

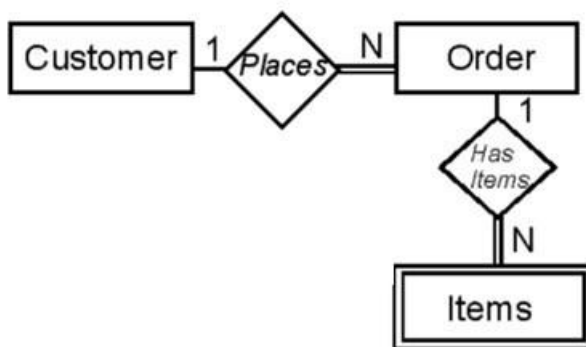
**Assignment 1:** Analyze a given business scenario and create an ER diagram that includes entities, relationships, attributes, and cardinality. Ensure that the diagram reflects proper normalization up to the third normal form.

### Step 1: Understanding the Business Scenario

- Identify the key business processes.
- Determine the necessary entities, their attributes, and relationships.
- Define the cardinality constraints for each relationship.

#### Business Scenario:

- Customers place orders.
- Each order consists of multiple items.
- Orders are processed based on the given ER diagram.



### Step 2: Identifying Entities & Attributes

#### Entities and Their Attributes:

1. **Customer** (*Customer\_ID*, Name, Contact\_Info)
2. **Order** (*Order\_ID*, Order\_Date, Customer\_ID)
3. **Items** (*Item\_ID*, Item\_Name, Price)
4. **Order\_Items** (*Order\_ID*, *Item\_ID*, Quantity)

### Step 3: Defining Relationships & Cardinality

1. **Customer places Orders (1:N)** - One customer can place multiple orders, but an order belongs to one customer.
2. **Order contains Items (1:N)** - One order can contain multiple items, but each item belongs to only one order.

Based on the provided ER diagram, these relationships are properly defined.

#### **Step 4: Normalization (Up to 3NF)**

##### **1. 1NF (Eliminate Duplicate Data & Ensure Atomicity)**

- Separate Order\_Items to handle the relationship between Orders and Items.
- Ensure all attributes contain atomic values.

##### **2. 2NF (Eliminate Partial Dependencies)**

- Order\_Items is correctly structured with only composite primary keys (Order\_ID, Item\_ID).

##### **3. 3NF (Eliminate Transitive Dependencies)**

- Order table refers to Customer\_ID directly.

#### **Final Normalized Schema:**

Customer(Customer\_ID, Name, Contact\_Info)

Order(Order\_ID, Order\_Date, Customer\_ID)

Items(Item\_ID, Item\_Name, Price)

Order\_Items(Order\_ID, Item\_ID, Quantity)