

**Databases I, Winter**  
**2024**

**Milestone 1**

*Submission: 07/10/2024*  
*(11:59 PM)*

**In this milestone, you are required to draw the EERD according to the project description and translate the EERD designed to its corresponding relational schema.**

**You are required to submit a zip file containing the following documents:**

- a) A PDF file containing an image of your Enhanced Entity Relationship Diagram (EERD) of the database of the required application.
- b) A PDF file containing the Database Schema of your application.
- c) An Excel file containing:
  - Team name
  - Team leader name and tutorial.
  - Team members' names.
  - Team members' application numbers.
  - Team members' tutorial groups.

**Note that:**

**The Milestone description is subject to minor changes that would be announced on CMS. Do check the CMS periodically.**

The EERD has to be drawn using graph editing software, screenshots or handwritten EERDs will not be accepted Examples of software:

- yEd: <https://www.yworks.com/products/yed>, online/offline tool
- draw.io: <https://www.draw.io/>, online tool

### **Submission guidelines:**

- a) You have to stick to the conventions of the EERD discussed in the tutorials.
- b) The deadline of submission for this milestone is **Monday 7th of October at 11:59 PM.**  
**This is a hard deadline with no extensions. Plan your work on the milestone as a team accordingly.**
- c) Only one copy of the documents will be submitted via a team member, other submissions will not be considered. The zip file submitted has to be named after the team number which will be announced after registration e.g. Team\_10.
- d) Submission will be via the submission link available on the course CMS.
- e) **Make sure that the team leader submits a printed A3 hard copy to the project assigned TA that should be announced on a document uploaded on CMS.**

### **Important Note:**

- **No late** submissions will be accepted.
- **The submission will be through the submission link ONLY, which will be announced on CMS. NO mail submissions would be accepted.**
- Cheating cases will be graded by ZERO in the whole Milestone.
- It is your responsibility to make sure that the files are not corrupt and were uploaded successfully to the submission link.

**Databases I, Winter 2024**  
**Milestone 1 Project**  
**Description**  
**“Telecom Customer Data Management System”**

## **1. Project Overview**

The aim of this project is to design and implement a comprehensive customer data management system for a telecom company. The data management system handles subscriber information, payment details and service usage.

The system provides the customer with a seamless and personalized digital service experience, that should streamline various customer interactions, enhance customer satisfaction and drive loyalty.

The database will store critical information such as customer profiles, customer accounts, service plans, call and data usage, payment history, and support ticket logs. This system will support efficient data retrieval for customer service, subscribed plans, benefits and wallet transactions.

The customer will automatically create an account upon purchasing a SIM card. This seamless process ensures immediate access to account features and services.

## **2. System Requirement**

This section describes the different requirements that the system has to include.

### **2.1 Customer Profile**

Detailed records of customer profile, including personal information such as national ID, name (first name and last name), email, address and date of birth.

### **2.2 Customer Account**

Each account is uniquely tied to a customer's mobile number. If a customer holds multiple mobile numbers, they will possess separate accounts for each number, allowing for tailored management of services and preferences associated with each line.

Each account should be uniquely identified by the customer's mobile number and has line balance, account type, account start date, account status, and total points earned which represents points earned through various transactions, which can later be exchanged for multiple vouchers on future purchases.

### **2.3 Service Plan**

The service plan offers a set of services (SMS, Minutes and Mobile Internet). Each plan is characterized by certain number of SMS, internet Giga bytes, number of call minutes, name, price, description and uniquely identified by plan ID.

Each customer account is required to subscribe to at least one service plan, while a single service plan can be linked to multiple accounts. This subscription has a certain subscription date, and status (active or on hold).

### **2.4 Plan Usage**

Plan usage refers to how customers utilize the services and features included in the subscription plans. It provides the monitoring of calls, SMS and data usage patterns to provide insights for customers.

Each account has the capability to track various usage, with each usage activity associated with a specific account. The usage is associated to a certain subscription plan while a plan can have multiple usages. Each plan usage is tracked by a unique usage ID, and includes start date, end date, data consumption, minutes used and SMS sent.

### **2.5 Payment**

Payment refers to the record of all previous transactions made by the customer account. This includes recharges for services such as account balances and subscription plans. Each payment transaction is uniquely identified by a payment ID. It also includes transaction amount, date of payment, payment method and payment status. This information enables tracking the payment history, ensuring transparency and facilitating better financial management of the telecommunications services.

Each payment transaction must be initiated by a specific account while a single account can initiate multiple payments. A payment is processed according to the selected subscription plan, effectively tracking both the remaining balance and any additional amounts beyond the plan's specified fees. A single subscription plan can be linked to multiple payments.

## 2.6 Wallet

A financial wallet designed to track customer interactions and facilitate seamless money transfers between users. This innovative solution not only provides an intuitive interface for managing financial transactions but also enhances user experience by offering real-time transfer capabilities and secure transaction processing. Customers can effortlessly send and receive money, all while gaining valuable insights into their financial behavior.

Each wallet has current balance, which reflects the total funds available, currency for transactions, last modified date that indicates the most recent update to the wallet balance, and is identified by a unique Wallet ID.

Each wallet is uniquely linked to a single customer. In cases where a customer has multiple accounts, they can easily select a preferred mobile number to associate with their wallet. Any customer can use his/her wallet in order to transfer money to another customer(s) wallet. Each transfer transaction includes essential details such as the amount being sent and the date the transaction is initiated.

## 2.7 Benefits

The benefit represents various advantages or features offered to the customer's account. This includes points group, cashback, and exclusive offers.

A customer's account may be entitled to multiple benefits on the same time, while each benefit instance may be associated with one specific account. Additionally, benefits can also be linked to one or more subscription plans and **conversely, a single subscription plan can provide multiple benefits.**

The benefit ID serves as a unique identifier for each benefit. A benefit can also have a description, validity date and status (active or expired).

### 2.7.1 Points Group

Points are earned through various payment transactions; each group of points is assigned based on a specific percentage calculated from a total transaction amount.

Points record has ID, and amount

### 2.7.2 Exclusive Offer

Offers refer to promotional deals or packages provided by the service provider. This includes Offer ID, Internet Giga bytes, number of SMS, and Call minutes

### 2.7.3 Cashback

The cashback can be returned as an amount derived from a percentage of their spending credited directly into their wallet balance. Noting that, cashback can be awarded multiple times. Cashback has amount, credit date, and ID.

## **2.8 Voucher**

The voucher serves as a valuable shopping tool that can be redeemed using accumulated points, highlighting one of the key benefits.

Each account may hold one or multiple vouchers, while each voucher may be linked to a specific customer's account.

Each voucher is uniquely identified by a voucher ID, Voucher Value, expire date and, the points required for redemption.

## **2.9 Shop**

A shop can be classified as either a physical store or an e-shop, each with unique characteristics. Every shop is uniquely identified by its ID and features a name that represents its brand.

Additionally, each shop is categorized based on the type of products it offers. A physical shop has an address and working hours, while an E-shop has a Website URL and rating. Each voucher can be redeemed at specific shops. Conversely, a shop can utilize multiple vouchers to promote its products.

## **2.10 Technical support Ticket**

A technical support ticket is a formal record used to track issues related to services, or network performance. Once an account is closed, its related tickets are also deleted. Any account can raise any number of tickets while a ticket can be issued by a single account. Tickets include ticket ID, issue description, priority level, and status (Open, In Progress, Resolved, Closed).