and stakeholder expectations, explored industry best practices and regulations, and provided a clear requirement specification document. By following these insights and recommendations, the HMS can be developed to enhance the management and operational capabilities of the hospital, leading to improved patient care and operational efficiency.

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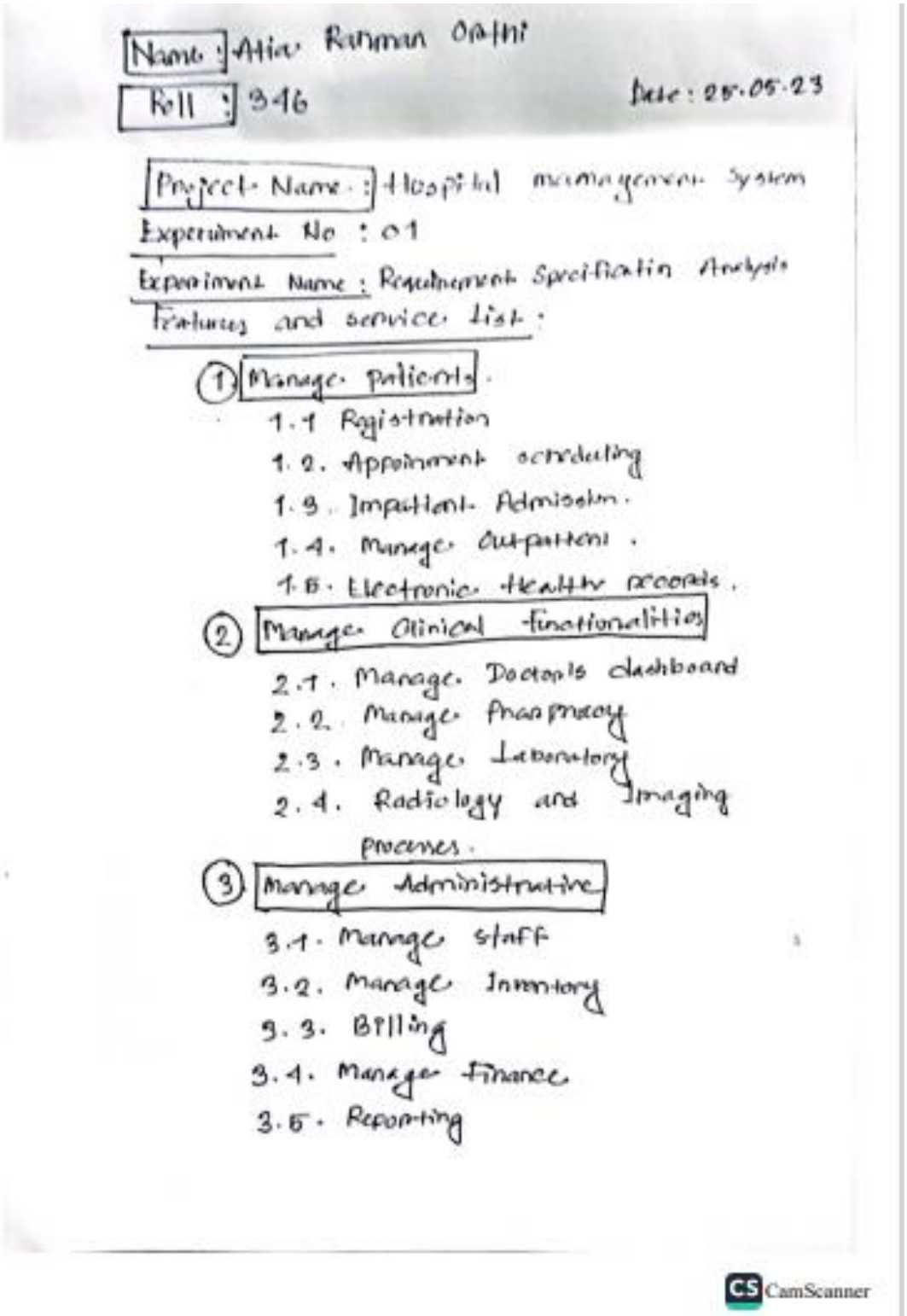

Name : Atia Rahman Orthi

Roll : 346 Date : 25.05.23

Project Name : Hospital management System

Experiment No : 01

Experiment Name : Requirement Specification Analysis Features and service list :

1. Manage patients.
   - 1.1 Registration
   - 1.2. Appointment scheduling
   - 1.3. Inpatient Admission.
   - 1.4. Manage outpatient.
   - 1.5. Electronic Health records.
2. Manage clinical functionalities
   - 2.1. Manage Doctors dashboard
   - 2.2. Manage Pharmacy
   - 2.3. Manage Laboratory
   - 2.4. Radiology and Imaging processes.
3. Manage Administrative
   - 3.1. Manage staff
   - 3.2. Manage Inventory
   - 3.3. Billing
   - 3.4. Manage finance
   - 3.5. Reporting

CamScanner

Name : Alia Rahman Oishi
Roll : 346 page no : 01

Project Name : Hospital management system

Experiment no : 02

Experiment Name : Requirements specification Analysis.

(1) Introduction

The hospital management system (HMS) is a comprehensive software application designed to automate and streamline the day-to-day operations of a hospital or healthcare facility. It aims to improve efficiency, enhance patient care, and optimize resource utilization within the organization. The following requirement specification outlines the functional and Non-functional requirements of the HMS.

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- Provide doctors with a comprehensive overview of their appointments, patient details and medical history
- Enable doctors to record diagnoses.

2.2.2 Pharmacy Management

- manage pharmacy inventory
- Generate electronic prescription.

2.2.3. Laboratory Management

- Manage lab tests and track results.
- Integrate with diagnostic devices and enable the automatic capture.

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2.3.1. Staff management

- Maintain a database of healthcare providers and staff.
- Manage their roles, responsibilities.

2.3.2. Inventory Management -

- Automate reordering and alert for low stock levels.

2.3.3. Billing and Insurance

- Generate and manage patients Bills for services rendered -

page no : 06

2.3.5. Reporting and Analytics

- Generate various reports such as patient statistics, financial summaries and resource utilization.
- Provide analytics for informed decision making.

Name : Alia Rahman orthi

Roll : 346

Date : 01.06

Project group NO : 08

Project title : Hospital management S

Experiment NO : 02.

Experiment title : Requirement specificatio
Analysis.

Subsystems under the hospital mana
system are mentioned in the follow

1. Appoinment system
2. Pharmacy management system.
3. Reception Management system
4. Staff management system
5. Laboratory management system
6. Patient management subsyste

Name : Alia Rahman Orthi

Roll : 3416

Project Group No : 08

Project title : Hospital Management System

Experiment No : 02

Experiment Title : Requirements Specification Analysis and Reports.

Doctor's Appointment system

Actors

1. Patient
2. Receiptionist
3. Doctor

Scenario

In order to visit a doctor, patient requires to make an appointment first. For this purpose, patient or anyone on behalf of patient should make an appointment through a Receiptionists.

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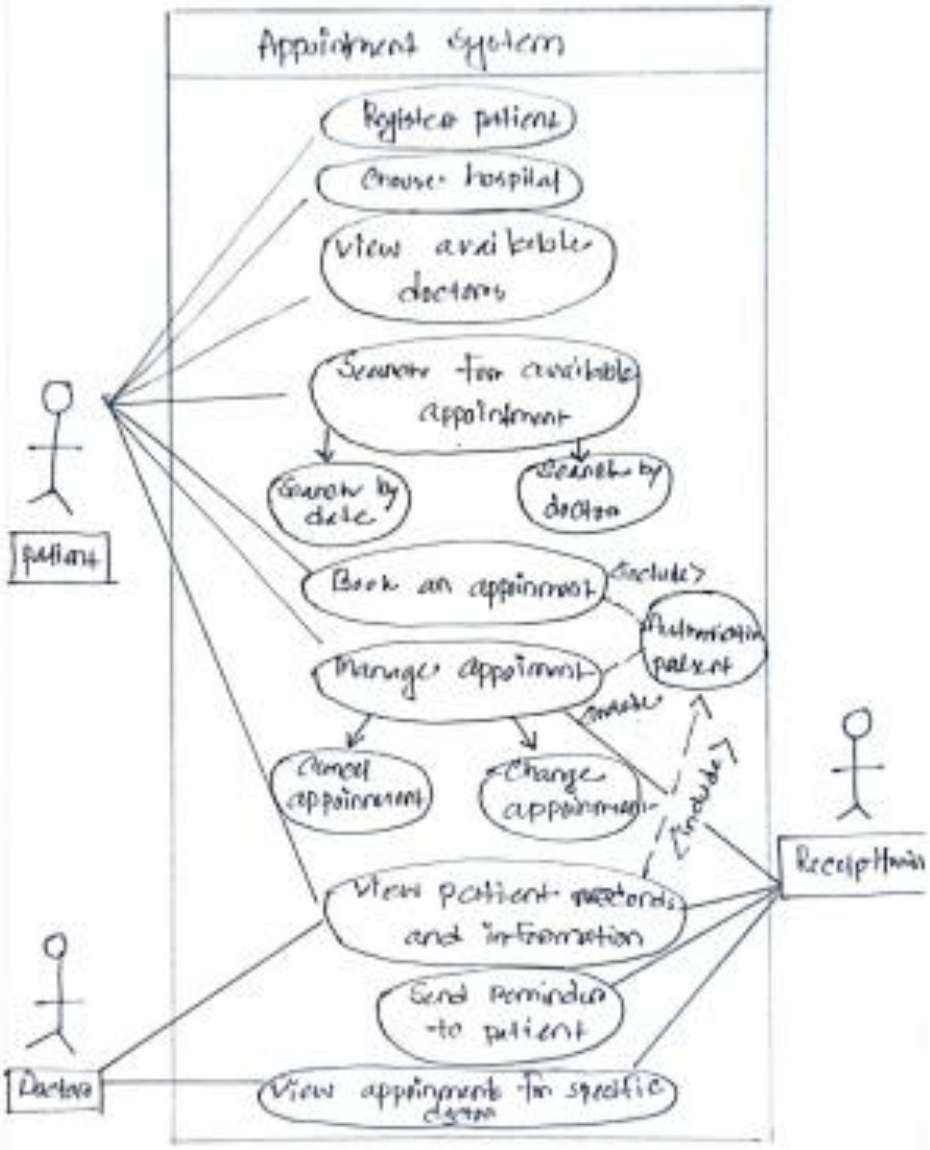

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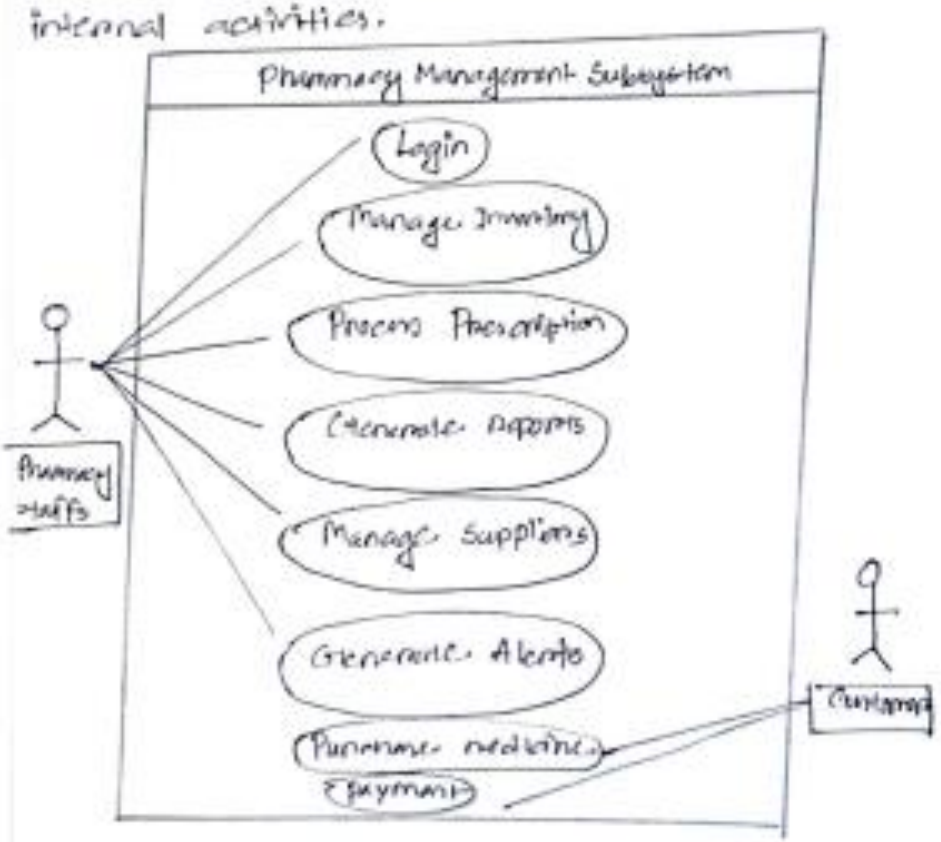
Hospital pharmacy management subsystem

[Actors:] 1. Pharmacy staff
2. User (customer, Patients)

[Scenario:] Whenever a user wants to purchase medicine, one the pharmacy subsystem. The pharmacy staffs mostly manages internal activities.



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Patient Management Subsystem

Actors: 1. Patient
2. Staffs