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PHARMACY24:Pharmacy Management System
Section: D

<u>**Submitted by**</u>

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1.0 Introduction

The Pharmacy Management System has been extensively developed to optimize and automate several aspects of pharmacy operations. This all-inclusive solution focuses on critical areas such as inventory management, prescription tracking, and sales processes. The major goal is to improve operational efficiency, reduce errors, and provide a user-friendly interface that meets the demands of both staff and customers. This solution claims to transform traditional pharmaceutical procedures by ensuring precision and improving the overall consumer experience through the use of cutting-edge automation.

The Pharmacy Management System project documentation serves as a foundational resource, providing a comprehensive introduction to the initiative. Its primary purpose is to offer a detailed overview of the project, encompassing its purpose, scope, and core objectives. This document acts as a guiding compass for stakeholders involved in the project lifecycle, ensuring a shared understanding, and facilitating effective communication. It serves as a reference guide for project managers, developers, end-users, and decision-makers, acting as a roadmap that outlines key milestones and deliverables throughout the project's development, implementation, and maintenance phases. Designed for a diverse audience, including project stakeholders, end-users, and decision-makers, this document aims to address specific needs and interests. It provides insights into how the Pharmacy Management System impacts daily operations for pharmacists, customers, and system administrators. The overarching objectives are to define the project's goals, justify its necessity, and articulate specific features contributing to pharmacy operations' optimization. By clearly stating these objectives, the document aligns stakeholders toward a common vision and fosters a shared commitment to the project's success, serving as a reference point for evaluating progress against original goals and objectives. As a living document, it establishes a foundation for ongoing maintenance by providing guidelines for updates, troubleshooting, and future enhancements. This ensures the longevity and adaptability of the Pharmacy Management System, aligning it with evolving technological and operational needs in the pharmacy domain.

2.0 Project Title

PHARMACY24:Pharmacy Management System.

3.0 Objectives

The primary aim of the Pharmacy Management System is to transform and improve the efficiency of pharmacy operations by introducing a comprehensive, automated solution. The system is designed to seamlessly integrate and optimize critical components of inventory management, prescription tracking, and sales processes, with the ultimate goal of enhancing operational efficiency, reducing errors, and delivering an exceptional and user-friendly experience for both pharmacy staff and customers.

Specific Objectives:

1. **Optimize Inventory Management:**

   - Deploy a real-time tracking system for precise and current information on pharmaceutical inventory.
   - Minimize instances of understock and overstock by adjusting stock levels based on demand and usage patterns.
   - Streamline tracking and restocking processes to improve overall efficiency in managing pharmacy inventory.

2. **Facilitate Prescription Tracking:**

   - Establish a secure and centralized database for prescription orders to ensure accuracy and accessibility.
   - Implement a systematic approach to monitor prescription fulfillment, minimizing errors, and enhancing patient care.
   - Enable rapid access to patient history, aiding healthcare providers in delivering more informed and personalized care.

3. **Enhance Customer Service:**

    - Develop a user-friendly interface for both staff and customers to foster a positive and efficient environment.
    - Streamline processes to reduce wait times, ensuring a seamless and enjoyable experience for customers.

4. **Real-time Inventory Updates:**

    - Introduce a system that maintains real-time updates on inventory information for prompt decision-making.
    - Mitigate the risk of stockouts or overstock situations through continuous monitoring and updates.

5. **Prescription History Access:**

    - Enable easy and secure access to a comprehensive history of prescriptions for pharmacists and healthcare providers.
    - Improve patient care by providing valuable references for understanding medication history and potential interactions.

6. **Secure Payment Processing:**

    - Implement strong security measures to ensure secure and confidential payment transactions.
    - Provide a reliable platform for financial transactions within the pharmacy, instilling confidence in both staff and customers.

4.0 Justification

The implementation of the Pharmacy Management System is motivated by the necessity to address challenges inherent in manual pharmacy operations, aiming to usher in a new era marked by efficiency, precision, and heightened customer satisfaction. Focused on optimizing key processes like inventory management, prescription tracking, and sales operations, the system utilizes

advanced automation to overcome the limitations of conventional methods. This ensures precision in tasks and enhances the overall consumer experience, emphasizing the seamless integration of technology to revolutionize the pharmacy landscape.

The advantages and recipients of the Pharmacy Management System are diverse and significant. From heightened operational efficiency for pharmacists and staff to improved patient care through rapid access to prescription histories, the system generates positive impacts throughout the pharmacy ecosystem. Customers enjoy benefits such as optimized inventory management, a user-friendly interface, and precise services, fostering an environment of heightened satisfaction. Moreover, the system contributes to data accuracy and compliance, benefiting pharmacists, regulatory authorities, and insurance providers, while also streamlining communication with medicine suppliers for efficient supply chain management. Overall, the Pharmacy Management System acts as a catalyst for positive transformation, bringing about improvements at every stage of the pharmacy workflow.

5.0 Systems Overview

The Pharmacy Management System is a comprehensive solution designed to modernize and streamline traditional pharmacy operations. Its key components, functionalities, and technologies work in harmony to enhance efficiency and accuracy. The inventory management module employs real-time tracking mechanisms, ensuring precise and up-to-date information on pharmaceutical stock. This optimization of stock levels, coupled with streamlined tracking and restocking processes, contributes to heightened operational efficiency, preventing shortages and ultimately improving the overall workflow.

Another crucial aspect is prescription tracking, facilitated by a secure and centralized database. This feature enables a systematic approach to monitor prescription fulfillment, ensuring accuracy and providing quick access to patient history. The system's automation of sales and billing processes not only accelerates transactions but also generates detailed billing records, improving the overall sales and billing procedures. Real-time inventory updates and secure payment processing further underscore the system's commitment to informed decision-making, efficient

inventory management, and maintaining the confidentiality and integrity of financial transactions within the pharmacy. Together, these components make the Pharmacy Management System a transformative solution for pharmacies, bringing about a seamless and modernized approach to daily operations.
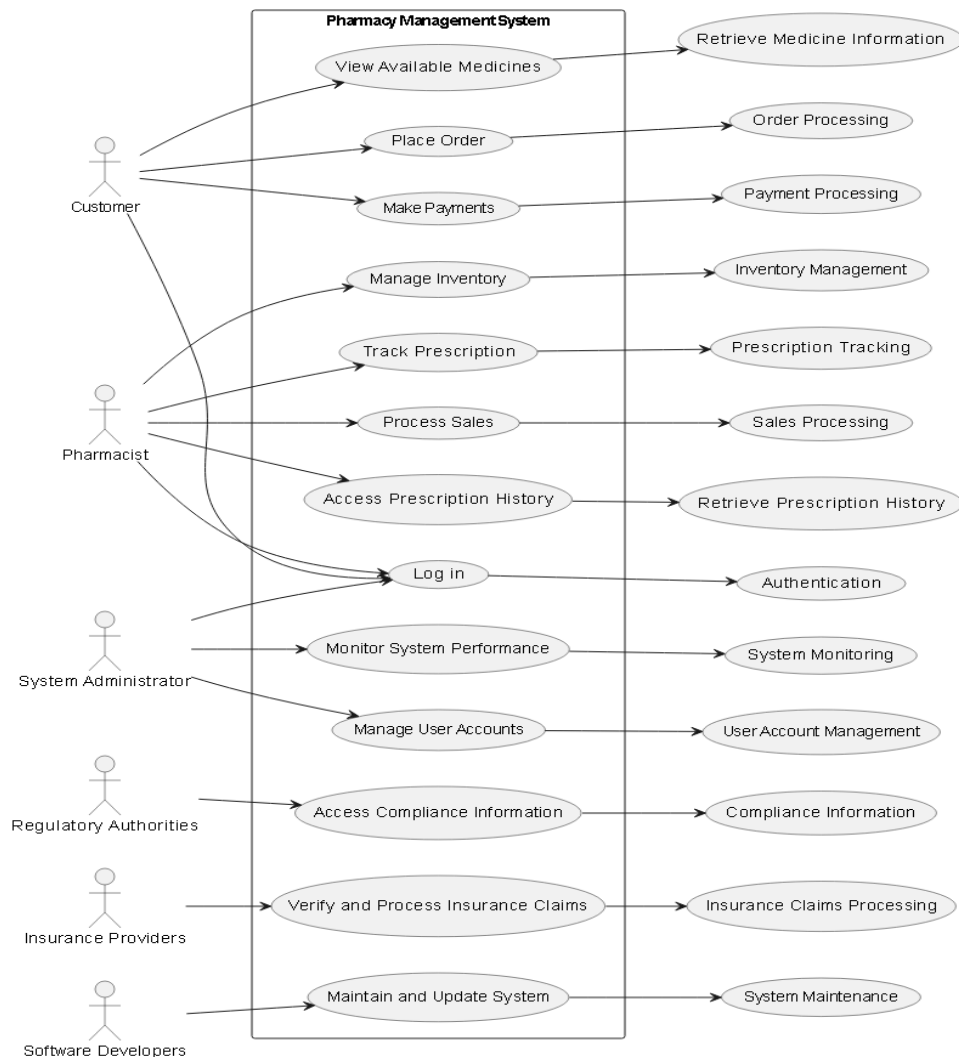

Fig: Use Case Diagram of Pharmacy Management System.

6.0 Stakeholders Analysis

Stakeholders in the Pharmacy Management System project play crucial roles in its development, implementation, and ongoing success. Identifying and understanding their interests, needs, and

contributions is essential for effective project management. The primary and secondary stakeholders are as follows:

Primary Stakeholders:

1. **Pharmacists:**

   - *Role:* Utilize the system for day-to-day pharmacy operations, including inventory management and prescription fulfillment.

   - *Interest:* Efficient workflows and accurate prescription processing to enhance productivity.

2. **Customers:**

   - *Role:* Interact with the system for prescription services, medication information, and transactions.

   - *Interest:* Seamless and accurate services, user-friendly interface for a positive customer experience.

3. **System Administrators:**

   - *Role:* Oversee the proper functioning of the Pharmacy Management System, ensure data security, and provide technical support.

   - *Interest:* System reliability, data security, and effective technical support.

4. **Medicine Suppliers:**

   - *Role:* Provide pharmaceutical products to the pharmacy, utilize the system for order processing and inventory management.

   - *Interest:* Streamlined communication and transaction processes, efficient order processing.

Secondary Stakeholders:

1. **Regulatory Authorities:**

   - *Role:* Monitor and ensure compliance with pharmacy regulations, utilize system data for reporting and oversight.

   - *Interest:* Regulatory compliance, integrity, and legality of pharmacy operations.

2. **Insurance Providers:**

- *Role:* Access accurate billing and transaction records for insurance claims processing.

- *Interest:* Transparency, accuracy, and efficiency in financial transactions related to insurance claims.

3. **Software Developers:**

- *Role:* Contribute to system development, updates, and maintenance.

- *Interest:* Address technical issues, improve system functionality, and enhance the overall technological infrastructure.

Stakeholder Analysis:

- **Pharmacists:** Critical for daily operations, their feedback ensures the system aligns with practical pharmacy needs.

- **Customers:** Their experience directly impacts the system's success; a positive experience leads to increased customer satisfaction.

- **System Administrators:** Key for maintaining system functionality, reliability, and providing necessary support to end-users.

- **Regulatory Authorities:** Ensure the system complies with regulations, contributing to the legal integrity of pharmacy operations.

- **Insurance Providers:** Rely on accurate billing records for claims processing, making transparent and efficient financial transactions essential.

- **Software Developers:** Instrumental in system development and maintenance, addressing technical issues and improving functionality.

- **Medicine Suppliers:** Essential for the supply chain, their satisfaction ensures the timely and accurate processing of medicine orders.

7.0 Feasibility Study

The technical feasibility of the Pharmacy Management System is rigorously examined through a multifaceted evaluation process. This includes an assessment of system requirements, ensuring the availability of requisite technology and compatibility with existing systems. The complexity of software development, incorporating real-time inventory tracking and secure database

management, is scrutinized for feasibility, contingent upon the presence of skilled developers and proven technologies. Robust data security measures, encompassing encryption and access controls, are implemented to protect sensitive information. Integration feasibility with external entities is considered to facilitate seamless collaboration. On the financial front, cost estimation covers software development, hardware procurement, and ongoing maintenance, aligning projected costs with the budget. The return on investment is evaluated against benefits like enhanced operational efficiency and customer satisfaction. Resource availability, both human and financial, is confirmed, and ongoing operational and maintenance costs are assessed for sustainability within the budgetary constraints.

Project Cash Flow Projection - figures are end of year totals (BDT)	
Year	Project cash flow
0	**-7,20,500**
1	2,90,000
2	2,10,000
3	3,80,000
4	3,20,000
5	4,00,000
Net Profit	8,79,500

- **Payback Period:** 4 years is the time taken to break even or pay back the initial investment.

- **Return on Investment (ROI):**

  Average Annual Profit = Annual Profit/Number of Years = 8,79,500/5 = Tk. 1,75,900

  ROI = (Average Annual Profit/Total Investment) * 100

  $= (1,75,900/7,20,500) * 100$

  $= 2.4$

8.0 System Component

1. **User Interface Component:**

    - Description: The front-end interface that allows users (pharmacy staff, healthcare providers, and customers) to interact with the system.
    - Functionality: Enables input and retrieval of information related to inventory management, prescription tracking, and sales processes.

2. **Database Management Component:**

    - Description: The back-end component responsible for securely storing, organizing, and managing data related to inventory, prescriptions, and transactions.
    - Functionality: Facilitates efficient data retrieval, storage, and manipulation, ensuring accuracy and integrity.

3. **Inventory Management Component:**

    - Description: Specialized module focused on organizing and optimizing pharmacy inventory.
    - Functionality: Real-time tracking of inventory levels, prevention of understock and overstock situations, and streamlined tracking and restocking processes.

4. **Prescription Tracking Component:**

    - Description: Dedicated to managing and tracking prescription orders securely.
    - Functionality: Facilitates seamless tracking of prescription orders, provides a systematic approach to monitor prescription fulfillment, and enhances accuracy in processing.

5. **Sales and Billing Component:**

    - Description: Manages the sales process and generates detailed billing records for each transaction.
    - Functionality: Automates sales processes, ensures error-free transactions, and streamlines overall sales and billing procedures.

6. **Real-time Updates Component:**

    - Description: Monitors and updates inventory information in real-time.
    - Functionality: Keeps inventory information up-to-date, enables quick decision-making based on current stock levels, and minimizes the risk of stockouts or overstock situations.

7. **Prescription History Access Component:**

    - Description: Allows easy access to a comprehensive history of prescriptions.

- Functionality: Provides a valuable reference for pharmacists and healthcare providers, enhancing patient care by understanding their medication history.

8. **Secure Payment Processing Component:**

- Description: Ensures secure and confidential financial transactions within the pharmacy.
- Functionality: Implements robust security measures for safe payment transactions, maintains the confidentiality of customer payment information, and provides a trustworthy platform for financial transactions.

9. **System Administration and Maintenance Component:**

- Description: Manages the overall functioning, security, and maintenance of the Pharmacy Management System.
- Functionality: Oversees system reliability, data security, and provides technical support and training to users.

10. **Integration Interfaces Component:**

- Description: Interfaces facilitating communication with external entities like regulatory authorities, insurance providers, and medicine suppliers.
- Functionality: Ensures seamless integration with external systems, supports data exchange, and enhances collaboration.

11. **Reporting and Analytics Component:**

- Description: Gathers and analyzes data from various modules, providing insights through comprehensive reports and analytics to support informed decision-making.

12. **Customer Service and Support Component:**

- Description: Offers customer support services, including assistance for staffing purposes and addressing user queries or concerns related to the system.

13. **Medicine Supplier Integration Component:**

- Description: Manages interactions with medicine suppliers, handling order processing and inventory management in collaboration with external suppliers.

9.0 Process Model to be Followed

In order to develop successful software and achieve the desired outcome, it is crucial for an organization to choose the appropriate process model. For our "Pharmacy Management System", we have decided to utilize the Agile Process Model, specifically the Scrum methodology.

The adoption of the Agile software development model, specifically the Scrum methodology, for the Pharmacy Management System is justified by its inherent flexibility, collaboration-centric approach, and adaptability to evolving project requirements. The iterative development cycle of Scrum aligns with the complex nature of the Pharmacy Management System, allowing for continuous evolution based on stakeholder feedback and addressing dynamic healthcare industry needs. The customer collaboration aspect ensures active involvement of pharmacy staff and end-users, contributing to a user-friendly and effective solution. Scrum's risk mitigation strategies, cross-functional collaboration, predictable delivery schedule, and emphasis on continuous improvement align seamlessly with the complexities and uncertainties of developing a comprehensive Pharmacy Management System.

In the context of Scrum methodology, the iterative and incremental development supports continuous delivery, allowing stakeholders to witness tangible progress and provide feedback. Customer collaboration remains a focal point, ensuring the system aligns closely with diverse user needs. The flexibility and adaptability of Scrum accommodate the dynamic healthcare environment, responding effectively to changes in requirements or regulations. Risk mitigation is inherent in the short development cycles, fostering early identification and resolution of issues. Cross-functional collaboration ensures a comprehensive understanding of the pharmacy domain, and Scrum's predictability in delivery schedules, continuous improvement ethos, and focus on early value delivery further solidify its suitability for the successful development of the Pharmacy Management System.
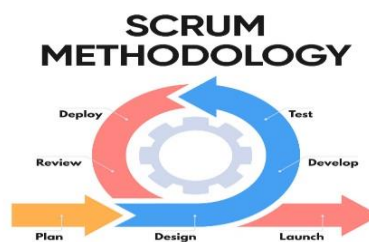
So, for all these unavoidable and necessary reasons, we choose Agile Process Model specifically, Scrum Methodology.

10.0 Efforts Estimation

The Work Breakdown Structure (WBS) for this project is given below:
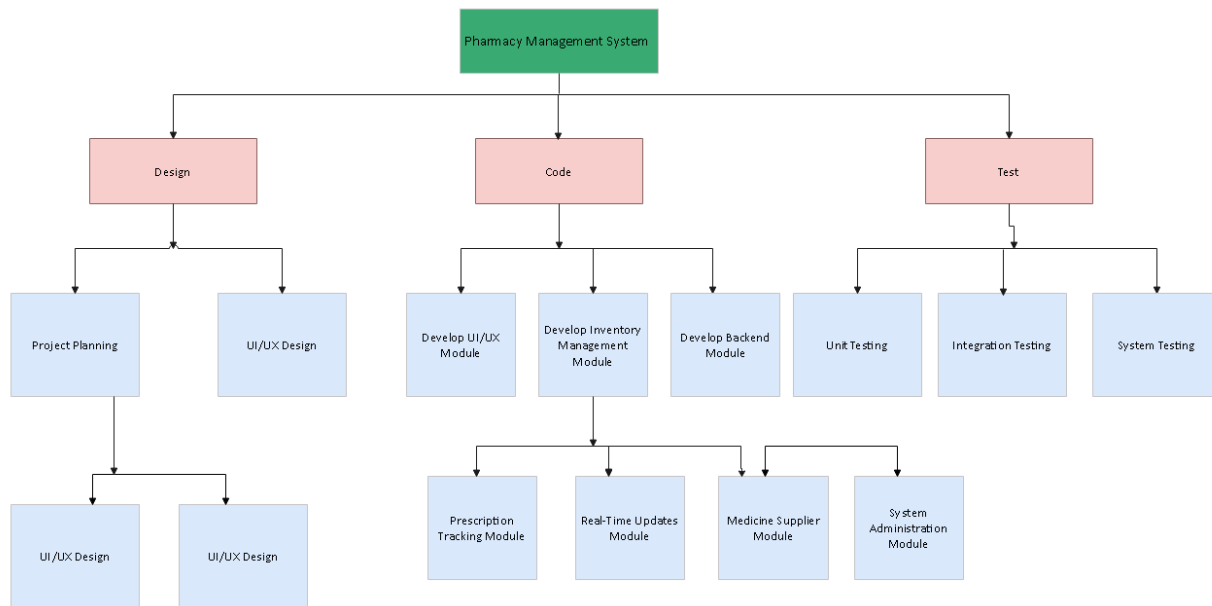
Based on system components, estimated SLOC are described below –

Task	SLOC
UI Design	1100
Database Connection	1200
Inventory Management Module	1500
Prescription Tracking Module	3200
Sales and Billing Module	3200
Real-time Updates Module	1800
Prescription History Access Module	1400
Secure Payment Processing Module	1600

System Administration	2100
Integration Interface	2200
Medicine Supplier Integration Module	1900
Customer Service Module	1500
Total	**22,700**

Cost Constructive Model:

Considering the software project type as Semi-detached.

So, here Project Complexity, P = 1.2, SLOC-dependent coefficient, T = 0.45 and Coefficient<Effort Factor> = 3.0

SLOC= 25,000

Effort = Person Months for the project (PM) = Coefficient<Effort Factor>*(SLOC/1000) ^P
$$= 3.0 * (22700/1000)\,{}^\wedge 1.2 = 127.16 \approx 128$$

Development Time = DM = 2.50*(PM)^T = 2.50 * (127.16) ^0.45
$$= 22.12 \text{ months} \approx 23 \text{ months} = 92 \text{ weeks}$$
$$= (5*8*92) \text{ hours}$$
$$= 3680 \text{ hours}$$

Required Number of People = ST = Effort (PM) / Development Time (DM)
$$= 127.16 / 22.12 = 5.74 = 6 \text{ people needed}$$

Works assigned to the required developers		
Module	**Name**	**Weeks**
UI Development	Developer 1	9 weeks
Inventory Management Module	Developer 2	10 weeks
Prescription Tracking Module	Developer 3	11 weeks
Sales and Billing Module	Developer 4	14 weeks
Real-time Updates Module	Developer 5	13 weeks
Prescription History Access Module	Developer 6	9 weeks
Secure Payment Processing Module	Developer 1	8 weeks
System Administration	Developer 2	5 weeks

| Medicine Supplier Integration Module | Developer 3, Developer 5 | 4 weeks |
| Customer Service Module | Developer 6 | 4 weeks |

11.0 Activity Diagram

| Activity Name	Activity Node	Duration (Weeks)	Precedence
Project Planning	A	7	-
Feasibility Study	B	5	A
Requirement Engineering	C	4	B
System Component Design	D	4	C
UI Design	E	3	C
Inventory Management Module	F	6	D
Prescription Tracking Module	G	6	D
Sales and Billing Module	H	5	D
Real-time Updates Module	I	4	F
Prescription History Access Module	J	6	G
Secure Payment Processing Module	K	4	H
Medicine Supplier Integration Module	L	5	F
Customer Service Module	M	6	L
System Administration	N	6	M
System Testing & Release	O	7	N
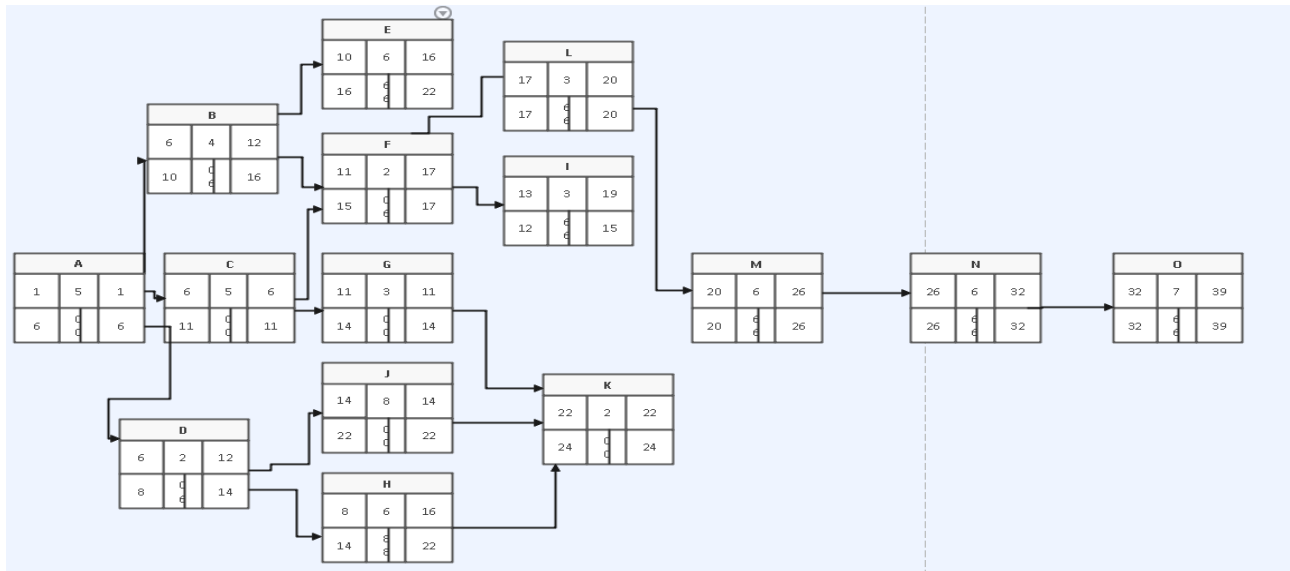
Fig: Precedence Activity Network Diagram

12.0 Risk Analysis

Risk Id	Description	Risk Type/ Category	Probabili tyof the Risk	Cost	Mitigation Policy	Risk Exposure
Risk01	During the project, 35% of developers may leave the project.	Staff Size and Experience (ST)	35%	Tk 40,000	Make a waiting list for the developer s.	35%*40,000 =14000
Risk02	The project maybe larger than estimated.	Product Size(PS)	25%	Tk 30,000	Keep customers informed about project enlargement.	25%*30,000 = 7500
Risk03	The project schedule may canslip.	Developmt Environme nt	20%	Tk 20,000	Keep ready to takemore employees.	20%*20,000 = 4000
Risk04	The choice of Technology may not fit for project.	Technology tobe built (TE)	42%	Tk 45,000	Make sure to have backup technology plan.	42%*45,000 = 18900

Risk05	Funding can befinished	Customer characteristics(CU)	40%	Tk 48,000	Communicate withcustomer in a timely manner.	40%*48,000 = 19200
Risk06	Developers may be inexperienced	Staff Size and Experience	30%	Tk 27,000	Make sure to take senior developers with proper experience.	30%*27,000 = 8100
Risk07	System Crash	System Failure (SF)	38%	Tk 35,000	Make sure the components is good enough.	38%*35,000 = 13300

13.0 Budget for the Project

Developer Salary:

Per hour working salary = Tk 140

Developer 1 salary = (120 * 8 hours * 5 days * 17 weeks) = Tk 81,600

Developer 2 salary = (120 * 8 hours * 5 days * 15 weeks) = Tk 72,000

Developer 3 salary = (120 * 8 hours * 5 days * 15 weeks) = Tk 72,000

Developer 4 salary = (120 * 8 hours * 5 days * 14 weeks) = Tk 67,200

Developer 5 salary = (120 * 8 hours * 5 days * 17 weeks) = Tk 81,600

Developer 6 salary = (120 * 8 hours * 5 days * 13 weeks) = Tk 62,400

Total developer salary = Tk 4,36,800

Project Manager Salary:

Per hour salary for PM = Tk 150

 Estimated Time = 23 months = 3680 hours

Total PM salary = Tk (3680*150) = Tk 5,52,000

Requirement Analyst Salary:

Required Requirement Analyst= 1

Estimated time: 5 weeks

Per hour salary for analyst = Tk 100

Total Requirement Analyst Salary = Tk (5 days * 8 hours * 5 weeks *100) = Tk 20,000

Software Tester Salary:

Required Software Tester=2

Estimated time: 4 weeks

Per hour salary for Tester = Tk 110

Total Tester salary = Tk (4 weeks * 5 days * 8 hours * 110 * 2) = Tk 35,200

Maintenance (Till 6 Months after Delivery):

Expense per Hour: 350 Taka

Total Estimated Time needed for Maintenance = 60 Hours

Total Estimated Maintenance Expense = Tk (350*60) = Tk 21,000

Other Expenses:

Training Expense Estimation (4 weeks) = Tk 25,000

Hardware Expense Estimation = Tk 2,00,000

Total Transportation Expense estimation (40 weeks) = Tk 15,000

Utilities Bill for 23 months = Tk 1,70,200

Total Budget for the Project = Tk 14,75,200

14.0 Conclusion

In summary, a pharmacy management system will significantly transform your pharmacy operations by streamlining key processes such as inventory management, prescription tracking, and sales. The project's key objectives - real-time inventory updates, medication supply, improved prescription accuracy and an intuitive user interface - underline the commitment to improving overall efficiency and customer satisfaction. The reasons for introducing this system are obvious: it effectively addresses the challenges of manual work, minimizes errors and allows pharmacy staff to prioritize patient care. As a complete solution, the pharmacy management system not only meets current industry requirements through stakeholder collaboration, technical feasibility and financial sustainability, but also ensures the sustainable success of pharmacies in the dynamic healthcare landscape.