**a. Determining possible entities - What are the candidate entity sets you would consider in order to build your ER model?**

Branch

Account

Employee

Customer

Transaction

Loan

User

User Privilege

**b.Identify relationship types between entities and determine the cardinality and participation constraints of the relationships.**

Branch - Employee: Each branch is managed by one employee (1-to-1).

Branch - Account: Each branch can have multiple accounts (1-to-many).

Account - Customer: Each account belongs to one customer (1-to-1).

Account - Transaction: Each account can have multiple transactions (1-to-many).

Branch - Loan: Each branch can have multiple loans (1-to-many).

Loan - Customer: Each loan is associated with one customer (1-to-1).

Employee - User: Each employee can have one user account (1-to-1).

Customer - User: Each customer can have one user account (1-to-1).

User - User Privilege: Each user has specific privileges (1-to-many).

**c.Defining attributes and their domain for all given entities - What are the attributes you can assign to each of these given the available information? What are the attribute domains?**

Branch: BranchID (Primary Key), Name (string), Location (string), ManagerID (Foreign Key referencing EmployeeID)

Account: AccountID (Primary Key), BranchID (Foreign Key referencing BranchID), Type (string), Balance (decimal), OpenDate (date)

Employee: EmployeeID (Primary Key), Name (string), ContactInfo (string), Role (string)

Customer: CustomerID (Primary Key), FirstName (string), LastName (string), Address (string), ContactNumber (string), Email (string)

Transaction: TransactionID (Primary Key), AccountID (Foreign Key referencing AccountID), Type (string), Amount (decimal), Date (datetime)

Loan: LoanID (Primary Key), BranchID (Foreign Key referencing BranchID), Type (string), PrincipalAmount (decimal), InterestRate (decimal), StartDate (date), MaturityDate (date)

User: UserID (Primary Key), Username (string), Password (string), UserType (string)

User Privilege: PrivilegeID (Primary Key), UserID (Foreign Key referencing UserID), Resource (string), AccessLevel (string)

**d.Determine primary key attributes and foreign key attributes**

Primary Keys:

Branch: BranchID

Account: AccountID

Employee: EmployeeID

Customer: CustomerID

Transaction: TransactionID

Loan: LoanID

User: UserID

User Privilege: PrivilegeID

Foreign Keys:

Branch: ManagerID (referencing EmployeeID)

Account: BranchID (referencing BranchID)

Transaction: AccountID (referencing AccountID)

Loan: BranchID (referencing BranchID)

Loan: CustomerID (referencing CustomerID)

User: UserID (referencing UserID)

User Privilege: UserID (referencing UserID)