

Database Design for Skincare Products Data Management

Group 6

1. Business problems

1-1 Purpose

In view of the flourishing skincare market, targeting customers' preferences accurately is of great importance in terms of maintaining a competitive edge. The purpose of the database is to maintain and integrate the data used to meet the needs of sales record management service, customer information management sales service, review management and other sub-services. The end users of the system are the retailers. With this system, retailers could monitor product sales, dig for potential customers and provide recommend service to the customers.

1-2 Business Problems Addressed

- (1) Maintain customer's information, order information, and product information.
- (2) Collect the data from each order such as customer's reviews and volume of sales to evaluate the product.
- (3) Recommend suitable products based on customer's personal information. (e.g., gender, age, and skin type)
- (4) Provide retailers with valuable statistics to forecast customer's demand and meet supplies.
- (5) Provide customers with a number of benefits, including subscription service and discounting event

1-3 Business Rules

- (1) Each customer only has one location address.
- (2) Each customer only has one customer personal information table.
- (3) Each customer has one email and phone number record stored in the database.
- (4) Each customer only has one skin type and one primary occupation.
- (5) Each customer can have none or many reviews.
- (6) Each customer can have zero or many orders.
- (7) Each order only has one location.
- (8) Each order should have one customer.
- (9) Each order is associated with one retailer.
- (10) Each order may have one or many order items.
- (11) Each order item contains at least one product information.
- (12) Each product should have one relative product information description.
- (13) Each product belongs to one subcategory.
- (14) Each subcategory belongs to one category.
- (15) Each product owns none or more review records.
- (16) Each review record may have an empty or one rating and comment.
- (17) Each review should belong to one product ID and one customer ID.
- (18) Each retailer can only have one retailer location address record.
- (19) Each customer will have zero or many subscribes.
- (20) Each subscriber will relate to at least one product.

2.Listing all entities and how they are related to each other, and explaining the key design decisions.

Entity	Relation to others	Key design decision
Customers	<p>The primary key of the Customer entity should be CustomerID, which is the unique key that links to all other entities. Every customer has ONLY one CustomerID.</p> <p>CustomerPersonalInfo: The primary key CustomerID relates to the CustomerPersonalInfo entity because we need the it to help us get every customer's basic information.</p> <p>CustomerLocation: The CustomerAddressID serves as a foreign key that links CustomerLocation entity with Customer entity. Every customer should have only one location.</p> <p>Reviews: Every customer can make some reviews of the products they bought. CustomerID serves as the foreign key links to the Reviews entity.</p> <p>Subscribe: Also, customers can subscribe the products they like and may buy them again. CustomerID is the foreign key which links to the Subscribe entity. Each customer can subscribe zero or many products.</p> <p>Orders: We can also track the orders made by customers through CustomerID, therefore CustomerID serves as the foreign key that links to the Order entity. Every customer can have zero or many orders.</p>	<p>Customer is the primary attribute of our Skincare products data management system. We want to collect different kinds of data (including customer's basic information, customer's personal information, customer's location, customer's review, customers subscribe and orders) to help the company understand their customers' needs and evaluate customers' demands, therefore to adjust the marketing strategies and guide marketing initiatives. Also, we used CustomerAddressID as a foreign key to link the CustomerLocation entity to provide more detailed information about the customers.</p>
CustomerLocation	<p>The CustomerLoaction entity is related to the Customer entity. The primary key is Customer AddressID, which is used to relate the entity to CustomerID. Each CustomerID only has one CustomerAdressID, but CustomerAdressID can only be associated with one CustomerID.</p>	<p>The CustomerLocation and address are very important information. They are used to contact the customer later. In addition to this, it also serves to communicate with customers in the long term and get feedback later.</p>
CustomerPersonalInfo	<p>The Customer Personal Info entity is related to the Customer entity and Product</p>	<p>The Customer Personal Information entity is used to store the personal</p>

	entity. The primary key is Customer ID. We can analyze the customers' purchase habits and performance to customize the future market and sale plan. The one customer personal information is related to the one CustomerID, which has one customer.	information, such as gender, skin type, occupation, and date of birth. This entity is listed separately from the Customer entity, which is used to store more information about customer preferences and consumption habits.
Retailers	The Retailers entity is related to Orders Entity and RetailerLocation entity. The primary key of this entity is RetailerID, which is used to related it to the Orders entity. The RetailerID is also the foreign key in Orders Entity. A retailer has one or many orders. The Retailers Entity is related to the RetailerLocation entity using the foreign key RetailerAddressID in it. A Retailer has only one RetailerLocation record.	The Retailers entity is the essential entity in this database to record retailer name and address. The information of this entity can be used to track the product sales under different retailers. Statistics can be done to forecast customer's demand and meet supplies by using this entity information.
RetailerLocation	The RetailerLocation is related to the Retailers entity. The primary key is RetailerAddressID, which is used to relate the Retailer entity. Each retailer location should have one retailer, and one retailer has one retailer location.	The Retailer location is a necessary entity, that stores retailers' locations such as country, state, city, street, and zip code. With this entity, we could analyze which is the highest-demand retailers, which means where has the most customers. That helps retailers decide where to develop the market next.
Orders	The Orders entity is related to the OrderItems entity, Customers entity, Retailers entity, and OrderLocation entity. The primary key is OrderID, which is used to relate the entity to OrderItems. Each order may have one or many order items. The Orders entity is associated with the Customers entity, Retailers entity and OrderLocation entity using the foreign key. Each order should have a customer and each order is associated with one retailer and only one location.	As a skincare product database, Orders is an essential entity. It mainly records orders' general information, such as their customers, retailers, order date, and sales amounts. With these attributes, retailers could track their sales condition periodically. Besides, retailers also could evaluate the purchasing power of customers, which helps retailers recommend products at different prices to regular customers accurately. which helps retailers both retain regular customers and dig potential customers.
OrderItems	The OrderItems entity is related to the	The OrderItems is a very important

	<p>Orders entity and Product entity. The primary key is OrderID, which is used to relate the Orders entity. Each order item should have one order. The OrdersItems entity is associated with the Products entity using the foreign key and each order item contains at least one product information.</p>	<p>entity, that stores item details about the order. With this entity, we could get specific product information in one order, such as its quantity and unit price. In this way, the retailers could monitor their products in stock as well as the preference of customers. It is helpful for retailers to guide marketing initiatives.</p>
OrderLocation	<p>The Order Location entity is related the Order entity. The primary key is OrderAddressID, which is used to the order entity. There is a one-to-one correspondence between Orders and Order locations.</p>	<p>The order location entity is used to store the order shipping address. Customers can enter different addresses for family and friends to make online purchases. The order location information includes Country, State, City, Street, and ZIP Code to confirm the exact location.</p>
Product	<p>OrderItemProducts: The Products Entity's primary key, ProductID, relates to the OrderItems Entity. Each product belongs to zero or more OrderItemProducts. The OrderItemProducts shows the product contained in the order item.</p> <p>Subcategory: The Products Entity's foreign key, ProductSubcategoryID, relates to the Subcategory Entity. Each product belongs to one subcategory.</p> <p>ProductInfo: The Products Entity's primary key, ProductID, relates to the ProductInfo Entity. Each product has one ProductInfo. The ProductInfo shows the product details.</p> <p>Reviews: The Products Entity's primary key, ProductID, relates to the Reviews Entity. Each product has zero or more reviews. The Reviews shows the product evaluations from customers.</p> <p>Subscribe: The Products Entity's primary key, ProductID, relates to the Subscribe Entity. Each product has zero or more subscribes.</p>	<p>Product is a very important part of Skincare Product Data Management System. The purpose of creating this entity is to maintain the basic information of skincare products, including ProductID, ProductName and ProductSubcategoryID. So that we can easily query and update the product information when we track order products, recommend suitable products or find relevant subscribers. And the customers can also use it to view product information.</p>

ProductInfo	The product info entity is associated with the product entity using the ProductID as the foreign key. Also, the product and the product info entity have a one and only one relationship.	ProductInfo is an entity that details the product, which is the core entity of this database. This entity provides database users with details not included in the product entity such as price, size, ingredients, brand, etc. for each product.
Category	The primary key of this entity is ProductCategoryID. This key relates the entity to the SubCategory entity. Each Category can be classified to one or many subcategories which are stored in the SubCategory Entity.	Category entity can be used to classified different type of products. It allows customers as well as retailers to find the needed product by using the ProductCategoryID.
SubCategory	A subcategory belongs to only one category. It associated with the Product entity and Category entity by using the primary key ProductSubCategoryID and the foreign key ProductCategoryID. A subcategory can have one or many products, also a subcategory can also be found in one Category.	Subcategory entity can store the detailed product category information in this database. The category entity is the bigger category, such as facial, eye skincare product while the subcategory will include more detailed function type, such as the product is the facial wash or a moisturizer. This database can use this entity to quickly locate the product information.
Review	The Review entity has a relationship with the Customer entity using the CustomerID as the foreign key. Customers may not write any review or write reviews for each item they ordered. The Review entity also has a relationship with the Product entity using the Product ID as the foreign key. A product can have 0 or more reviews.	Customer's product reviews are used as key information for the product recommendation service, which is one of the key features of this database. Customers create product reviews including ratings, comment texts, helpfulness, etc., and retailers consider this information and customer personal information together to make product recommendations.
Subscribe	The Subscribe entity has a relationship with the customer entity using the CustomerID as the foreign key, and the customer can either not subscribe to the service or subscribe to one or more products. It also has a one and only one relationship with the Product entity using the ProductID as the foreign key.	Customers can use the subscription service for frequently purchased and preferred products. The Subscribe entity has information about subscription including start date and end date.