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African Centre of Excellence in Data Science (ACE-DS)

Masters of Data Science in Mining

Module: Advanced Database and Technology

Case Study: **Retail Inventory and Sales Management System.**

1. Introduction

This project implements a comprehensive Retail Inventory & Sales Management System designed to support chain store operations. The system manages customer purchases across multiple product categories, tracks supplier relationships, processes sales transactions, and provides analytical capabilities for business intelligence. The database facilitates efficient inventory management, sales tracking, and supplier performance analysis.

2. Project Overview

The system addresses the core needs of retail operations by providing a robust database solution that:

- a. Tracks product inventory and stock levels
- b. Manages customer orders and sales transactions
- c. Maintains supplier and vendor information
- d. Supports business analysis through specialized queries and views
- e. Ensures data integrity through constraints and triggers

3. Core Entities

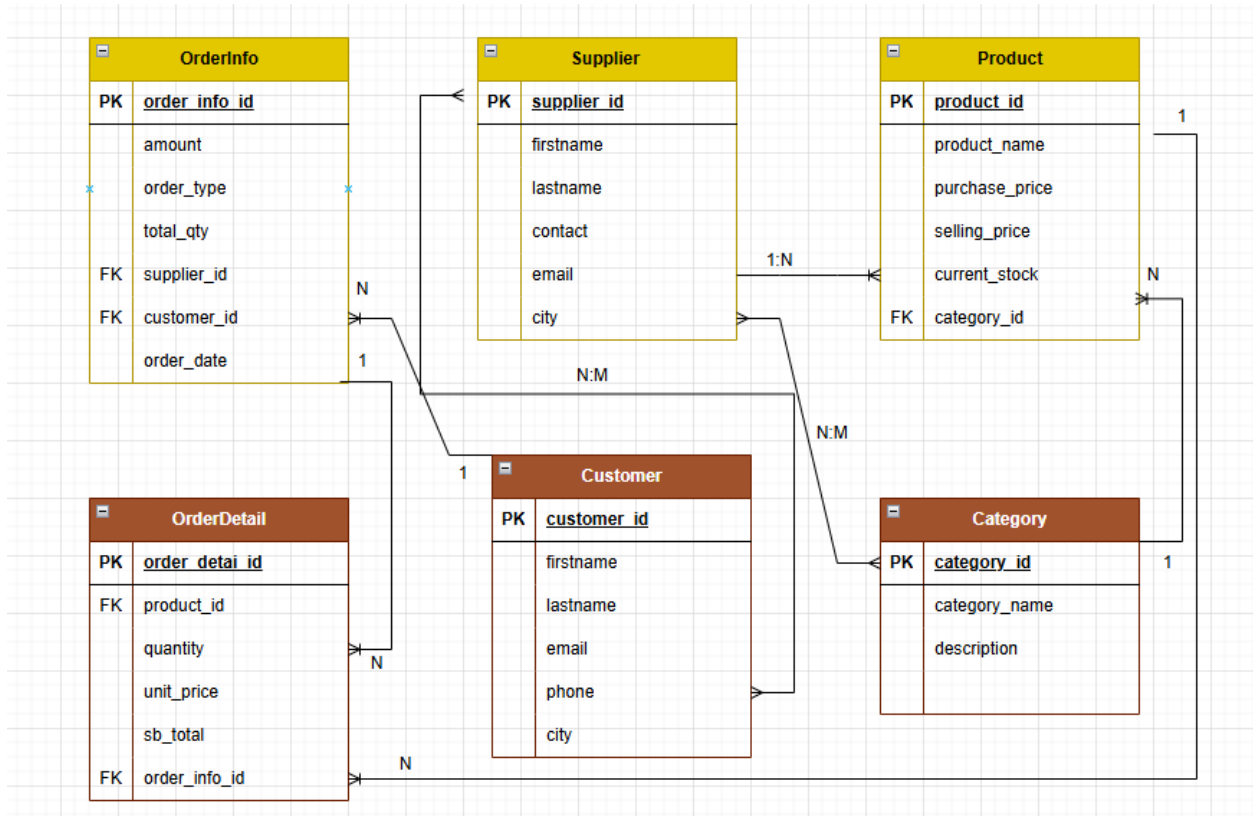
- a) **Supplier:** Vendor management with contact information
- b) **Category:** Product classification system
- c) **Product:** Inventory management with pricing and stock levels
- d) **Customer:** Customer relationship management
- e) **Order-Info:** Sales transaction headers
- f) **Order-Detail:** Line items for each order

4. Data Integrity Constraints

- a) **Primary Keys:** Unique identifiers for all entities
- b) **Foreign Keys:** Maintain referential integrity across relationships
- c) **CHECK Constraints:** Validate data quality (e.g., positive stock levels)
- d) **CASCADE DELETE:** Automatic cleanup of related records (Supplier→Product, OrderInfo→OrderDetail etc...)

Below is an Entity Relationship Diagram (ERD) which shows what is in each entity and how entities are related to each other, with a specification of Primary key and all foreign key.

5. Database Schema Design (Entity Relationship)



6. Conclusion.

The Retail Inventory and Sales Management System represent a complete database solution for modern retail operations. By implementing proper database design principles, business constraints, and analytical capabilities, the system provides a solid foundation for managing complex retail operations while enabling data-driven business decisions. The study demonstrates proficiency in database design, SQL programming, business logic implementation, and practical problem-solving for real-world retail scenarios.