

## **CS331 - Group 7**

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### **Business Requirements:**

#### **BRANCH:**

- The bank is organized into branches.
- Each branch is in a particular city with an address and is identified by a unique branch-ID and a name.
- The bank monitors the assets of each branch.
- Each branch of the bank has a manager and an assistant manager who are employees of the bank.

Assumptions:

- The branch manages a number of assets; it is a multivalued attribute that will be organized in an asset relation with the asset name serving as a partial key.

#### **CUSTOMER:**

- Bank customers are uniquely identified by their social security numbers.
- The bank stores each customer's name and address (apartment number, street number, state, city, and zip code).
- Customers may have several accounts and can take out loans that are managed as accounts as well.
- A customer may be associated with a particular branch and has a personal banker who works with the customer on their loan and bank transactions.

Assumptions:

- The customer has total participation in the BANKER relationship with their primary banker: every customer associated with the bank must have a personal banker.
- Each customer is optionally associated with a single branch.

#### **EMPLOYEE:**

- Bank employees are also identified by their social security numbers.
- The bank stores the name and telephone numbers of each employee and the names of the employee's dependents.
- The bank also keeps track of the employee's start date and, thus, length of employment.
- An employee at the bank works for one of the branches and reports to the manager of that branch.
- The employee may have a manager and the manager is in charge of a certain number of employees.

Assumptions:

- The employee may have a number of dependents (it is a multivalued attribute) and this will be managed as a separate relation with the employeeSSN and dependent name serving as partial keys.
- Employees do not have to participate in a SUPERVISION relationship with a managing employee (as they may be the manager). However, employees can only have one manager.
- The participation of employees in WORKS\_FOR is total, as every employee must work for a branch to be an employee.
- Length of employment is a derived attribute from their start date.
- For a more robust design, we included the attributes sex, salary, address, and date of birth.
- In addition to the dependent names, we will also keep track of each dependent's birthday and sex.

#### **ACCOUNT:**

- The bank offers several types of accounts; savings, checking, money market, and loan accounts.
- An account can be held by more than one customer, and a customer can have more than one account.
- Each account is assigned a unique account number.
- The bank maintains a record of each account balance and the most recent date on which the account was accessed by each customer holding the account.
- In addition, saving and loan accounts have fixed interest rates, money market accounts have variable interest rates regularly updated based on the stock market
- Overdrafts are recorded for each checking account.

#### Assumptions:

- The participation of accounts in MANAGES is total, because an account cannot exist without having an owner.
- Each account type (checkings, savings, money market, loan account) is a subclass of account with disjoint participation. Each account entity must belong to one of the subclasses (the subclasses are total).
- Account overdrafts are a multivalued attribute that will be a separate relation, with the overdraft amount and accountID serving as partial keys.

#### **LOAN:**

- A loan originates at a particular branch and can be held by one or more customers.
- A loan is identified by a unique loan number (similar to an account number)
- For each loan, the bank keeps track of the loan amount and the loan monthly repayment amount.

- The bank keeps track of all the transactions. A transaction is identified by a unique code and has a type of name. For example, “WD” is the code for withdrawal, and “CD” is for customer deposit.

Assumptions:

- The participation of a loan in TAKES\_OUT is total, because a loan cannot exist without having an owner.
- The LOAN has total participation in a HOLDS relationship with Loan Account because every loan must belong to a loan account.

### **TRANSACTION:**

- When a customer makes a transaction, the transaction record should identify the transaction code, the date, the hour, the amount, and the account.
- Some transactions are free but the bank charges for most of them. If a customer makes a chargeable transaction, the charge is also registered as a chargeless transaction.

Assumptions:

- Transaction has total participation in the MAKES relationship with the ACCOUNT entity because every transaction must have an account associated with it.