**DATABASE MANAGEMENT SYSTEMS**

**CS6106**

**PROJECT ABSTRACT**

**TITLE – BANK MANAGEMENT SYSTEM**

**Prepared and Submitted By**

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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**.

1. **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, AdddresLine2, 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**.

1. **Customers :**

Attributes:

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

**CUSTOMERID ->** Name, Sex, DateOfBirth, AddressLine1, AdddresLine2, City, PostalCode.

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

1. **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**.

1. **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**.

1. **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**.

1. **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, BRANACHIFSCCODE ->** 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**.

1. **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**.

1. **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**.

1. **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.**