Bank Database Management System Requirements

- Bank has branches , employees, and customers, accounts, and loans.
- Each branch is identified by a name, address, and a unique branch ID.
- Each branch has employees, and each is managed by a particular employee. Each employee works for one branch only.
- Each employee is identified by a name, sex, salary, and a unique employee ID.
- An employee can be a supervisor of other employees whether they are in the same branch or not. An employee may only have one supervisor.
- Each customer is identified by a name, address, phone number, and a unique customer ID.
- A customer may have multiple accounts and loans. Accounts and loans are managed by branches.
- Each account is identified by account type, account balance, and a unique account ID.
- Each loan is identified by loan type, loan amount, and a unique loan ID.
- Employees may work with customers to sell them products. A customer may work with multiple employees.
- Keep track of the sales numbers.

ER Diagram Design Process

Entities and Attributes:

1. Branch: branch ID, branch name, branch address
2. Employee: employee ID, employee name, sex, salary
3. Customer: customer ID, name, address, phone
4. Loan: loan ID, loan type, loan amount
5. Account: account ID, account type, balance

- *Each branch has employees, and each is managed by a particular employee. Each employee works for one branch only.*

  ➢ There are two relationships between employee and branch: "works for" and "manages". All branches have employees working for them and all employees work for a branch, so they both have full participation of the relationship "works for". A branch may have many employees, but an employee can only work for one branch, so the relationship cardinality is 1:N; on the other hand, all branches have a manager, but not all employees are managers. A branch can only be managed by one employee, and a manager can only manage one branch, so the relationship cardinality is 1:1.

- *An employee can be a supervisor of other employees whether they are in the same branch or not. An employee may only have one supervisor.*

  ➢ Employees have their own relationship of "supervision". Not all employees are supervisors nor supervisees. A supervisor can have many supervisees, but a supervisee can only have one supervisor, so the relationship cardinality is 1:N.

- *Accounts and loans are managed by branches.*

  ➢ Accounts and loans are two entities that are "offered" by branches. Not all branches offer accounts and loans, but all accounts and loans are offered by branches. A branch can offer many accounts and loans, but a loan or an account can only be offered by one branch, so both relationships have cardinality 1:N.

- *A customer may have multiple accounts and loans.*

  ➢ Loans and accounts are "borrowed" and "owned" by customers respectively. All loans and accounts are borrowed and owned by customers, all customers have account(s), but not all customers have loans. A loan and an account can be borrowed and owned by many customers and a customer can borrow and own many loans and accounts, so both relationships have cardinality M:N.

- *Employees may work with customers to sell them products. A customer may work with multiple employees. Keep track of the sales numbers.*

  ➢ All customers work with an employee, but not all employees work with a customer. An employee can work with many customers and vice versa, so the relationship have cardinality M:N. Since we want keep track of the sales numbers, the “works with” relationship have its own attribute: “sales”.