P2. Database Design, Initial ERD
DMDD PROJECT
Online shoe marketplace

Business Problems being addressed by the database:

1. Customers often struggle to find a variety of shoe styles, brands, and sizes in physical stores. Online shoe marketplaces aggregate products from multiple sellers, providing customers with a vast selection to choose from.

2. Online shoe marketplaces offer a convenient shopping experience, allowing customers to browse and purchase shoes from the comfort of their homes.

3. Customers can easily compare prices and deals on different shoe brands and styles. This transparency encourages competitive pricing among sellers and helps buyers find the best value for their money.

4. Online marketplaces feature customer reviews and ratings, providing valuable information to potential buyers. This helps customers make informed decisions.

5. Sellers can efficiently manage their inventory through online marketplaces, tracking sales and stock levels in real-time. This reduces the risk of overstocking or running out of popular shoe models.

6. Online marketplaces handle payment processing, reducing the administrative burden on sellers. This ensures secure transactions for both parties.

Entities and its attributes:

1. Customer
   - Customer ID (Primary Key)
   - Username
   - Email
   - Password (hashed)
   - First Name
   - Last Name
   - Address
   - Payment Methods

2. Brand:
   - Brand ID (Primary Key)
   - Brand Name

3. Category
   - Category ID (Primary Key)
   - Category Name

4. Shoe Product
   - Product ID (Primary Key)
   - Product Name
   - Product Description
   - Brand ID (Foreign Key)
   - Category ID (Foreign Key)
   - Price
   - Availability (in stock, out of stock)
   - Sizes Available
   - Colours Available

5. Order
   - Order ID (Primary Key)
   - User ID (Foreign Key)
   - Order Date
   - Shipping Address
   - Total Amount
   - Payment Status (e.g., paid, pending)
   - Order Status (e.g., processing, shipped, delivered)

6. Shopping Cart:
   - Cart ID (Primary Key)
   - Customer ID (Foreign Key)
   - Products (List of Product IDs)
   - Quantity (for each product)
   - Total Price

7. Payment Transaction:
   - Transaction ID (Primary Key)
   - CustomerID (Foreign Key)
   - Order ID (Foreign Key)
   - Payment Date
   - Payment Method
   - Amount Paid

8. Shipping:
   - Shipping ID (Primary Key)
   - Order ID (Foreign Key)
   - Shipment Date

9. Supplier:
   - Supplier ID (Primary Key)
   - Supplier Name
   - Contact Information
   - Shoe Brands Supplied

10. Inventory:
   - Inventory ID (Primary Key)
   - Product ID (Foreign Key)
   - Stock Quantity

11. Review:
   - Review ID (Primary Key)
   - Product ID (Foreign Key)
   - User ID (Foreign Key)
   - Rating (e.g., 1 to 5 stars)
   - Review Description

Flow of Data:

1. A Customer can browse and add Shoe Products to their Shopping Cart.
2. Customers can place an Order from their shopping cart, which includes their shipping address and triggers a Payment Transaction.
3. Payment transactions record the payment details made by a Customer for a specific Order.
4. After an order is placed and paid, it can be shipped, and a Shipping record is created.
5. Shoe products are tracked in the Inventory, which records the stock quantity.
6. Reviews can be written by Customers for specific Shoe Products.
7. Shoe Products belong to a Brand and are categorised into a Category.
8. Suppliers provide shoe products to the store, and this information is linked to the Shoe Products they supply.

Relationship between Entities:

1. Customers and Their Orders:
 - Customer has a one-to-many relationship with Order, as one customer can place multiple orders. Every customer is permitted to make several orders. Similar to online shopping, you might purchase multiple pairs of shoes at various times. You placed each of these transactions as a request.

2. Customers and Payment Transactions:
 - Customer has a one-to-many relationship with Payment Transaction, as one customer can have multiple payment transactions. Just as you might use various payment methods or pay for certain orders separately, customers can make numerous payments. It also means that one customer may be the subject to multiple payment transactions.

3. Customers and Their Reviews:
 - Customer has a one-to-many relationship with Review, as one customer can write multiple reviews. Customers can submit feedback for shoes whether they like them or not. One consumer frequently writes numerous ratings for various pairs of shoes they've worn..

4. Orders and Their Payment Transactions:
 - Order has a one-to-many relationship with Payment Transaction, as one order can have multiple payment transactions. There may be several payment transactions for a single order. Consider placing an order to purchase multiple pairs of shoes and selecting to pay for each pair separately. As a result, the same order is the subject of many payment transactions.

5. Orders and Shipping Records:
 - Order has a one-to-one relationship with Shipping, as one order is associated with one shipping record. Every order you place has an individual shipping record associated with it. This record

makes simpler for both you and the seller to keep track of where and when your order will be delivered.

6. Customers and Their Shopping Carts:
 - Customer has a one-to-many relationship with Shopping Cart, as one customer can have multiple shopping carts. Customers can have a lot shopping carts for various reasons, just like in a physical store. For example, you may make different carts for athletic shoes and casual shoes.

7. Shopping Carts and Shoe Products:
 - Shopping Cart has a one-to-many relationship with Shoe Product, as one cart can have multiple products. A number of various shoe products may be combined together in a shopping basket. As you explore the market, you are free to add as many items as you like to your cart.

8. Payment Transactions and Orders:
 - Payment Transaction has a many-to-one relationship with Order, as multiple payment transactions can be associated with one order. A single order may be associated with multiple payment transactions. For instance, several payment transactions associated with the same purchase will happen if you pay for an order in instalments or with a variety of payment methods.

9. Shipping Records and Orders:
 - Shipping has a one-to-one relationship with Order, as one shipping record corresponds to one order. Each order is linked with a particular shipping record. It allows you to track the progress of your order and helps ensure that it is on its way to you.

10. Shoe Products and Their Brands:
 - Shoe Product has a many-to-one relationship with Brand, as multiple shoe products belong to one brand. There is one brand that is connected to many shoe products. Similar to how many shoe models are created by the same company.

11. Shoe Products and Their Categories:
 - Shoe Product has a many-to-one relationship with Category, as multiple shoe products can belong to one category. One category includes many different shoe goods. Sports shoes, for instance, can be broadly classed as "sports shoes."

12. Shoe Products and Orders:
 - Shoe Product has a one-to-many relationship with Order, as one shoe product can be part of multiple orders. One category includes many different shoe goods. Sports shoes, for instance, can be broadly classed as "sports shoes."

13. Shoe Products and Shopping Carts:
 - Shoe Product has a one-to-many relationship with Shopping Cart, as one shoe product can be added to multiple shopping carts. The same pair of shoes can be added to multiple shopping carts. You can keep track of the products you're interested in thanks to this flexibility.

14. Shoe Products and Inventory Records:
 - Shoe Product has a one-to-many relationship with Inventory, as one shoe product can be tracked in multiple inventory records. Many inventory records for each pair of shoes are kept track of. This is due to the possibility of multiple suppliers or separate storage facilities for the products.

15. Reviews and Customers:
 - Review has a many-to-one relationship with Customer, as multiple reviews can be written by one customer. You have the option of writing several reviews as a client. Therefore, if you feel strongly about various pairs of shoes, your reviews will be linked to your account.

16. Reviews and Shoe Products:
 - Review has a many-to-one relationship with Shoe Product, as multiple reviews can be written for one shoe product. One pair of shoes might be the subject of numerous evaluations. This is particularly typical for well-known products that lots of consumers have used and rated.17. Suppliers and Shoe Products:
 - Supplier has a one-to-many relationship with Shoe Product, as one supplier can provide multiple shoe products. The store receives a variety of shoes from suppliers. The various goods you see on the platform are provided by various suppliers.

Entity Relationship Diagram: