

# Assignment

Course Title: Database (MySQL/Oracle/SQL Server)

Submitted to

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## **Assignment 1**

**Question-1.** You have to develop a Human Resource Management database for a company. It requires that you have to add some information of departments, employees and projects including company. As mentioned, every department has many employees and each employee works for a department and each department is led 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. Each employee can work for different job positions like Developer, Programmer and frontend designer.

### **ER diagram for Human Resource Management**

#### **Step 1: Identify the Attributes and Primary key for each Entity**

1. Employees : employee\_id(primary key), Name, Address, Gender, Dob, hire\_date, salary, position\_id(foreign key), dept\_id.
2. Departments : dept\_id(primary key), Name, num\_of\_employee, hod, Location.
3. Projects : Project\_id(primary key), name, num\_of\_employee, location
4. Dependents : D\_no, Gender, relationship.
5. Positions : position\_id (Primary Key), title, description

#### **Step 2: Identify the Relationship**

Entities have some relationships with each other. Relationships define how entities are associated with each other.

Let's Establishing Relationships between them are:

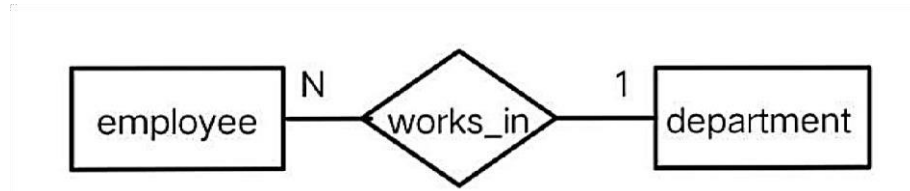
1. Employee works in Departments
2. Employee(manager) manages Department
3. Employee works on project
4. Department controls Projects
5. Employee has dependents
6. Employee holds position

#### **Step 3: Identify the Cardinality Ratio and Participation**

1. Employee-Department

### Relationship: Many-to-One

Many employee works in one Department but one employee can not work in many departments.



### 2. Employee(manager)-Department

#### Relationship: one-to-one

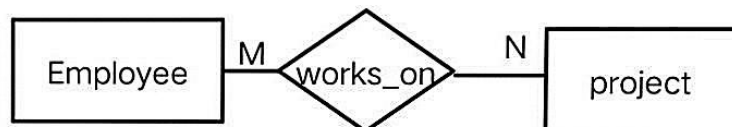
Employee works under the manager of the Department and the manager records the date of joining of employee in the department.



### 3. Employee-Project

#### Relationship: Many-to-Many

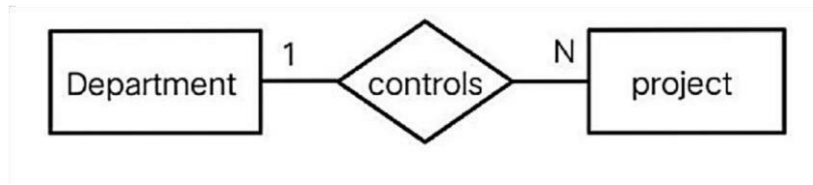
Many employee works on several projects and the number of hours worked by the employee on a single project is recorded.



### 4. Department-project

#### Relationship: one-to-Many

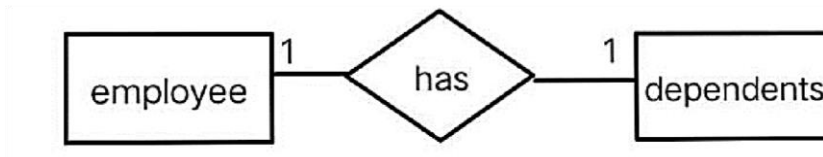
One department has many projects but one project can not come under many departments.



### 5. Employee-Dependent

#### **Relationship: one-to-one**

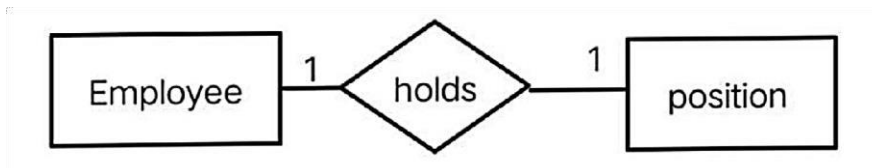
Each Employee has dependents. Each dependent is dependent of only one employee.

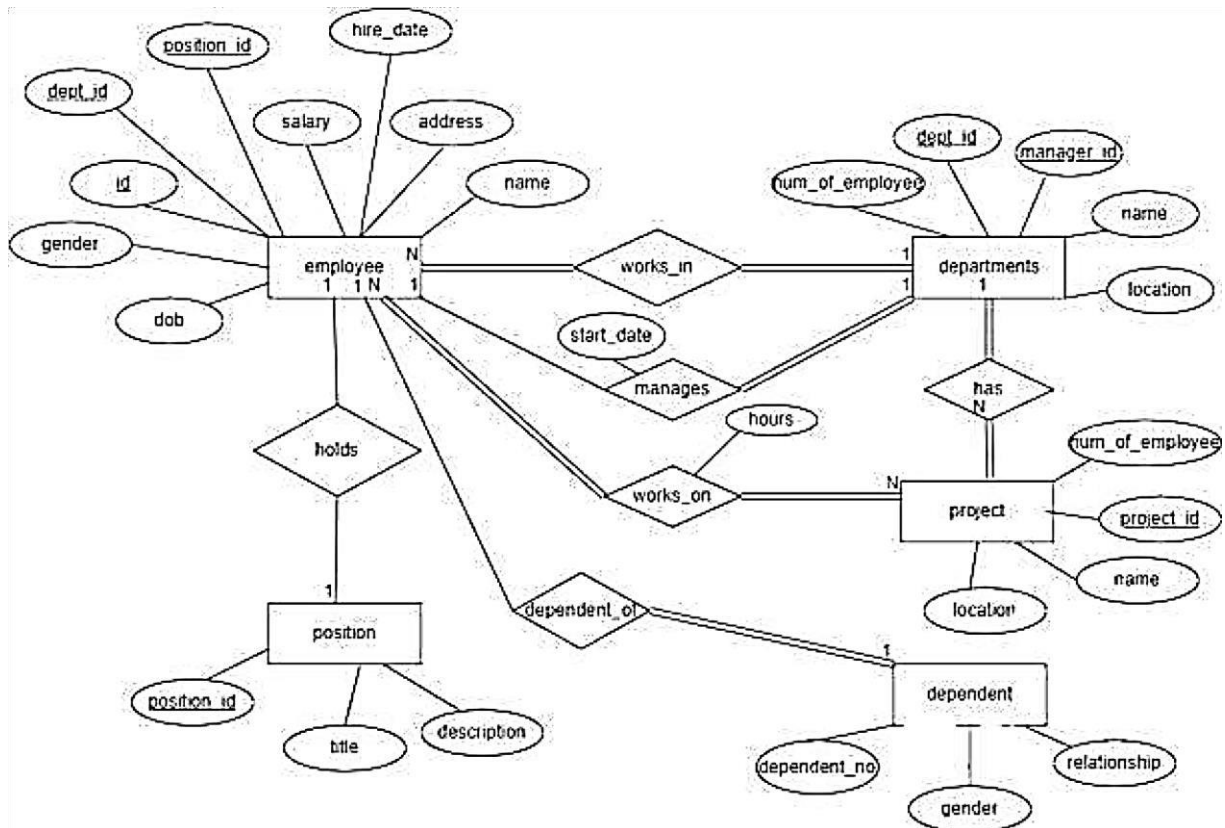


### 6. Employee-Position

#### **Relationship: one-to-One**

An Employee can have one Position at a time and a Position is held by one Employee.





#### Step 4: ER Diagram Representation

#### ERD to table:

1. Employee( *id*, Name, Address, Gender, Dob, hire\_date, salary, position\_id, dept\_id.
2. Departments : dept\_id, Name, num\_of\_employee, manager\_id, Location.
3. Projects : Project\_id, name, num\_of\_employee, location
4. Dependents : D\_no, Gender, employee\_id
5. Positions :position\_id, title, description
6. works\_on (id, hours, start\_date, employee\_id, Project\_id.

#### Question -2: ER diagram for University Management System

# **ER diagram for University Management System**

## **Step 1: Identify the Attributes and Primary key for each Entity**

1. Students: Student\_ID (Primary Key), Name, Date\_of\_Birth, Age, Gender, Address, Phone\_Number, Email
2. Courses: Course\_ID (Primary Key), Course\_Name, Credits, Duration
3. Faculty: Faculty\_ID (Primary Key), Name, Date\_of\_Birth, Gender, Address, Phone\_Number, Email, Hire\_Date, Salary, Department, Designation.
4. Department: Dept\_ID (Primary Key), Dept\_Name, Location
5. Hostel: Hostel\_id (primary key), Hostel\_name, No\_of\_seats
6. Subjects: Sub\_id(primary key), Sub\_name
7. Exams: Exam\_code(primary key), Room, Date, Time

## **Step 2: Identify the Relationship**

Entities have some relationships with each other. Relationships define how entities are associated with each other.

Let's Establishing Relationships between them are:

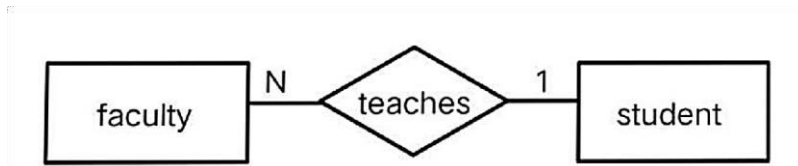
1. Faculty teaches student
2. Faculty takes subjects
3. Faculty belongs to department
4. Students enrolls courses
5. Student living in hostel
6. Course handles Department
7. Department conducts exams

### Step 3: Identify the Cardinality Ratio and Participation

#### 1. Student— Faculty

##### Relationship: Many-to-One

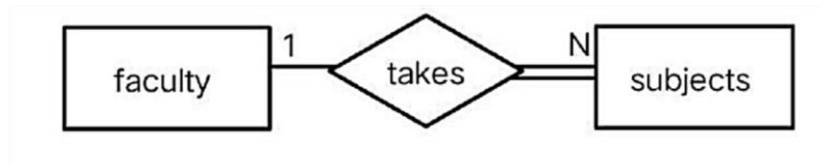
A faculty members teaches many students , but each student is taught by one faculty members.



#### 2. Faculty— Subject

##### Relationship: One-to-many

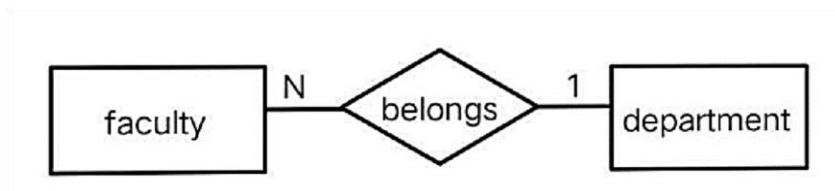
A faculty members takes many subjects , but each subject is taught by one faculty members.



#### 3. Faculty— Department

##### Relationship: Many-to-One

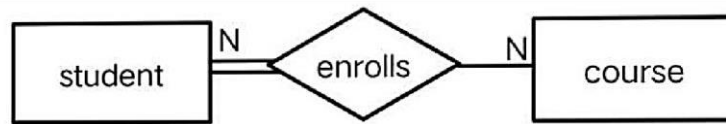
A department can have multiple faculty members, but a faculty member belongs to only one department.



#### 4. Student — Course

##### Relationship: Many-to-Many

A student can enroll in many courses, and each course enrolled by many students.



#### 5. Student — Hostel

**Relationship: Many-to-One**

A hostel accommodates many students, but single student is living in one hostel.



#### 6. Course — Department

**Relationship: Many-to-One**

A department handles multiple courses, but each course is handled by one department.



#### 7. Department — Exams

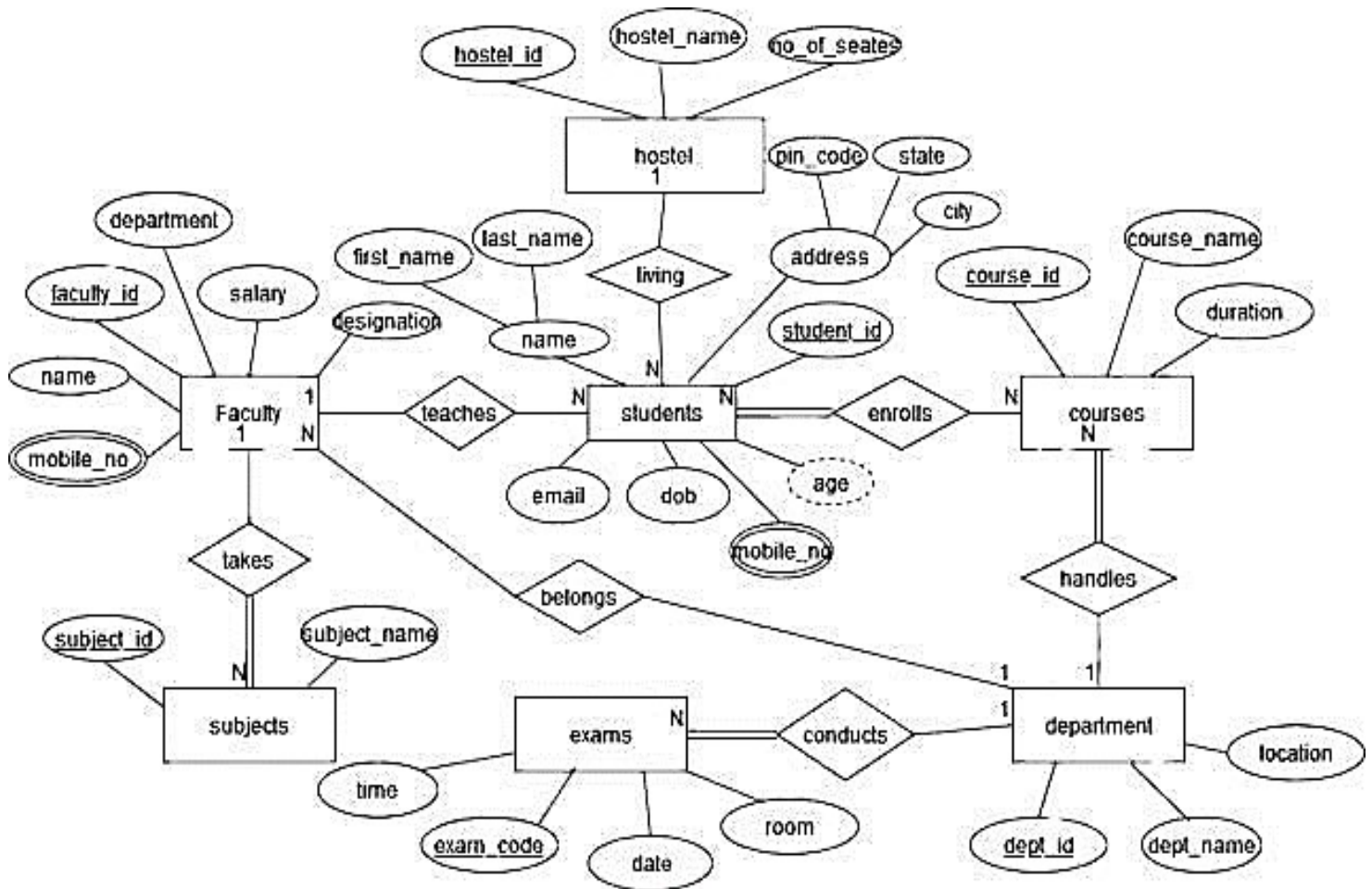
**Relationship: one-to-Many**

A department conducts multiple exams, but each exam is conducted by one department.





## Step 4: ER Diagram Representation



## ERD to table :

1. Students: Student\_ID, first\_name, last\_name, Date\_of\_Birth, Age, Gender, Address, Phone\_Number, Email
2. Courses: Course\_ID, Course\_Name, Credits, Duration, dept\_id
3. Faculty: Faculty\_ID, Name, Date\_of\_Birth, Gender, Address, Phone\_Number, Email, Hire\_Date, Salary, dept\_id, Designation.
4. Department: Dept\_ID , Dept\_Name, Location

- 5.Hostel: Hostel\_id, Hostel\_name, No\_of\_seats
- 6.Subjects: Sub\_id, Sub\_name, course\_id
- 7.Exams: Exam\_code, Room, Date, Time, subject\_id.
- 8. Address : city, state, pin\_code

**Question 3:** 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.

## **ER diagram for car insurance company**

### **Step 1: Identify the Attributes and Primary key for each Entity**

- 1. Customer: C\_id( primary key), name, address, phone\_no
- 2. Car: car\_id(primary key), color, model, year, engine\_no
- 3. Insurance policy : policy\_id(primary key), name, start\_date, end\_date
- 4. Premium installments : premium\_no, amount, received\_date, due\_date
- 5. Accident : accident\_id(primary key), car\_id(foreign key), date, place, report\_no, damage\_cost

### **Step 2: Identify the Relationship**

Entities have some relationships with each other. Relationships define how entities are associated with each other.

Let's Establishing Relationships between them are:

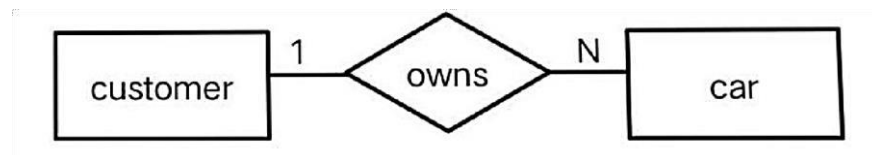
1. Customer owns Car
2. Car insured by Insurance policy
3. Car associated with Accident
4. Insurance policy involves premium installments

### Step 3: Identify the Cardinality Ratio and Participation

1. Customer-car

#### Relationship: One-to-many

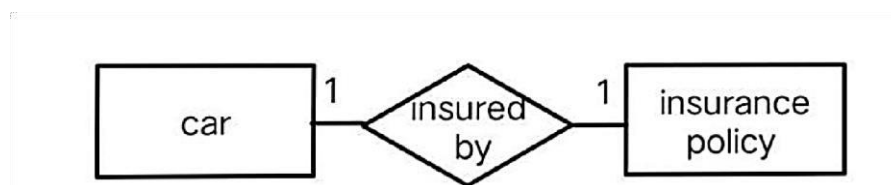
One customer can own multiple cars but one car can't own by multiple customers.



2. Car-insurance\_policy

#### Relationship: One-to-One

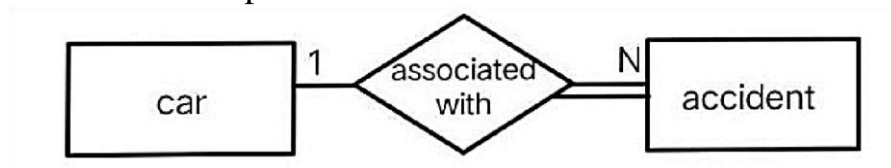
One car can insured by only one insurance policy.



3. Car-Accident

#### Relationship: one-to-Many

One car can meet with multiple accidents.



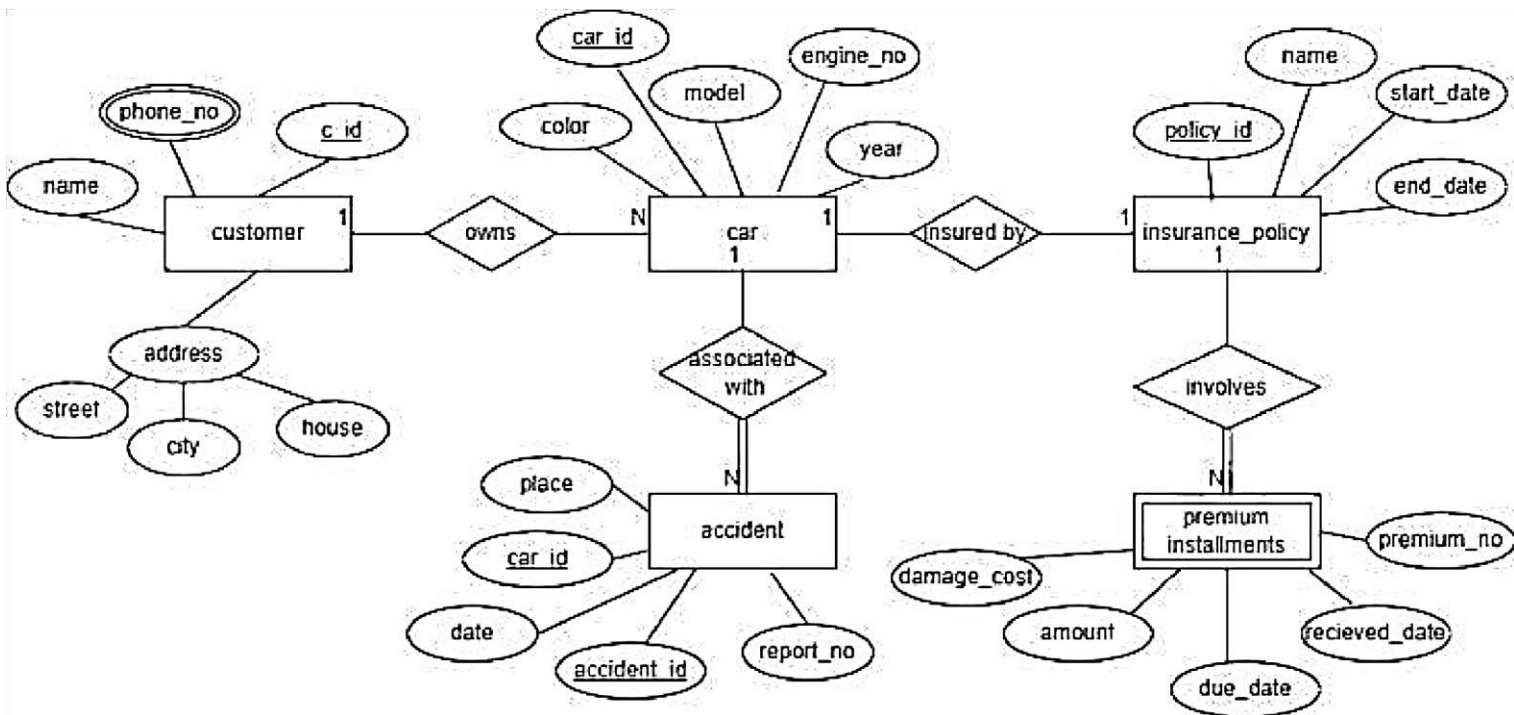
#### 4. Insurance\_policy-premium installments

**Relationship: one-to-Many**



One insurance policy has multiple premium installments but one premium installments has one Insurance policy.

#### Step 4: ER Diagram Representation



#### ERD to table :

1. Customer: C\_id, name, address, phone\_no
2. Car: car\_id, color, model, year, engine\_no
3. Insurance policy : policy\_id, name, start\_date, end\_date
4. Premium installments : premium\_no, amount, received\_date, due\_date, policy\_id

5. Accident : accident\_id, car\_id, date, place, report\_no, damage\_cost