Assignment

Assignment-01:

Steps of Constructing ERD

1. Identify the Entities Required.
2. Identify the Attributes and Primary key for each Entity.
3. Identify the Relationship needed.
4. Identify the Cardinality Ratio and Participation.
5. Draw the Diagram.

Step 1: Identify the Entities Required

We have to develop a database for a company including some information of departments, employees and projects of the company. As mentioned that every **department** has many **employees** and each employee work for a department and each department is leading by only one **manager** who is also an employee. Initially a new department need not have any employee. Here, though an employee belongs a department but they can work for different **projects** at the same time.

Step 2: Identify the Attributes and Primary key for each Entity

- **Company** (Id, company_name, location, founded_date, managing_director)
- **Departments** (Department_id, name,number_of_employee, manager_id, employee_id, company_id)

- **Employees** (id, first_name, middle_name, last_name, joining_date, email, phone, date_of_birth, gender, designation, salary, department_id, job_title)
- **Address (**Id, employee_id, Village_name, post_office, post_code, Upazila, District)
- **Phone** (Id, number, code, employee_id, sim_operator) ◦ **Job Position (**position_id, position_name, employee_id, name_of_employee, name_of_department)
- **Projects** (Project_id, name, number_of_employee, start_date, end_date, budget, company_id, description).

Step 3: Identify the Relationship needed

1. Employees work_for Department

2. Employee Manages Department

3. Employees work_on Project

4. Department Controls Project

5. Manager leading department

Step 4: Identify the Cardinality Ratio and Participation

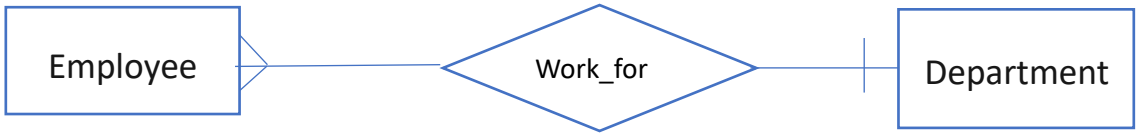
1.**Company to Department:** One-to-Many

Participation: Total for Department

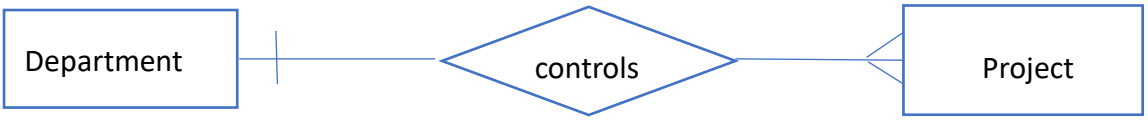
2.**Employee to department:** Many to One

total for Employee

Partial for Department

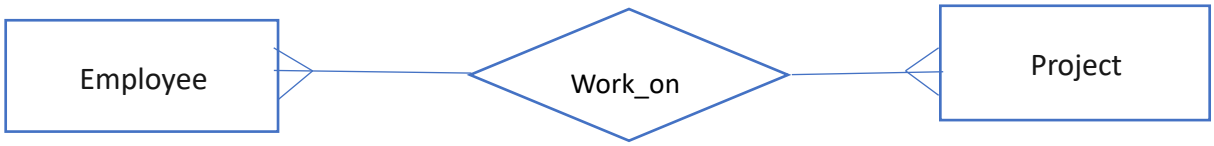


3.**Department to project:** One-to-Many



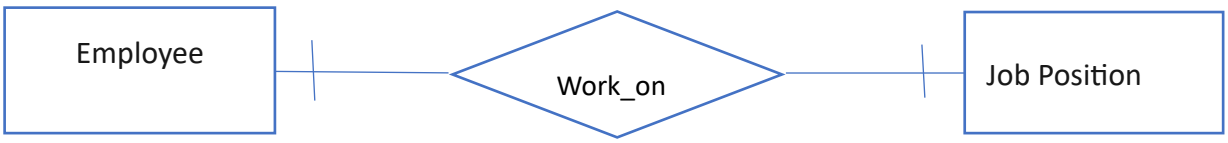
4.**Employee to Project:** Many-to-Many

Total for both Employee and Project

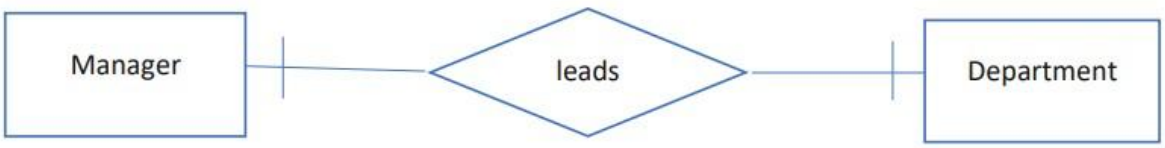


5.**Employee to Job Position:** One-to-One

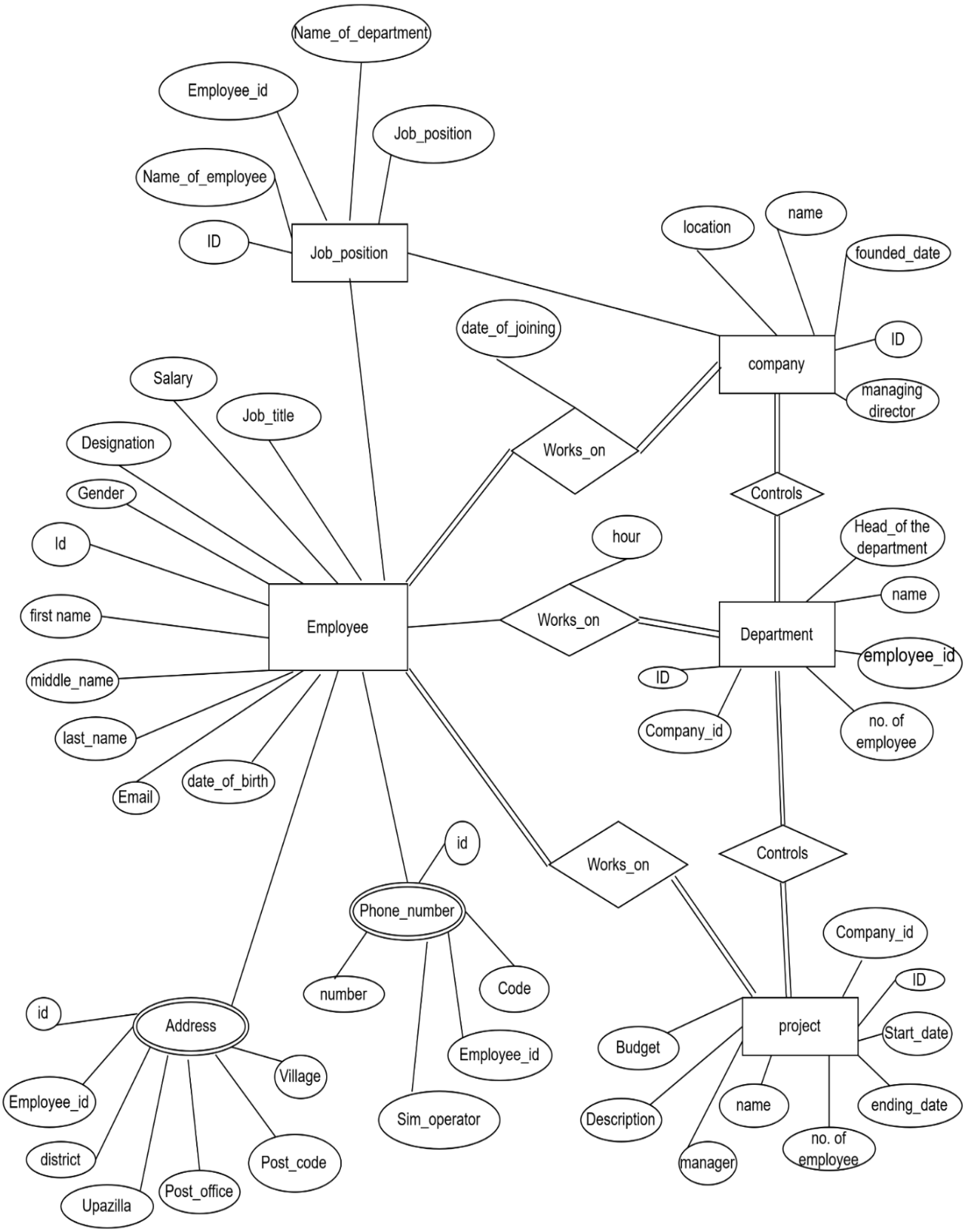
Total for Job Position



6.Manager leads Department: one to one



Step 5: Draw the Diagram



Assignment-02:

ER diagram for university management system

Step 1: Identify the Entities Required

Creating a university management system (UMS) database involves setting up tables for various entities like students, courses, faculty, departments, classes, and enrollment.

Step 2: Identify the Attributes and Primary key for each Entity

- **Student (**Student_id (PK), First_name, Last_name, Date_of_birth, Gender, Phone_number, Email, Department_id (Foreign Key references Department), Enrollment_date).
- **Department** (Department_id (PK),Department_name, Head_of_department (Foreign Key references Faculty)).
- **Course** (Course_id (PK), Course_name, Credits, Department_id (FK references Department), Course_description).
- **Faculty** (Faculty_id (Primary Key), First_name, Last_name, Email, Phone_number, Department_id (Foreign Key references Department), Joining_date). ○ **Class** (Class_id (Primary Key), Faculty_id (FK references Faculty), Course-id (Foreign Key references Course), Semester, Year). ○ **Enrollment** (Enrollment_id (Primary Key), Student_id (Foreign Key references Student), Class_id (Foreign Key references Class), Grade, Enrollment_date).

Step 3: Identify the Relationship needed

1.Student belongs to department

2.Faculty member belongs to department

3.Each course is offered by department

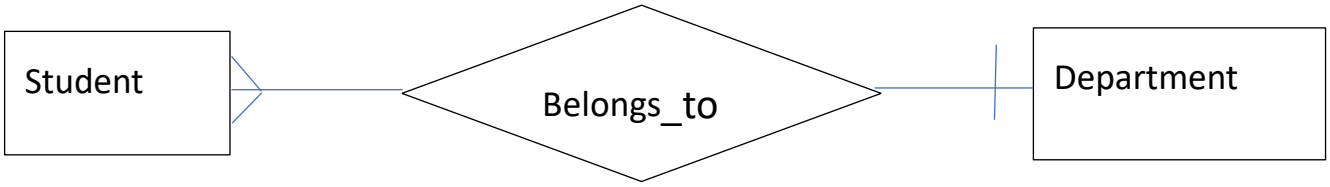
4.Faculty member teach Courses

5. Student can enroll in Courses

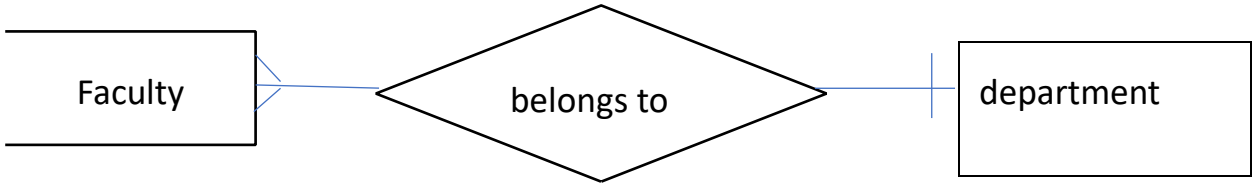
6.Class has multiple timetable slots.

Step 4: Identify the Cardinality Ratio and Participation

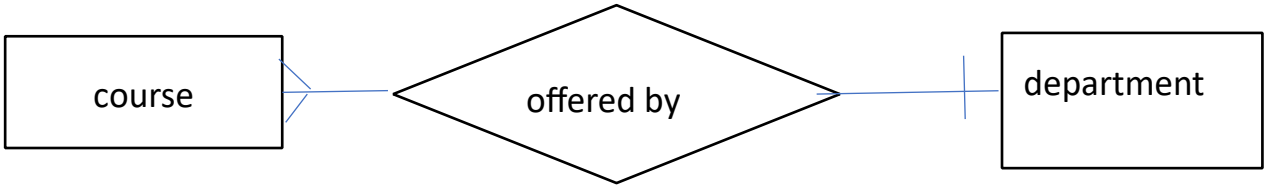
1. **Student - Department**: Many-to-One



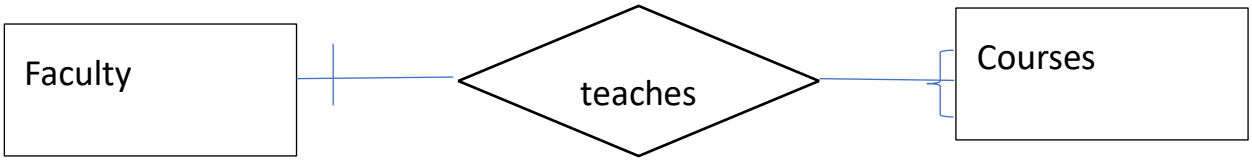
2. **Faculty - Department**: Many-to-One



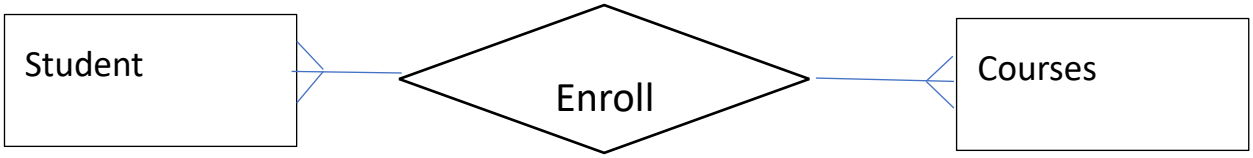
3. **Course - Department**: Many-to-One



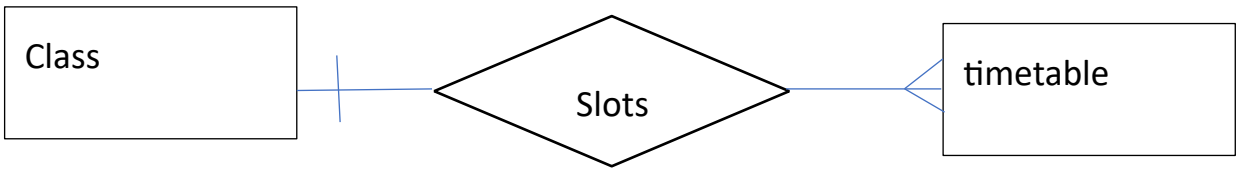
4.**Faculty - Class**: One-to-Many



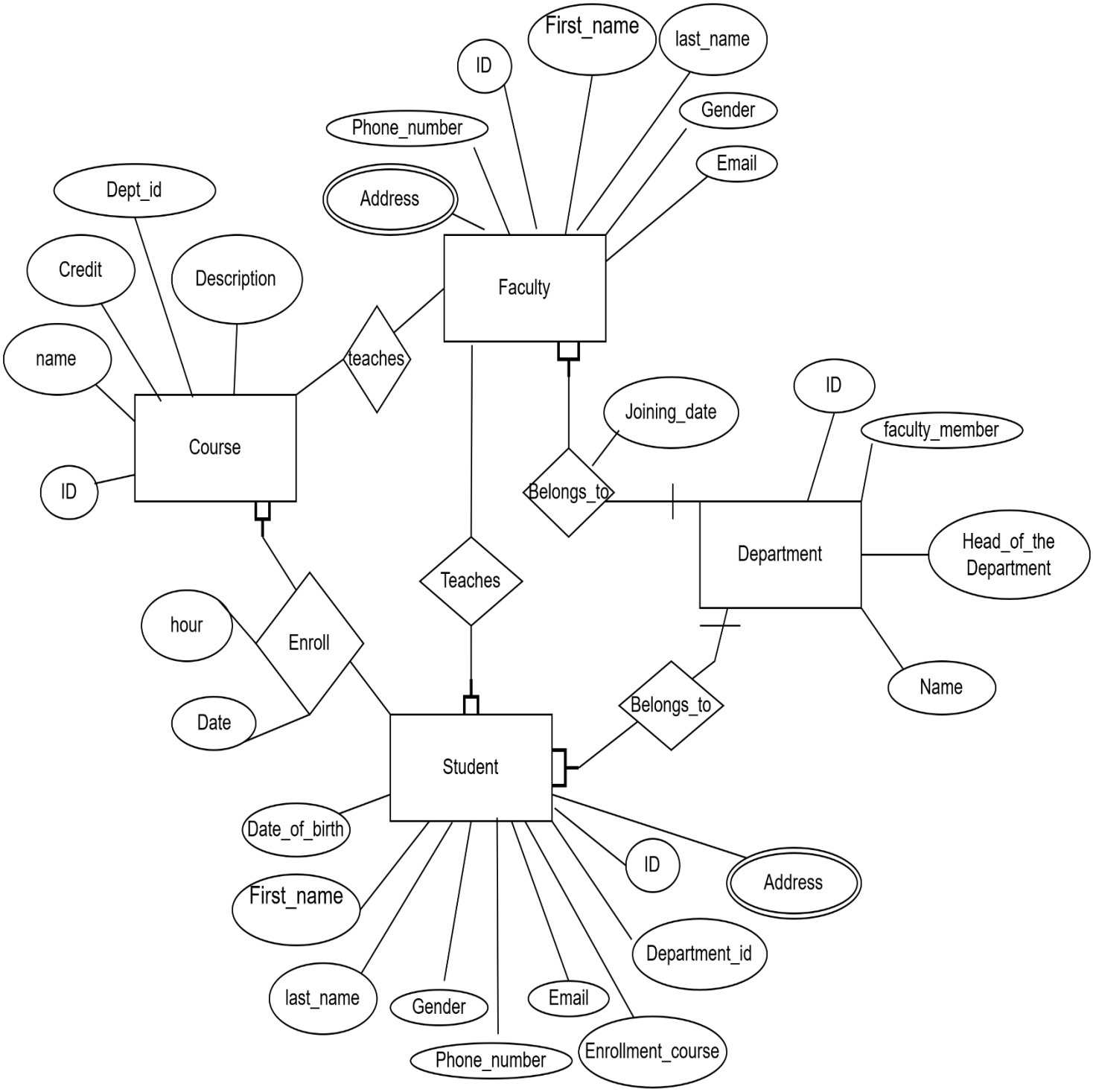
5.Student - Classes: Many-to-Many



6.Class - Timetable: One-to-Many



Step 5: Draw the Diagram



Assignment-03

Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received

Step 1: Identify the Entities Required

- **Customer**: Customer_id (Primary Key), Name, Address, Phone_number, Email.
- **Car**: Car_ID (Primary Key), License_Plate, Make, Model, Year, CustomerID (Foreign Key to Customer)
- **Accident**: Accident_ID (Primary Key), Date, Location,
  Description, Car_ID (Foreign Key to Car)
- **Insurance_Policy**: Policy_ID (Primary Key), Policy_Number, Coverage_Details, CustomerID (Foreign Key to Customer)
- **Payment**: Payment_ID (Primary Key), Amount, Period, Due_Date, Payment_Date, Policy_ID (Foreign Key to Insurance_Policy)

Step 3: Identify the Relationship needed

1. Customer can own one or more cars
2. Each accident record is linked to car.
3. Each car can be covered by multiple policies
4. Insurance policy can have multiple premium payments

5. Each payment record is linked to a single policy.

Step 4: Identify the Cardinality Ratio and Participation

○ Customer and Car (One-to-Many). ○ Car and Accident (One-to-Many). ○ Insurance_Policy and Car (Many-to-Many via Car_Policy). ○ Insurance_Policy and Payment (One-to-Many).

Step 5: ERD Diagram