# Banking Database Management System – ERD Analysis

# Group- 25

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## 1. Introduction

This project aims to design and implement a normalized Banking Database Management System using MySQL. The system is capable of managing essential banking functions such as customer onboarding, account management, nominee tracking, document verification, and service request processing.

- **Entities and their attributes**
- **Relationships and their types (One-to-Many, Many-to-Many)**
- **Mandatory vs. Optional Relationships**

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### 2. Entities, Attributes, and Data Types

The database consists of five core tables. Each table contains a primary key that uniquely identifies each record, along with several important attributes.

#### 2.1 Bank Customers

- **Primary Key:** customer id (INT)
- **Attributes:**
    - Full name (VARCHAR)
    - address (VARCHAR)
    - contact number (VARCHAR)
    - email (VARCHAR)
    - date of birth (DATE)
    - pan number (CHAR)
    - adhaar number (CHAR)
    - gender (VARCHAR)

#### 2.2 Accounts

- **Primary Key:** account id (INT)

- **Foreign Key:** customer id (INT)
- **Attributes:**
    - Account number (CHAR)
    - Account type (VARCHAR)
    - Branch code (CHAR)
    - Initial deposit (DECIMAL)
    - Mode of operation (VARCHAR)

**2.3 Nominees**

- **Primary Key:** nominee id (INT)
- **Foreign Key:** customer id (INT)
- **Attributes:**
    - name (VARCHAR)
    - relationship (VARCHAR)
    - address (VARCHAR)

**2.4 Documents**

- **Primary Key:** document id (INT)
- **Foreign Key:** customer id (INT)
- **Attributes:**
    - Document type (VARCHAR)
    - Document number (VARCHAR)

**2.5 Service Requests**

- **Primary Key:** service id (INT)
- **Foreign Key:** customer id (INT)
- **Attributes:**
    - Service type (VARCHAR)
    - status (VARCHAR)

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**3. Relationships and Their Types**

**I. Bank Customers - Accounts (1:M) [Mandatory-Mandatory]**

- **Type:** One-to-Many (1:M)
- **Cardinality:** One customer can have multiple accounts, but each account belongs to exactly one customer.
- **Logic:**
    - A customer may have multiple types of bank accounts (e.g., savings, current).
    - Mandatory (Accounts) - An account must be linked to a customer.
    - Mandatory (Customer) - A customer must hold at least one account.

**II. Bank Customers - Nominees (1:M) [Optional-Mandatory]**

- **Type:** One-to-Many (1:M)
- **Cardinality:** One customer can have multiple nominees, but each nominee is linked to one customer.
- **Logic:**
    - Customers can have multiple nominees for different accounts.
    - Mandatory (Nominee) - A nominee must be linked to a customer.
    - Optional (Customer) - A customer may or may not assign nominees.

**III. Bank Customers - Documents (1:M) [Mandatory-Mandatory]**

- **Type:** One-to-Many (1:M)
- **Cardinality:** One customer can have multiple documents linked for KYC, but each document belongs to one customer.
- **Logic:**
    - Each customer must submit documents like PAN, Aadhaar.
    - Mandatory (Documents) - A document must be associated with a customer.
    - Mandatory (Customer) - A customer must submit at least one document for verification.

**IV. Bank Customers – Service Requests (1:M) [Optional-Mandatory]**

- **Type:** One-to-Many (1:M)
- **Cardinality:** One customer can raise multiple service requests, but each request belongs to one customer.

- **Logic:**
    - Customers can request multiple services (e.g., cheque book, debit card).
    - Mandatory (Service Requests) - A service request must be linked to a customer.
    - Optional (Customer) - A customer may not have any service requests.

## 4.**ERD Diagram**