

CS23401 Database Management Systems
Course Instructor: V P Jayachitra

Week 2 Assignment

Topic: ER Diagram Mapping to Relation

Instruction:

**Create Table Name using last 4 digits of your
register number**

**Example: If register number is 2024503001,
create table EMP3001**

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EMPLOYEE

Table-Level Constraints:

- Commission should not be greater than Salary
- Date of joining should not be a future date

Column Name	Attribute Specification	Constraint
Empno	4-digit number	PRIMARY KEY, Must be unique
Empname	Up to 50 characters	NOT NULL
Deptno	2-digit number	Must be between 10 and 90
Jobtitle	Up to 50 characters	Must be one of: 'MANAGER', 'ANALYST', 'CLERK', 'SALESMAN'
DoJ	Date value	Date of joining should not be a future date
Salary	6 digits before decimal, 2 after	Must be greater than 0
Commission	6 digits before decimal, 2 after	Should not be greater than salary, Can be NULL

Test Cases

Valid insertion

```
INSERT INTO EMPLOYEE VALUES (1001, 'John Smith', 10, 'MANAGER', DATE '2024-01-15', 80000, 5000);
```

FAIL: Future DoJ

```
INSERT INTO EMPLOYEE VALUES (1002, 'Jane Doe', 10, 'ANALYST', DATE '2026-12-31', 60000, NULL);
```

FAIL: Commission > Salary

```
INSERT INTO EMPLOYEE VALUES (1003, 'Bob Wilson', 20, 'CLERK', DATE '2024-03-20', 25000, 30000);
```

FAIL: Invalid Jobtitle

```
INSERT INTO EMPLOYEE VALUES (1004, 'Alice Brown', 30, 'ENGINEER', DATE '2024-05-10', 70000, NULL);
```

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Department

Table-Level Constraints:

- Deptno must be same range as EMPLOYEE.Deptno (10-90)
- Manager_empno is FOREIGN KEY to EMPLOYEE(Empno) with ON DELETE SET NULL

column Name	Attribute Specification	Constraint
Deptno	2-digit number	PRIMARY KEY
Deptname	Up to 30 characters	NOT NULL, UNIQUE
Location	Up to 30 characters	Optional (can be NULL)
Manager_empno	4-digit number	References EMPLOYEE(Empno), Can be NULL initially

Test cases

Insert department without manager

```
INSERT INTO DEPARTMENT VALUES (10, 'Sales', 'New York', NULL);
```

Insert employee in this department

```
INSERT INTO EMPLOYEE VALUES (1001, 'John Manager', 10, 'MANAGER', DATE '2024-01-15',  
80000, NULL);
```

Update department with manager

```
UPDATE DEPARTMENT SET Manager_empno = 1001 WHERE Deptno = 10;
```

FAIL: Non-existent manager

```
UPDATE DEPARTMENT SET Manager_empno = 9999 WHERE Deptno = 10;
```

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Project

Table-Level Constraints:

- End_date must be NULL OR greater than Start_date
- Deptno references DEPARTMENT with ON DELETE CASCADE

Column Name	Attribute Specification	Constraint
<u>Projectno</u>	4-digit number	PRIMARY KEY
<u>Projectname</u>	Up to 50 characters	NOT NULL, UNIQUE
<u>Deptno</u>	2-digit number	References DEPARTMENT(<u>Deptno</u>), NOT NULL
<u>Budget</u>	10 digits before decimal, 2 after	Must be greater than 0
<u>Start_date</u>	Date value	NOT NULL, Must not be future date
<u>End_date</u>	Date value	Can be NULL (ongoing projects), Must be after <u>Start_date</u> if provided

Test cases

Valid project

```
INSERT INTO PROJECT VALUES (101, 'ERP Implementation', 10, 500000, DATE '2024-01-01', DATE  
'2025-12-31');
```

FAIL: End date before start date

```
INSERT INTO PROJECT VALUES (102, 'Invalid Project', 10, 100000,  
DATE '2024-06-01', DATE '2024-01-01');
```

FAIL: Duration > 5 years

```
INSERT INTO PROJECT VALUES (103, 'Long Project', 10, 200000,  
DATE '2020-01-01', DATE '2026-01-01');
```

FAIL: Budget too low

```
INSERT INTO PROJECT VALUES (104, 'Small Project', 10, 30000,  
DATE '2024-01-01', NULL);
```

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EMPLOYEE_PROJECT (WORKS_ON) Table

Table-Level Constraints:

- Composite primary key (Empno, Projectno)
- Both foreign keys reference their parent tables with CASCADE delete

Column Name	Attribute Specification	Constraint
<u>Empno</u>	4-digit number	PRIMARY KEY (composite), References EMPLOYEE(Empno)
<u>Projectno</u>	4-digit number	PRIMARY KEY (composite), References PROJECT(Projectno)
<u>Hours</u>	3 digits before decimal, 1 after	NOT NULL, Must be greater than 0 and less than or equal to 168 (hours per week)

Test Cases

Valid assignment

INSERT INTO EMPLOYEE_PROJECT VALUES (1001, 101, 40);

INSERT INTO EMPLOYEE_PROJECT VALUES (1001, 102, 20);

FAIL: Duplicate assignment

INSERT INTO EMPLOYEE_PROJECT VALUES (1001, 101, 30);

FAIL: Hours > 168

INSERT INTO EMPLOYEE_PROJECT VALUES (1002, 101, 200);

FAIL: Non-existent employee

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DEPENDENT Table

Table-Level Constraints:

- Composite primary key (Empno, Projectno)
- Both foreign keys reference their parent tables with CASCADE delete

Column Name	Attribute Specification	Constraint
Empno	4-digit number	PRIMARY KEY (composite), References EMPLOYEE(Empno)
Dependent_name	Up to 50 characters	PRIMARY KEY (composite), NOT NULL
Sex	1 character	Must be 'M' or 'F'
Bdate	Date value	Can be NULL
Relationship	Up to 20 characters	Must be one of: 'Spouse', 'Son', 'Daughter', 'Father', 'Mother', 'Other'

Test cases

Valid dependent with NULL birthdate

```
INSERT INTO DEPENDENT VALUES (1003, 'Unknown Relative', 'M', NULL, 'Other');
```

Valid spouse dependent

```
INSERT INTO DEPENDENT VALUES (1001, 'Mary Smith', 'F', DATE '1990-05-15', 'Spouse');
```

Valid son dependent

```
INSERT INTO DEPENDENT VALUES (1001, 'John Smith Jr', 'M', DATE '2010-08-20', 'Son');
```

Valid other relationship

```
INSERT INTO DEPENDENT VALUES (1003, 'Sarah Brown', 'F', DATE '1995-02-14', 'Other');
```