Phase III – Logical Model Design

Project Title: E-commerce Order Management System

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# 1. Entities and Attributes

* Customer:
* - customer\_id (PK)
* - full\_name
* - email
* - phone
* - address
* Product:
* - product\_id (PK)
* - name
* - description
* - price
* - stock\_quantity
* Orders:
* - order\_id (PK)
* - order\_date
* - status
* - customer\_id (FK)
* Order\_Item:
* - order\_id (FK)
* - product\_id (FK)
* - quantity
* - unit\_price
* Payment:
* - payment\_id (PK)
* - order\_id (FK)
* - amount
* - payment\_date
* - method
* - status
* Shipment:
* - shipment\_id (PK)
* - order\_id (FK)
* - ship\_date
* - carrier
* - tracking\_number
* - status
* Manager:
* - manager\_id (PK)
* - name
* - email
* Order\_Approval:
* - order\_id (FK)
* - manager\_id (FK)
* - approval\_date

# 2. Relationships

* A Customer can place many Orders (1:M)
* An Order can have many Order\_Items (1:M)
* An Order\_Item links Orders to Products (M:N)
* An Order has one Payment (1:1)
* An Order can have one Shipment (1:1)
* A Manager can approve many Orders (1:M)
* An Order can be approved by one Manager (optional)

# 3. Normalization

All tables are normalized to Third Normal Form (3NF):

- No repeating groups (1NF)

- All non-key attributes fully depend on the primary key (2NF)

- No transitive dependencies (3NF)

# 4. ER Diagram

The following diagram visualizes the logical model for the E-commerce Order Management System.

