

Assignment 4 – Database Design

E-R Design

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Abstract

The following lays out the requirements for building an E-R Database Diagram for a fictitious e-commerce company that wishes to keep track of its customers, their orders, the products they order, product vendors, and country of origin. This is done with the Order Entity Set, Vendor Entity Set, Customer Entity Set, Products Entity Set, Orders Relationship Set, Ordered Relationship Set, and the Supplies Relationship Set, all of which are a part of the design of this E-R Database Diagram. Each of the Entity Sets specifies an object, where each relationship set defines the correlation between two or more of the entity sets. Following the specifications is the E-R Database Diagram of this e-commerce company's database.

1.1 Database Requirements

1.1.1 The Order Entity Set

The **Order entity set** is comprised of time, date, and order id variables. The order id (o_id) is the primary key and main identifier of the order entity set. The Date variable is a multivalued variable that comprises of the day that the order was created, beginning with Year, followed by Month, then finally Day. The Time variable is the exact time of day that the order was created. Each order will be automatically timestamped with the date and time.

Customers can be found to have ordered many different products through the use of this entity set.

1.1.2 The Vendor Entity Set

The **Vendor entity set** is comprised of the country and vendor id variables. The vendor id (v_id) is the primary key and main identifier of the vendor entity set. The country variable is the location that the vendor is. Products will use this location as their origination location. The country variable in the vendor entity set should

not be confused with the country variable in the customer entity set.

1.1.3 The Customer Entity Set

The **Customer entity set** is comprised of address, birth year, phone, age, and customer id variables. The customer id (cust_id) is the primary key and main identifier of the customer entity set. The phone number is a multi-valued variable that contains a phone number as well as possible extension number for office phones. The Birth Year variable is the customer's birth year, this allows the company to ensure that users are of age if purchasing alcoholic or tobacco-based products, etc. The Age variable is a derived variable that is calculated using the Birth Year variable. The Address variable is a composite variable consisting of Street, City, Zip Code, State, and Country variables. The Street variable is the street that the customer wants their order shipped to. The City variable is the city that the customer lives in. The Zip Code variable is the zip code of the city that the customer lives in, which can also take in a 4-digit zip code extension. The State variable is the state that the customer lives in. The country

variable is the country that the customer lives in, which allows for the company to service multiple countries. The country variable in the customer entity set should not be confused with the country variable in the vendor entity set.

1.1.4 The Products Entity Set

The **Products entity set** is comprised of size, weight, quantity, price, and product id variables. The product ID (p_id) variable is the primary key and main identifier of the product entity set. The size variable is the size of the product. The weight variable is the weight of the product. The price variable is the monetary value of the product, which will add to the summed total in a customer's order. The quantity variable allows the customer to order a higher quantity of the product they want to buy.

1.1.5 The Orders Relationship Set

The **orders** relationship set defines the relationship between the Order entity set and the customers entity set. The relationship takes in the Order ID (o_id) and the Customer ID (cust_id). Customers can have multiple orders; however, an order can not have multiple customers, therefore the relationship is 1:N or 1-to-many with order being our 'many' entity set. Each order that the customer creates will be logged in the orders relationship set, hence there can be many orders attached to one customer id. This list will contain all of the orders that this company transacts.

1.1.6 The Ordered Relationship Set

The **ordered** relationship set defines the relationship between the product and the order set. A single order cannot have the same product twice, so the relationship is 1:N or 1-to-many with product being our 'many' set. Ordered takes in to account the product id (p_id), the size of the product whether it be: Small, Medium, Large, extra-large, extra-extra-large, etc., quantity of the product the customer is ordering, and the order id (o_id). A product can be defined as 'ordered' when the customer 'adds it to their cart' in a sense; this is where the ordered set comes in and keeps track of all of the ordered products.

1.1.7 The Supplies Relationship Set

The supplies relationship set defines the relationship between the Product entity set and the vendor entity set. A single vendor can supply multiple different products to the company which can be bought by the customer, so this is also a 1:N or 1-to-many relationship with product being our 'many' set. Products will be listed individually with their product id (p_id) alongside the vendor id that supplies the company with the product (v_id). Vendor IDs will appear multiple times. When a vendor supplies a new product, this will be updated to include the new product that will be listed alongside the vendor.

1.2 E-R Diagram

