

Entity-Relationship Diagram (ERD) for Clothing E-Commerce

1. User (Users)

Function:

- Represents a user in the e-commerce system. This can be a customer who can make orders, add products to a cart, or add products to a wishlist.

Attributes:

- UserID (PK): Unique identifier for each user.
- Name: Name of the user.
- Email: User's email address (must be unique).
- Password: User's encrypted password for login.

Relationships:

- **User to Cart:** One-to-One relationship. A user can have only one cart.
 - User.UserID -> Cart.UserID
- **User to Order:** One-to-Many relationship. A user can have many orders.
 - User.UserID -> Order.UserID
- **User to Wishlist:** One-to-Many relationship. A user can have many wishlist entries.
 - User.UserID -> Wishlist.UserID

2. Cart (Cart)

Function:

- Stores the cart information for a user. This includes the list of products added to the cart before making a purchase.

Attributes:

- CartID (PK): Unique identifier for each cart.
- UserID (FK): The user to whom this cart belongs.

Relationships:

- **Cart to CartItem:** One-to-Many relationship. A cart can contain multiple items (through the CartItems table).
 - Cart.CartID -> CartItem.CartID
- **Cart to User:** One-to-One relationship. Each cart is owned by a single user.
 - Cart.UserID -> User.UserID

3. CartItem (CartItem)

Function:

- Represents each product in a user's cart, including the quantity and size of the product.

Attributes:

- CartItemID (PK): Unique identifier for each cart item.
- CartID (FK): The cart to which this item belongs.
- ProductID (FK): The product that has been added to the cart.
- Quantity: Quantity of the product in the cart.
- Size: Size of the product selected (e.g., Small, Medium, Large).

Relationships:

- **CartItem to Cart:** Many-to-One relationship. A cart item is associated with one cart.
 - CartItem.CartID -> Cart.CartID
- **CartItem to Product:** Many-to-One relationship. A cart item refers to a specific product.
 - CartItem.ProductID -> Product.ProductID

4. Order (Orders)

Function:

- Represents an order made by a user. This includes order details such as the total amount, shipping address, and payment method.

Attributes:

- OrderID (PK): Unique identifier for each order.
- UserID (FK): The user who placed the order.
- TotalAmount: Total amount of the order.
- ShippingAddress: Address where the order will be shipped.
- PaymentMethod: The method used for payment (e.g., Visa, COD).
- Status: Current status of the order (e.g., Delivered, Shipped, Pending).
- CreatedAt: Timestamp when the order was created.
- UpdatedAt: Timestamp when the order was last updated.
- TrackingNumber: Shipping tracking number.

Relationships:

- **Order to OrderItem:** One-to-Many relationship. An order can have multiple items (through the OrderItems table).
 - Order.OrderID -> OrderItem.OrderID
- **Order to User:** Many-to-One relationship. An order is placed by one user.
 - Order.UserID -> User.UserID

5. OrderItem (OrderItems)

Function:

- Represents an individual product within an order. It includes the quantity, price, discount, and size for each product in the order.

Attributes:

- OrderItemID (PK): Unique identifier for each order item.
- OrderID (FK): The order this item is associated with.
- ProductID (FK): The product that was purchased.
- Quantity: The quantity of the product in the order.
- Price: The price of the product when the order was placed.
- Discount: Any discount applied to the product.
- Size: Size of the product (if applicable).

Relationships:

- **OrderItem to Order:** Many-to-One relationship. An order item belongs to one order.
 - OrderItem.OrderID -> Order.OrderID
- **OrderItem to Product:** Many-to-One relationship. An order item refers to a specific product.
 - OrderItem.ProductID -> Product.ProductID

6. Product (Products)

Function:

- Represents the products available for purchase in the e-commerce system. This includes product details like name, price, description, and sizes.

Attributes:

- ProductID (PK): Unique identifier for each product.
- Name: The name of the product.
- Price: The price of the product.
- ImageURL: URL for the product image.
- Description: Short description of the product.
- Sizes: Available sizes for the product (e.g., S, M, L, XL).

Relationships:

- **Product to CartItem:** Many-to-One relationship. A product can appear in multiple cart items.
 - Product.ProductID -> CartItem.ProductID
- **Product to OrderItem:** Many-to-One relationship. A product can appear in multiple order items.
 - Product.ProductID -> OrderItem.ProductID
- **Product to Wishlist:** Many-to-Many relationship. A product can appear in multiple wishlist entries.
 - Product.ProductID -> Wishlist.ProductID

7. Wishlist (Wishlist)

Function:

- Represents a user's wishlist. Users can add products to their wishlist for future purchases.

Attributes:

- WishlistID (PK): Unique identifier for each wishlist entry.
- UserID (FK): The user who added the product to the wishlist.
- ProductID (FK): The product that is in the wishlist.

Relationships:

- **Wishlist to User:** Many-to-One relationship. A wishlist entry belongs to one user.
 - Wishlist.UserID -> User.UserID
- **Wishlist to Product:** Many-to-One relationship. A product can appear in many wishlists.
 - Wishlist.ProductID -> Product.ProductID

Summary of Relationships:

- **User to Cart:** One-to-One (User.UserID -> Cart.UserID)
- **User to Order:** One-to-Many (User.UserID -> Order.UserID)
- **User to Wishlist:** One-to-Many (User.UserID -> Wishlist.UserID)
- **Cart to CartItem:** One-to-Many (Cart.CartID -> CartItem.CartID)
- **CartItem to Product:** Many-to-One (CartItem.ProductID -> Product.ProductID)
- **Order to OrderItem:** One-to-Many (Order.OrderID -> OrderItem.OrderID)
- **OrderItem to Product:** Many-to-One (OrderItem.ProductID -> Product.ProductID)
- **Product to CartItem:** Many-to-One (Product.ProductID -> CartItem.ProductID)
- **Product to Wishlist:** Many-to-One (Product.ProductID -> Wishlist.ProductID)

