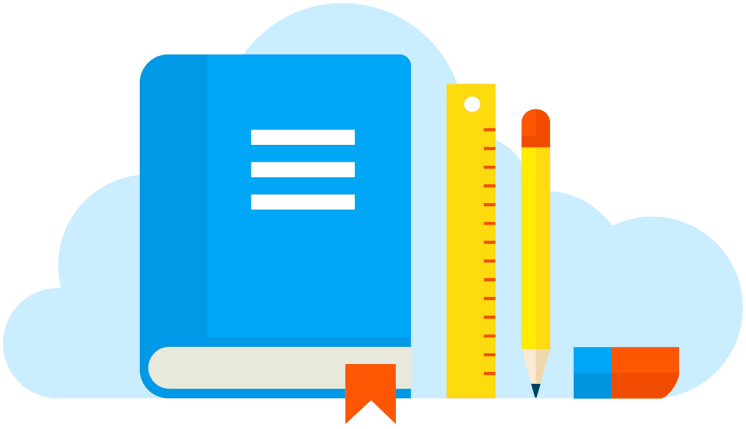

WebMart

Date: 10/02/2023

Small Summary

We have designed and implemented a database system with 8 SQL tables that follow the ER model and Relational model principles.It contains several entities such as Admins, Retailers, Categories, Products, Delivery Agents, Customers, Orders, and a Cart. These entities are linked through foreign keys, and constraints have been added to ensure that only valid data is stored in the database.

Entities and their attributes

1. **Admins**: This entity represents the administrative users of the online retail store.The entity has the following attributes:

- Admin_ID: A unique identifier for each administrator, which is automatically generated.
- Admin_fName: The first name of the administrator.
- Admin_mName: The middle name of the administrator.
- Admin_lName: The last name of the administrator.
- Admin_Age: The age of the administrator.
- Admin_Gender: The gender of the administrator, which is a fixed list of options ('Male', 'Female', 'Other').
- Admin_Username: The username of the administrator.
- Admin_Pwd: The password of the administrator.

2. **Retailer**: This entity represents the retailers who are selling products in the online retail store. The entity has the following attributes:

- Retailer_ID: A unique identifier for each retailer, which is automatically generated.
- Retailer_fName: The first name of the retailer.
- Retailer_mName: The middle name of the retailer.
- Retailer_lName: The last name of the retailer.
- Admin_ID: The identifier of the administrator who is associated with the retailer. This attribute is a foreign key, which references the Admin_ID attribute of the Admins entity.

3. **Category**: This entity represents the different categories of products that are available in the online retail store. The entity has the following attributes:

- Category_ID: A unique identifier for each category, which is automatically generated.
- Category_Name: The name of the category.
- Category_Discount: The discount that is applied to the products in this category.
- Category_Description: A description of the category.
- Admin_ID: The identifier of the administrator who is associated with the category. This attribute is a foreign key, which references the Admin_ID attribute of the Admins entity.

4. **Product**: This entity represents the products that are available for purchase in the online retail store. The entity has the following attributes:

- Product_ID: A unique identifier for each product, which is automatically generated.
- Product_Name: The name of the product.
- Product_Price: The price of the product.
- Product_Quantity: The quantity of the product that is available for purchase.
- Product_Discount: The discount that is applied to the product.
- Product_Description: A description of the product.
- Product_Image: An image of the product.
- Category_ID: The identifier of the category that the product belongs to. This attribute is a foreign key, which references the Category_ID attribute of the Category entity.

- Retailer_ID: The identifier of the retailer who is selling the product. This attribute is a foreign key, which references the Retailer_ID attribute of the Retailer entity.

5. **Customer** : This entity stores the information about the customers of the online retail store. The entity has the following attributes:

- User_ID: a unique identifier for each customer, generated automatically and cannot be null.
- User_fName: the first name of the customer, with a maximum length of 30 characters and cannot be null.
- User_mName: the middle name of the customer, with a maximum length of 30 characters.
- User_lName: the last name of the customer, with a maximum length of 30 characters and cannot be null.
- User_Gender: the gender of the customer, with a value of Male, Female, or Other, and cannot be null.
- User_Age: the age of the customer and cannot be null.
- User_Address: the address of the customer and cannot be null.
- User_phoneNumber: the phone number of the customer, with a maximum length of 11 characters and cannot be null.

6. **Delivery Agent** : This entity stores the information about the delivery agents who are responsible for delivering the products to the customers. The entity has the following attributes:

- DeliveryAgent_ID: a unique identifier for each delivery agent, generated automatically and cannot be null.
- DeliveryAgent_fName: the first name of the delivery agent, with a maximum length of 30 characters and cannot be null.
- DeliveryAgent_mName: the middle name of the delivery agent, with a maximum length of 30 characters.

- DeliveryAgent_lName: the last name of the delivery agent, with a maximum length of 30 characters and cannot be null.
- DeliveryAgent_Gender: the gender of the delivery agent, with a value of Male, Female, or Other, and cannot be null.
- DeliveryAgent_Age: the age of the delivery agent and cannot be null.
- DeliveryAgent_PhoneNumber: the phone number of the delivery agent, with a maximum length of 11 characters and cannot be null.
- DeliveryAgent_Rating: the rating of the delivery agent, with a value of type float.

7. **Order** : This entity is used to store information about the orders placed by the customers. The table contains the following attributes:

- Order_ID: A unique identifier for each order placed.
- User_ID: The identifier of the customer who placed the order. This attribute references the User_ID attribute of the Customer table.
- DeliveryAgent_ID: The identifier of the delivery agent who will deliver the order. This attribute references the DeliveryAgent_ID attribute of the DeliveryAgent table.
- Order_Amount: The total cost of the order, including all products and any shipping fees.
- Order_Date: The date on which the order was placed.
- Order_Day: The day on which the order was placed.
- Order_Month: The month in which the order was placed.
- Order_Year: The year in which the order was placed.

8. **Cart** : This entity is used to store information about the items in a customer's shopping cart. The table has the following attributes:

- User_ID: The identifier of the customer who owns the cart. This attribute references the User_ID attribute of the Customer table.

- Product_ID: The identifier of the product in the cart. This attribute references the Product_ID attribute of the Product table.

Data and it's constraint

In the database management system, several constraints have been added to ensure data consistency and maintain the relationship between the entities.

In the "Admins" entity, the "Admin_ID" field has been set as the primary key, which means that it must be unique and non-null for every record in the table. The "Admin_fName", "Admin_lName", and "Admin_Username" fields have been set as "NOT NULL" to indicate that these fields must have a value for every record.

In the "Retailer" entity, the "Retailer_ID" field has been set as the primary key and the "Admin_ID" field has been set as a foreign key referencing the "Admins" entity, thus creating a one-to-many relationship between the two entities.

In the "Category" entity, the "Category_ID" field has been set as the primary key and the "Admin_ID" field has been set as a foreign key referencing the "Admins" entity. The "Category_Name" field has been set as "NOT NULL" to indicate that it must have a value for every record in the table.

In the "Product" entity, the "Product_ID" field has been set as the primary key, and the "Category_ID" and "Retailer_ID" fields have been set as foreign keys referencing the "Category" and "Retailer" entities, respectively. The "Product_Name" and "Product_Price" fields have been set as "NOT NULL" to indicate that these fields must have a value for every record in the table.

In the "DeliveryAgent" entity, the "DeliveryAgent_ID" field has been set as the primary key and the "DeliveryAgent_Age" field has been set as "NOT NULL". An additional constraint "age_check" has been added to the entity to ensure that the value of the

"DeliveryAgent_Age" field must be greater than or equal to 10 for every record in the table.

In the "Customer" entity, the "User_ID" field has been set as the primary key and the "User_Age" field has been set as "NOT NULL". An additional constraint "age_checks" has been added to the entity to ensure that the value of the "User_Age" field must be greater than or equal to 10 for every record in the table.

In the "Orders" entity, the "Order_ID" field has been set as the primary key, and the "User_ID" and "DeliveryAgent_ID" fields have been set as foreign keys referencing the "Customer" and "DeliveryAgent" entities, respectively. The "Order_Amount", "Order_Date", "Order_Day", "Order_Month", and "Order_Year" fields have been set as "NOT NULL" to indicate that these fields must have a value for every record in the table.

In the "Cart" entity, the "User_ID" and "Product_ID" fields have been set as foreign keys referencing the "Customer" and "Product" entities, respectively.

Additionally, the database has two constraints added to ensure the validity of the data:

- The DeliveryAgent table has a constraint named age_check which ensures that the delivery agent's age is at least 10.
- The Customer table has a constraint named age_checks which ensures that the customer's age is at least 10.

Randomly Generated Data : The image shows the amount of rows generated for each entity. To maintain the hierarchy the number of admins have been kept 5. Each admin manages 10 retailers as there are 50 retailers. Also each admin manages 2 categories as there are 10 categories. The number of orders is less than the number of customers as all the customers might not have placed an order. The amount of rows are chosen such as to maintain proper flow of the database and at the same time the data should be realistic. For example we cannot have the same number of products and categories, the number of products is always greater than or equal to the number of categories. Also the constraints mentioned above have been taken care when generating the data.

Table	Rows
Orders	50
Product	50
Cart	100
DeliveryAgent	100
Retailer	50
Category	10
Admins	5
Customer	100