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Sem: 4 – D

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EXP 2

Aim: Consider the university database system designed and created in practical 1. Write and execute SQL queries for performing the following.

- i. Create various tables as per the schema diagram of the practical 1.

```
=> CREATE TABLE UNIVERSITY (
    university_id INT PRIMARY KEY,
    name VARCHAR(100) NOT NULL
);
```

```
CREATE TABLE DEPARTMENT (
    dept_id INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    building VARCHAR(50),
    budget DECIMAL(12, 2),
    university_id INT,
    FOREIGN KEY (university_id) REFERENCES UNIVERSITY(university_id)
);
```

```
CREATE TABLE INSTRUCTOR (
    instructor_id NUMBER PRIMARY KEY,
    name VARCHAR2(50) NOT NULL,
    dept_id NUMBER,
    is_hod CHAR(1) DEFAULT 'N' CHECK (is_hod IN ('Y', 'N')),
    salary NUMBER(10, 2),
    CONSTRAINT fk_instructor_dept
```

```
    FOREIGN KEY (dept_id)
    REFERENCES DEPARTMENT(dept_id)
);

CREATE TABLE COURSE (
    course_id VARCHAR(8) PRIMARY KEY,
    title VARCHAR(100) NOT NULL,
    dept_id INT,
    credits INT,
    FOREIGN KEY (dept_id) REFERENCES DEPARTMENT(dept_id)
);

CREATE TABLE SECTION (
    section_id INT PRIMARY KEY,
    course_id VARCHAR(8),
    sec_id INT,
    semester VARCHAR(6),
    year INT,
    building VARCHAR(50),
    room_number VARCHAR(10),
    time_slot_id VARCHAR(4),
    FOREIGN KEY (course_id) REFERENCES COURSE(course_id)
);

CREATE TABLE TEACHES (
    instructor_id INT,
    section_id INT,
    PRIMARY KEY (instructor_id, section_id),
    FOREIGN KEY (instructor_id) REFERENCES INSTRUCTOR(instructor_id),
    FOREIGN KEY (section_id) REFERENCES SECTION(section_id)
);
```

```
CREATE TABLE STUDENT (
    student_id INT PRIMARY KEY,
    name VARCHAR(50) NOT NULL,
    tot_cred INT
);
```

```
CREATE TABLE TAKES (
    student_id INT,
    section_id INT,
    grade VARCHAR(2),
    PRIMARY KEY (student_id, section_id),
    FOREIGN KEY (student_id) REFERENCES STUDENT(student_id),
    FOREIGN KEY (section_id) REFERENCES SECTION(section_id)
);
```

```
CREATE TABLE TIME_SLOT (
    time_slot_id VARCHAR2(4) PRIMARY KEY,
    day CHAR(1),
    start_time DATE,
    end_time DATE
);
```

```
CREATE TABLE CLASSROOM (
    building VARCHAR(50),
    room_number VARCHAR(10),
    capacity INT,
    PRIMARY KEY (building, room_number)
);
```

- ii. Insert minimum 7 rows in each table.

```
=> INSERT INTO UNIVERSITY (university_id, name) VALUES (1, 'Example University');
INSERT INTO UNIVERSITY (university_id, name) VALUES (2, 'Another University');
INSERT INTO UNIVERSITY (university_id, name) VALUES (3, 'Third University');
INSERT INTO UNIVERSITY (university_id, name) VALUES (4, 'Fourth University');
INSERT INTO UNIVERSITY (university_id, name) VALUES (5, 'Fifth University');
INSERT INTO UNIVERSITY (university_id, name) VALUES (6, 'Sixth University');
INSERT INTO UNIVERSITY (university_id, name) VALUES (7, 'Seventh University');
```

```
INSERT INTO DEPARTMENT (dept_id, name, building, budget, university_id) VALUES
(1, 'Computer Science', 'Taylor', 100000, 1);
INSERT INTO DEPARTMENT (dept_id, name, building, budget, university_id) VALUES
(2, 'Mathematics', 'Watson', 90000, 1);
INSERT INTO DEPARTMENT (dept_id, name, building, budget, university_id) VALUES
(3, 'Physics', 'Newton', 95000, 1);
INSERT INTO DEPARTMENT (dept_id, name, building, budget, university_id) VALUES
(4, 'Biology', 'Darwin', 85000, 1);
INSERT INTO DEPARTMENT (dept_id, name, building, budget, university_id) VALUES
(5, 'Chemistry', 'Curie', 92000, 1);
INSERT INTO DEPARTMENT (dept_id, name, building, budget, university_id) VALUES
(6, 'English', 'Shakespeare', 80000, 1);
INSERT INTO DEPARTMENT (dept_id, name, building, budget, university_id) VALUES
(7, 'History', 'Roosevelt', 78000, 1);
```

```
INSERT INTO INSTRUCTOR (instructor_id, name, dept_id, is_hod, salary)
VALUES (1, 'John Doe', 1, 'Y', 80000);
INSERT INTO INSTRUCTOR (instructor_id, name, dept_id, is_hod, salary)
VALUES (2, 'Jane Smith', 1, 'N', 75000);
INSERT INTO INSTRUCTOR (instructor_id, name, dept_id, is_hod, salary)
VALUES (3, 'Bob Johnson', 2, 'Y', 82000);
INSERT INTO INSTRUCTOR (instructor_id, name, dept_id, is_hod, salary)
VALUES (4, 'Alice Brown', 2, 'N', 76000);
```

```
INSERT INTO INSTRUCTOR (instructor_id, name, dept_id, is_hod, salary)
VALUES (5, 'Charlie Davis', 3, 'Y', 81000);

INSERT INTO INSTRUCTOR (instructor_id, name, dept_id, is_hod, salary)
VALUES (6, 'Eva Wilson', 3, 'N', 77000);

INSERT INTO INSTRUCTOR (instructor_id, name, dept_id, is_hod, salary)
VALUES (7, 'Frank Miller', 4, 'Y', 79000);
```

```
INSERT INTO COURSE (course_id, title, dept_id, credits) VALUES
('CS-101', 'Introduction to Programming', 1, 3);

INSERT INTO COURSE (course_id, title, dept_id, credits) VALUES
('CS-201', 'Data Structures', 1, 4);

INSERT INTO COURSE (course_id, title, dept_id, credits) VALUES
('MATH-101', 'Calculus I', 2, 4);

INSERT INTO COURSE (course_id, title, dept_id, credits) VALUES
('MATH-201', 'Linear Algebra', 2, 3);

INSERT INTO COURSE (course_id, title, dept_id, credits) VALUES
('PHY-101', 'Mechanics', 3, 4);

INSERT INTO COURSE (course_id, title, dept_id, credits) VALUES
('PHY-201', 'Quantum Physics', 3, 4);

INSERT INTO COURSE (course_id, title, dept_id, credits) VALUES
('BIO-101', 'Introduction to Biology', 4, 4);
```

```
INSERT INTO SECTION (section_id, course_id, sec_id, semester, year, building, room_number,
time_slot_id) VALUES (1, 'CS-101', 1, 'Fall', 2023, 'Taylor', '3128', 'A');

INSERT INTO SECTION (section_id, course_id, sec_id, semester, year, building, room_number,
time_slot_id) VALUES (2, 'CS-201', 1, 'Spring', 2024, 'Taylor', '3114', 'B');

INSERT INTO SECTION (section_id, course_id, sec_id, semester, year, building, room_number,
time_slot_id) VALUES (3, 'MATH-101', 1, 'Fall', 2023, 'Watson', '2230', 'C');

INSERT INTO SECTION (section_id, course_id, sec_id, semester, year, building, room_number,
time_slot_id) VALUES (4, 'MATH-201', 1, 'Spring', 2024, 'Watson', '2245', 'D');

INSERT INTO SECTION (section_id, course_id, sec_id, semester, year, building, room_number,
time_slot_id) VALUES (5, 'PHY-101', 1, 'Fall', 2023, 'Newton', '1320', 'E');
```

```
INSERT INTO SECTION (section_id, course_id, sec_id, semester, year, building, room_number, time_slot_id) VALUES (6, 'PHY-201', 1, 'Spring', 2024, 'Newton', '1310', 'F');
```

```
INSERT INTO SECTION (section_id, course_id, sec_id, semester, year, building, room_number, time_slot_id) VALUES (7, 'BIO-101', 1, 'Fall', 2023, 'Darwin', '2110', 'G');
```

```
INSERT INTO TEACHES (instructor_id, section_id) VALUES (1, 1);
```

```
INSERT INTO TEACHES (instructor_id, section_id) VALUES (2, 2);
```

```
INSERT INTO TEACHES (instructor_id, section_id) VALUES (3, 3);
```

```
INSERT INTO TEACHES (instructor_id, section_id) VALUES (4, 4);
```

```
INSERT INTO TEACHES (instructor_id, section_id) VALUES (5, 5);
```

```
INSERT INTO TEACHES (instructor_id, section_id) VALUES (6, 6);
```

```
INSERT INTO TEACHES (instructor_id, section_id) VALUES (7, 7);
```

```
INSERT INTO STUDENT (student_id, name, tot_cred) VALUES (1, 'Mike Johnson', 60);
```

```
INSERT INTO STUDENT (student_id, name, tot_cred) VALUES (2, 'Sarah Lee', 45);
```

```
INSERT INTO STUDENT (student_id, name, tot_cred) VALUES (3, 'Tom Brown', 30);
```

```
INSERT INTO STUDENT (student_id, name, tot_cred) VALUES (4, 'Emily Davis', 75);
```

```
INSERT INTO STUDENT (student_id, name, tot_cred) VALUES (5, 'David Wilson', 90);
```

```
INSERT INTO STUDENT (student_id, name, tot_cred) VALUES (6, 'Lisa Anderson', 15);
```

```
INSERT INTO STUDENT (student_id, name, tot_cred) VALUES (7, 'Chris Taylor', 105);
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (1, 1, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (1, 3, 'B');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (2, 2, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (2, 4, 'B');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (3, 1, 'B');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (3, 5, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (4, 2, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (4, 6, 'B');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (5, 3, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (5, 7, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (6, 4, 'B');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (6, 1, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (7, 5, 'A');
```

```
INSERT INTO TAKES (student_id, section_id, grade) VALUES (7, 2, 'B');
```

```
INSERT INTO TIME_SLOT (time_slot_id, day, start_time, end_time) VALUES ('A', 'M',  
TO_DATE('09:00', 'HH24:MI'), TO_DATE('10:30', 'HH24:MI'));
```

```
INSERT INTO TIME_SLOT (time_slot_id, day, start_time, end_time) VALUES ('B', 'T',  
TO_DATE('10:30', 'HH24:MI'), TO_DATE('12:00', 'HH24:MI'));
```

```
INSERT INTO TIME_SLOT (time_slot_id, day, start_time, end_time) VALUES ('C', 'W',  
TO_DATE('13:00', 'HH24:MI'), TO_DATE('14:30', 'HH24:MI'));
```

```
INSERT INTO TIME_SLOT (time_slot_id, day, start_time, end_time) VALUES ('D', 'R',  
TO_DATE('15:00', 'HH24:MI'), TO_DATE('16:30', 'HH24:MI'));
```

```
INSERT INTO TIME_SLOT (time_slot_id, day, start_time, end_time) VALUES ('E', 'F',  
TO_DATE('11:00', 'HH24:MI'), TO_DATE('12:30', 'HH24:MI'));
```

```
INSERT INTO TIME_SLOT (time_slot_id, day, start_time, end_time) VALUES ('F', 'M',  
TO_DATE('14:00', 'HH24:MI'), TO_DATE('15:30', 'HH24:MI'));
```

```
INSERT INTO CLASSROOM (building, room_number, capacity) VALUES ('Taylor', '3128', 50);
```

```
INSERT INTO CLASSROOM (building, room_number, capacity) VALUES ('Taylor', '3114', 40);
```

```
INSERT INTO CLASSROOM (building, room_number, capacity) VALUES ('Watson', '2230', 60);
```

```
INSERT INTO CLASSROOM (building, room_number, capacity) VALUES ('Watson', '2245', 45);
```

```
INSERT INTO CLASSROOM (building, room_number, capacity) VALUES ('Newton', '1320', 55);
```

```
INSERT INTO CLASSROOM (building, room_number, capacity) VALUES ('Newton', '1310', 50);
```

```
INSERT INTO CLASSROOM (building, room_number, capacity) VALUES ('Darwin', '2110', 40);
```

iii. Alter the datatypes of any 3 columns

⇒ **ALTER TABLE STUDENT MODIFY name VARCHAR2(100);**

⇒ **ALTER TABLE INSTRUCTOR MODIFY salary NUMBER(12,2);**

⇒ **ALTER TABLE DEPARTMENT MODIFY building VARCHAR2(100);**

iv. Increase the salary of each instructor in the Comp. Sci. department by 10%.

=> **UPDATE instructor set salary = salary + salary * .1 where DEPT_ID = 1;**

v. Delete all courses that have never been offered (that is, do not occur in the section relation).

vi. Delete all tuples in the instructor relation for those instructors associated with a department located in the Watson Building.

vii. Give a 5% salary raise to those instructors who earn less than 70000.

=> **UPDATE instructor set salary = salary + salary * .05 where salary < 80000;**

viii. a. Create a new course "CS-001", titled "Weekly Seminar", with 1 credits.

=> **insert into course values ('CS-001', 'Weekly Seminar', 1, 1);**

b. Create a section of this course in Fall 2017, with sec_id of 1, and with the location of this section not yet specified.

=> **insert into section(section_id, course_id, sec_id, semester, year) values (8,'CS-001', 1, 'FALL', 2017);**

c. Delete the course CS-001. What will happen if you run this delete statement without first deleting offerings (sections) of this course?

=> **delete from course where course_id = 'CS-002';**

ix. From a given set of any relational tables, perform the following:

Create Views (with and without check option, with and without read only), Drop views, Selecting from a view.

x. Create any table, use sequence for insertion of the rows and drop the sequence.

⇒ **create table emp(emp_id int primary key, name varchar2(20), mobile int);**

create sequence emp_seq start with 1 increment by 1;

```
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz1', '9000000001');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz2', '9000000002');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz3', '9000000003');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz4', '9000000004');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz5', '9000000005');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz6', '9000000006');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz7', '9000000007');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz8', '9000000008');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz9', '9000000009');
INSERT INTO emp (emp_id, name, mobile) VALUES (emp_seq.NEXTVAL, 'xyz10', '9000000010');
```

For drop => drop sequence emp_seq;

xi. Rename the above table.

⇒ **rename emp to employee;**
⇒ **alter table employee rename column mobile to mobilenumber;**

xii. Add a new column PINCODE with not null constraints to the above existing table.

⇒ **ALTER TABLE employee ADD pincode INT DEFAULT 0 NOT NULL;**

xiii. Drop the column with the use cascade constraints.