# Practical-2: Subquery-join operations on Relational Schema

Name :-Umair Khan

Roll no :- 16

**1. Design ERD for the following schema and execute the following Queries on it:**

**Consider the schema for Movie Database:**

**ACTOR (Act\_id, Act\_Name, Act\_Gender)**

**DIRECTOR (Dir\_id, Dir\_Name, Dir\_Phone)**

**MOVIES (Mov\_id, Mov\_Title, Mov\_Year, Mov\_Lang, Dir\_id) MOVIE\_CAST (Act\_id, Mov\_id, Role)**

**RATING (Mov\_id, Rev\_Stars)**

ACTOR

DIRECTOR

MOVIE’S

ACTID

NAME

GENDER

MOVIE

CASE

DNAME

DIR ID

DIRECTED

BY

PHONE

MOV ID

ROLE

MOV\_LANG

MOV\_TITLE

YEAR

REV\_STARS

N

N

M

Students

STNO.

NAME

ADDR

CITY

ZIP

ADVISING

GRADES

INSTRUCTORS

SEM

year

grade

graded

advisee

advisor

grader

COURSES

EMP

NO

NAME

RANK

ROOM

NO

TEL.

NO

SUBJECT

**C.NO.**

cr

**CAP**

cname

Mithibai College

Department of Computer Science

Msc(Data Sci and AI)

Name:-Arpit Chauhan

Roll No:-40

Practical-2 : Subquery-join operations on Relational Schema

#1. USING (practical 1)

1. Count the customers with grades above NewYork average

mysql> SELECT grade, COUNT(\*) FROM customer GROUP BY grade HAVING grade > (SELECT

AVG(grade) FROM customer WHERE city = 'New York');

+-------+----------+

| grade | COUNT(\*) |

+-------+----------+

| 200 | 3 |

| 300 | 2 |

+-------+----------+

2 rows in set (0.02 sec)

2.Find the name and numbers of all salesmen who had more than one customer mysql> select salesman\_id,name from salesman a where 1<(select count(\*) from customer where salesman\_id=a.salesman\_id);

+-------------+------------+

| salesman\_id | name |

+-------------+------------+

| 5001 | James Hoog |

| 5002 | Nail Knite |

+-------------+------------+

2 rows in set (0.01 sec)

3)Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted

mysql> delete from salesman where salesman\_id=1000; Query OK, 0 rows affected (0.00 sec)

Q2. Design ERD for the following schema and execute the following Queries on it:

Consider the schema for Movie Database:

ACTOR (Act\_id, Act\_Name, Act\_Gender)

DIRECTOR (Dir\_id, Dir\_Name, Dir\_Phone)

MOVIES (Mov\_id, Mov\_Title, Mov\_Year, Mov\_Lang, Dir\_id)

MOVIE\_CAST (Act\_id, Mov\_id, Role)

RATING (Mov\_id, Rev\_Stars)

mysql> create table Actor(act\_id integer primary key,act\_name

varchar(100),act\_gender varchar(10)); Query OK, 0 rows affected (0.01 sec)

mysql> create table Director(dir\_id integer primary key,dir\_name

varchar(200),dir\_phone varchar(100)); Query OK, 0 rows affected (0.01 sec)

mysql> create table Movies(mov\_id integer primary key,mov\_title

varchar(255),mov\_year year,mov\_lang varchar(100),dir\_id int, foreign key (dir\_id) references Director(dir\_id)); Query OK, 0 rows affected (0.02 sec)

mysql> create table Movie\_cast (act\_id int,foreign key (act\_id) references Actor(act\_id), mov\_id int, foreign key(mov\_id) references Movies(mov\_id),role varchar(100), primary key(act\_id,mov\_id) ); Query OK, 0 rows affected (0.02 sec)

mysql> create table Rating(mov\_id integer primary key , foreign key(mov\_id) references Movies(mov\_id),rev\_stars integer); Query OK, 0 rows affected (0.01 sec)

mysql> insert into Actor values(301, 'anuska','f'),

-> (302,'PRABHAS','M'),

-> (303,'PUNITH','M'),

-> (304,'jermy','M');

Query OK, 4 rows affected (0.03 sec) Records: 4 Duplicates: 0 Warnings: 0

mysql> insert into director values(60, 'rajamouli',8751611001),

-> (61,'HITCHCOCK', 7766138911),

-> (62,'FARAN', 9986776531),

-> (63,'STEVEN SPIELBERG', 8989776530);

Query OK, 4 rows affected (0.00 sec) Records: 4 Duplicates: 0 Warnings: 0

mysql> insert into movies values(1001,'BAHUBALI-2', 2017, 'TELAGU', 60),

-> (1002,'BAHUBALI-2', 2015, 'TELAGU', 60), -> (1003,'AKASH', 2008, 'KANNADA', 61),

-> (1004,'WAR HORSE', 2011, 'ENGLISH', 63);

Query OK, 4 rows affected (0.00 sec) Records: 4 Duplicates: 0 Warnings: 0

mysql> INSERT INTO MOVIE\_CAST VALUES (301, 1002, 'HEROINE'),

-> (301, 1001, 'HEROINE'),

-> (303, 1003, 'HERO'),

-> (303, 1002, 'guest'),

-> (304, 1004, 'hero');

Query OK, 5 rows affected (0.00 sec) Records: 5 Duplicates: 0 Warnings: 0

mysql> INSERT INTO RATING VALUES (1001, 4),

-> (1002, 2),

-> (1003, 5),

-> (1004, 4);

Query OK, 4 rows affected (0.00 sec)

Records: 4 Duplicates: 0 Warnings: 0

#Write SQL queries to

1. List the titles of all movies directed by ‘Hitchcock

mysql> select mov\_title from movies where dir\_id in(select dir\_id from director where dir\_name='hitchcock');

+-----------+

| mov\_title |

+-----------+

| AKASH |

+-----------+

1 row in set (0.00 sec)

2. Find the movie names where one or more actors acted in two or more movies.

mysql> select mov\_title from movies m,movie\_cast mv where m.mov\_id=mv.mov\_id and act\_id in(select act\_id from movie\_cast group by act\_id having count(act\_id)>1) group by mov\_title having count(\*)>1;

+------------+

| mov\_title |

+------------+

| BAHUBALI-2 |

+------------+

1 row in set (0.00 sec)

3. List all actors who acted in a movie before 2000 and also in a movie after 2015 (use JOIN operation).

mysql> select a.act\_name,c.mov\_title,c.mov\_year from actor a,movie\_cast b,movies c where a.act\_id=b.act\_id and b.mov\_id=c.mov\_id and c.mov\_year not between 2000 and 2015;

+----------+------------+----------+

| act\_name | mov\_title | mov\_year |

+----------+------------+----------+

| anuska | BAHUBALI-2 | 2017 |

+----------+------------+----------+

1 row in set (0.00 sec)

4. Find the title of movies and number of stars for each movie that has at least one rating and find the highest number of stars that movie received. Sort the result by movie title

mysql> select mov\_title,max(rev\_stars) from movies inner join rating using(mov\_id)

group by mov\_title having max(rev\_stars)>0 order by mov\_tit le;

+------------+----------------+

| mov\_title | max(rev\_stars) |

+------------+----------------+

| AKASH | 5 |

| BAHUBALI-2 | 4 |

| WAR HORSE | 4 |

+------------+----------------+

3 rows in set (0.00 sec)

5. Update rating of all movies directed by ‘Steven Spielberg’ to 5.

mysql> update rating set rev\_stars=5 where mov\_id in(select mov\_id from movies where dir\_id in (select dir\_id from director where dir\_name='STEVEN SPIELBERG'));

Query OK, 1 row affected (0.00 sec) Rows matched: 1 Changed: 1 Warnings: 0

mysql> select \* from rating;

+--------+-----------+

| mov\_id | rev\_stars |

+--------+-----------+

| 1001 | 4 |

| 1002 | 2 |

| 1003 | 5 |

| 1004 | 5 |

+--------+-----------+

4 rows in set (0.00 sec)

3. Design ERD for the following schema and execute the following Queries on it:

mysql> CREATE TABLE students ( -> stno INT PRIMARY KEY,

-> name VARCHAR(50),

-> addr VARCHAR(255),

-> city VARCHAR(50),

-> state VARCHAR(2),

-> zip VARCHAR(10)

-> );

Query OK, 0 rows affected (0.01 sec)

mysql> CREATE TABLE INSTRUCTORS ( -> empno INT PRIMARY KEY,

-> name VARCHAR(50),

-> ranks VARCHAR(20),

-> roomno VARCHAR(10),

-> telno VARCHAR(15)

-> );

Query OK, 0 rows affected (0.01 sec)

mysql> CREATE TABLE COURSES ( -> cno text PRIMARY KEY,

-> cname VARCHAR(50),

-> cr INT,

-> cap INT

-> );

Query OK, 0 rows affected (0.01 sec)

mysql> CREATE TABLE GRADES (

-> stno INT,

-> empno INT,

-> cno VARCHAR(50),

-> sem VARCHAR(10),

-> year INT,

-> grade INT,

-> FOREIGN KEY (stno) REFERENCES students(stno),

-> FOREIGN KEY (empno) REFERENCES INSTRUCTORS(empno),

-> FOREIGN KEY (cno) REFERENCES COURSES(cno)

-> );

Query OK, 0 rows affected (0.02 sec)

mysql> CREATE TABLE ADVISING (

-> stno INT,

-> empno INT,

-> PRIMARY KEY (stno, empno),

-> FOREIGN KEY (stno) REFERENCES students(stno),

-> FOREIGN KEY (empno) REFERENCES INSTRUCTORS(empno)

-> );

Query OK, 0 rows affected (0.02 sec)

mysql> insert into students values

->(1011,'edwards p. david','10 red rd','newton','MA','02159')

->(2415, 'Grogan A. Mary', '8 Walnut St', 'Malden', 'MA', '02148'),

-> (2661, 'Mixon Leatha', '100 School St', 'Brookline', 'MA', '02146'),

-> (2890, 'McLane Sandy', '30 Case Rd', 'Boston', 'MA', '02122'),

-> (3442, 'Novak Roland', '42 Beacon St', 'Nashua', 'NH', '03060'),

-> (3566, 'Pierce Richard', '70 Park St', 'Brookline', 'MA', '02146'),

-> (4022, 'Prior Lorraine', '8 Beacon St', 'Boston', 'MA', '02125'),

-> (5544, 'Rawlings Jerry', '15 Pleasant Dr', 'Boston', 'MA', '02115'), -> (5571, 'Lewis Jerry', '1 Main Rd', 'Providence', 'RI', '02904');

mysql> select \* from students;

+------+------------------+----------------+------------+-------+-------+

| stno | name | addr | city | state | zip |

+------+------------------+----------------+------------+-------+-------+

| 1011 | edwards p. david | 10 red rd | newton | MA | 02159 |

| 2415 | Grogan A. Mary | 8 Walnut St | Malden | MA | 02148 |

| 2661 | Mixon Leatha | 100 School St | Brookline | MA | 02146 |

| 2890 | McLane Sandy | 30 Case Rd | Boston | MA | 02122 |

| 3442 | Novak Roland | 42 Beacon St | Nashua | NH | 03060 |

| 3566 | Pierce Richard | 70 Park St | Brookline | MA | 02146 |

| 4022 | Prior Lorraine | 8 Beacon St | Boston | MA | 02125 |

| 5544 | Rawlings Jerry | 15 Pleasant Dr | Boston | MA | 02115 |

| 5571 | Lewis Jerry | 1 Main Rd | Providence | RI | 02904 |

+------+------------------+----------------+------------+-------+-------+

9 rows in set (0.00 sec)

mysql> INSERT INTO instructors VALUES

-> (19, 'Evans Robert', 'Professor', '82', '7122'),

-> (23, 'Exxon George', 'Professor', '90', '9101'),

-> (56, 'Sawyer Kathy', 'Assoc Prof', '91', '5110'),

-> (126, 'Davis William', 'Assoc Prof', '72', '5411'), -> (234, 'Will Samuel', 'Assist Prof', '90', '7024');

Query OK, 5 rows affected (0.01 sec) Records: 5 Duplicates: 0 Warnings: 0

mysql> select \* from instructors;

+-------+---------------+-------------+--------+-------+

| empno | name | ranks | roomno | telno |

+-------+---------------+-------------+--------+-------+

| 19 | Evans Robert | Professor | 82 | 7122 |

| 23 | Exxon George | Professor | 90 | 9101 |

| 56 | Sawyer Kathy | Assoc Prof | 91 | 5110 |

| 126 | Davis William | Assoc Prof | 72 | 5411 |

| 234 | Will Samuel | Assist Prof | 90 | 7024 |

+-------+---------------+-------------+--------+-------+

5 rows in set (0.00 sec)

mysql> insert into courses values

-> ('cs110', 'Introduction to Computing', 4, 120),

-> ('cs210', 'Computer Programming', 4, 100),

-> ('cs240', 'Computer Architecture', 3, 100), -> ('cs310', 'Data Structures', 3, 60),

-> ('cs350', 'Higher Level Languages', 3, 50),

-> ('cs410', 'Software Engineering', 3, 40),

-> ('cs460', 'Graphics', 3, 30);

Query OK, 7 rows affected (0.00 sec) Records: 7 Duplicates: 0 Warnings: 0

mysql> select \* from courses;

+-------+---------------------------+------+------+

| cno | cname | cr | cap |

+-------+---------------------------+------+------+

| cs110 | Introduction to Computing | 4 | 120 |

| cs210 | Computer Programming | 4 | 100 |

| cs240 | Computer Architecture | 3 | 100 |

| cs310 | Data Structures | 3 | 60 |

| cs350 | Higher Level Languages | 3 | 50 |

| cs410 | Software Engineering | 3 | 40 |

| cs460 | Graphics | 3 | 30 |

+-------+---------------------------+------+------+

7 rows in set (0.00 sec)

mysql> insert into grades values -> (1011, 019, 'cs110', 'Fall', 2001, 40),

-> (2661, 019, 'cs110', 'Fall', 2001, 80),

-> (3566, 019, 'cs110', 'Fall', 2001, 95),

-> (5544, 019, 'cs110', 'Fall', 2001, 100),

-> (1011, 023, 'cs110', 'Spring', 2002, 75),

-> (4022, 023, 'cs110', 'Spring', 2002, 60),

-> (3566, 019, 'cs240', 'Spring', 2002, 100),

-> (5571, 019, 'cs240', 'Spring', 2002, 50),

-> (2415, 019, 'cs240', 'Spring', 2002, 100),

-> (3442, 234,'cs410', 'Spring', 2002, 60),

-> (5571, 234, 'cs410', 'Spring', 2002, 80),

-> (1011, 019, 'cs210', 'Fall', 2002, 90),

-> (2661, 019, 'cs210', 'Fall', 2002, 70),

-> (3566, 019, 'cs210', 'Fall', 2002, 90),

-> (5571, 019, 'cs210', 'Spring', 2003, 85),

-> (4022, 019, 'cs210', 'Spring', 2003, 70),

-> (5544, 56, 'cs240', 'Spring', 2003, 70),

-> (1011, 56, 'cs240', 'Spring', 2003, 90),

-> (4022, 56, 'cs240', 'Spring', 2003, 80),

-> (2661, 234, 'cs310', 'Spring', 2003, 100),

-> (4022, 234, 'cs310', 'Spring',2003, 75);

Query OK, 21 rows affected (0.00 sec) Records: 21 Duplicates: 0 Warnings: 0

mysql> select \* from grades;

+------+-------+-------+--------+------+-------+

| stno | empno | cno | sem | year | grade |

+------+-------+-------+--------+------+-------+

| 1011 | 19 | cs110 | Fall | 2001 | 40 |

| 2661 | 19 | cs110 | Fall | 2001 | 80 |

| 3566 | 19 | cs110 | Fall | 2001 | 95 |

| 5544 | 19 | cs110 | Fall | 2001 | 100 |

| 1011 | 23 | cs110 | Spring | 2002 | 75 |

| 4022 | 23 | cs110 | Spring | 2002 | 60 |

| 3566 | 19 | cs240 | Spring | 2002 | 100 |

| 5571 | 19 | cs240 | Spring | 2002 | 50 |

| 2415 | 19 | cs240 | Spring | 2002 | 100 |

| 3442 | 234 | cs410 | Spring | 2002 | 60 |

| 5571 | 234 | cs410 | Spring | 2002 | 80 |

| 1011 | 19 | cs210 | Fall | 2002 | 90 |

| 2661 | 19 | cs210 | Fall | 2002 | 70 |

| 3566 | 19 | cs210 | Fall | 2002 | 90 |

| 5571 | 19 | cs210 | Spring | 2003 | 85 |

| 4022 | 19 | cs210 | Spring | 2003 | 70 |

| 5544 | 56 | cs240 | Spring | 2003 | 70 |

| 1011 | 56 | cs240 | Spring | 2003 | 90 |

| 4022 | 56 | cs240 | Spring | 2003 | 80 |

| 2661 | 234 | cs310 | Spring | 2003 | 100 |

| 4022 | 234 | cs310 | Spring | 2003 | 75 |

+------+-------+-------+--------+------+-------+

21 rows in set (0.00 sec)

mysql> insert into advising values

-> (1011,019);

-> (2415,019),

-> (2661,0023), -> (2890,023),

-> (3442,0056),

-> (3566,126),

-> (4022,234),

-> (5544,023),

-> (5571,234);

Query OK, 8 rows affected (0.00 sec) Records: 8 Duplicates: 0 Warnings: 0

mysql> select \* from advising;

+------+-------+

| stno | empno |

+------+-------+

| 1011 | 19 |

| 2415 | 19 |

| 2661 | 23 |

| 2890 | 23 |

| 5544 | 23 |

| 3442 | 56 |

| 3566 | 126 |

| 4022 | 234 |

| 5571 | 234 |

+------+-------+

9 rows in set (0.00 sec)

#Queries

1. Find the names of students who took only four-credit courses.

mysql> SELECT DISTINCT s.name

-> FROM students s

-> JOIN grades g ON s.stno = g.stno

-> JOIN courses c ON g.cno = c.cno

-> WHERE c.cr = 4

-> AND g.cno NOT IN (

-> SELECT cno

-> FROM courses

-> WHERE cr != 4

-> );

+------------------+

| name |

+------------------+

| edwards p. david |

| Mixon Leatha |

| Pierce Richard |

| Rawlings Jerry |

| Prior Lorraine |

| Lewis Jerry |

+------------------+

6 rows in set (0.00 sec)

2.Find the names of students who took no four-credit courses.

mysql> SELECT DISTINCT s.name -> FROM students s

-> WHERE s.stno NOT IN (

-> SELECT DISTINCT g.stno

-> FROM grades g

-> JOIN courses c ON g.cno = c.cno

-> WHERE c.cr = 4

-> );

+----------------+

| name |

+----------------+

| Grogan A. Mary |

| McLane Sandy |

| Novak Roland |

+----------------+

3 rows in set (0.00 sec)

3. Find the names of students who took cs210 or cs310

mysql> select name from students where stno in (select stno from grades where cno='cs210' or cno='cs310');

+------------------+

| name |

+------------------+

| edwards p. david |

| Mixon Leatha |

| Pierce Richard |

| Prior Lorraine |

| Lewis Jerry |

+------------------+

5 rows in set (0.00 sec)

4. Find names of all students who have a cs210 grade higher than the highest grade given in cs310 and did not take any course with Prof. Evans.

mysql> SELECT s.name -> FROM students s

-> WHERE s.stno IN (

-> SELECT g1.stno

-> FROM grades g1

-> WHERE g1.cno = 'cs210'

-> AND g1.grade > (

-> SELECT MAX(g2.grade)

-> FROM grades g2

-> WHERE g2.cno = 'cs310'

-> )

-> )

-> AND s.stno NOT IN (

-> SELECT g3.stno

-> FROM grades g3

-> JOIN instructors i ON g3.empno = i.empno

-> WHERE i.name = 'Evans Robert'

-> );

Empty set (0.00 sec)

5.. Find course numbers for courses that enrol at least two students,solve the same query for courses that enroll at least three students

mysql> SELECT cno -> FROM grades

-> GROUP BY cno

-> HAVING COUNT(DISTINCT stno) >= 2;

+-------+

| cno |

+-------+

| cs110 |

| cs210 |

| cs240 |

| cs310 |

| cs410 |

+-------+

5 rows in set (0.00 sec)

mysql> SELECT cno -> FROM grades

-> GROUP BY cno

-> HAVING COUNT(DISTINCT stno) >= 3;

+-------+

| cno |

+-------+

| cs110 |

| cs210 |

| cs240 |

+-------+

3 rows in set (0.00 sec)

6. Find the names of students who obtained the highest grade in cs210.

mysql> SELECT s.name -> FROM students s

-> JOIN grades g ON s.stno = g.stno

-> WHERE g.cno = 'cs210' AND g.grade = (SELECT MAX(grade) FROM grades WHERE cno = 'cs210');

+------------------+

| name |

+------------------+

| edwards p. david |

| Pierce Richard |

+------------------+

2 rows in set (0.00 sec)

7. Find course numbers for courses that enroll exactly two students;

mysql> SELECT cno -> FROM grades

-> GROUP BY cno

-> HAVING COUNT(DISTINCT stno) = 2;

+-------+

| cno |

+-------+

| cs310 |

| cs410 |

+-------+

2 rows in set (0.00 sec)

8. Find the names of all students for whom no other student lives in the same city.

mysql> SELECT DISTINCT s1.name

-> FROM students s1

-> WHERE NOT EXISTS (

-> SELECT 1

-> FROM students s2

-> WHERE s2.city = s1.city AND s2.stno <> s1.stno

-> );

+------------------+

| name |

+------------------+

| edwards p. david |

| Grogan A. Mary |

| Novak Roland |

| Lewis Jerry |

+------------------+

4 rows in set (0.00 sec)

9.Find the names of students whose advisor did not teach them any course

mysql> SELECT s.name -> FROM students s

-> WHERE NOT EXISTS (

-> SELECT 1

-> FROM advising a

-> WHERE a.stno = s.stno

-> AND NOT EXISTS (

-> SELECT 1

-> FROM grades g

-> WHERE g.stno = a.stno -> AND g.empno = a.empno

-> )

-> );

+------------------+

| name |

+------------------+

| edwards p. david |

| Grogan A. Mary |

| Prior Lorraine |

| Lewis Jerry |

+------------------+

4 rows in set (0.00 sec)

10.Find the highest grade of a student who never took cs110 mysql> SELECT MAX(grade) AS highest\_grade

-> FROM grades

-> WHERE stno NOT IN (

-> SELECT stno

-> FROM grades

-> WHERE cno = 'cs110'

-> );

+---------------+

| highest\_grade |

+---------------+

| 100 |

+---------------+

1 row in set (0.00 sec)