**Supermarket Management System**

**Muhammad Wajih Rashid 2112322**

**Usman Bin Obaid 2112338**

**Saad Qasim 2112326**

This Entity-Relationship Diagram (ERD) models the core structure and data flow within a **Supermarket Management System**, covering product inventory, sales transactions, employees, customers, and suppliers.

**🧱 Entities and Attributes**

**1. Product**

Represents items available for sale in the supermarket.

* **ProductID (PK)**: Unique identifier for each product.
* **Name**: Name/description of the product.
* **CategoryID (FK)**: Links the product to its category.
* **SupplierID (FK)**: Links the product to its supplier.
* **QuantityInStock**: Current inventory quantity.
* **UnitPrice**: Selling price per unit.

**2. Category**

Defines logical groupings of products.

* **CategoryID (PK)**: Unique identifier.
* **CategoryName**: Name of the category (e.g., Beverages, Dairy).

**3. Supplier**

Contains supplier details for sourcing products.

* **SupplierID (PK)**: Unique identifier.
* **Name**: Supplier's name.
* **ContactInfo**: Contact details (e.g., phone/email).

**4. Customer**

Stores information about customers who make purchases.

* **CustomerID (PK)**: Unique identifier.
* **Name**: Full name.
* **Email**: Email address.
* **Phone**: Contact number.

**5. Employee**

Represents supermarket staff, including cashiers and managers.

* **EmployeeID (PK)**: Unique identifier.
* **Name**: Employee name.
* **Role**: Job role (e.g., Cashier, Manager).
* **Email**: Contact email.

**6. Sale**

Represents a transaction when a customer purchases items.

* **SaleID (PK)**: Unique transaction identifier.
* **CustomerID (FK)**: Customer involved in the sale.
* **EmployeeID (FK)**: Staff member who processed the sale.
* **Date**: Date and time of the sale.
* **TotalAmount**: Total price of the sale.

**7. SaleItem**

Links products to a specific sale, detailing quantity and price at the time.

* **SaleItemID (PK)**: Unique line item ID.
* **SaleID (FK)**: Links to the Sale.
* **ProductID (FK)**: Links to the Product.
* **Quantity**: Number of units sold.
* **PriceAtSale**: Unit price at the time of sale (helps in auditing).

**🔗 Relationships**

* **Product → Category**: Many products belong to one category.
* **Product → Supplier**: Each product is supplied by one supplier.
* **Sale → Customer**: A sale is made to one customer.
* **Sale → Employee**: A sale is handled by one employee.
* **SaleItem → Sale**: Each sale contains one or more sale items.
* **SaleItem → Product**: Each sale item corresponds to one product.

**📝 Summary**

This ERD supports:

* **Inventory management** (Products, Categories, Suppliers)
* **Sales tracking** (Sales, SaleItems, Customers)
* **Employee accountability** (who handled which sale)

It is scalable and adaptable to advanced features like purchase orders, product returns, loyalty programs, and more.

