CentraMart: A Single-Vendor E-Commerce Management System

Overview

This project involves the design and planning of a single-vendor e-commerce platform focused on centralized product management, order processing, and administrative control. The system models a realistic digital retail environment where products are managed centrally and customer orders progress through clearly defined lifecycle stages from creation to completion.

The platform emphasizes correctness in order lifecycle enforcement, pricing, secure payment handling, and controlled administrative workflows. Rather than prioritizing UI complexity, the project focuses on backend domain modeling, data integrity, and operational constraints commonly encountered in real-world e-commerce systems.

Project Description

Customers browse a centralized product catalog and place orders through a standard e-commerce checkout flow. Prices, quantities, discounts, and values are calculated and locked at the time of order creation to preserve financial accuracy and legal consistency. Once created, orders progress through predefined processing states until completion or cancellation.

The platform enables customers to browse a centralized product catalog, manage shopping carts, and place orders through a standard checkout flow. During order creation, all essential order data—including product details, pricing, discounts, delivery address snapshot, and payment information—is captured and stored permanently to ensure consistency throughout the order lifecycle. Once an order is created, its core data cannot be modified and progresses through predefined states until completion or cancellation.

The system supports multiple payment methods, including online payments, cash-on-delivery (COD), and wallet-based payments. The wallet functions as a system-managed balance used primarily for refunds and administrative credits, with

full transaction traceability. Wallet usage is optional during checkout and is reflected clearly in order and payment records.

Key Features

—> **User and Account Management**

Secure user authentication with profile management, multiple delivery addresses, password updates, order history, and wallet visibility.

—> **Product Catalog Management**

Centralized product management with category and brand associations, pricing, images, stock quantity, and availability status.

—> **Cart and Checkout Processing**

Cart-based purchasing with coupon application, optional wallet usage, and support for multiple payment methods.

—>**Order Lifecycle Management**

Structured order progression with immutable order data and clearly enforced state transitions for both users and administrators.

—> **Wallet and Transaction Handling**

System-managed wallet balances with detailed transaction history for refunds, credits, and deductions.

—-> **Coupon and Discount Control**

Admin-managed coupons with usage limits, expiry rules, and validation during checkout.

—> **Sales and Reporting**

Administrative reporting with support for time-based, brand-based, category-based, and payment-based sales analysis, including exportable reports.

—-> **Administrative Control and Auditability**

Role-based access control and restricted administrative actions to ensure traceability and prevent misuse.

Technology Stack

Frontend: html,css,bootstrap
Backend: Node.js with Express.js
Database: MongoDB
Authentication: JWT-based authentication with role-based access control

Project Goals

1. To design a realistic single-vendor e-commerce system that reflects real-world retail workflows and constraints.

2. To implement structured order processing with immutable order data and controlled lifecycle transitions.

3. To support multiple payment methods, including wallet-based payments, with clear transaction traceability.

4. To enable meaningful sales reporting based on time periods, product brands, categories, and payment methods.

5. To ensure system correctness, data consistency, and operational transparency through enforced business rules.