Faculty of Engineering & Technology

Electrical & Computer Engineering Department

Comp 333, Data Base Systems

Final Report

Pets & things Store Management System

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Project Scope and Description

The **Pets & Things Store Management System** is a desktop-based application developed for *Pets & Things Pet Store*, located in **Ein Musbah, Ramallah, Palestine**. The store operates on two floors, each providing different services.

The **first floor** is dedicated to selling pet products for both cats and dogs, including food, treats, toys, and accessories. The **second floor** offers a **cat hotel service**, where customers can book rooms for their cats for a specified period of time.

The system includes a **warehouse management module** that tracks the quantity of each product stored in the warehouse. When products are purchased from suppliers, the quantities are added to the warehouse stock. When products items are transferred to store branches for shelf restocking, the warehouse stock is automatically reduced. This mechanism helps the store maintain accurate inventory records, avoid out-of-stock situations, and identify low-stock items in a timely manner.

The store is managed by **Mr. Mohammad Sarhan**, who operates the business with one employee during the morning shift, while the owner manages the store in the evening. Currently, most daily operations—such as recording sales, purchases, inventory levels, and cat hotel bookings—are handled manually. This manual process is time-consuming and increases the risk of human errors.

This project aims to replace the manual workflow with a **simple and integrated digital system** that centralizes all store operations into a single platform.

The system will assist the store in:

- Managing product sales and purchases
- Tracking warehouse inventory and supplier information
- Handling cat hotel bookings and room availability
- Storing customer, employee, and pet records
- Generating useful reports and summaries for better decision-making

Smart Feature Ideas

The Pets & Things Store Management System includes several smart features that have been **fully implemented** to automate daily operations, improve accuracy, and support better decision-making. These features are grouped by functional area as follows.

Area	Smart Feature Ideas
Reports	**Sales Analytics** • View total sales by day, week, or month • Analyze sales trends and revenue **Top Products** • Display best-selling products • Support restocking and inventory planning **Occupancy Analytics** • Show occupied and available cat hotel rooms • Track room usage over time **Employee Attendance** • View employee check-in and check-out records • Calculate daily working hours
Inventory Management	• Maintain separate inventory for warehouse and branches • Increase warehouse stock after supplier purchases • Decrease branch stock after product sales • Transfer products from warehouse to branches for restocking • Track on-hand quantity and minimum stock levels • Generate low-stock alerts
User Roles	• **Admin:** Full system access, manage products, inventory, users, reports, and bookings • **Employee:** Handle sales, attendance, and bookings with limited permissions • **Customer:** Manage pet information and book cat hotel rooms, access products
Booking Management	**Customer** • Book a cat hotel room for a selected period • Register cat details and special care notes • View booking status and dates **Admin / Employee** • View today's bookings • View room occupancy status • Manage booking records and prevent double booking
Sales Management	• Record product sales by branch • Assign sales to employees and customers • Support multiple products per sale • Automatically reduce branch stock after each sale • Generate and print sales receipts

Product Management	- Add, update, and deactivate products - Assign products to categories - Store product price, description, and image - Track product availability in warehouse and branches - Prevent selling inactive products
Purchases & Suppliers	- Record product purchases from suppliers - Link each purchase to a warehouse - Support multiple products per purchase - Increase warehouse stock after each purchase - Store supplier information for tracking and reporting
Stock Movements	- Record all inventory changes for audit purposes - Track stock increases from purchases - Track stock decreases from sales - Track stock transfers between warehouse and branches - Store movement type, quantity, location, and user information
Dashboard	- Display total number of products - Show low-stock product count - Display today's total sales amount - Show number of active cat hotel bookings - Provide quick actions (Add Product, New Sale, New Booking, View Reports) - Display employee attendance status for the current day - Show check-in, check-out time, working hours, and salary per employee
Filters	- Filter data by date or date range - Filter records by category or type - Filter by status (e.g., active, inactive) - Search by name or keyword,etc……..

Client Information

Client Name: Mohammad Sarhan
Business Name: Pets & Things Store
Location: Ein Musbah, Ramallah, Palestine
Contact Information:
Phone: 0599597959
Email: petstore.pal@gmail.com

Business Description:
Pets & Things is a small pet store located in **Ein Musbah, Ramallah, Palestine**, offering both pet retail products and specialized pet care services. The business operates on two floors, each serving a different purpose.

The **first floor** focuses on selling pet products for cats and dogs, including food, treats, toys, and accessories. The store maintains a warehouse to store products and restock shelves as needed to ensure product availability.

The **second floor** provides a **cat hotel service**, where customers can book rooms for their cats for short or long stays. This service requires managing room availability, booking schedules, and pet information to ensure proper care and avoid booking conflicts.

The business is managed by the owner, **Mr. Mohammad Sarhan**, with the assistance of one employee during the morning shift, while the owner manages operations in the evening. Due to the manual handling of sales, inventory, purchases, and bookings, daily operations are time-consuming and prone to errors.

The Pets & Things Store Management System was developed to support the business by digitizing operations, improving accuracy, saving time, and providing better control over sales, inventory, and customer services.

System Requirements and Entities

1.System Modules

The *Pets & Things Store Management System* will include several main modules. Each module will handle a specific area of the store's daily operations.

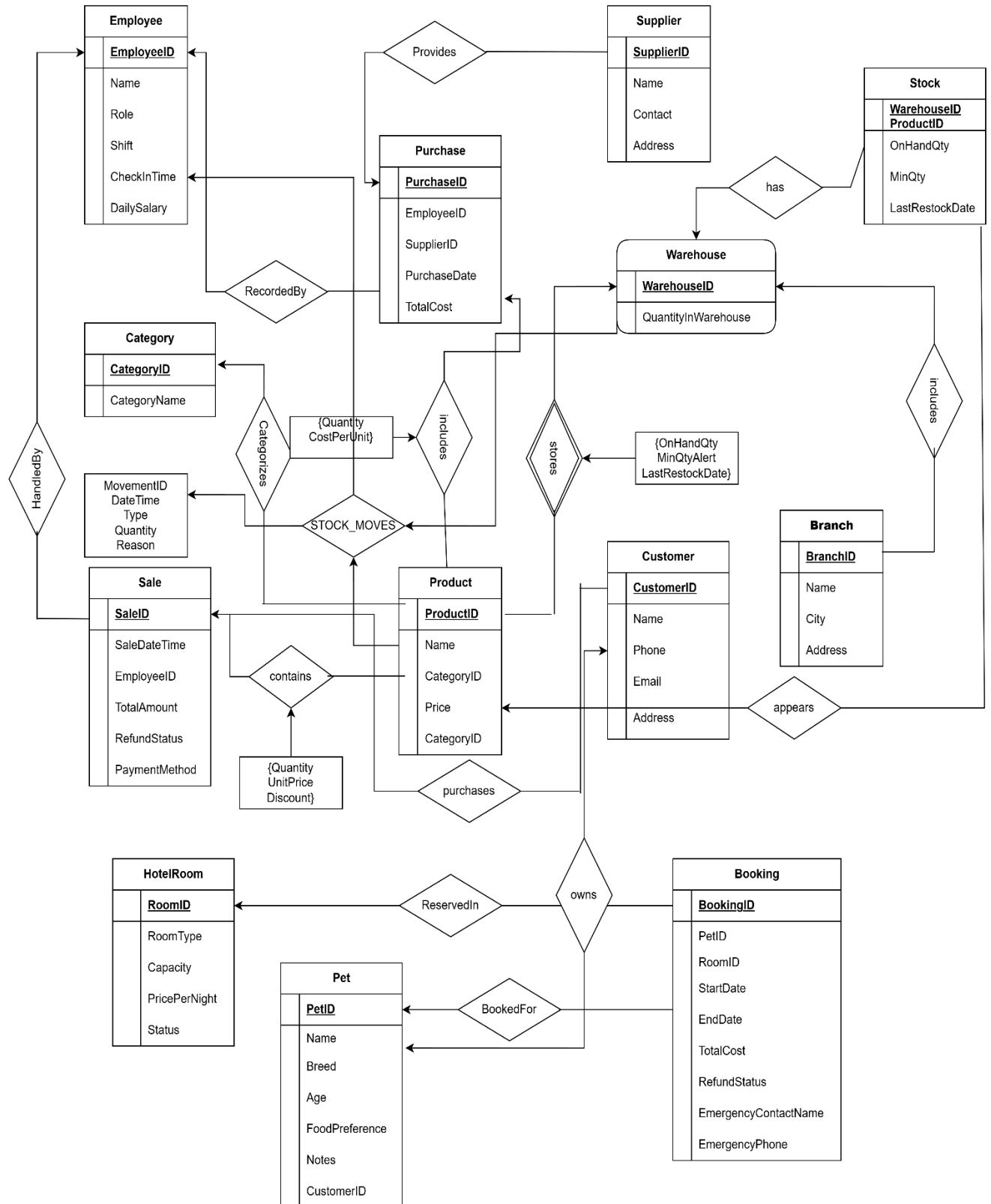| Module	Description
User Management	Manage admin, employee, and customer accounts and permissions
Product Management	Add, update, and categorize products
Inventory Management	Track stock levels in warehouse and branches
Sales Management	Record sales, generate receipts, and update stock
Purchase Management	Manage supplier purchases and update warehouse stock
Stock Transfer	Transfer products from warehouse to branches
Stock Movement	Track all inventory changes for auditing
Booking Management	Manage cat hotel bookings and room availability
Attendance Management	Track employee check-in and check-out
Reports & Analytics	View sales, products, occupancy, and attendance reports
Dashboard	Display key summaries and quick actions

2. Main Entities

The database will include several entities that represent different parts of the store and its operations. Each entity will have its own attributes, and relationships will connect them (for example, one pet can have many bookings).
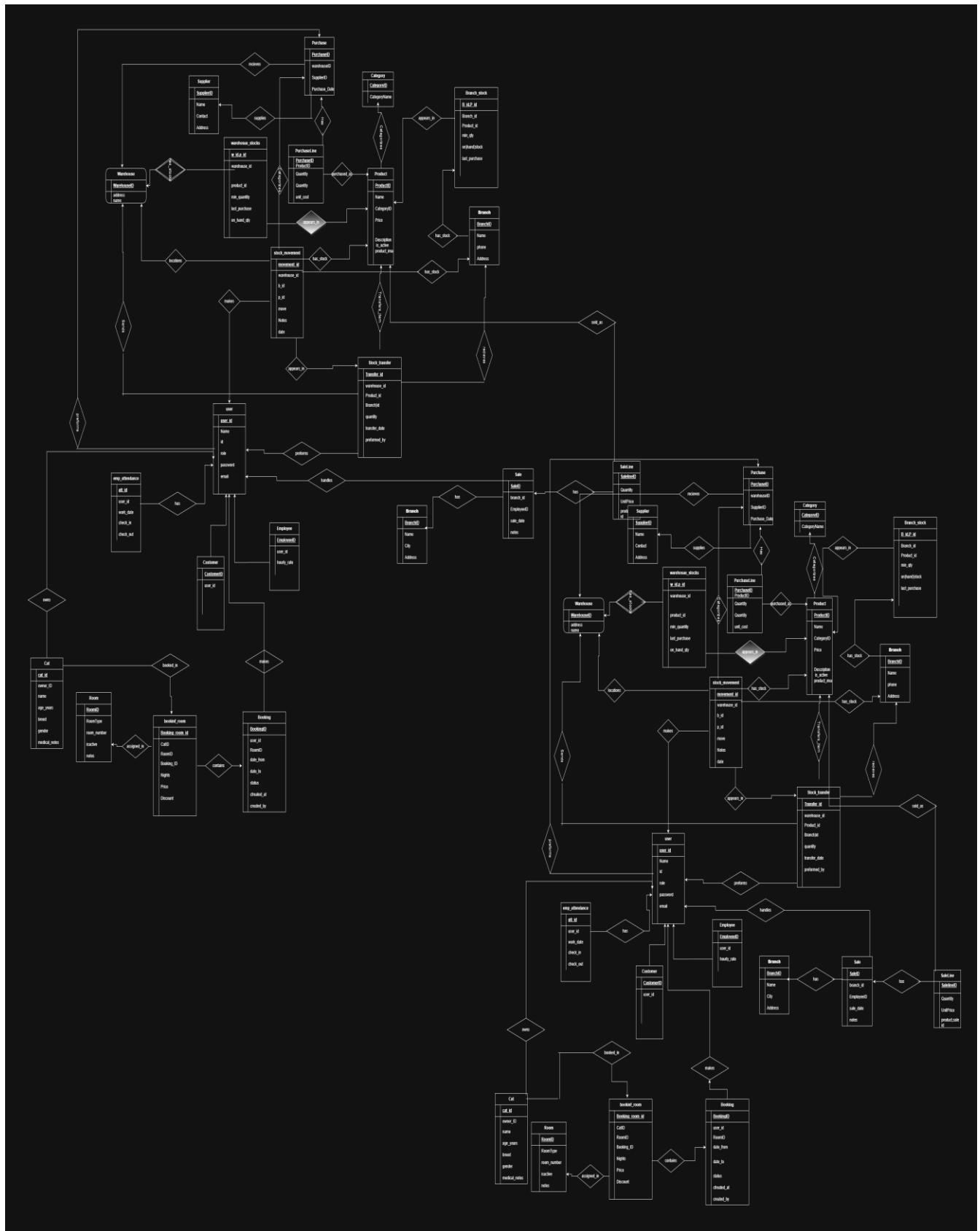
Entity	Description	Attributes
User	Stores system users (admin, employee, customer)	user_id, full_name, email, role, is_active
Employee	Stores employee-specific data	employee_id, user_id, hourly_rate
Employee Attendance	Records employee check-in and check-out	attendance_id, user_id, work_date, check_in, check_out
Category	Classifies products	category_id, category_name
Product	Stores pet products information	product_id, product_name, unit_price, category_id, is_active
Branch	Represents store branches	branch_id, branch_name, address
Warehouse	Represents product storage location	warehouse_id, warehouse_name, is_main
Branch Stock	Tracks product stock in branches	branch_id, product_id, on_hand_qty
Warehouse Stock	Tracks product stock in warehouse	warehouse_id, product_id, on_hand_qty
HotelRoom	Rooms available for the cat hotel. Each room can host more than one cat, depending on their size and comfort.	RoomID, RoomType, Capacity, PricePerNight, Status
Sale	Stores sales transactions	sale_id, branch_id, employee_id, sale_date
Sale Line	Stores products sold per sale	sale_line_id, sale_id, product_id, quantity
Supplier	Stores supplier information	supplier_id, name, contact
Purchase	Records purchases from suppliers	purchase_id, warehouse_id, supplier_id, purchase_date
Purchase Line	Stores purchased products per purchase	purchase_line_id, purchase_id, product_id, quantity
Stock Transfer	Transfers stock from warehouse to branch	transfer_id, warehouse_id, branch_id, quantity
Stock Movement	Logs all inventory changes	movement_id, product_id, change_qty, movement_type

Room	Represents cat hotel rooms	room_id, room_number, room_type
Cat	Stores customer pet information	cat_id, owner_id, cat_name, breed
Booking	Stores cat hotel bookings	booking_id, customer_id, date_from, date_to
Booking Room	Links bookings to rooms and cats	booking_room_id, booking_id, room_id, cat_id

3. ER Diagram(Old one, not used)

4.ERD After Normalization

5. Relationships Between Entities

- **Category (1) → (M) Product:** Each category can contain multiple products.
- **User (1) → (0..1) Employee:** A user may be assigned as an employee with additional employment details.
- **User (1) → (M) Employee Attendance:** A user can have multiple attendance records over time.
- **Branch (1) → (M) Sale:** Each branch can process many sales transactions.
- **User (Employee) (1) → (M) Sale:** An employee can handle multiple sales.
- **User (Customer) (0..1) → (M) Sale:** A customer may be associated with multiple sales.
- **Sale (1) → (M) Sale Line:** Each sale consists of one or more sale line items.
- **Product (1) → (M) Sale Line:** A product can appear in many sale transactions.
- **Supplier (1) → (M) Purchase:** A supplier can provide many purchases.
- **Warehouse (1) → (M) Purchase:** Purchases are received into a specific warehouse.
- **User (1) → (M) Purchase:** A user can record multiple purchase transactions.
- **Purchase (1) → (M) Purchase Line:** Each purchase includes one or more purchased products.
- **Product (1) → (M) Purchase Line:** A product can be included in multiple purchases.
- **Warehouse (1) → (M) Warehouse Stock:** A warehouse maintains stock records for many products.
- **Product (1) → (M) Warehouse Stock:** Each product can be stored in the warehouse with a stock quantity.
- **Branch (1) → (M) Branch Stock:** A branch maintains stock records for many products.
- **Product (1) → (M) Branch Stock:** Each product can be stocked in multiple branches.
- **Warehouse (1) → (M) Stock Transfer:** Products can be transferred from a warehouse to branches.
- **Branch (1) → (M) Stock Transfer:** Branches receive products through stock transfers.
- **Product (1) → (M) Stock Transfer:** A product can be transferred multiple times.
- **User (1) → (M) Stock Transfer:** A user performs stock transfer operations.
- **Warehouse (0..1) → (M) Stock Movement:** Stock movements may occur at a warehouse location.

- **Branch (0..1) → (M) Stock Movement:** Stock movements may occur at a branch location.
- **Product (1) → (M) Stock Movement:** Each product can have multiple stock movement records.
- **User (1) → (M) Stock Movement:** A user performs and records stock movements.
- **Sale (0..1) → (M) Stock Movement:** Sales generate stock movement records.
- **Purchase (0..1) → (M) Stock Movement:** Purchases generate stock movement records.
- **Stock Transfer (0..1) → (M) Stock Movement:** Transfers generate stock movement records.
- **User (Customer) (1) → (M) Cat:** A customer can own multiple cats.
- **User (Customer) (1) → (M) Booking:** A customer can make multiple bookings.
- **User (Employee/Admin) (1) → (M) Booking:** Employees or admins can create bookings.
- **Booking (1) → (M) Booking Room:** A booking may include one or more reserved rooms.
- **Room (1) → (M) Booking Room:** A room can be reserved in multiple bookings over time.
- **Cat (1) → (M) Booking Room:** A cat can be assigned to multiple bookings.

6. Normalization to 3NF with Justification (Sale, Purchase, Booking)

Table	3NF Problem	How We Identified It	Solution
Purchase	Stored supplier_name with supplier_id	supplier_id → supplier_name causes transitive dependency	Created supplier table and kept only supplier_id in purchase
Sale	Stored total_amount	Can be calculated from sale lines	Removed total_amount, calculate using SUM(quantity × unit_price)
Sale Line	Stored line_total	Depends on quantity and unit_price	Removed line_total, calculate when needed
Purchase Line	Stored line_total	Depends on quantity and unit_cost	Removed line_total, calculate when needed
Booking	Stored total_amount	Can be calculated from booking rooms	Removed total_amount, calculate dynamically
Booking Room	Stored line_total	Depends on nights, price, and discount	Removed line_total, calculate dynamically
Employee Attendance	Stored hours_worked, daily_salary	Derived from check-in/out and hourly rate	Removed derived columns and compute when needed

Technologies to Be Used

The *Pets & Things Store Management System* will be developed as a **desktop application**. It will use modern tools and technologies that make the system efficient, easy to use, and suitable for managing store operations.

Component	Technology / Tool	Description
Programming Language	Python	Used to implement application logic and system functionality
Framework	Flask	Used to build the desktop-style web application and handle routes
Database	MySQL	Used to store and manage all system data
Database Design Tool	MySQL Workbench	Used to design the ERD and manage the database
Frontend	HTML, CSS	Used to build user interfaces and layouts
Charts & Analytics	Chart.js	Used to display sales and analytics charts
Authentication	Flask Session	Used to manage user login and role-based access
Development Environment	Visual Studio Code	Used to write and manage source code

Queries

1. Show total sales for a specific day.
2. Show total sales for a selected date range.
3. Show sales grouped by branch.
4. Show sales handled by each employee.
5. Show sales for a specific customer.
6. Show daily sales summary.
7. Show monthly sales summary.

Products & Categories

8. Show all active products.
9. Show products by category.
10. Search products by name.
11. Show inactive products.

Inventory – Warehouse

12. Show current stock quantity for each product in the warehouse.
13. Show low-stock products in the warehouse.
14. Show products that need restocking.
15. Show last purchase date for each product in the warehouse.

Inventory – Branch

16. Show current stock quantity for each product in a branch.
17. Show low-stock products in a branch.
18. Show products sold from a specific branch.

Purchases & Suppliers

19. Show all purchases for a specific supplier.
20. Show purchases within a selected date range.
21. Show total purchase cost for a selected period.
22. Show products purchased from a specific supplier.
23. Show purchase history for a specific warehouse.

Stock Transfers & Movements

24. Show all stock transfers from warehouse to branches.
25. Show stock transfers for a specific branch.
26. Show stock movement history for a specific product.
27. Show stock movements by type (sale, purchase, transfer).
28. Show stock movements performed by a specific user.

Booking & Cat Hotel

29. Show all bookings for a specific date.
30. Show bookings within a selected date range.
31. Show room availability (occupied vs available).
32. Show current active bookings.
33. Show booking history for a specific customer.
34. Show bookings created by a specific employee.

Employee Attendance

35. Show daily attendance records for employees.
36. Show check-in and check-out times for a specific employee.
37. Show total working hours per employee for a selected period.
38. Show employees who have not checked out today.

Dashboard & Analytics

39. Show today's total sales amount.
40. Show number of low-stock products.
41. Show number of active cat hotel bookings.
42. Show top-selling products by quantity.
43. Show top-selling products by revenue.

Summary

The Pets & Things Store Management System was developed to automate and organize the daily operations of a pet store that offers both retail products and a cat hotel service. The system replaces manual record-keeping with a centralized digital solution that improves accuracy, efficiency, and data consistency.

The project covers key business functions including product management, sales, purchases, inventory control across warehouse and branches, booking management for the cat hotel, employee attendance tracking, and reporting. The database was carefully designed and normalized to **Third Normal Form (3NF)** to eliminate redundancy and ensure data integrity.

By using a role-based access system, the application supports administrators, employees, and customers with appropriate permissions. Dashboards, reports, filters, and analytics provide valuable insights that support better decision-making and improve overall business performance.

Overall, the system offers a practical and scalable solution that simplifies store management, reduces human errors, and enhances operational control for the Pets & Things business.