DataPioneers_Inventory

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Project Topic

An Inventory Management System using Oracle SQL Developer to efficiently track and manage stock, customers, and orders in a retail environment.

Problem Statement

Many small and mid-sized businesses have difficulty keeping track of their inventory. They often face problems like running out of stock, having too much stock, or delays in fulfilling orders. Without a proper system in place, businesses may lose money and struggle to keep customers happy. This project aims to solve these issues by creating a structured database system using Oracle SQL Developer. The system will help businesses track their products, manage customer orders, and improve overall efficiency.

Objective

- Develop a structured inventory management system solely using Oracle SQL Developer.
- Implement a well-defined database schema with clear relationships.
- Ensure accurate tracking of products, customer details, and order management.
- Optimize query performance for efficient data retrieval.
- Maintain data integrity using constraints and relationships.

Database Design Document

Business Problem and Solution

Retail businesses require a structured system for inventory and order management to prevent inefficiencies. Without a proper system, businesses often face challenges such as:

- **Stock Shortages:** Running out of popular products can lead to lost sales and dissatisfied customers.
- **Overstocking:** Holding too much inventory increases storage costs and the risk of product obsolescence.

- **Order Processing Delays:** Without an efficient system, businesses struggle to fulfill orders on time, leading to poor customer satisfaction.
- **Lack of Inventory Visibility:** Many businesses manually track inventory, which results in errors and mismanagement.

The **DataPioneers_Inventory** system provides a **structured, database-driven approach** to solve these issues by:

- **Implementing a central database** that stores product, customer, and order details, ensuring seamless tracking and management.
- **Utilizing Oracle SQL Developer** to enhance database integrity, minimize errors, and improve efficiency.
- **Automating inventory tracking** to ensure businesses always know stock levels, preventing shortages or overstocking.
- **Optimizing data relationships** for faster and more reliable order processing.
- **Providing real-time insights** into product availability, order history, and supplier details for better decision-making.

By adopting this system, businesses can ensure smoother inventory operations, minimize losses, and enhance customer satisfaction through better order fulfillment.

Entity Relationship Diagram (ERD)

Logical and Physical Models

The ERD defines the relationships between the key entities in the system.

Entities and Their Relationships:

1. **Products** - Stores product details such as name, category, price, and stock levels.
2. **Customers** - Maintains customer details such as name, contact information, and registration date.
3. **Orders** - Captures customer purchases, linking customers and order details.
4. **OrderDetails** - Stores specific product purchases linked to an order.
5. **Suppliers** - Stores supplier details for inventory management.
6. **Warehouse** - Maintains warehouse storage locations for inventory distribution.
7. **ProductWarehouse** - Links products to warehouses, allowing tracking of stock levels.

Relationships:

- **Customers place Orders** - One-to-Many (One customer can place multiple orders).
- **Orders contain OrderDetails** - One-to-Many (Each order contains multiple products).

- **OrderDetails reference Products** - Many-to-One (Multiple order details can include the same product).
- **Products are supplied by Suppliers** - Many-to-One (A product has one supplier, but a supplier can provide multiple products).
- **Products are stored in Warehouses through ProductWarehouse** - Many-to-Many (A product can be stored in multiple warehouses, and a warehouse can store multiple products).

Entity and Attributes with Defined Data Types

Products

- ProductID (NUMBER, Primary Key)
- Name (VARCHAR2(255), NOT NULL)
- Category (VARCHAR2(100))
- Price (NUMBER(10,2), NOT NULL)
- StockQuantity (NUMBER, NOT NULL)
- SupplierID (NUMBER, Foreign Key references Suppliers(SupplierID))
- CreatedAt (TIMESTAMP DEFAULT CURRENT_TIMESTAMP)
- UpdatedAt (TIMESTAMP DEFAULT CURRENT_TIMESTAMP ON UPDATE CURRENT_TIMESTAMP)

Customers

- CustomerID (NUMBER, Primary Key)
- FirstName (VARCHAR2(100), NOT NULL)
- LastName (VARCHAR2(100), NOT NULL)
- Email (VARCHAR2(255), UNIQUE, NOT NULL)
- Phone (VARCHAR2(20))
- CreatedAt (TIMESTAMP DEFAULT CURRENT_TIMESTAMP)

Orders

- OrderID (NUMBER, Primary Key)
- CustomerID (NUMBER, Foreign Key references Customers(CustomerID))
- OrderDate (TIMESTAMP DEFAULT CURRENT_TIMESTAMP)
- TotalAmount (NUMBER(10,2), NOT NULL)

OrderDetails

- OrderDetailID (NUMBER, Primary Key)
- OrderID (NUMBER, Foreign Key references Orders(OrderID))
- ProductID (NUMBER, Foreign Key references Products(ProductID))

- Quantity (NUMBER, NOT NULL)
- SubTotal (NUMBER(10,2), NOT NULL)

Suppliers

- SupplierID (NUMBER, Primary Key)
- CompanyName (VARCHAR2(255), NOT NULL)
- ContactPerson (VARCHAR2(100))
- Phone (VARCHAR2(20))

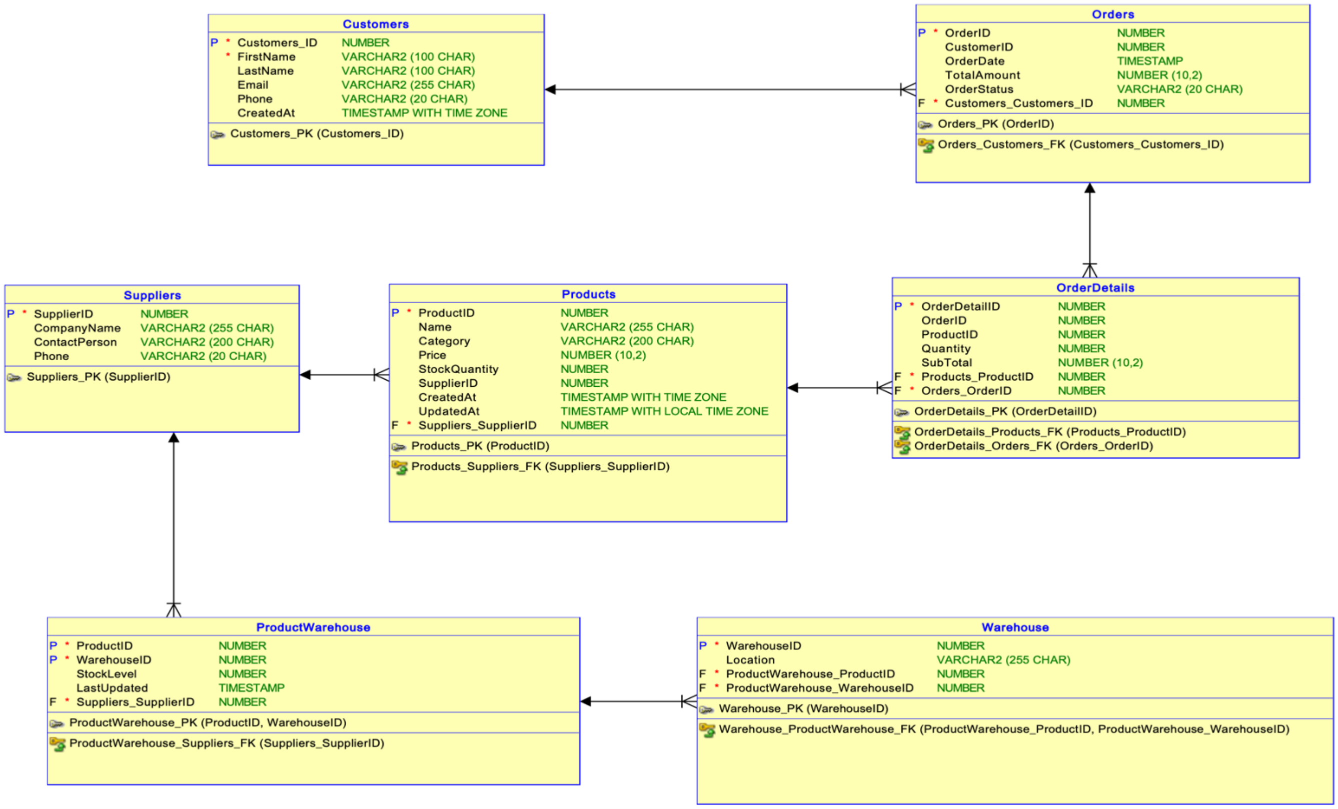
Warehouse

- WarehouseID (NUMBER, Primary Key)
- Location (VARCHAR2(255), NOT NULL)

ProductWarehouse

- ProductID (NUMBER, Foreign Key references Products(ProductID))
- WarehouseID (NUMBER, Foreign Key references Warehouse(WarehouseID))
- StockLevel (NUMBER, NOT NULL)
- LastUpdated (TIMESTAMP DEFAULT CURRENT_TIMESTAMP)
- **Primary Key: (ProductID, WarehouseID)**

ERD:



Customers

P	*	Customers_ID	NUMBER
	*	FirstName	VARCHAR2 (100 CHAR)
		LastName	VARCHAR2 (100 CHAR)
		Email	VARCHAR2 (255 CHAR)
		Phone	VARCHAR2 (20 CHAR)
		CreatedAt	TIMESTAMP WITH TIME ZONE

Customers_PK (Customers_ID)

Orders

P	*	OrderID	NUMBER
		CustomerID	NUMBER
		OrderDate	TIMESTAMP
		TotalAmount	NUMBER (10,2)
		OrderStatus	VARCHAR2 (20 CHAR)
F	*	Customers_Customers_ID	NUMBER

Orders_PK (OrderID)

Orders_Customers_FK (Customers_Customers_ID)

Suppliers

P	*	SupplierID	NUMBER
		CompanyName	VARCHAR2 (255 CHAR)
		ContactPerson	VARCHAR2 (200 CHAR)
		Phone	VARCHAR2 (20 CHAR)

Suppliers_PK (SupplierID)

Products

P	*	ProductID	NUMBER
		Name	VARCHAR2 (255 CHAR)
		Category	VARCHAR2 (200 CHAR)
		Price	NUMBER (10,2)
		StockQuantity	NUMBER
		SupplierID	NUMBER
		CreatedAt	TIMESTAMP WITH TIME ZONE
		UpdatedAt	TIMESTAMP WITH LOCAL TIME ZONE
F	*	Suppliers_SupplierID	NUMBER

Products_PK (ProductID)

Products_Suppliers_FK (Suppliers_SupplierID)

OrderDetails

P	*	OrderDetailID	NUMBER
		OrderID	NUMBER
		ProductID	NUMBER
		Quantity	NUMBER
		SubTotal	NUMBER (10,2)
F	*	Products_ProductID	NUMBER
F	*	Orders_OrderID	NUMBER

OrderDetails_PK (OrderDetailID)

OrderDetails_Products_FK (Products_ProductID)
OrderDetails_Orders_FK (Orders_OrderID)

ProductWarehouse

P	*	ProductID	NUMBER
P	*	WarehouseID	NUMBER
		StockLevel	NUMBER
		LastUpdated	TIMESTAMP
F	*	Suppliers_SupplierID	NUMBER

ProductWarehouse_PK (ProductID, WarehouseID)

ProductWarehouse_Suppliers_FK (Suppliers_SupplierID)

Warehouse

P	*	WarehouseID	NUMBER
		Location	VARCHAR2 (255 CHAR)
F	*	ProductWarehouse_ProductID	NUMBER
F	*	ProductWarehouse_WarehouseID	NUMBER

Warehouse_PK (WarehouseID)

Warehouse_ProductWarehouse_FK (ProductWarehouse_ProductID, ProductWarehouse_WarehouseID)