Introduction to Database Systems

Online Store

ER Diagram

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1. Problem Definition

Due to the COVID-19 pandemic, people have become more reliant on online services, particularly online shopping. Online shopping has become very important worldwide due to the safety issues regarding shopping in person.

In our system, we create a flexible online store which includes managers, employees, and customers. There are various categories, numerous products, several methods of payment, shipping to all places, and many other services such as product reviews to guarantee customer satisfaction. The system will be an **internet** application.

2. List of System Users and Privileges of Each User

1. Customer:

- Search for products
- Make an order to buy a product from the website
- Cancel an order
- Choose payment method
- Post a review

2. Manager:

- Insert employees
- Delete employees
- Manage employees
- Insert suppliers
- Delete suppliers
- Update suppliers
- Works for certain category
- Check products' descriptions and details
- Set promotions/discounts on products

3. Employee

- Create customers' accounts
- Delete customers' accounts
- Update customers' accounts
- Sell a product on the website
- Remove a product
- Deliver/Ship the product to the customer

4. Supplier

- Add the product to the store's storage
- Set product price

3. List of Entities and their Descriptions

1. **Customer**: the end user that can request an account to buy products on the website.
2. **Supplier**: the company which adds products to the store's stocks.
3. **Manager**: the user responsible for supervising employees and controlling suppliers as well as setting the discounts for products in the store. The managers work for specific categories (similar to departments.)
4. **Employee**: the user responsible for managing customers' accounts and products on the website and shipping products to the customers.
5. **Product**: the product which can be ordered and purchased on the website. Products belong to different categories.
6. **Orders**: the customer's order which can contain multiple products. The order can also be cancelled if the customer chooses to do so.
7. **Payment**: the method of payment for the customer's order (cash or credit.)
8. **Shipped Items**: the shipped items after the order including shipping price and delivery date.
9. **Category**: the category of the product (ex. Food, clothing, technology).
10. **Reviews**: reviews for the product which can be posted by customers.
11. **Storage**: the store's multiple storages which are in multiple locations. Storages include how many of the product the store has available for sale.

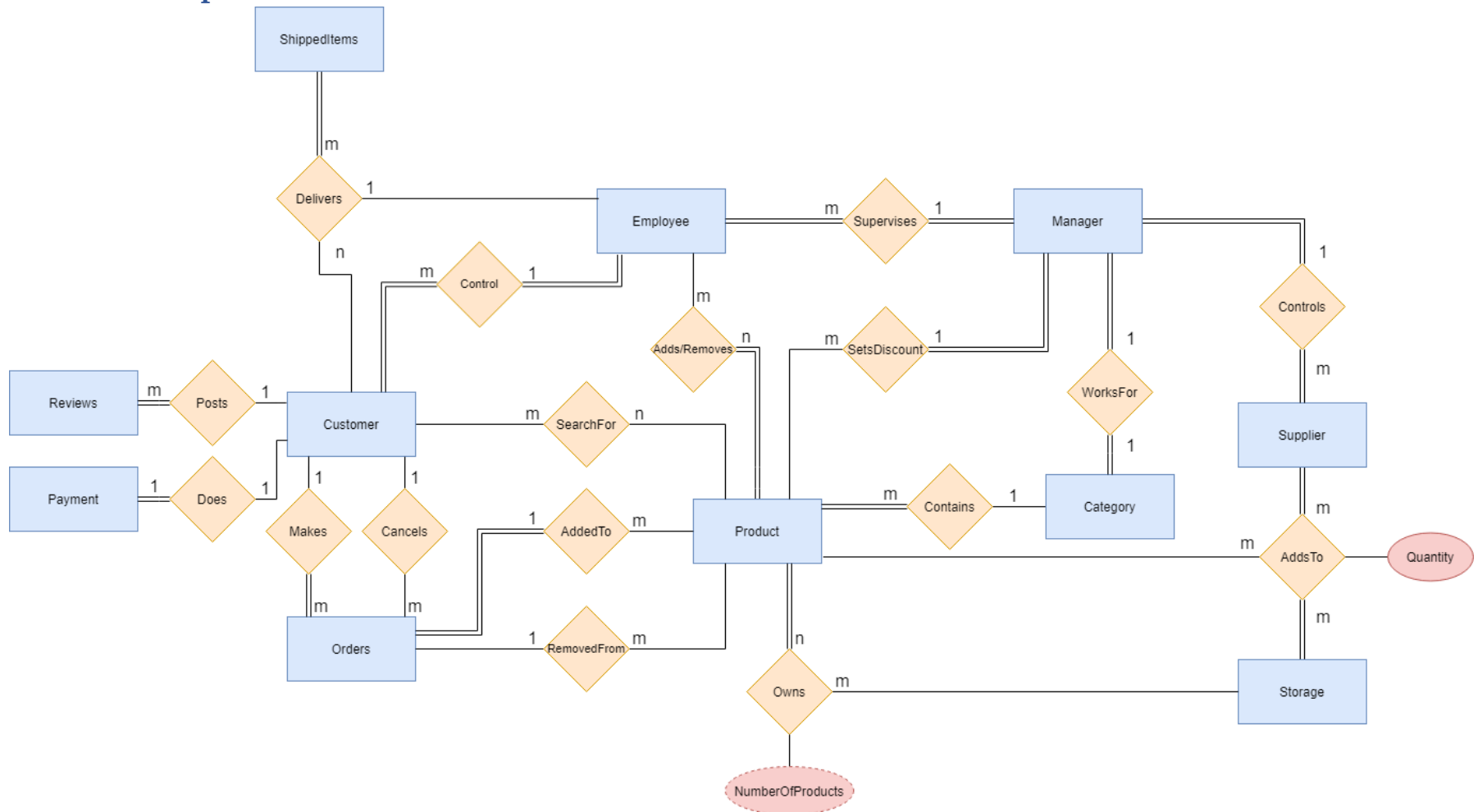## 4. List of Relationships and their Descriptions

- Manager **Supervises** Employee
  Each employee is supervised by a manager.
- Manager **Controls** Supplier
  Managers can insert, update, and delete suppliers.
- Manager **Works For** Category
  Each manager is assigned to a specific category.
- Manager **Sets Discount** for Product
  Managers can set the discounts for products.
- Supplier **Adds** product **To** Storage
  This relationship is ternary and includes the supplier, product, and storage entities.
  Suppliers add products to the store's storages according to the store's needs.
- Storage **Owns** Product
  The storages contain all of the store's many products.
- Employee **Adds/Removes** Product
  The employees of the store can add or remove products from the website.
- Category **Contains** Product

Each product belongs to a certain category.

- Product **Added to** Order
  The product is added to the order.
- Product **Removed From** Order
  The product is removed from the order.
- Customer **Search For** Product
  The customer can search the website for a specific product that suits their needs.
- Customer **Makes** Order
  The customer can make an order for some products.
- Customer **Cancels** Order
  The customer can cancel their order.
- Customer **Posts** Review
  The customer can post an online review for a product.
- Customer **Does** Payment
  The customer pays for their product using different types of payment methods.
- Employee **Delivers** Shipped Item to Customer
  This relationship is ternary and includes the employee, shipped item, and customer entities. The employee delivers the shipped item to the customer.
- Employee **Control** Customer
  The employee modifies the customer's account including creating, updating, or deleting the account.

5. ER Diagram

a. Relationships

b. Attributes

CUSTOMER
- Fname
- Minit
- Lname
- (Name)
- Address
- CustomerID
- Username
- Password
- Sex
- PhoneNumber
- Bdate
- CreditCard
- Email

SUPPLIER
- SupplierID
- SupplierName
- Address
- URL
- PhoneNumber
- Email

MANAGER
- Sex
- ManagerID
- ManagerFname
- (ManagerName)
- ManagerMinit
- Bdate
- ManagerLname
- Salary

CATEGORY
- CategoryName
- CategoryID
- Description

ORDER
- OrderID
- OrderDate

Employee
- Sex
- EmployeeID
- EmployeeFname
- (EmployeeName)
- EmployeeMinit
- Bdate
- EmployeeLname
- Salary

PRODUCT
- Weight
- ProductID
- Size
- Discount
- Color
- Price

SHIPPED_ITEM
- ShipDate
- ShippingID
- DeliveryDate
- ShippingPrice

REVIEWS
- ReviewDate
- ReviewNum
- ReviewRate

STORAGE
- StorageID
- Location

PAYMENT
- PaymentID
- PaymentType