

Database System – S232

Assignment 1 Report

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Class: CC02

Group No.: 4

List of members:

- 1- Trần Nguyễn Thế Nhật (2252556)
- 2- Nguyễn Viết Hùng (2252272)
- 3- Nguyễn Tiến Hưng (2252280)

1. BUSINESS DESCRIPTION

A technology start-up is embarking on its first venture by building an e-commerce website. The platform aims to establish a user-friendly online marketplace for buying and selling a diverse range of products and services, ensuring a seamless and secure shopping experience.

The e-commerce website database includes:

In order to access the e-commerce website, signing up for an account is a must. Each account includes the information of Account Identity number, Date of Birth, E-mail and Hash Password. Specifically, each account is assigned to at most one of two roles: admin or user.

- User accounts contain Name(FName, LName), Address and Phone Number. This role can be further subdivided into seller and customer roles or it might have dual roles, allowing for seamless transitions between buying and selling activities within the same account.

- A registered Seller has their own seller identity number. At any time, each seller can possibly sell products of different kinds. Each product has product_id, price, name, discount and warranty. In addition, description and Url_of_image for easier identification. Besides, sellers can book advertisements from the third-party companies several times. Advertisers have the capability to promote products across various platforms, including youtube, television and social networks. Each platform's advertisement has their own identity number, fee and airtime. These companies specialize in creating and executing comprehensive advertising campaigns to reach a diverse audience through different channels.
- Each Customer owns only one Cart with its own ID. In each cart, customers can keep numbers of products from different sellers, the quantities of products will be shown in the cart as well. Afterwards, whenever the customers purchase the products, the cart will create orders. Each order has the information of orderID, creation date, expected delivery date, state of the delivery and payment method of customers. To be more specific, each order contains numbers of order items and every order item has their own quantity, special option, item line number and discount. After orders are confirmed, the third-party delivery company will collect the items and deliver to the consumers. Each delivery company has a company ID. Moreover, the distance and the weight of the order-product are used to calculate the shipping fee and the appropriate type of vehicle with the right capacity for delivery. After all, customers

can rate the products based on their experience, the rating will be calculated and appear on the products' pages.

- Admin accounts include Name(FName, LName) and level of admin. Each admin can check other work at runtime in order to ensure the smooth operation, compliance with policies and overall integrity of the platform. Even more, admins with sellers work together on the customer care service with the main objective is to reply to all reports from customers about orders, together with working on rating of products for later promotion on the platform.

-In our administrative structure, higher-level admins have the authority to review the work of lower-level admins, fostering accountability and collaboration. This system enables senior admins to assess tasks, projects, and adherence to protocols, promoting consistency and alignment with organizational objectives. By facilitating oversight, our administrative framework ensures efficiency and effectiveness in operations.

- Customer care services play a vital role as a collaborative effort between administrators and sellers, aimed at effectively addressing customer issues such as product errors or discrepancies. This multifaceted role encompasses attributes from both the administrative and seller domains, ensuring a comprehensive approach to problem-solving. Additionally, customer care services include an additional attribute: Experience, which reflects the cumulative time they have worked in either the seller or administrative capacity.

When it comes to handling customer concerns, a crucial component is the generation of relation reports. These reports capture essential attributes such as Date, indicating the day when the customer discovered and reported the problem, and Feedback, which serves as a repository for detailed information regarding the issue at hand. This meticulous approach ensures that customer complaints are not only promptly addressed but also thoroughly documented for future reference and analysis.

- Advertisement_company combines three types of advertisements: TV_advertisement, Youtube_advertisement, and Social_advertisement. Each type has specific attributes:

1. TV_advertisement:

- Attributes: TV_ad_id, Fee, and Time_onside.
- Time or frequency cannot exceed twice the average for this type of advertisement.

2. Youtube_advertisement:

- Attributes: Youtube_ad_id, Fee, and Frequency_on_video.
- Time or frequency cannot exceed twice the average for this type of advertisement.

3. Social_advertisement:

- Attributes: Social_ad_id, Fee, and Frequency_on_social_network.
- Time or frequency cannot exceed twice the average for this type of advertisement.

- The booking relationship represents the scenario where a seller reserves a service from an advertisement company. This arrangement involves the concept of time, which is specified by two attributes: Start_date (the beginning of the booking) and End_date (the conclusion of the booking). Crucially, the Start_date must always precede the End_date to ensure accurate booking management.

- Within the structure of our ordering system, each individual order consists of one or multiple order items. These order items are defined by several key attributes, including quantity, special options, discount, and item line number. Each order item is intricately linked to the product entity, allowing for precise specification and identification of the product being ordered.

The quantity attribute denotes the number of units of the specified product included in the order item. Additionally, order items may include special options, offering customers the opportunity to customize their orders according to specific preferences or requirements. Moreover, discounts may be applied to certain order items, providing customers with potential savings or promotional benefits.

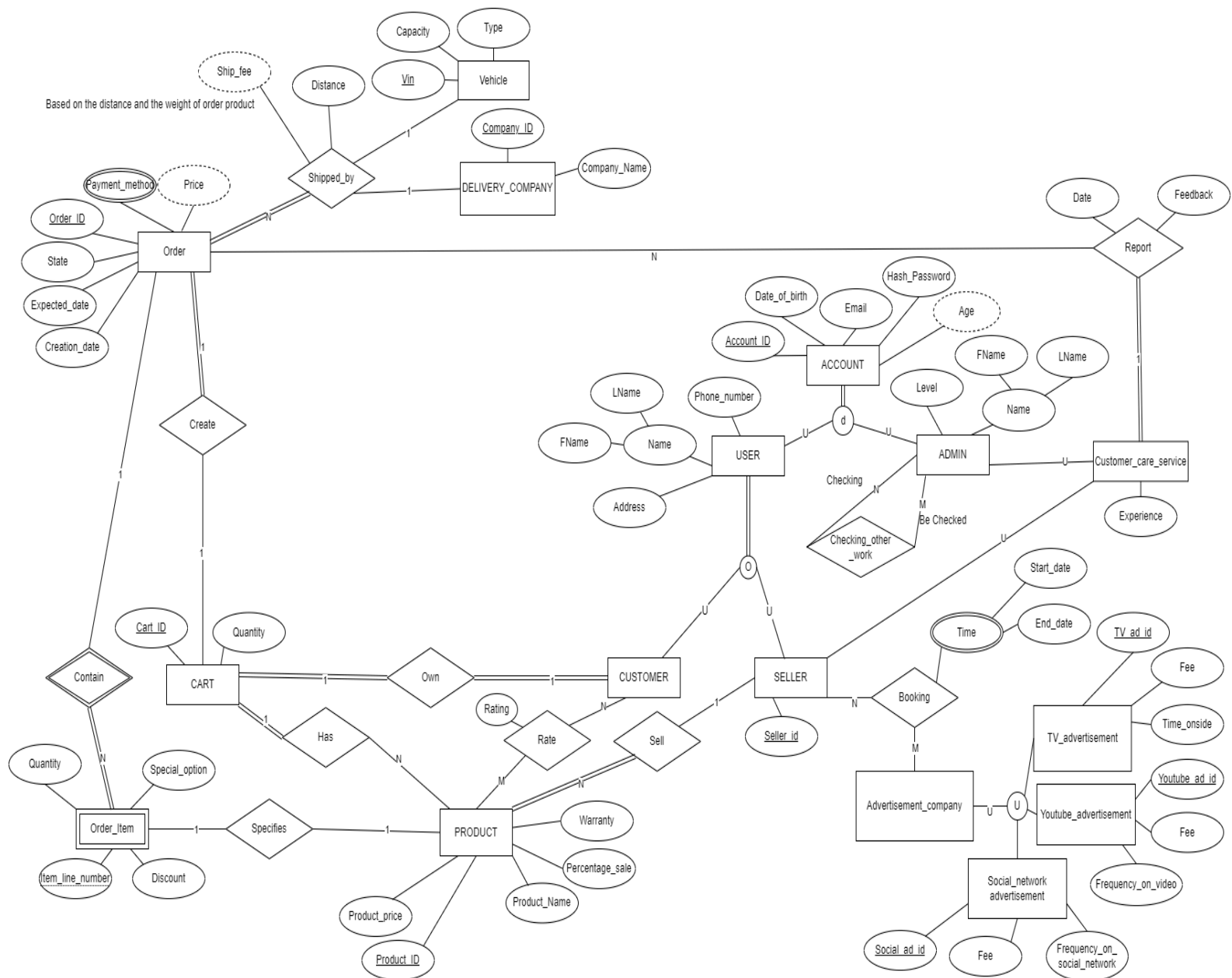
Each order item is assigned a unique item line number, facilitating organizational clarity and ease of reference within the ordering system. This numbering system ensures that every order item is distinctly identified, streamlining the process of order management and fulfillment. Overall, this detailed framework ensures accuracy, efficiency, and customer satisfaction throughout the order processing journey.

In our logistics infrastructure, every order undergoes shipment via one of three vehicle types: trucks, cars, or motorcycles. These vehicles are utilized for transportation and delivery, managed collectively under the auspices of a single delivery company.

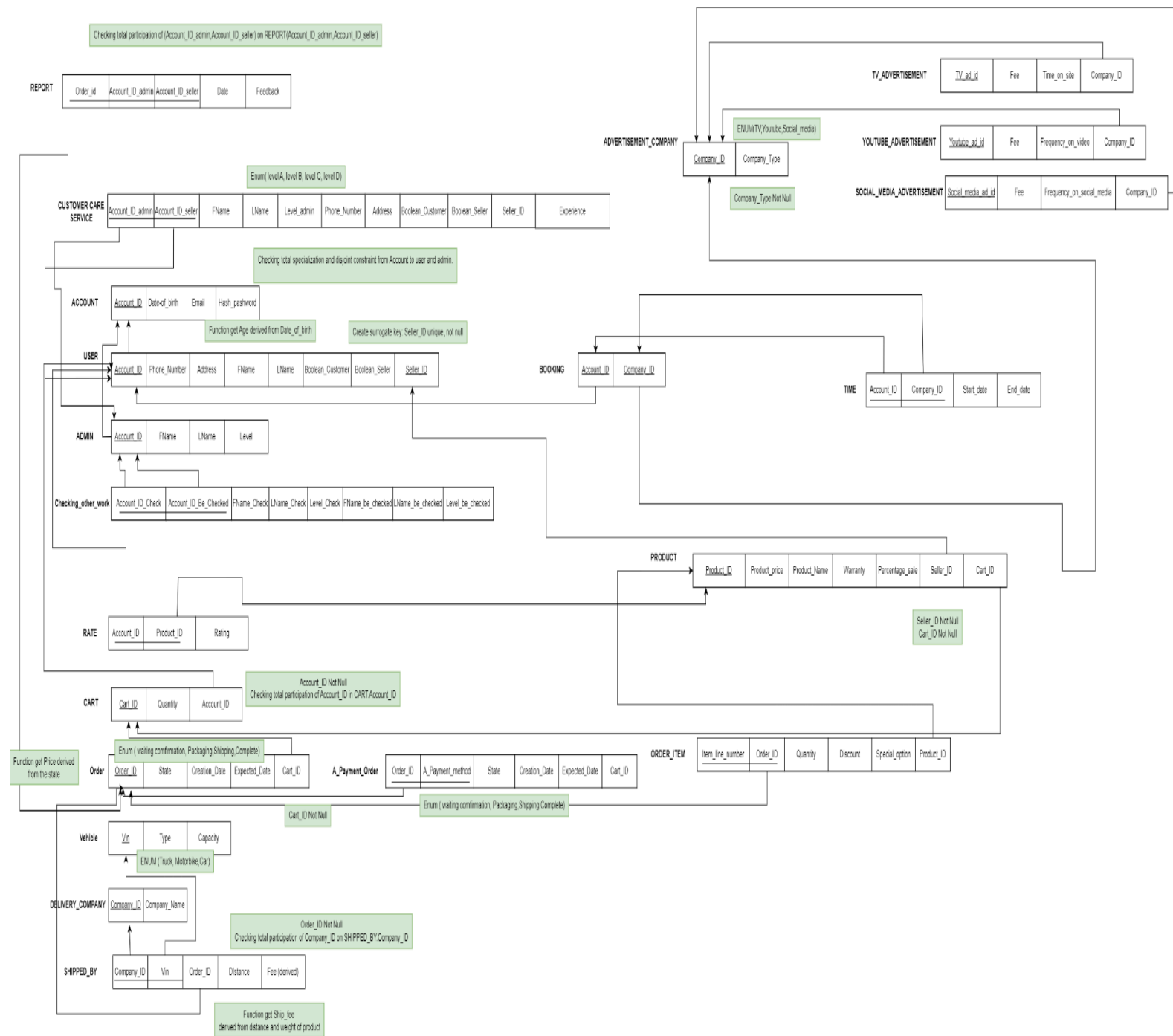
- The choice of vehicle for each order is determined by various factors such as the size and weight of the items being shipped, the distance to the delivery destination, and any specific requirements for speed or efficiency. Trucks are typically deployed for larger, bulkier orders or those requiring long-distance transportation. Cars may be utilized for smaller, more time-sensitive deliveries within urban areas, offering flexibility and agility in navigating congested traffic conditions. Motorcycles provide a rapid and maneuverable option for expedited deliveries or shipments to locations with limited access.

Underpinning this operational framework is the coordinated management of the delivery fleet by the designated company. This entails logistical planning, scheduling, maintenance, and coordination of resources to ensure timely and reliable order fulfillment. By leveraging a diverse array of vehicle types and centralized management, our delivery system is optimized for efficiency, reliability, and customer satisfaction.

2. EERD



3. Relational database schema



4. Constraints not shown in (E)ER diagram**1) Age of an user:**

- The age of an user must be greater than 15 years old.

2) Date Range Validations:

- The creation date of an order cannot be in the future, or the expected delivery date must be after the creation date.

3) Experience of the Customer Care Service:

- The experience must be at least 2 years.

4) Quantity of Cart:

- Because Order must have at least 1 product to make purchase so the Quantity of the Cart must be greater than 0.

5) Rating the Product:

- Customers only can rate the Product if they have purchased that product (Order has that Product relating to that Customer).

6) Advertisement_Company frequency, time_onside:

- Time_onside, Frequency for an advertisement cannot surpass 2 times the average of Time_onside, Frequency.

7) The level of the Admin in relation of Cheking_other_work:

- The level of the Admin checking must be greater than the level of the Admin that is checked.

8) Time booking from relation Booking:

- The time start_date from relation Booking between Seller and Advertisement_company must be before the time end_date.

9) Date Report from relation Report:

- The Date of relation Report must be exactly the day a Customer finds out it gets any error, and cannot be the time in future.

10) Distance for the ship vehicle and company:

- The distance for the ship can only be in Viet Nam' territory. So the maximum distance is 4639 km.

5. References:

- [1] [What is the Difference Between Weak Entity and Strong Entity - Pediaa.Com](#)
- [2] [Theory of Constraints in eCommerce Development \(mobecls.com\)](#)
- [3] [What's an Example of Good E-Commerce Database Design? \(fabric.inc\)](#)
- [4] [Ecommerce Database Design: ER Diagram for Online Shopping | Vertabelo Database Modeler](#)