# Data management and system design

# Deliverable 1

**Team Number:** 11

**Section:** CS-631 009

**Team Members:**
Shivrishvith Palthyavathu (SP2962)
Vinay Ram Gazula (VG472)
Ganesh sai Ravuru (GR359)

**Database Design and Conceptual Schema**

**1.Goals of this Phase:**
Understanding the requirements and limitations of the database system, identifying the key entities, relationships, and attributes, and visually representing them in a conceptual schema (Extended ER diagram) are the main goals of this phase. This aids in determining the user needs and offers a conceptual picture of the database, which will act as a guide for the actual physical design in later stages.

**2. Extended ER Diagram:**
The ER Diagram is attached at the end of this document.

**Entities and Attributes:**

1. Customer:
   - Primary Key: CustomerID
   - Attributes: FirstName, Surname, HomeAddress, Telephone, Email, Status (regular, silver, gold, platinum), CreditAmount (derived for silver and above status)

2. CreditCard:
   - Primary Key: CardNumber
   - Attributes: SecurityNumber, OwnerName, BillingAddress, CardType, ExpiryDate
   - Foreign Key: CustomerID (referencing Customer)

3. ShippingAddress:
   - Composite Key: AddressName, CustomerID
   - Attributes: ZipCode, StreetName, StreetNumber, City, State, Country

4. Product:
   - Primary Key: ProductID
   - Attributes: Product Name, Recommended Price, Product Description, QuantityInStock
   - Foreign Key: ProductTypeID (referencing ProductType)

5. Offer:
   - Primary Key: OfferID

- Attributes: OfferPrice
- Foreign Key: ProductID (referencing Product)

6. ShoppingBasket:
- Primary Key: BasketID
- Attributes: Products(Prod ID, Quantity), Total amount
- Foreign Key: CustomerID (referencing Customer)

7. SalesTransaction:
- Primary Key: TransactionID
- Attributes: Transaction Status

8. ProductType:
- Primary Key: ProductID
- Attributes: TypeName, MainCategory, CPUType (for Desktop and Laptop), Weight (for Laptop), BatteryRuntime (for Laptop), Resolution (for Printer), PrinterType (for Printer), Product quantity, Product name, Product description, Price, Product type.

**3. Assumptions:**

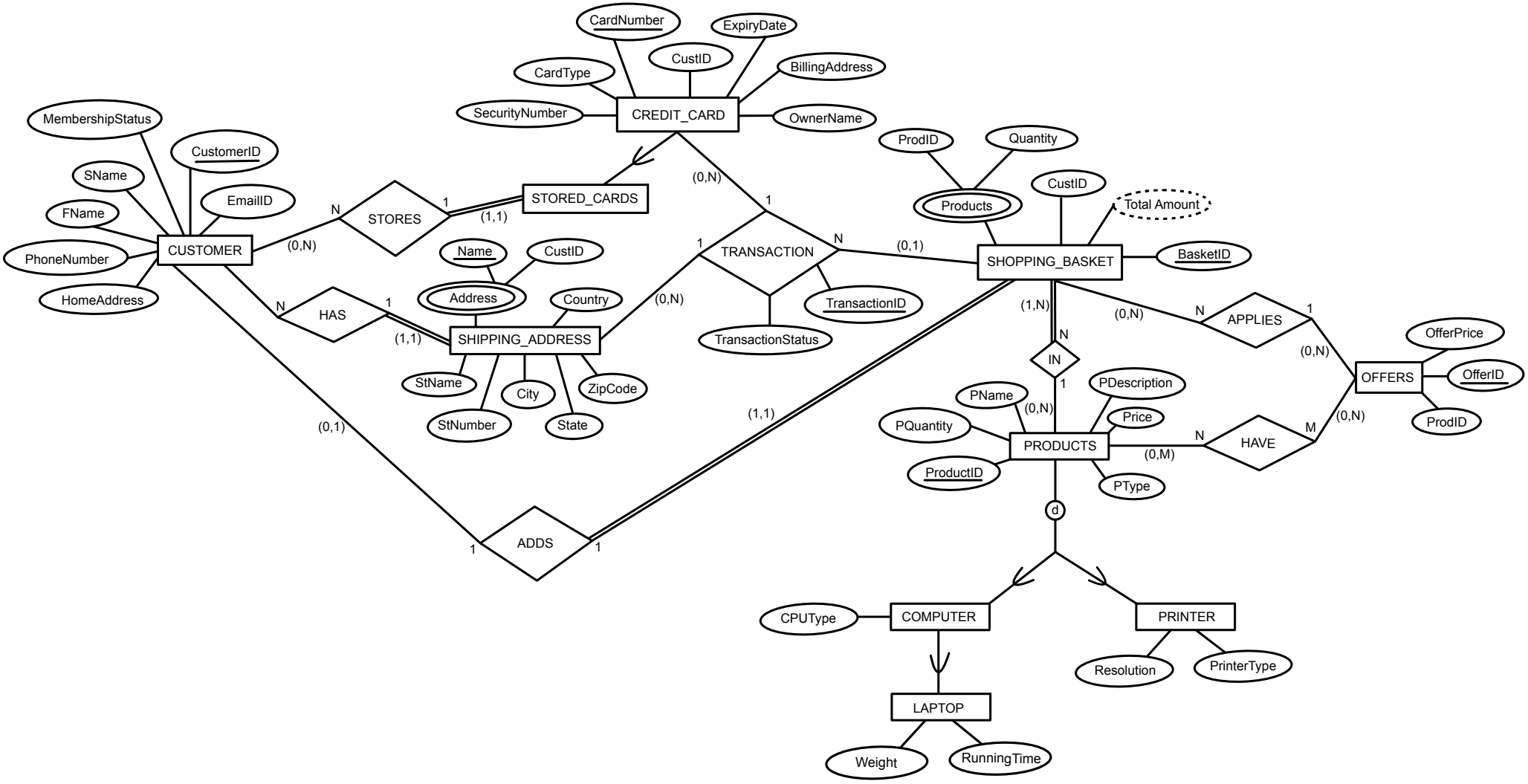
- Each customer has only one primary home address.
- The CardNumber associated with CreditCard is unique in both worldwide and for each individual client.
- A product may only be offered in one type of offer at a time.
- The Many to Many relationship between Product and ShoppingBasket is created using the Basket_Product bridge entity.
- The TypeID in the ProductType entity and the ProductTypeID's ProductTypeID are related.

**4. Additional Constraints:**

- Every product must belong to a ProductType.
- The Status attribute in Customer can only have values from the set {regular, silver, gold, platinum}.
- The MainCategory attribute in ProductType can only have values from the set {Desktop computers, laptops, printers, other}.
- ShoppingBasket must always contain at least one product.
- The shopping basket will only come into existence once, a product is added into the basket.

## 5. Difficulties Faced:

- Deciding whether or not the credit card number for the credit card should be globally unique.
- Including all of the restrictions in the ER diagram, particularly the semantic ones that are difficult to visualize.




Assumptions:

1. A customer has only one basket.
2. A customer can have multiple shipping addresses but they should have different names.
3. A customer can place an order using saved cards or a new card.
4. A basket is created only when a customer adds a product.
5. An offer is only applied if the customer membership status is gold or platinum.