DBMS PROJECT

Scope of project

In this project, we aimed to provide users with a convenient and reliable online banking experience.

The project uses the concepts of DBMS to make a database and handle the data required for an online banking system.

Stakeholders

- Banking customers
- Employees(Bankers)

Entities

1. **USER** (**user ID**, userType, password)
2. **CUSTOMER** (**customer ID**, Customer name, customer address, user ID, Date of birth, credit score)
3. **DOCUMENTS** (customer ID, Document type, Document file)
4. **BANKER** (**Employee ID**, employee name, employee address, year of joining, date of birth, user ID, Adhaar ID, Salary, branchID)
5. **ACCOUNT** (**Account number,** Balance, Category, customer ID, branch ID)
6. **BRANCH** (**Branch ID**, Branch address)
7. **LOAN** (**Loan ID**, Amount, Due date, Interest rate, mortgage, loan type, Customer ID)
8. **CARDS** (**Card number**, cvv, expiry, Account number,cardLimit,cardType)
9. **Verifies(VerificationID,**employeeID**)**
10. **Issues(**employeeID,cardNumber**)**
11. **Submits(**customerID,employeeID**)**
12. **Gives(**branchID,loanID**)**
13. **MakeAccount(**customerID,accountNumber**)**
14. **RenewCard(**customerID,cardNumber**)**
15. **Transaction(**TransactionID,customerID,accountDebited,accountCredited**)**

1) User

Variable	Datatype	Integrity Constraints
userID	INT	Primary key
userType	CHAR[50]	Not null, (banker, customer)
password	VARCHAR[50]	Not null

2) Customer

Variable	Datatype	Integrity constraints
customerID	INT	Primary key
customerName	VARCHAR[45]	Not Null
accountNumber	DOUBLE	Not Null
customerAddress	VARCHAR[45]	Not Null
userID	INT	foreignKey, Not Null
DoB	DATE	Not Null

3) Banker

Variable	Datatype	Integrity constraints
employeeID	INT	Primary key
employeeNAME	VARCHAR[45]	Not Null
employeeADDRESS	VARCHAR[45]	Not Null
userID	INT	foreignKey, Not Null
salary	VARCHAR[45]	Not Null
aadharID	DOUBLE	Not Null
DoB	DATE	Not Null
branchID	INT	Not Null
joiningYEAR	YEAR	Not Null

4) Loan

Variable	Datatype	Integrity constraints
loanID	DOUBLE	Primary key
amount	VARCHAR[45]	Not Null
DueDate	DATE	Not Null
InterestRate	VARCHAR[10]	Not Null
loanType	VARCHAR[45]	Not Null
customerID	INT	foreignKey,Not Null

5) Documents

Variable	Datatype	Integrity constraints
customerID	DOUBLE	ForeignKey referenced from Customer used as PrimaryKey
documentTYPE	VARCHAR[45]	Not Null
documentFILE	VARCHAR[45]	Not Null
customerID	INT	foreignKey,Not Null

6) Branch

Variable	Datatype	Integrity constraints
branchID	INT	Primary key
branchADDRESS	VARCHAR[45]	Not Null

7) Account

Variable	Datatype	Integrity constraints
accountNUMBER	INT	Primary key
balance	INT	Not Null
category	VARCHAR[45]	Not Null
branchID	INT	Not Null
customerID	INT	foreignKey,Not Null

8) Card

Variable	Datatype	Integrity constraints
cardNUMBER	INT	Primary key
expiry	DATE	Not Null
cvv	INT	Not Null
cardLimit	INT	Not Null
cardType	VARCHAR[20]	Not Null
accountNumber	INT	foreignKey,Not Null

9) Verifies

Variable		Integrity Constraints(if any)
VerificationID	VARCHAR[15]	Primary key
Banker	employeeID	

10) Issues

Variable		Integrity Constraints(if any)
Banker	employeeID	
Card	cardNumber	

11) Submits

Variable		Integrity Constraints(if any)
Banker	employeeID	
Customer	customerID	

12) Gives

Variable		Integrity Constraints(if any)
Branch	branchID	
Loan	loanID	

13) Make account

Variable		Integrity Constraints(if any)
Customer	customerID	
Account	accountNUMBER	

14) Renew Card

Variable		Integrity Constraints(if any)
Customer	customerID	
Card	cardNUMBER	

15) Transaction

Variable		Integrity Constraints(if any)
TransactionID	INT	PrimaryKey
Customer	customerID	NOT NULL
AccountDebited	accountNumber	NOT NULL
AccountCredited	accountNumber	NOT NULL

WEAK ENTITY

In the given entities

- Documents

are the weak entities because they cant independently exist.

Documents cannot exist without customer and the banker. Customer is needed to provide the documents and the banker needs to verify these documents.

TERNARY RELATIONSHIP

Ternary Relationships in these relationships are make account, renew cards.

These are ternary relationships because they have more than one entities involved in the relationship.

Make Account : Banker,Customer,Account

Renew Card : Banker,Customer,Card

ENTITY PARTICIPATION TYPE

Total Participation : **Documents, BankCards, Loan, Customer**

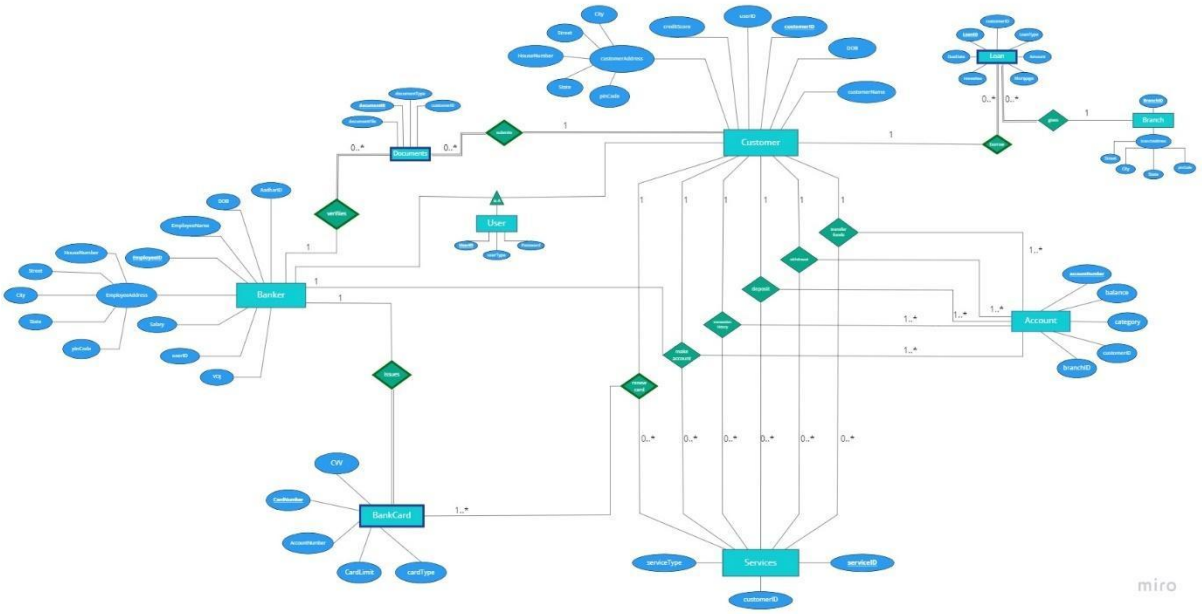
Documents participate completely in submits and verifies relationships because they have to be part of these relationships.

BankCards participate completely in issues and renew cards as they have to be a part of these relationships.

Customers have total participation in submit as without submitting they cant proceed to any service.

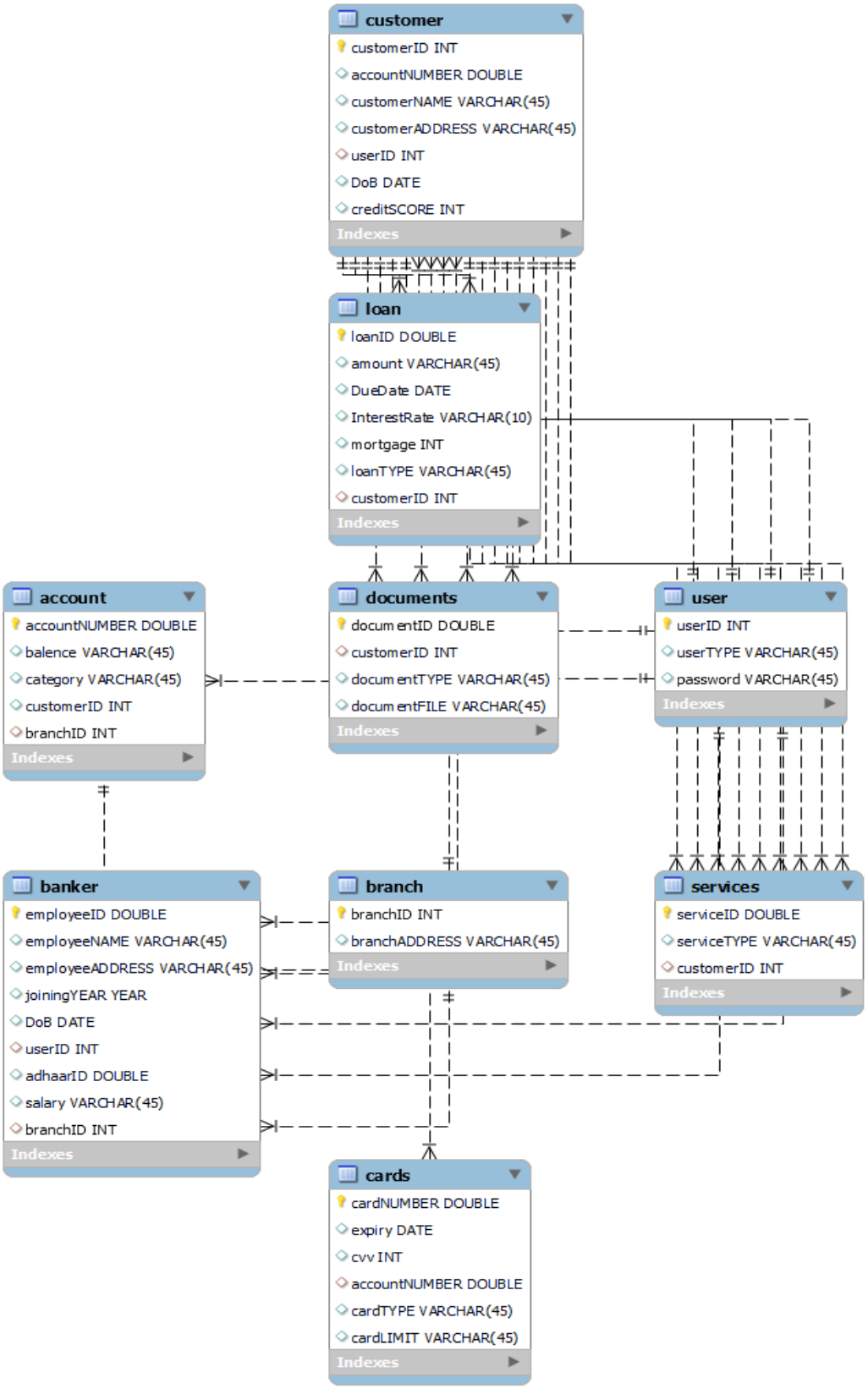
Loan participates completely in gives and borrow relationships. Without loan there is not concept of give and borrow.

ER DIAGRAM



Link to the ER Diagram
https://miro.com/welcomeonboard/ZFZ2UDJJRzBmWDVpZDBtR2tRb2tGbWJXaGw4ejZ0WmtZYzJJcUtrS2dXTm1DMlJTQTZObklnbmI2ZkpZeFpNTXwzMDc0NDU3MzU0MjY2MjY2OTg4?invite_link_id=486978681630

Relationship Schema


customer
customerID INT
accountNUMBER DOUBLE
customerNAME VARCHAR(45)
customerADDRESS VARCHAR(45)
userID INT
DoB DATE
creditSCORE INT
Indexes
loan
loanID DOUBLE
amount VARCHAR(45)
DueDate DATE
InterestRate VARCHAR(10)
mortgage INT
loanTYPE VARCHAR(45)
customerID INT
Indexes
account
accountNUMBER DOUBLE
balence VARCHAR(45)
category VARCHAR(45)
customerID INT
branchID INT
Indexes
documents
documentID DOUBLE
customerID INT
documentTYPE VARCHAR(45)
documentFILE VARCHAR(45)
Indexes
user
userID INT
userTYPE VARCHAR(45)
password VARCHAR(45)
Indexes
banker
employeeID DOUBLE
employeeNAME VARCHAR(45)
employeeADDRESS VARCHAR(45)
joiningYEAR YEAR
DoB DATE
userID INT
adhaarID DOUBLE
salary VARCHAR(45)
branchID INT
Indexes
branch
branchID INT
branchADDRESS VARCHAR(45)
Indexes
services
serviceID DOUBLE
serviceTYPE VARCHAR(45)
customerID INT
Indexes
cards
cardNUMBER DOUBLE
expiry DATE
cvv INT
accountNUMBER DOUBLE
cardTYPE VARCHAR(45)
cardLIMIT VARCHAR(45)
Indexes

SQL Queries

1. **Withdrawing money from bank account only if the account has sufficient balance**

   Update account set balance = balance-1000 where customerID = ID and balance >= 1000

2. **Listing all the customer ID's and name of all the customers who have taken loan**

   SELECT customer.customerID, customer.customerNAME FROM loan INNER JOIN customer ON loan.customerID = customer.customerID

3. **Grouping all the employee's according to joining Year in decreasing order**

   SELECT joiningYEAR, COUNT(employeeID) from banker group by joiningYEAR order by joiningYEAR desc

4. **Listing all the customer's ID's and names who have a creditScore > 300 and account net balance > $31624.49**

   select customerID, customerNAME from customer where creditSCORE > 300 and customerID in (select customerID from account where balence > '$31624.49')

5. **List all the accountNumbers which have more than $31624.49 in their accounts and have a credit or debit card**

   select accountNUMBER from cards where accountNUMBER in (select accountNUMBER from account where balence > '$31624.49')

6. **Finding all the customers who have a credit score<200 but still have a loan sanctioned by the bank**

   select customerID, customerNAME from customer where exists(select customer.customerID from customer inner join loan on customer.customerID=loan.customerID where customer.creditSCORE < 200)

7. **List all the customers who have availed the service of depositing money in their bank account**

   select customerNAME, customerID from customer where customerID in (select customerID from services where serviceTYPE = 'deposit')

8. **Listing all the customers who have more than $61112.05 in their accounts and have their name beginning with "kip".**

select customerNAME, customer.customerID, balence from customer, account where customerNAME like 'kip%' and customer.customerID = account.customerID and customer.customerID in(select customerID from account where balence > '$61112.05')

9. **If the bank employee has more than 20 years of experience then we give him/her a raise.**

   update banker set salary = '$10000' where year(curdate()) - joiningYEAR >= 20

10. **Deleting all the cards that have expired(expiry date of tha card has passed)**

    delete from cards where expiry = curdate()