

# **BBM473: Database Laboratory Final Project**

## **Phase-1: Design**

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**Project:** E-Commerce Management System

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# 1- Project Definition

E-commerce (electronic commerce) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. E-commerce is current popular trend in the world due to different reasons like:

- eCommerce helps to reduce costs for both of customers and sellers.
  - eCommerce helps businesses to be global with fewer risks.
  - Since eCommerce offers better marketing opportunities, it's really easier to broaden brand and also expand business with eCommerce.
  - Online stores will stay open 24 hours in each day of a day.
  - Collecting and analyzing user data is easier with e-commerce.

Also due to digitalization of world and COVID-19, electronic commerce become so popular in recent years. For example, according to the official values volume of e-commerce increased by %66 in 2020 (just in 1 year).

But since e-commerce systems works on digital platforms, it's easier to crack or hack them. Also it's important that providing not only security but also different functionalities such as user experience. For these reasons, in this project i'll develop an intermediate and customizable database system (also a web interface) for e-commerce systems. Also this project will provide some data analysis and visualization functionalities.

## 2- Project's Main Functions

- ✓ Elementary operations (read, write, update to different tables etc.)
  - ✓ Necessary eCommerce functionalities (product presentation, electronic catalogs, order entry, order information, payment information, shopping basket (cart), products from different categories, delivery information, different payment methods etc.)
- ✓ Optimized SQL queries (security & execution speed optimization)
  - ✓ Database optimization button and module at admin interface
- ✓ Transaction management and concurrency control management
  - ✓ Special management and analysis interface for admins
- ✓ Responsive (mobile adaptive) + well designed web interface
  - ✓ Different customer types with different advantages

- ✓ Analysing data and visualization of data (For example analysing sales of last 30 days to from different categories in order to find new ideas about developing marketing strategies)
- ✓ And many of similar functions which needs to be in e-commerce sys.

### 3- Role of Entity Sets & Relations

**User:** As we can understand from the name, user is superclass of users. User has three subclasses of supplier, admin and customer.

**Supplier:** Suppliers are product providers. We can think them as companies or entrepreneurs who make wholesale trading. In other words, suppliers are simple users who sell products.

**Admin:** Admin is system manager. Responsibilities of admins are managing (update, delete, insert etc.) users, products, categories, companies, orders, deliveries etc.

**Customer and Subclass Tables of Customer:** Customers buy products. But customer has three subclasses of standart customer, premium customer and platin customer. Platin customer is best one. Premium and platin customers are selling by money but these accounts provide more discount. (with discount they do shopping more and system earns more, if they don't do shopping system still earns with account price). Also customers can have credit cards.

**Shopping Session:** Shopping sessions are like shopping baskets. Products which are added to basked by of each user are stored in shopping sessions. Each user has a different shopping session. Shopping session table can be used for encouraging customers to buy products which are added to basket but not ordered.

**Cart Item:** The products which are added to basked are stored in cart\_item table. But but in order to prevent data spam in the database, records which are older than 1 month should be deleted regularly. (this should be done at both of shopping session and cart item tables)

**Product and Category:** Products are items which are on sale. They can have different categories. These are stored and different tables.

**Company:** Companies are user suppliers but each of suppliers don't need to be companies since suppliers can be enterprenaur people. For example company of 'Ülker Chocolate' is Ülker.

**Order:** If products which are added to basket in a shopping session are bought, then this process is stored at order table.

**Order Status:** Order status table checks whether order payment is done or customer give up to buy at the payment section.

**Payment:** Payment table stores information about payments. Payments can be done by both of cash money and credit card. Therefore when adding a customer to customer table, also credit card information is stored at bot h of customer and credit\_card\_payment tables.

**Cash Payment:** Payment table for cash. If a standart user makes a cash payment, then user gets a discount. If premium or platin user makes a cash payment, then user gets a huge discount. Therefore this table is related to discount table.

**Credit Card Payment:** Payment table for credit card. In this table not only credit card info but also installment data etc. will be stored.

**Delivery:** Delivery table stores information about delivery processes. There can be different delivery methods.

**Delivery Status:** Delivery status table checks whether delivery is done. It's required to test delivery teams' performance in order to provide a better user experience also preventing fraud.

**Discount:** Discount and promotions are stored in this table. Different factors such as customer type and payment type affects percentage of discount.

## 4- Conditions That Need To Satisfied

**1- At Least One Subclass:** In this project, there are multi level subclasses. User is superclass, customer is one of subclasses of it but also customer has three more subclasses.

**2- More Than One Weak Entity Sets:** Cash payment and credit card payment are weak entity sets of payment. Also order status table is weak entity set too since it doesn't have a primary key and a foreign key is used to access and define it.

### **3- More Than One Different Relations:**

#### **3.1 - One to one:**

Example-1: Each order has only one payment. (there can be installments)

Example-2: Each order has only one delivery.

#### **3.2 - Exactly one:**

Example-1: Each user can be only supplier or admin or customer.

Example-2: Each customer can be only standard, premium or platin cust.

#### **3.3 - One to many:**

Example-1: Each user can have more than 1 credit card payment.

Example-2: A product can belong to multiple carts.

#### **3.4 - Many to many:**

Example-1: A product can have multiple companies also a company can have multiple products.

Example-2: An order can have multiple products and also a product can be ordered in multiple orders.

### **4. More Than One Descriptive Attributes In It's Relations:**

1. Between user and product, there is a relation about buying and this relation has attributes of date, count and cost.

2- Also between customer and premium and platin customer, there is relation about pays\_for since they are paid customer types. Also this relation has cost, type, duration and start\_from descriptive attributes.

**5. No Redundant Attributes In Tables Which Are Particularity Used To Construct A Key:** Amount of redundant attributes are reduced as much as possible to provide a clean design.

**6- Evolvable Characteristics, Which Provides Adaptability Towards The Occurrence Of Conditional Changes:** This database is adapted to different conditions such as order cancellation, delivery cancellation, some problems about order or delivery steps (for example empty inventory) etc. Also it has been tried to be develop that database in a way that can be easily adapted to the changes that can be experienced in the world and technology.