Medical Inventory Management System

SWARNANDHRA COLLEGE OF ENGINEERING AND TECHNOLOGY

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1. Assignments

Objective: I led the development of a Salesforce-based **Medical Inventory Management System**. I created my Salesforce account and followed the guided project with support from my teammates. We collaborated by dividing tasks and solving errors using AI assistance.

Detail:
"As we worked on the Medical Inventory project, each of us contributed knowledge and support to others. Member 1 mapped the inventory flow, helping everyone understand the hospital's supply chain needs. Member 2 led data modeling sessions with clear explanations. I (Member 3) created the testing plan, which we refined collaboratively. Member 4 configured real-time inventory alerts using Flow Builder. These shared learning sessions made our output and our teamwork stronger."

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2. Ideation Phase

1. Brainstorming Document

- **Challenge**:
  "How can we build an effective medical inventory management system inside Salesforce?"
- **Constraints & Context**:
  - Must utilize Salesforce objects, automation, and reports
  - Must support integration with hospital ERP or supplier API

- Mobile accessibility for warehouse/medical staff
- Timeline: ~8 weeks

- **Ideation Techniques**:
  - **SCAMPER**
  - Mind mapping user roles: Admin, Nurse, Pharmacist, Inventory Clerk
- **Raw Ideas**:

1. Custom "Stock Request" object with approval process
2. Expiry alerts for medicines
3. Mobile form for staff to log usage
4. Real-time dashboard of inventory levels
5. Automated reorder triggers when stock falls below threshold
6. Supplier API integration for ordering
7. Patient-linked consumption tracking
8. Batch/lot tracking for medicines
9. QR/barcode scanning for inventory updates
10. Post-usage feedback/logs for critical items

- **Categorization**:
  - **Operations**: Item usage, restocking
  - **Monitoring**: Dashboards, alerts
  - **Experience**: Mobile usability, traceability
- **Evaluation & Shortlisting**:
  Selected top ideas: automated reorder, expiry alerts, mobile logging, QR integration, batch tracking.

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2. Empathy Map (Persona: Hospital Pharmacist)

Says	Thinks	Does	Feels
"I need faster access to stock."	"Are critical medicines running low?"	Logs inventory in spreadsheets	Worried about stockouts

Says	Thinks	Does	Feels
“Why do we always reorder late?”	“Could automation help?”	Manually checks expiry dates	Overwhelmed, reactive
“I don’t want to misplace anything.”	“How can I trace each batch?”	Cross-checks paper logs	Anxious about compliance

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3. Problem Statement

Context: Hospitals using manual processes and spreadsheets for inventory tracking.

Need: A digital solution to monitor stock, automate alerts, and simplify restocking.

Impact: Inefficiencies cause medication delays, stockouts, compliance issues.

How Might We:
“How might we empower medical staff with a Salesforce-based inventory solution that provides real-time tracking, expiry alerts, and streamlined procurement?”

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3. Requirement Analysis

1. Customer Journey Map (Modified)

1. **Inventory Request**
   Staff requests medicine via portal/app
2. **Approval Workflow**
   Pharmacist/Manager approves or denies
3. **Issuance**
   Stock issued and logged against patient or department
4. **Consumption Logging**
   Usage recorded, batch/expiry tracked
5. **Reorder Trigger**
   System detects low stock, initiates reorder
6. **Supplier Fulfillment**
   API call to supplier, receives restocked items
7. **Inventory Update**
   Records updated with quantity, expiry, batch

8. **Monitoring & Reporting**
   Dashboards show critical stock, upcoming expiries

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2. Data Flow Diagram (DFD)

- **External Entities**: Medical Staff, Pharmacist, Supplier
- **System**: Salesforce Medical Inventory Management
- **Processes**:
    - P1: Inventory Request and Approval
    - P2: Issuance & Consumption Logging
    - P3: Stock Monitoring & Alerts
    - P4: Supplier Integration & Replenishment
    - P5: Reporting & Compliance
- **Data Stores**:
    - Inventory
    - Stock Requests
    - Batch/Expiry Info
    - Supplier Orders
    - Usage Logs

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3. Solution Requirements

Functional:

- Objects: Medicine, Inventory, StockRequest, Supplier, Batch, Reorder, Feedback
- Relationships: Medicine ↔ Batch ↔ Inventory; StockRequest ↔ User; Reorder ↔ Supplier
- Automation:
    - Flow: Expiry alerts, low-stock reorders, usage confirmation
    - Approval Processes: High-cost requests
    - Apex: Batch validations, expiry-based restrictions

Non-Functional:

- Response time < 2 seconds
- Availability: 99.9%
- Security: Field-level, role-based, encrypted
- Mobile support: Essential for warehouse/scanning tasks

Operational:

- Salesforce Enterprise or Health Cloud
- Defined permission sets for nurse, pharmacist, admin

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4. Project Design Phase

1. Problem–Solution Fit

- **Problem**: Disconnected inventory systems lead to overstocking, wastage, and compliance risk.
- **Solution**: Unified Salesforce solution with expiry monitoring, QR-based tracking, and automated restocking.
- **Validation**:
    - Interviews: Pharmacists prefer mobile logging and expiry alerts
    - Competitive Gap: Few SME-friendly solutions
    - Metrics: 20% reduction in waste, 30% faster restocking

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2. Proposed Solution

Core Features:

- **Inventory Dashboard**: Medicine stock levels, expiry alerts
- **Stock Requests & Approvals**: Via mobile app
- **Consumption Tracking**: By batch, department, or patient
- **Reorder Automation**: Triggered when below threshold
- **Supplier Integration**: REST API-based
- **Mobile App Support**: Barcode scan, item usage logging

Supporting Features:

- Field-level security (e.g., batch visibility restricted to managers)

- Flow-based notifications and escalations
- Real-time alerts and compliance logs

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3. Solution Architecture

Layers:

Layer	Description
Data Layer	Custom Objects: Medicine, Batch, StockRequest, Inventory, Supplier
Logic Layer	Apex Triggers, Validation Rules, Flow Automations
Integration Layer	Supplier APIs (REST), optionally ERP/MIS system
UI Layer	Lightning App, LWC for dashboards, Mobile Flows for barcode scanning
Reporting Layer	Expiry reports, stock consumption, reorder trends (Einstein optional)
Security Layer	Profiles, Roles, Encryption, Field-Level Security
DevOps	GitHub + Salesforce CLI, Sandboxes, Deployment via Change Sets

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5. Project Planning

Tools Used:

- **ClickUp**: Task tracking and team assignments
- **Miro**: Project Gantt and stakeholder roadmap
- **Excel/Word**: Task lists, RACI, status tracking
- **Jira/Asana**: Optional for team sprints

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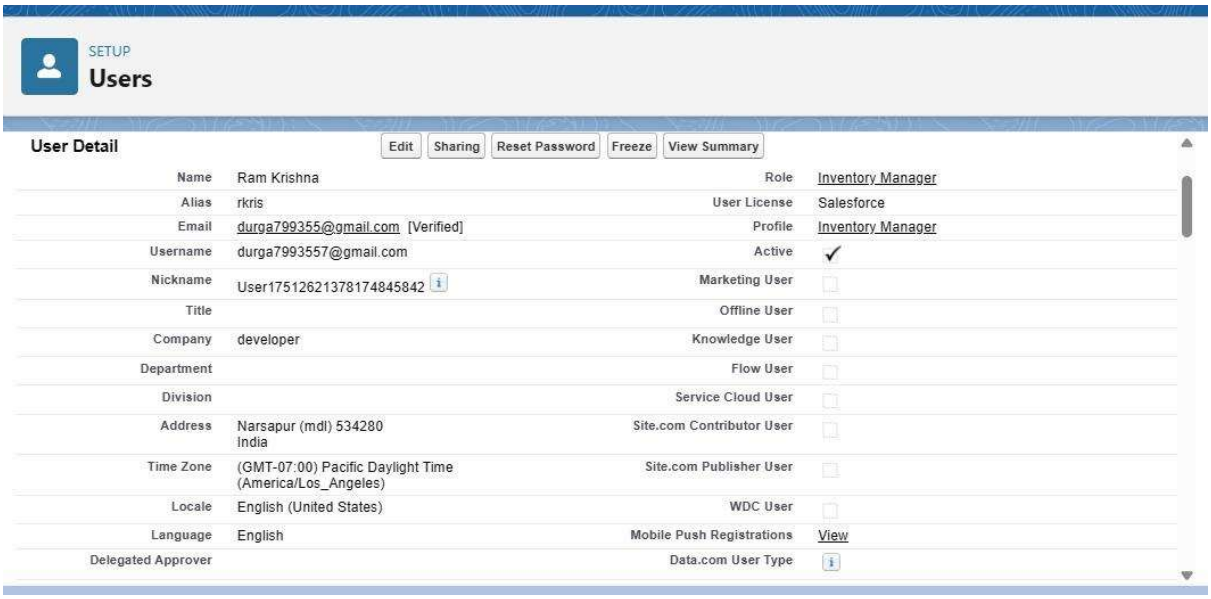
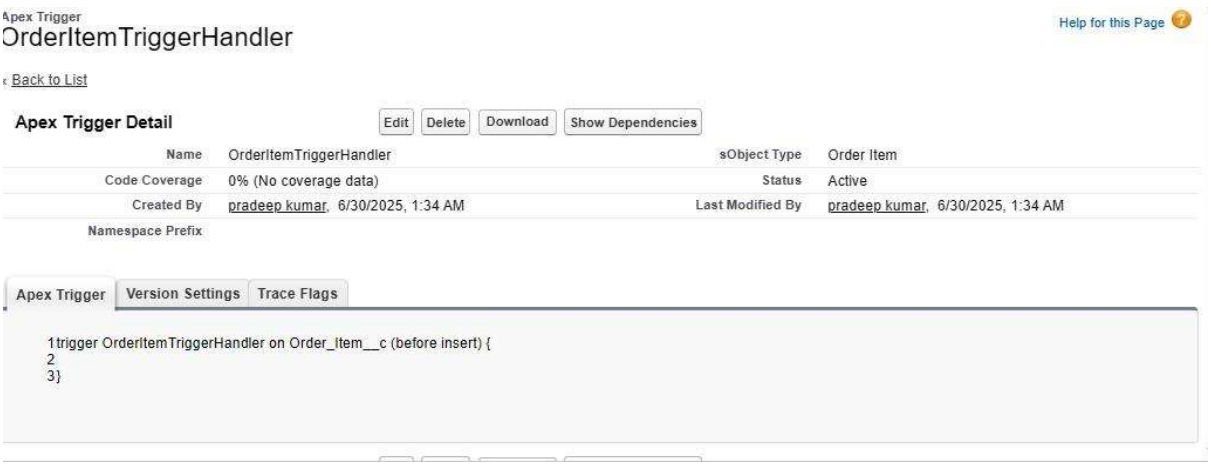
6. Project Files

- GitHub Repositories:
    - Medical Inventory Salesforce App
- Includes:

- Custom Object Definitions
- Apex Classes & Flows
- **Screenshots**





Apex Trigger

OrderItemTriggerHandler

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Apex Trigger Detail Edit | Delete | Download | Show Dependencies

Name	OrderItemTriggerHandler	sObject Type	Order Item
Code Coverage	0% (No coverage data)	Status	Active
Created By	pradeep kumar, 6/30/2025, 1:34 AM	Last Modified By	pradeep kumar, 6/30/2025, 1:34 AM
Namespace Prefix			

Apex Trigger | Version Settings | Trace Flags

```
1 trigger OrderItemTriggerHandler on Order_Item__c (before insert) {
2
3 }
```

SETUP

Apex Classes

Apex Class

CalculateTotalAmountTest

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Apex Class Detail Edit | Delete | Download | Security | Show Dependencies

Name	CalculateTotalAmountTest	Status	Active
Namespace Prefix		Code Coverage	0% (No coverage data)
Created By	pradeep kumar , 6/29/2025, 11:50 PM	Last Modified By	pradeep kumar , 6/29/2025, 11:50 PM

Class Body | Class Summary | Version Settings | Trace Flags

```
1  public class CalculateTotalAmountTest {
2
3  }
```

7. Functional & Performance Testing

Scope:

- Medicine creation, QR scans, expiry updates, reorder flows

Metrics:

- < 2 sec response for mobile flows
- < 1% failure rate
- Handle up to 100 users logging data concurrently

Test Tools:

- JMeter scripts for Salesforce REST calls
- Salesforce Developer Console & Event Monitoring

8. Documentation & Demo

Team Contribution Table:

Member	Role	Responsibilities	Deliverables
S.U.D Savitri	Project Lead	Coordination, reporting	Final Report, Presentation
Pradeep kumar	Technical Lead	System design, APIs	Data Diagrams, API Docs
Varun Bhogaraju	Developer, Documentation lead	UI/UX, testing	Screenshots, Test Results