

Entities and Attributes

The “User” entity is a supertype that describes whether the person is a customer or an employee, both of which are the subtypes. The supertype has a “is-a” relationship with its subtypes. The relationship is generalized because the supertype cannot exist without being one of the subtypes. Although an employee can be a customer, and a customer can also be an employee, the relationship is also disjoint because while logged into the website, a user can only be one or the other. The “User” entity has the attributes “UserID”, “Address”, “Password”, “Email”, “Phone #”, “First Name”, and “Last Name”. All of these attributes are inherited by the subtypes. The primary key is “UserID” because it’ll uniquely identify each user.

The “Product” entity describes the details of a specific product. Its attributes are “ProductID”, “Product Name”, “Description”, “Price”, and “Stock Quantity”. The primary key for this entity is “ProductID”, which is the unique number provided to identify each product.

The “Order” entity describes the details of an order placed by a customer. Its attributes are “OrderID”, “Order Date”, “Status”, “Total Amount”, “Product ID”, and “Quantity”. The primary key for this entity is the “OrderID”, which is the unique number provided to identify each order.

The “Order Status” entity describes the shipping and tracking information for the order. Its attributes are “Tracking ID”, “Carrier”, and “Price”. The primary key for this entity is “TrackingID”.

The “Promo code” entity describes the details of a given promo code that a customer can apply to an order. Its attributes are “PromoCodeID”, “Discount”, and “ExpirationDate”. The primary key is “PromoCodeID” because it will uniquely identify which code the customer is trying to use.

Relationships and Cardinalities

Customer & Order: The relationship between customer and order is “placed” because the customer places an order. The cardinality is 1-to-many since 1 customer can place many orders.

Customer & Order: The relationship between customer and order is “is billed” because when the customer places an order, they need to submit their billing information. The intersection data for this relationship are the attributes “Name”, “CardNumber”, “CardExpiration”, “CVV”, and “BillingAddress”. The cardinality is 1-to-1 because only 1 customer gets billed for an order and only 1 order can get billed to the customer.

Order & Product: The relationship between order and product is “contains” because an order contains the products. The cardinality is 1-to-many since there is 1 order placed, but many products can be included in that order.

Order & Order Status: The relationship between order and order status is “has” since an order always exhibits a status that reflects its current processing stage. The intersection data for this relationship is the attribute “ConfirmationNumber”. The cardinality is 1-to-1 since for every 1 order, there can only be 1 status that goes along with it.

Order & Promo Code: The relationship between order and promo code is a weak entity since a promo code cannot exist without an order to attach itself to. Therefore, promo code is the weak entity, while order is the strong entity. The cardinality is optional 1-to-1 since a promo code is not a necessity for an order, and therefore an order can exist without a promo code.