POS SYSTEM FOR JJ MARKETING

A Project Requirement for
CCE104L Information Management

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I] THE COMPANY PROFILE

JJ Marketing specializes in selling motorcycle parts, and accessories and provides comprehensive motorcycle repair services. Their extensive inventory includes high-quality parts for various motorcycle brands, ensuring that our customers find everything they need for maintenance, repairs, and upgrades. They also offer motorcycle repair and maintenance services from tire changes to overhauling by their veteran mechanics.

Founded in 2018 by husband-and-wife team Arnold and Jesusa Estrebello, JJ Marketing began with a single stall where mechanical repairs were performed at the front. Leveraging their extensive experience from working in a hardware shop, they have since expanded to include a dedicated repair area and a bodega for stock storage.

They later expanded JJ Marketing into another stall where they would store stocks and allow their mechanics to do their repairs comfortably. In March 2024, JJ Marketing opened its second branch in the neighboring municipality of Lupon where they would continue to provide high-quality motorcycle parts and repair and maintenance services.

Following the end of the pandemic, the municipality of Banaybanay saw a notable increase in the number of motorcycle parts and repair shops, leading to heightened competition for JJ Marketing. In response to this emerging challenge, we decided to strategize and implement a comprehensive program system to streamline the company's operations. This new system includes a state-of-the-art Point of Sale (POS) system and an advanced inventory management solution, designed to enhance efficiency and improve our service offerings.

II] THE DESCRIPTION OF THE EXISTING SYSTEM

JJ Marketing currently operates without an integrated digital system. All business operations, including inventory management, sales transactions, and receipt issuance, are conducted manually. This traditional method involves over-the-counter interactions, where staff physically handle inventory checks, financial transactions, and record-keeping.

III] THE PROPOSED SOLUTION TO THE EXISTING SYSTEM

A. Objectives of the System

The goal of this proposed system is to enhance the efficiency and effectiveness of JJ Marketing's business operations.

A.1 General Objectives

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- Enhance Operational Efficiency
  - Streamline all business processes to improve productivity and reduce operational costs.
- Improve Customer Experience
  - Deliver exceptional service to boost customer satisfaction and loyalty
- Ensure Security and Data Integrity
  - To safeguard sensitive data and ensure system reliability, utilizing MySQL for secure and stable database management.

A.2 Specific Objectives

- Enhance Inventory Management
  - Optimize inventory tracking and control processes to minimize stockouts and overstock situations, ensuring efficient use of resources and timely replenishment.
- Maintain Accurate Sales Record
  - To accurately record and store sales data, including items sold, quantities, prices, and customer details, facilitating informed decision-making and compliance reporting.
- Minimize Errors Through Automation
  - Implement automation features to reduce manual errors in processes such as data entry, calculation, and reporting, improving accuracy, efficiency, and overall system reliability.

B. Scope and Limitations of the System

The proposed system for JJ Marketing aims to streamline operations and boost efficiency through a range of integrated functionalities. Central to its capabilities is the point-of-sale (POS) feature, facilitating smooth sales transactions by enabling tasks such as pricing, and payment processing. Complementing this, inventory management tools will ensure real-time tracking of stock levels, mitigating stockouts and overstock scenarios while enabling efficient stock replenishment. Moreover, comprehensive sales records, including item details, quantities, and prices will be stored within the system, providing valuable insights for sales analysis and strategic decision-making.

However, several limitations should be considered during system implementation. Challenges may arise concerning hardware constraints, potentially impacting system performance, particularly during peak usage. Additionally, the system's ability to integrate with other software systems, such as accounting software or e-commerce platforms, may be limited by compatibility issues or technical constraints. Adequate training and ongoing support will be essential to address user proficiency and any arising issues effectively. Furthermore, scalability challenges may necessitate system upgrades to accommodate growing transaction volumes and user bases.

C. Significance of the System

a] The Management of the Business Establishment

The proposed system presents management with streamlined operations and improved decision-making capabilities by offering comprehensive data insights. It delivers real-time visibility into sales performance, inventory levels, and customer behavior, enabling managers to make informed strategic decisions. This results in improved productivity, cost savings, and ultimately, greater profitability for the business.

b] The Client or Customer

From the client or customer's perspective, the system enhances their overall experience with the establishment. It ensures smoother and more efficient transactions, minimizing wait times. The system's accurate inventory management prevents stockouts, ensuring that desired products are available when needed.

c] The Employees

For employees, the system simplifies their daily tasks and enhances job satisfaction. Its user-friendly interface reduces training time and minimizes the risk of errors, allowing employees to focus on delivering exceptional service to customers. With real-time access to sales and inventory data, employees can make informed decisions, respond quickly to customer inquiries, and effectively manage stock levels.

D. System Design

A standalone transaction processing system is an ideal choice for JJ Marketing, offering simplicity, reliability, and independence from external factors such as network connectivity. In the context of a motor shop, where transactions predominantly occur in a physical store environment, a standalone system ensures seamless operation even in situations where internet access is limited or unreliable. This approach mitigates the risk of disruptions or delays commonly associated with network-based solutions while also offering ease of setup, management, and enhanced security. By processing transactions locally, without dependence on external networks or servers, JJ Marketing can efficiently manage sales transactions, inventory tracking, and customer interactions within the confines of the store environment, focusing on delivering exceptional service to customers without concerns about network dependencies or technical complexities.

IV] THE PROTOTYPES

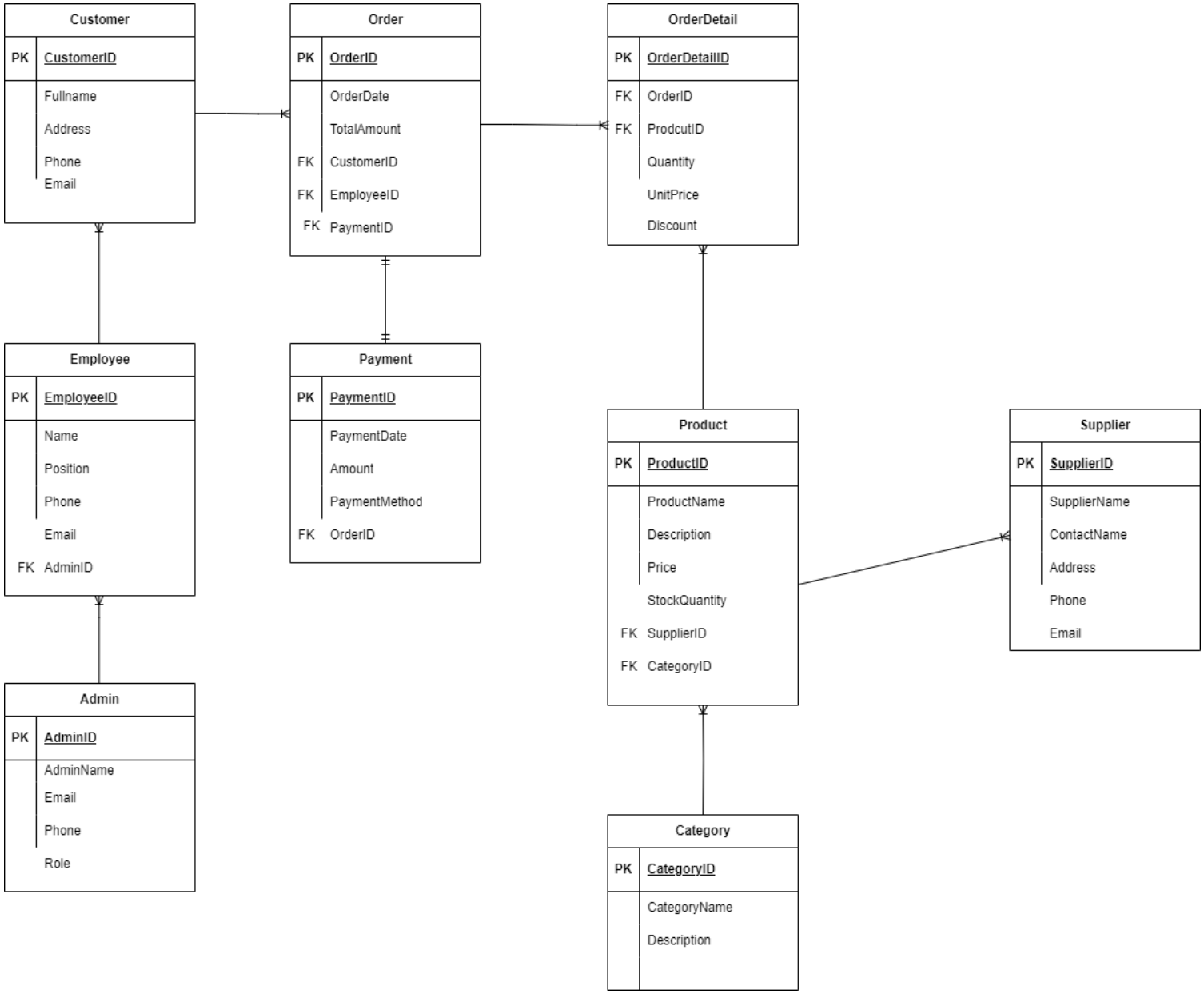
A. The ENTITIES, RELATIONSHIPS and CARDINALITIES

1. Entities
    - Customer
        - Represents individuals who purchase products or services from the business.
    - Order
        - Represents the transaction initiated by a customer to purchase one or more products or services.
    - OrderDetail
        - Contains detailed information about each product or service included in an order, such as quantity, price, and date purchased.
    - Employee
        - Refers to individuals who work for the business, mainly the cashier.
    - Admin
        - Represents users with administrative privileges within the system, responsible for managing users, permissions, and system configurations.
    - Payment
        - Records transactions involving the transfer of funds from customers to the business in exchange for products or services.
    - Product
        - Represents the goods or services offered for sale by the business.
    - Category
        - Organizes products or services into logical groupings
    - Supplier
        - Represents external entities or organizations that provide products or services to the business for resale or use in operations.
2. Relationships and Cardinalities
    - Customer - Order:
        - Relationship: One-to-Many
        - Cardinality: One customer can place many orders, but each order is placed by only one customer.
    - Order - OrderDetail:
        - Relationship: One-to-Many
        - Cardinality: One order can contain many order details (representing multiple products or services), but each order detail belongs to only one order.
    - Employee - Order:
        - Relationship: One-to-Many
        - Cardinality: One employee can handle many orders, but each order is handled by only one employee.
    - Admin - Employee:
        - Relationship: One-to-Many
        - Cardinality: One admin can manage many employees, but each employee has only one admin responsible for managing them.
    - Payment - Order:
        - Relationship: One-to-One
        - Cardinality: Each payment is associated with one specific order, and each order corresponds to one payment.
    - OrderDetail - Product:
        - Relationship: Many-to-One
        - Cardinality: Many order details can refer to the same product, but each order detail corresponds to only one product.
    - Product - Category:
        - Relationship: Many-to-One
        - Cardinality: Many products can belong to the same category, but each product is assigned to only one category.
    - Product - Supplier:
        - Relationship: Many-to-One
        - Cardinality: Many products can be supplied by the same supplier, but each product is supplied by only one supplier.

B. The Entity-Relationship Diagram(ERD)

Sketch a diagram for the following

B.1 Crow's Foot Model



Customer-Order:

- One Customer can place multiple Orders.
- Each Order is placed by one Customer.

Order-OrderDetail:

- One Order can contain multiple OrderDetails.
- Each OrderDetail belongs to one Order.

OrderDetail-Product:

- One Product can be included in multiple OrderDetails.
- Each OrderDetail contains one Product.

Product-Supplier:

- One Supplier can supply multiple Products.
- Each Product is supplied by one Supplier.

Product-Category:

- One Category can include multiple Products.
- Each Product belongs to one Category.

Order-Employee:

- One Employee can process multiple Orders.
- Each Order is processed by one Employee.

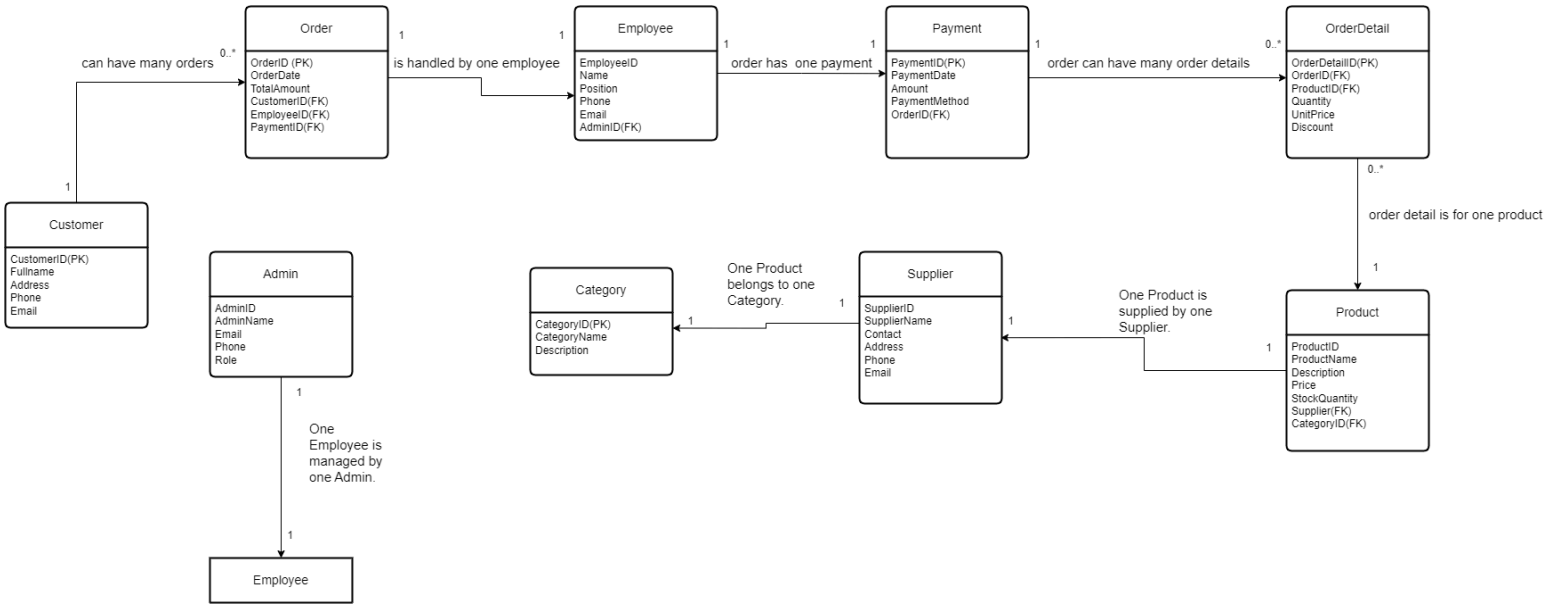
Order-Payment:

- One Order can have one Payment.
- Each Payment is linked to one Order.

Employee-Admin:

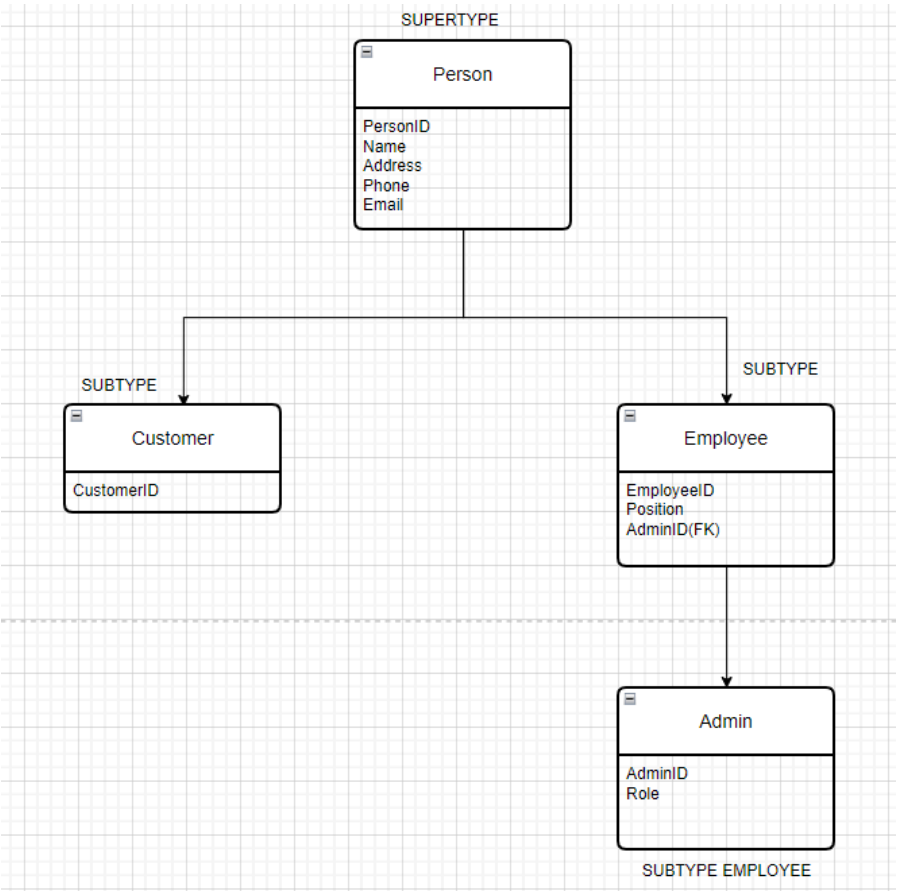
- One Admin manages multiple Employees.
- Each Employee is managed by one Admin.

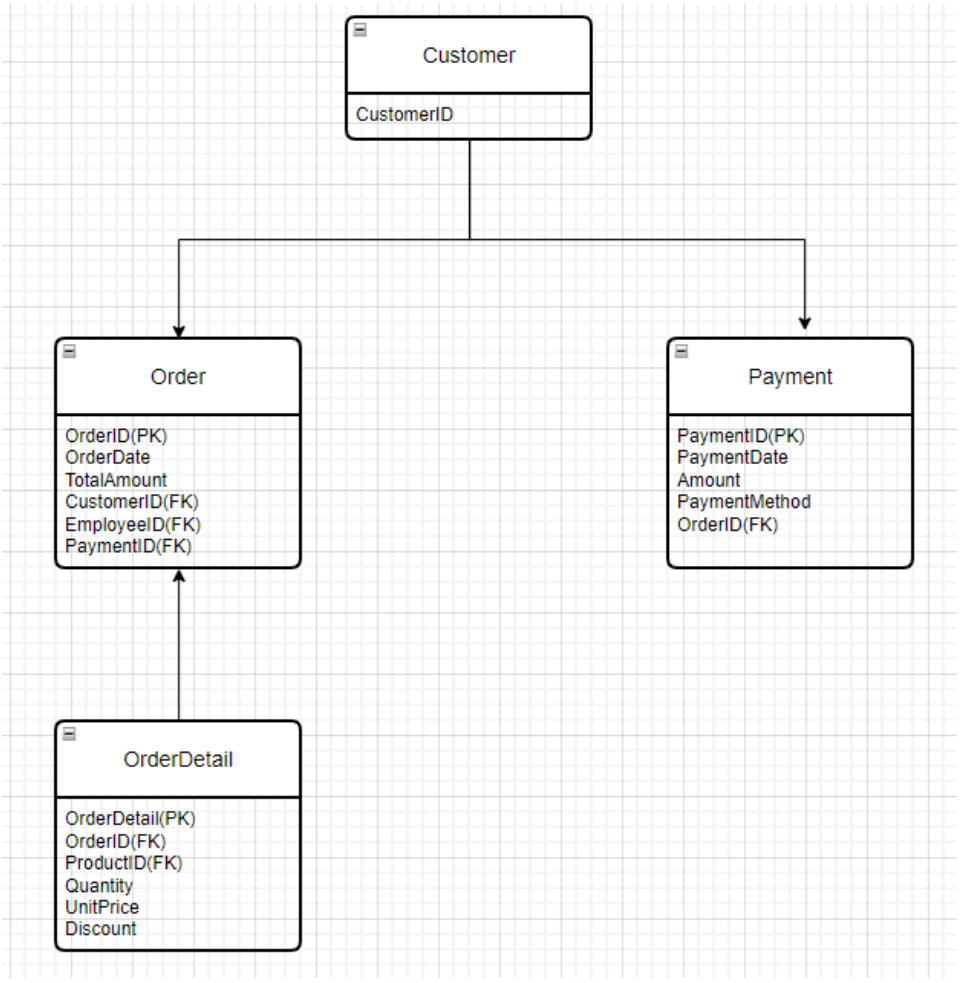
B. Unified Modeling Language (UML) Notation

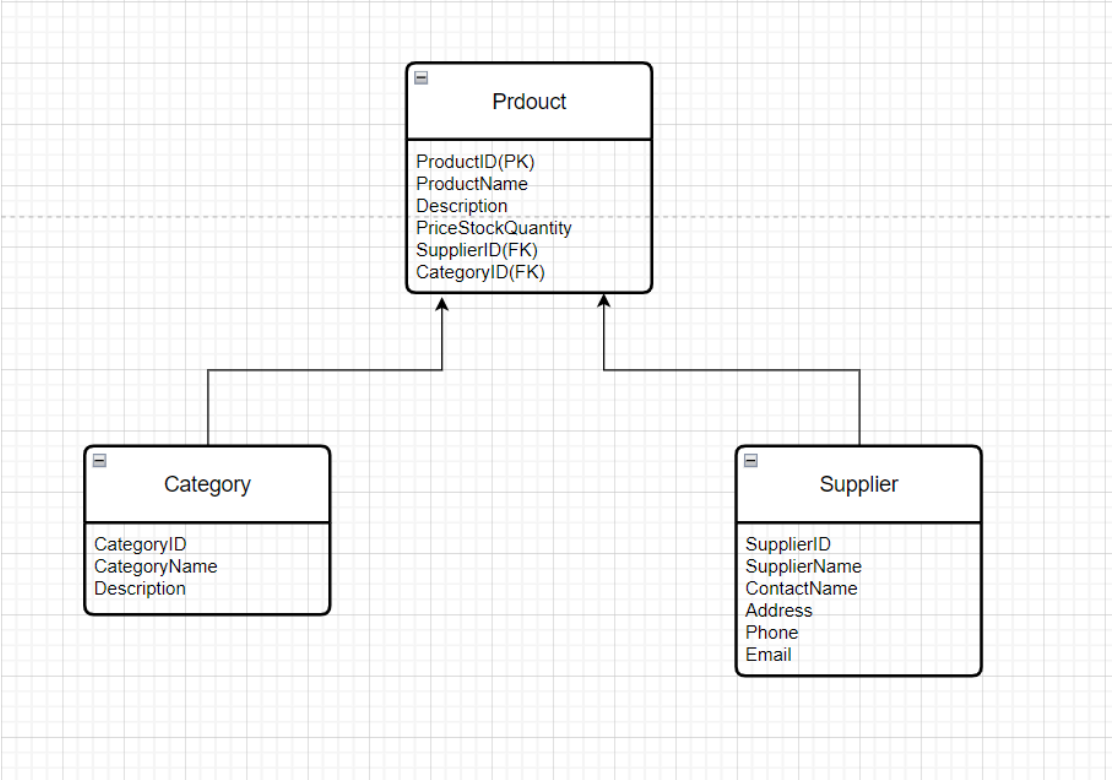


- A customer can have many orders.
- An order is handled by one employee.
- An order has one payment .
- An order can have many order details.
- An order detail is for one product.
- A product can be part of many order details.
- A product is supplied by one supplier.
- A product belongs to one category.
- An employee is managed by one admin.

B.3 SuperTypes/Sub-Types







C. Database, Tables, Primary and Foreign Keys, Database Normalization

Show the database design and identify the tables including primary and foreign keys

Show database tables normalization from general table comprising all data attributes to:

General Table

adminID	AdminName	Email	Phone	Role	EmployeeID	Name	Position	Phone	Email	CustomerID
James123	James	james@gmail.com	09456	Cashier	01	Julianne	Mechanic	09543	julianne@gmail.com	001
Ivan456	Ivan	ivan@gmail.com	09123	IT	02	Romar	cashier	09876	romar@gmail.com	002

Fullname	Address	Phone	Email	OrderID	OrderDate	TotalAmount	PaymentID	PaymentDate	Amount	PaymentMethod
JacknJill	Brgy.Mogbongcogon	0912345	Jack@gmail.com	0001	01:06:2024	3000	00001	01:06:2024	3000	Cash
IanMejos	Brgy.Poblacion	09123678	Ian@gmail.com	0002	02:06:2024	5000	00002	02:06:2024	5000	Cash

OrderDetailID	Quantity	UnitPrice	Discount	ProductID	ProductName	Description	Price	StockQuantity	SupplerID	SupplierName	ContactName	Address	Phone	Email
123	3	1000	0		CST Tire	Tire	800	50	535274	RHEAN	Maria	DavaoCity	0934567	rhean@gmail.com
456	1	5000	0		Brake	RubberPad	2800	50	535200	Top	Job	Mati	0978954	top@gmail.com

1. First Normalization Form

adminID	AdminName	Email	Phone	Role	EmployeeID	Name	Position	Phone	Email	CustomerID
James123	James	james@gmail.com	09456	Cashier	01	Julianne	Mechanic	09543	julianne@gmail.com	001
Ivan456	Ivan	ivan@gmail.com	09123	IT	02	Romar	cashier	09876	romar@gmail.com	002

Fullname	Address	Phone	Email	OrderID	OrderDate	TotalAmount	PaymentID	PaymentDate	Amount	PaymentMethod
JacknJill	Brgy.Mogbongcogon	0912345	Jack@gmail.com	0001	01:06:2024	3000	00001	01:06:2024	3000	Cash
IanMejos	Brgy.Poblacion	09123678	Ian@gmail.com	0002	02:06:2024	5000	00002	02:06:2024	5000	Cash

OrderDetailID	Quantity	UnitPrice	Discount	ProductID	ProductName	Description	Price	StockQuantity	SupplerID	SupplierName	ContactName	Address	Phone	Email
123	3	1000	0		CST Tire	Tire	800	50	535274	RHEAN	Maria	DavaoCity	0934567	rhean@gmail.com
456	1	5000	0		Brake	RubberPad	2800	50	535200	Top	Job	Mati	0978954	top@gmail.com

2. Second Normalization Form

Admin Table:

adminID	AdminName	Email	Phone	Role
James123	James	james@gmail.com	09456	Cashier
Ivan456	Ivan	ivan@gmail.com	09123	IT

Employee Table:

AdminID	EmployeeID	Name	Position	Phone	Email
James123	01	Julianne	Mechanic	09543	julianne@gmail.com
Ivan456	02	Romar	cashier	09876	romar@gmail.com

Customer Table:

CustomerID	Fullname	Address	Phone	Email
001	JacknJill	Brgy.Mogbongcogon	0912345	Jack@gmail.com
002	IanMejos	Brgy.Poblacion	09123678	Ian@gmail.com

Order Table:

OrderID	CustomerID	EmployeeID	PaymentID	OrderDate	TotalAmount
0001	001	01	00001	01:06:2024	3000
0002	002	02	00002	02:06:2024	5000

Payment Table:

PaymentID	OrderID	PaymentDate	Amount	PaymentMethod
00001	0001	01:06:2024	3000	Cash
00002	0002	02:06:2024	5000	Cash

OrderDetails Table:

OrderDetailID	OrderID	ProductID	Quantity	UnitPrice	Discount
123	0001	12345	3	1000	0
456	0002	6789	1	5000	0

Products Table:

ProductID	SupplierID	Category	ProductName	Description	Price	StockQuantity
12345	535274	Tire	CST Tire	Tire	800	50
6789	535200	Part	Brake	RubberPad	2800	50

Supplier Table:

SupplierID	SupplierName	ContactName	Address	Phone	Email
535274	RHEAN	Maria	DavaoCity	0934567	rhean@gmail.com
535200	Top	Job	Mati	0978954	top@gmail.com

3. **Third Normalization Form or beyond (4th or 5th Normal Form)**

The same as the 2nd Normalized Form since there are no other transitive dependencies to be found.

D. Data Dictionary

- ‘admin’ Table

Field	Type	Size	Description
adminID	varchar	255	Displays admin ID
Email	varchar	255	Admin Email
Name	varchar	255	Admin name
Phone	bigint	20	Admin contact number
Role	varchar	255	Admin’s role

- ‘customer’ Table

Field	Type	Size	Description
customerID	varchar	255	Customer Identification
Fullname	varchar	255	Customer first name
Address	varchar	255	Customer’s address
Email	varchar	255	Customer email
Phone	bigint	255	Customer contact number

- ‘order’’ Table

Field	Type	Size	Description
OrderID	bigint	20	Displays order ID
OrderDate	date	-	Date the order was made
TotalAmount	bigint	20	Total amount of order
CustomerID	int	11	Customer Identification
EmployeeID	int	11	Employee Identification
PaymentID	varchar	255	Payment ID

- ‘product’ Table

Field	Type	Size	Description
ProductID	varchar	255	Displays product ID
Category	varchar	255	Display product/s category
ProductName	varchar	255	Displays product’s name
Description	varchar	255	Product general description
Price	varchar	255	Price of the product/s

StockQuantity	int	255	Number of stocks available
SupplierID	varchar	255	Supplier unique identification

- ‘supplier’ Table

Field	Type	Size	Description
SupplierID	varchar	255	Supplier unique identification
SupplierName	varchar	255	Supplier name
ContactName	varchar	255	Supplier contact name
Address	varchar	255	Supplier base location
Phone	int	11	Supplier phone number
Email	varchar	255	Supplier email address

- ‘payment’ Table

Field	Type	Size	Description
PaymentID	varchar	255	Payment unique identification
PaymentDate	date	-	Payment Date
Amount	varchar	255	Payment total
PaymentMethod	varchar	255	Method of payment
OrderID	int	11	Displays order ID

- ‘orderdetails’ Table

Field	Type	Size	Description
OrderDetailID	varchar	255	Order detail unique identification
ProductID	varchar	255	Product unique identifier
Quantity	int	11	Number of items
UnitPrice	int	11	Price per item
OrderID	int	11	Displays order ID
Discount	int	11	Less from total amount

- ‘employee’ Table

Field	Type	Size	Description
EmployeeID	varchar	255	Order detail unique identification
AdminID	varchar	255	Admin unique identifier
Name	varchar	255	Employee’s name
Position	varchar	255	employee job position

Phone	int	11	Employee phone number
Email	varchar	255	Employee email address

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