

**DATABASE MANAGEMENT SYSTEMS**

**CS6106**

**PROJECT ABSTRACT**

**TITLE – BANK MANAGEMENT SYSTEM**

**Prepared and Submitted By**

**SRINATH S**

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**B. E. Computer Science and Engineering**

## **DATABASE MANAGEMENT SYSTEMS**

### **BANK MANAGEMENT SYSTEM**

The project “Bank Management System” is developed to maintain a record of the branches, employees, customers, deposits, loans and transactions under a particular bank.

The Front-End: Ionic Framework, Angular

The Back-End: Node JS

Database Server: MySQL Server 8.0

Database Tools: MySQL Shell 8.0.19, MySQL Workbench 8.0 CE, MySQL 8.0 Command Line Client.

Functionalities of the system:

The system maintains the data of

- Branches under the bank.
- Employees working in the bank.
- Customers with the bank.
- Accounts maintained by the customers.
- Loans borrowed by the customers.
- Interest towards each deposit and loan (compounded monthly).
- Amounts transfers between customers.
- Deposits to accounts.
- Payments towards loans.

#### **Relations Under The Database :**

##### **1) Branches :**

Attributes:

- IFSCCode (Primary Key, uniquely identify a branch).
- Area, City.
- ManagerID (foreign key, refers to EMPLOYEES.EMPLOYEEID, manager of the branch).

**IFSCCODE** -> Area, City, ManagerID.

All attributes are non-transitively determined by the Primary Key (super key) IFSCCode.  
Hence, it is in **Boyce-Codd Normal Form**.

## 2) Employees :

Attributes:

- EmployeeID (Primary Key, uniquely identify an employee).
- EmployeeName, Sex, DateOfBirth, AddressLine1, AddressLine2, City, PostalCode, Password, Designation, Salary.
- BranchIFSCCode (foreign key, refers to BRANCHES.IFSCCODE, denotes the branch the employee works in).  
**EMPLOYEEID** -> EmployeeName, Sex, DateOfBirth, AddressLine1, AddressLine2, City, PostalCode, Password, Designation, Salary, BranchIFSCCode.

All attributes are non-transitively determined by the Primary Key (super key) EmployeeID.  
Hence, it is in **Boyce-Codd Normal Form**.

## 3) Customers :

Attributes:

- CustomerID (primary key, uniquely identify a customer).
- Name, DateOfBirth, Sex, AddressLine1, AddressLine2, City, PostalCode.  
**CUSTOMERID** -> Name, Sex, DateOfBirth, AddressLine1, AddressLine2, City, PostalCode.

All attributes are non-transitively determined by the Primary Key (super key) CustomerID.  
Hence, it is in **Boyce-Codd Normal Form**.

## 4) Accounts :

Attributes:

- AccountNo, BranchIFSCCode (primary key, uniquely identify an account).
- AccountType, Status, Balance.
- CustomerID (foreign key, refers to CUSTOMERS.CUSTOMERID).
- BranchIFSCCode (foreign key, refers to BRANCHES.IFSCCODE, part of primary key).

**ACCOUNTNO, BRANCHIFSCCODE** -> AccountType, Status, Balance, CustomerID, BranchIFSCCode.

All attributes are non-transitively determined by the Primary Key (super key) AccountNo, BranchIFSCCode. Hence, it is in **Boyce-Codd Normal Form**.

#### 5) Transactions :

Attributes:

- TransactionID (primary key, uniquely identify a transaction).
- Date, Amount.
- DebitAccountNo, DebitIFSCCode (foreign key, refers to ACCOUNTS.ACCOUNTNO and ACCOUNTS.BRANCHIFSCCODE).
- CreditAccountNo, CreditIFSCCode (foreign key, refers to ACCOUNTS.ACCOUNTNO and ACCOUNTS.BRANCHIFSCCODE).
- BranchIFSCCode (foreign key, refers to BRANCHES.IFSCCODE, branch of transaction).

**TRANSACTIONID** -> Date, Amount, DebitAccountNo, DebitIFSCCode, CreditAccountNo, CreditIFSCCode, BranchIFSCCode.

All attributes are non-transitively determined by the Primary Key (super key) TransactionID. Hence, it is in **Boyce-Codd Normal Form**.

#### 6) DepositInterestInfo :

Attributes:

- AccountNo, BranchIFSCCode, Date (primary key, uniquely identify a interest record).
- Interest.
- AccountNo, BranchIFSCCode (foreign key, refers to ACCOUNTS.ACCOUNTNO and ACCOUNTS.BRANCHIFSCCODE, part of primary key).

**ACCOUNTNO, BRANCHIFSCCODE, DATE** -> Interest

All attributes are non-transitively determined by the Primary Key (super key) AccountNo, BranchIFSCCode, Date. Hence, it is in **Boyce-Codd Normal Form**.

#### 7) Loans :

Attributes:

- LoanAccountNo, BranchIFSCCode (primary key, uniquely identify a account).
- Principle, InterestAmt, Outstanding, Status, Security.

- LoanType (foreign key, refers to INTERESTINFO.INTERESTPERCENTAGE).
  - CustomerID (foreign key, refers to CUSTOMERS.CUSTOMERID).
  - ApprovedBy (foreign key, refers to EMPLOYEES.EMPLOYEEID, manager of the branch).
  - BranchIFSCCode (foreign key, refers to BRANCHES.IFSCCODE, part of primary key).
- LOANACCOUNTNO, BRANCHIFSCCODE** -> Principle, InterestAmt, Outstanding, Status, Security, LoanType, CustomerID, ApprovedBy.

All attributes are non-transitively determined by the Primary Key (super key) LoanAccountNo, BranchIFSCCode. Hence, it is in **Boyce-Codd Normal Form**.

#### 8) InterestInfo :

Attributes:

- LoanType (foreign key, uniquely identify a loan type).
  - InterestRate.
- LOANTYPE** -> InterestRate.

All attributes are non-transitively determined by the Primary Key (super key) LoanType. Hence, it is in **Boyce-Codd Normal Form**.

#### 9) LoanInterestRecord :

Attributes:

- LoanAccountNo, LoanIFSCCode, Date (primary key, uniquely identify an interest record).
  - Interest.
  - LoanAccountNo, LoanIFSCCode (foreign key, refers to LOANS.LOANACCOUNTNO and LOANS.BRANCHIFSCCODE, part of primary key).
- LOANACCOUNTNO, LOANIFSCCODE, DATE** -> Interest.

All attributes are non-transitively determined by the Primary Key (super key) LoanAccountNo, LoanIFSCCode, Date. Hence, it is in **Boyce-Codd Normal Form**.

#### 10) LoanPayments :

Attributes:

- LoanPayID (primary key, uniquely identify a loan payment record).
- Date, Amount.

- LoanAccountNo, LoanIFSCCode (foreign key, refers to LOANS.LOANACCOUNTNO and LOANS.BRANCHIFSCCODE, part of primary key).
  - BranchIFSCCode (foreign key, refers to BRANCHES.IFSCCODE, branch of payment).
- LOANPAYID** -> Date, Amount, LoanAccountNo, LoanIFSCCode, BranchIFSCCode.

All attributes are non-transitively determined by the Primary Key (super key) LoanPayID. Hence, it is in **Boyce-Codd Normal Form**.

**ALL THE RELATIONS UNDER THE DATABASE ARE BOYCE-CODD NORMALISED.**