Group-05 Banking Management and Monitoring System

Team Members:

Sai Dinesh Kumar Reddy Addula-11746819 (Team coordinator)

Varun kumar Chennuri -11749795

Harish Chinnakadiri -11690969

Manichandra navuluri -11749618

INFO 5707 DATA MODELLING

Dr.Hong,Lingzi

Objectives:

The Banking Management and Monitoring System shall set up a centralized database for the proper management of the banks in all aspects, from customer account maintenance to monitoring every transaction in real time, processing loans, and managing credit cards. The BMMS shall achieve the following:

Store customer information, accounts details, transaction records, loans information, and employees' data in one integrated system.

Real-time fraudulent activity detection and monitoring.

• Enable personalization of recommendations for financial products towards customers, based on transaction and behavior history.

• Improved worker efficiency due to proper time management.

The scope of the Project:

- The Banking Management System will ensure that the management of customer accounts, transactions, and loans, and functions of employees are optimized to further enhance operational efficiency and service delivery.
- It shall consolidate information relative to the profiles of customers, accounts, loan history, and transactions and employee base for proper strategic planning and improvement of banking services.
- These are the functional modules: customer management, account management, tracking of loans, transaction processing, and employee management that will be integrated into the relational database to support present operational requirements.

- The system will provide automatic reports regarding account balance, loan repayments, summaries of transactions, and customer activities. The reports are to be automated to minimize manual efforts in reporting and to increase the accuracy of data.
- This will offer standardized practices in account creation, the approval of loans, and transaction execution to ensure smooth banking operations, enabling customers to conveniently manage account balances and the status of their loans.
- All transactions shall be captured in real time to enhance effective monitoring, fraud detection, and analysis of financial behavior trends.
- The system will also allow for notifications in good time regarding due dates for loan repayment, account activities, and other transactions via mobile or web banking.
- Customer data, transactions, and financial records will be backed up in a very secure way to avoid loss of data and to address all the financial regulations.
- The software will henceforth help to better facilitate employee assignment to branches, management of staff schedules, track the performance of the branches, and improve customer support at the branch level to deliver efficiency and effectiveness in the workforce.

User Requirements:

- The system shall assign each customer with a unique Customer ID and shall store their personal information like name, address, phone number, and email ID, in a separate customer table.
- Customers shall periodically update their personal information to ensure data accuracy regarding Address, Phone Number, and Email.

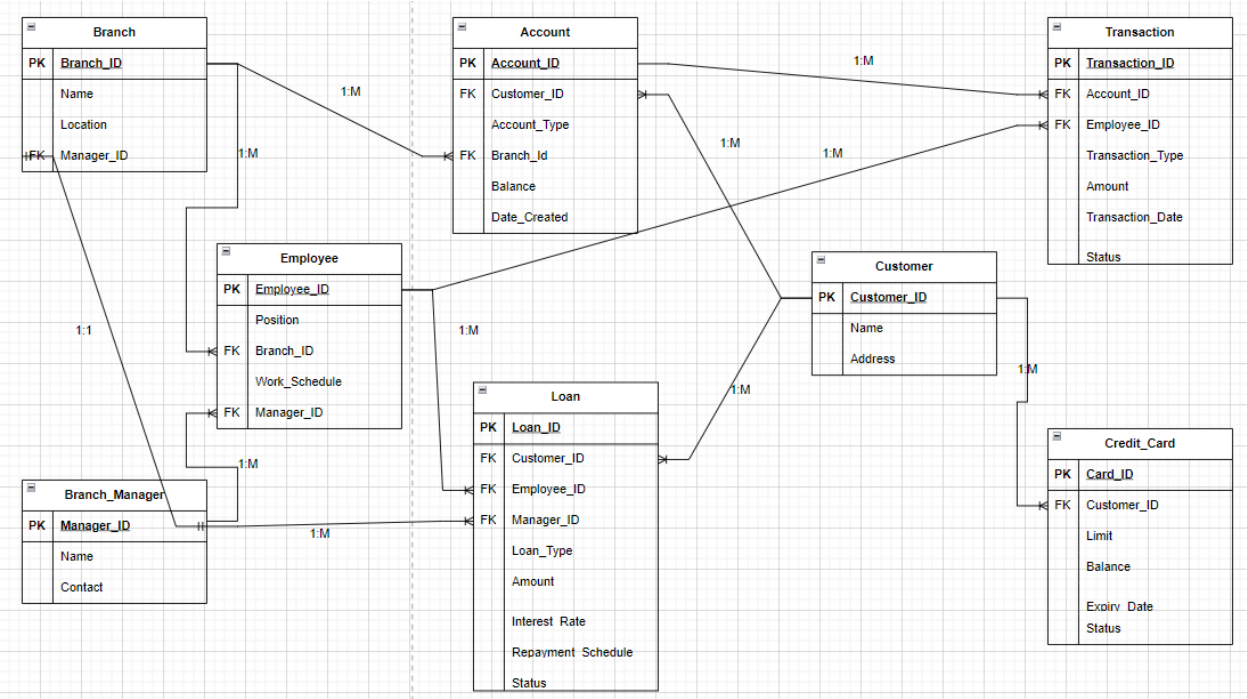
- The customers shall be allowed access to their account balance information, including recent transactions and status of the account, through their secure login.
- Every transaction shall be assigned a unique Transaction ID that logs the transaction type-deposit, withdrawal, and transfer-date, and amount of money.
- Every loan taken shall be assigned a Loan ID for tracking such information as the type of loan taken, amount borrowed, interest applied, due dates for repayment, and status of loan.
- The client will be able to view his loan information and his repayment schedule through his account portal.
- The system shall provide multiuser access via secure means, with differentiation of permissions depending on user roles: customer, teller, loan officer, and manager.
- Bank managers shall receive daily automated reports that summarize transaction activities across customer accounts.
- Each employee shall be automatically assigned an Employee ID with a profile inclusive of personal information, position, and schedule, which the HR personnel maintain.
- The employees may independently update their personal information, such as contact details and direct deposit information.
- The system shall fully support, from the back end, online and mobile banking by the customers to manage accounts, transfer money, pay bills, and monitor loans.
- The system should provide real-time monitoring of suspicious transaction activities and raise a red flag to help prevent fraud.

- The interface should be such that it allows for multiple languages depending on the bank branch's geographical location to respond to the various needs of its customers.
- It should record transactions in the local currency to accommodate the banking needs of that region.

Business Rules:

- One branch manager is assigned to each branch.
- One customer can have more than one account and loan in the bank
- Each account is associated with one customer and handled at a particular branch
- A transaction can only be done from an authorized person within the place of their assignment
- A loan requires an approval of a loan officer and also a branch manager.
- Each credit card is assigned to only one customer. Also, limits and balances are well defined.
- Each branch manager can assign responsibilities and organize work schedules for the employees working in that branch.
- Each employee has an ID number assigned uniquely. Though an employee is connected with only one branch, he can serve customers of every branch.
- Repayment of loans should be on time. If not, then the particular account is highlighted to pursue the same.
- The system keeps a track of transactions minute by minute. Any suspicious activity is highlighted and needs to be investigated immediately.

ENTITY RELATIONSHIP DIAGRAM (ERD)



The above ERD meets the requirements with at least six entities and relationships depicted in Crow's Foot notation, covering all essential entities, primary and foreign keys, and relationship types. Here's a summary of the key entities:

- **Branch**: Identified by Branch_ID, stores branch details and is managed by a Branch_Manager.
- **Employee**: Identified by Employee_ID, linked to Branch and Branch_Manager, covering details like position and work schedule.
- **Customer**: Identified by Customer_ID, stores customer personal details.

- **Account**: Contains Account_ID, associated with Customer and Branch, tracks account type, balance, and creation date.
- **Loan**: Identified by Loan_ID, associated with Customer and Employee, includes details like loan type, amount, interest rate, and repayment schedule.
- **Transaction**: Identified by Transaction_ID, linked to Account and Employee, records transaction type, amount, and status.
- **Credit Card**: Contains Card_ID, associated with Customer, tracks balance, limit, and expiry date.

Data Dictionary:

This is considered to be very crucial in designing the data model. With this, the users would be able to shortcut the needs of the primary entities immediately.

Exposing the dataset to inconsistency and undefined standards are what happens if one doesn't have a data dictionary. The orderly set of the records of all

key characteristics of the data are called the data dictionary. It includes the name, type, format, and range. The mapping of tables and the

Relationships between the tables so that tracing the connection between the tables is easy.

Key concepts of data dictionary:

- Supports avoidance of inconsistency within the data for the warehouse data management system

- Explanation of conventions used within the warehouse data management system
- Synchronization of team members so that uniformity exists in gathering and giving meaning to the data
- Impose data standards followed by all.
- Speed up the analysis of data for large business insight.

Table Name	**Attribute Name**	**Data Type**	**Description**	**Data Format**	**Required**	**PK / FK**	**Sample Value**
Branch Table	Branch_ID	Integer	Primary Key which represents branch	9999	Y	PK	11746
Branch Table	Name	String	Name of the brach	XXXXX	Y		"Liability"
Branch Table	Location	String	Location of the brach	XXXXX	Y		"Basic"
Branch Table	Manager_ID	Integer	ID of manager who's	9999	Y	FK	"L01"

Branch_Manager Table	Manager_ID	Integer	Primary Key which represents manager	9999	Y	PK	1469
Branch_Manager Table	Name	String	Name of the manager		Y		"tony"
Branch_Manager Table	Contact	String	contact number of manager	9999999999	Y		9453281282
Employee Table	Employee_ID	Integer	primary Key which represents employee	9999	Y	PK	1234
Employee Table	Position	String	Position which employee holding	XXXXX	Y		"accountent"
Employee Table	Branch_ID	Integer	Forign Key representing branch id	9999	Y	FK	1235

			from branch table				
Customer Table	Customer_ID	Integer	primary Key which represents customer	9999	Y	PK	2346
Customer Table	Name	String	Name of the customer	XXXXX	Y		"rishi"
Customer Table	Address	String	address of customer	XXXXX	Y		"Denton Texas"
Account Table	Account_ID	Integer	Primary Key which represents Account	9999	Y		8657
Account Table	Customer_ID	Integer	Forign key which represents id of customer	9999	Y	FK	3654

			from customer table				
Account Table	Branch_ID	Integer	Forign key which represents id of brach from brach table	9999	Y	FK	2674
Account Table	Balance	Integer	Balance remaining in account of customer	9999	Y		84000
Account Table	Date_Created	Date	Account created date	MM-DD-YYYY	Y		12/12/12
Transaction Table	Transaction_ID	Integer	Primary Key which represents Transactions	9999	Y	PK	4353

Transaction Table	Account_ID	Integer	Forign key which represents id of Acount from Acount table	9999	Y	FK	2938
Transaction Table	Transaction_Type	String	Transaction method	XXXXX	Y		"card"
Transaction Table	Amount	Integer	Amount of the transaction.	9999	Y		1020
Transaction Table	Transaction_Date	Date	Date of the transaction.	MM-DD-YYYY	Y		12/10/18
Transaction Table	Status	String	Status of the transaction	XXXXX	Y		"completed"
Loan Table	Loan_ID	Integer	Primary Key which	9999	Y	PK	218931

			represents Loan				
Loan Table	Customer_ID	Integer	Foreign Key which represents ID of customer who took Loan	9999	Y	FK	2382
Loan Table	Loan_Type	String	Type of loan	XXXXX	Y		"Home"
Loan Table	Amount	Integer	Amount of the loan.	999999	Y		49000
Loan Table	Interest_Rate	Integer	Interest rate for the loan.	99	Y		4
Loan Table	Repayment_Schedule	Integer	Schedule for loan repayment in years	99	Y		15

Loan Table	Status	String	Status of the loan	XXXXX	Y		Pending
Credit_Card Table	Card_ID	Integer	Primary Key which represents credit	999999	Y	PK	2823
Credit_Card Table	Customer_ID	Integer	Foreign Key which represents ID of customer who have credit card	9999	Y	FK	1928
Credit_Card Table	Limit	Integer	Credit limit of the card.	9999	Y		20000
Credit_Card Table	Balance	Integer	Current balance on the card.	999999	Y		10000
Credit_Card Table	Expiry_Date	DATE	Expiration date of the credit card.	MM-DD-YYYY	Y		12/10/40

Credit_Card Table	Status	String	Status of the card	XXXXX	Y		"Active"