

Software Design Documentation

SupraMart - Digital Supermarket Management System

Version: 1.0

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1. Introduction

SupraMart is a desktop-based application designed to digitize and streamline supermarket operations. It is tailored for multi-role usage environments, supporting distinct functionalities for Cashiers, Inventory Managers, Administrators and Auditors.

This document serves as a comprehensive design blueprint for SupraMart. It covers the system architecture, 40 user interfaces, a detailed database schema (ER Diagram) and stakeholder workflows to guide development and implementation.

2. Objective

The objective of SupraMart is to:

- Automate and optimize supermarket workflows
- Ensure real-time tracking and updates of inventory
- Provide centralized control over users, transactions and reporting
- Improve billing accuracy and enhance customer experience
- Reduce manual errors and ensure accountability across operations

3. System Overview

SupraMart is a Windows-based desktop application integrated with a centralized relational database system. Users authenticate themselves based on roles and each role is granted specific access to features relevant to their responsibilities.

4. System Features

Module	Features
Billing	Barcode scanning, cart management, discount application, payment processing
Inventory	Add/edit/delete products, stock level tracking, low stock alerts Batch management and expiry tracking

Admin	User and role management, access control, system settings, data backups
Reporting	Sales reports, inventory reports, audit logs, export options Custom date range filters and graphical insights
Multi-role	Role-based login and dynamic dashboards for each user type

5. Roles

Role	Responsibilities
Admin	Manages users and roles, system settings, data security and backups
Cashier	Processes billing, scans items, handles returns and discounts
Inventory Manager	Oversees product inventory, updates stock records, monitors stock levels
Auditor	Accesses and analyzes reports, audits transactions, monitors system performance logs

6. ER Diagram

Main Entities:

- Users (Admin, Cashier, Inventory Manager, Auditor)
- Products and Categories
- Inventory Transactions
- Sales and Sale Items
- Customers
- Suppliers
- Branches, Cities, Provinces
- Employees
- Roles

7. Screen Interfaces

Category	Interface	Role(s)
Authentication	1. Login Screen	All Roles
	2. Logout Confirmation Screen	All Roles
Dashboards	3. Admin Dashboard	Admin
	4. Cashier Dashboard	Cashier
	5. Inventory Manager Dashboard	Inventory Manager
	6. Auditor Dashboard	Auditor
Billing	7. Barcode Scan Interface	Cashier
	8. Modify Cart (Add/Edit/Delete Items)	Cashier
	9. Apply Discount (Manual/Code)	Cashier
	10. Payment Method Selection	Cashier
	11. Receipt Preview & Print	Cashier
	12. Handle Returns/Exchanges	Cashier
Inventory	13. View Product List	Inventory/Admin
	14. Add New Product	Inventory/Admin
	15. Edit Product Details	Inventory/Admin
	16. Delete Product	Inventory/Admin
	17. Low Stock Alerts	Inventory/Admin
	18. Set Reorder Levels	Inventory Manager

	19. Expiry Tracking and Management	Inventory Manager
Reports	20. Sales Report Viewer	Admin/Auditor
	21. Inventory Report Viewer	Admin/Auditor
	22. Export Report (PDF/Excel)	Auditor
	23. Branch Comparison Report	Auditor
Users	24. Add New User	Admin
	25. Edit Existing User	Admin
	26. Delete User	Admin
	27. Role Permission Configuration	Admin
	28. Reset User Password	Admin
Backup & Restore	29. Backup Database	Admin
	30. Restore Database from Backup	Admin
Audit Logs	31. View Login History	Admin/Auditor
	32. View System Activity Logs	Auditor
Customer	33. Add Customer (Optional Loyalty)	Cashier
	34. View Customer Purchase History	Cashier/Admin
Settings	35. System Preferences Panel	Admin
	36. Tax Configuration Settings	Admin
	37. Discount Rules Management	Admin

UI Utility	38. Notifications Panel	All Roles
	39. Search & Filter Interface	All Roles
	40. User Profile & Logout Panel	All Roles

8. System Architecture

Architecture Type: 2-tier (Desktop App + Local/Cloud DB)

- **Frontend:** Desktop GUI (Java Swing)
- **Backend:** Internal logic (Java)
- **Database:** MySQL

9. UI Design Plan

Each interface in SupraMart will follow modern UI/UX standards to ensure a smooth and user-friendly experience. Key design elements include:

- Clear labels and button actions
- Role-specific menus for better navigation
- Input validations and error handling
- Consistent color themes and icons for usability

Planned Sample Wireframes:

- Login Page
- Billing Screen
- Inventory Management Table

- Reports Export Interface

10. Technology Stack

Layer	Tools
GUI	Java Swing
Logic	Java
Database	MySQL
Reporting	JasperReports
Backup	Automated SQL dump / Scheduled database backups

11. Modules Breakdown

Module	Description
Billing	Handles barcode input, cart management, discount logic, and payment processing
Inventory	Product CRUD operations, low stock alerts, expiry tracking, reorder settings
User Management	Role-based access, user credentials
Reports	Generates and exports sales, inventory, and audit reports for analysis
Database Tools	Provides database backup, restore functionality, and logs key admin actions

12. Security Considerations

To ensure safe and reliable operations, the following security measures will be applied:

- Password hashing using algorithms like bcrypt or argon2
- Role-Based Access Control to restrict access by role
- Session timeout to auto-logout idle users
- Input validation to prevent SQL injection and data manipulation
- Database encryption for sensitive records

13. Future Enhancements

Potential future features include:

- Loyalty points system for registered customers
- SMS or Email receipts for customer convenience
- Online ordering integration via web or mobile extensions
- AI-driven sales prediction for smarter inventory planning
- Multi-language UI support to cater to diverse staff and customers