Logical(Relational) Model
Project : Marketplace for University Student

Group 16

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Percentage of Effort Contributed by Student 1: 50%

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Logical Model

Representation : Primary key(bold underline), foreign key(underline)

1. University (**Uni_ID**, Uni_Name, Uni_Address)

2. User (**User_ID**, Name, Email, Address)

3. Seller (**User_ID,** Uni_ID)
   Uni_ID is a foreign key and refers to university and it cannot have NULL value.

4. Buyer (**User_ID,** Uni_ID)
   Uni_ID is a foreign key and refers to university and it cannot have NULL value.

5. Product (**Prod_No**, Name, P_Type, Description, User ID(s), Order_No)
   User ID(s) and Order_No are foreign keys. User ID(s) cannot have NULL value while Order_No is NULL allowed.

6. Order (**Order_No**, Date, Status, Pay_ID)
   Pay_ID is a foreign key and is NULL allowed.

7. Payment (**Pay_ID**, Amount, Date, P_Type)

8. Delivery (**Del_ID**, Order_No)
   Order_No is foreign key and it cannot have NULL value.

9. Pick-Up (**Del_ID**, Time, Address, Order_No)
   Order_No is a foreign key and it cannot have NULL value.

10. Courier (**Del-ID**, Company_Name, Tracking_ID, Charge, Del_Time, Order_No)
    Order_No is a foreign key and it cannot have NULL value.

Normalization

- University: This relation is already in 1st Normal Form (1NF) because it has a unique identifier and atomic values.

- User: This relation is already in 1NF because it has a unique identifier and atomic values.

- Seller: This relation is already in 1NF because it has a composite primary key made up of two foreign keys.

- Buyer: This relation is already in 1NF because it has a composite primary key made up of two foreign keys.

- Product: This relation is not in 1NF because the User ID(s) attribute contains multiple values. It should be split into a separate table. When split into two tables, Product and Product_User can be said to be in 2NF.

  Product (**Prod_No**, Name, P_Type, Description)
  Product_User (**Prod_No**, User_ID, Order_No)

- Order: This relation is already in 1NF because it has a unique identifier and atomic values.

- Payment: This relation is already in 1NF because it has a unique identifier and atomic values.

- Delivery: This relation is already in 1NF because it has a unique identifier and a foreign key that cannot have a NULL value.

- Pick-Up: This relation is already in 1NF because it has a unique identifier and foreign key that cannot have a NULL value.

- Courier: This relation is already in 1NF because it has a unique identifier and foreign key that cannot have a NULL value.