Smart Inventory and Billing Management System

1. Project Overview

This project aims to build a desktop-based Inventory and Billing Management System that helps small businesses manage stock, suppliers, customers, and billing efficiently. Students will learn to integrate Python GUI (Tkinter) with MySQL and implement complete CRUD operations, real-world data validations, and modular programming practices.

2. Objectives

- To design an interactive and responsive GUI using Tkinter.
- To connect Python applications with MySQL databases using mysql.connector.
- To implement key CRUD operations (Create, Read, Update, Delete).
- To apply error handling, input validation, and business logic.
- To practice modular programming and clean code principles.
- To simulate an industry-like development process with clear roles and deliverables.

3. Core Functional Modules

- A. Login & User Management
    - Secure login system (Admin, Staff roles).
    - Store hashed passwords (optional advanced task).
    - Admin can add/remove users.
- B. Product Management Module
    - Add new products with details: Product ID, Name, Category, Supplier, Cost Price, Selling Price, Stock Quantity.
    - Update or delete products.
    - Search and filter by product name or category.
    - Auto-update stock on billing.
- C. Supplier Management
    - Maintain supplier details: Supplier ID, Name, Contact, Email, Address.
    - Link suppliers with products.
- D. Customer Management
    - Store customer details: Customer ID, Name, Phone, Email.
    - Auto-fetch customer details during billing.
- E. Billing Module

- Select products and generate invoices.
- Auto-calculate totals, discounts, and taxes (GST simulation optional).
- Generate a printable bill in text or PDF format.
- Update inventory automatically after each sale.

- F. Reporting Module (Optional for Extra Credit)

  - Display sales summaries (daily, weekly, monthly).
  - Show top-selling products.
  - Generate low-stock alerts.

4. Database Design (Sample Tables)

Tables:
1. users (user_id, username, password, role)
2. suppliers (supplier_id, name, contact, email, address)
3. products (product_id, name, category, supplier_id, cost_price, sell_price, stock)
4. customers (customer_id, name, phone, email)
5. sales (invoice_id, date, customer_id, total_amount)
6. sales_items (id, invoice_id, product_id, quantity, price)

5. Expected Deliverables

1. Project Proposal (Day 1–2): Overview, modules, ER diagram, and UI layout sketches.
2. Database Setup (Day 3–5): MySQL database with all tables and constraints.
3. GUI Development (Day 6–11): Implement main Tkinter windows and navigation.
4. Module Integration (Day 12–15): Integrate login, billing, and reports with MySQL.
5. Testing and Debugging (Day 16–17): Validate inputs, test CRUD and billing flows.
6. Documentation & Presentation (Day 18–20): Final report with screenshots, SQL schema, and code summary.

6. Optional Advanced Enhancements

- PDF bill export using reportlab.
- Search filters with combobox and autocomplete.
- Graphical sales dashboard using matplotlib.
- Email invoice feature using smtplib.
- Barcode scanning simulation.