S3120 Database Management Systems Laboratory

Assignment – 6

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1. **Show student name, department name course title for course id the student has chosen and name of instructor who is teaching that student using joins. (Give proper names to columns)**

```
MariaDB [university]> select student.name as student_name, course.dept_name as dept_name,
    ->        course.title as course_title, instructor.name as instructor_name
    -> from takes
    -> inner join student using (ID)
    -> inner join course using (course_id)
    -> inner join teaches using (course_id, year, sec_id, semester)
    -> inner join instructor on teaches.ID = instructor.ID;
+--------------+------------+--------------------------------+-----------------+
| student_name | dept_name  | course_title                   | instructor_name |
+--------------+------------+--------------------------------+-----------------+
| Zhang        | Comp. Sci. | Intro. to Computer Science     | Srinivasan      |
| Shankar      | Comp. Sci. | Intro. to Computer Science     | Srinivasan      |
| Levy         | Comp. Sci. | Intro. to Computer Science     | Srinivasan      |
| Williams     | Comp. Sci. | Intro. to Computer Science     | Srinivasan      |
| Brown        | Comp. Sci. | Intro. to Computer Science     | Srinivasan      |
| Bourikas     | Comp. Sci. | Intro. to Computer Science     | Srinivasan      |
| Shankar      | Comp. Sci. | Robotics                       | Srinivasan      |
| Bourikas     | Comp. Sci. | Robotics                       | Srinivasan      |
| Zhang        | Comp. Sci. | Database System Concepts       | Srinivasan      |
| Shankar      | Comp. Sci. | Database System Concepts       | Srinivasan      |
| Yogesh       | Finance    | Investment Banking             | Wu              |
| Sanchez      | Music      | Music Video Production         | Mozart          |
| Peltier      | Physics    | Physical Principles            | Einstein        |
| Brandt       | History    | World History                  | El Said         |
| Levy         | Comp. Sci. | Intro. to Computer Science     | Katz            |
| Levy         | Comp. Sci. | Image Processing               | Katz            |
| Tanaka       | Biology    | Intro. to Biology              | Crick           |
| Tanaka       | Biology    | Genetics                       | Crick           |
| Shankar      | Comp. Sci. | Game Design                    | Brandt          |
| Williams     | Comp. Sci. | Game Design                    | Brandt          |
| Brown        | Comp. Sci. | Image Processing               | Brandt          |
| Aoi          | Elec. Eng. | Intro. to Digital Systems      | Kim             |
+--------------+------------+--------------------------------+-----------------+
22 rows in set (0.002 sec)
```

2.

(a) Using join show a student name, instructor name pair where the instructor advises student.

```
MariaDB [university]> select student.name as student_name,
    ->        instructor.name as instructor_name
    -> from advisor
    -> inner join student on advisor.s_ID = student.ID
    -> inner join instructor on advisor.i_ID = instructor.ID;
+--------------+-----------------+
| student_name | instructor_name |
+--------------+-----------------+
| Shankar      | Srinivasan      |
| Peltier      | Einstein        |
| Levy         | Einstein        |
| Zhang        | Katz            |
| Brown        | Katz            |
| Chavez       | Singh           |
| Tanaka       | Crick           |
| Aoi          | Kim             |
| Bourikas     | Kim             |
+--------------+-----------------+
9 rows in set (0.000 sec)
```

(b) Create a view to show the students names and their advisors names

```
MariaDB [university]> create view advisor_names as (
    ->     select student.name as student_name,
    ->         instructor.name as instructor_name
    ->     from advisor
    ->     inner join student on advisor.s_ID = student.ID
    ->     inner join instructor on advisor.i_ID = instructor.ID
    -> );
Query OK, 0 rows affected (0.007 sec)
```

(c) Update the student as '< Your name>' for the advisor 'Singh' and write what happens to the view and advisor table

```
MariaDB [university]> update advisor_names
    -> set student_name='Yogesh'
    -> where instructor_name='Singh';
Query OK, 1 row affected (0.010 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

```
MariaDB [university]> select *
    -> from advisor_names
    -> where student_name='Yogesh';
+--------------+-----------------+
| student_name | instructor_name |
+--------------+-----------------+
| Yogesh       | Singh           |
+--------------+-----------------+
1 row in set (0.003 sec)
```

The advisor table will have no change as only the student's name is changed and not the ID but the advisor table consists of only student ID and instructor ID.

(d) Delete the updated record and write what happens to the view and advisor table

```
MariaDB [university]> delete from advisor_names
    -> where student_name='Yogesh';
ERROR 1395 (HY000): Can not delete from join view 'university.advisor_names'
```

Deleting from a complex view is not allowed and thus will result in an error. The view and advisor table will remain the same.

(e) Insert a record with values 'Advisor1','<Your name>' into the view and write what happens to the view and advisor table

```
MariaDB [university]> insert into advisor_names
    -> values ('Yogesh', 'Advisor1');
ERROR 1394 (HY000): Can not insert into join view 'university.advisor_names' without fields list
```

Insertion into a complex view is not allowed and thus will result in an error. The view and advisor will remain the same.

3. **Display all student names, student id their advisor names and advisor id also including those students who are not advised by any advisor.**

```
MariaDB [university]> select student.name, student.ID, instructor.name, instructor.ID
    -> from student
    -> left join advisor on student.ID = advisor.s_ID
    -> left join instructor on advisor.i_ID = instructor.ID;
+----------+-------+------------+-------+
| name     | ID    | name       | ID    |
+----------+-------+------------+-------+
| Zhang    | 00128 | Katz       | 45565 |
| Shankar  | 12345 | Srinivasan | 10101 |
| Brandt   | 19991 | NULL       | NULL  |
| Yogesh   | 23121 | Singh      | 76543 |
| Peltier  | 44553 | Einstein   | 22222 |
| Levy     | 45678 | Einstein   | 22222 |
| Williams | 54321 | NULL       | NULL  |
| Sanchez  | 55739 | NULL       | NULL  |
| Snow     | 70557 | NULL       | NULL  |
| Brown    | 76543 | Katz       | 45565 |
| Aoi      | 76653 | Kim        | 98345 |
| Bourikas | 98765 | Kim        | 98345 |
| Tanaka   | 98988 | Crick      | 76766 |
+----------+-------+------------+-------+
13 rows in set (0.002 sec)
```

4. **(a) Create view advisor_dept_budg containing advisors' ID,name, department name, salary where advisors in a department with a total salary of more than 100000.**

```
MariaDB [university]> create view advisor_dept_budg as (
    ->  select distinct ID, name, dept_name, salary
    ->  from (
    ->           select ID, name, dept_name, salary
    ->           from instructor
    ->           where dept_name in (
    ->               select dept_name
    ->               from instructor
    ->               group by dept_name
    ->               having sum(salary)>100000
    ->           )
    ->       ) as more_salary
    ->           inner join advisor on more_salary.ID = advisor.i_ID
    -> );
Query OK, 0 rows affected (0.004 sec)
```

```
MariaDB [university]> select *
    -> from advisor_dept_budg;
+-------+------------+------------+----------+
| ID    | name       | dept_name  | salary   |
+-------+------------+------------+----------+
| 10101 | Srinivasan | Comp. Sci. | 65000.00 |
| 22222 | Einstein   | Physics    | 95000.00 |
| 45565 | Katz       | Comp. Sci. | 75000.00 |
| 76543 | Singh      | Finance    | 80000.00 |
+-------+------------+------------+----------+
4 rows in set (0.008 sec)
```

(b) Increase the salary of each instructor by 10% and check in the view

```
MariaDB [university]> update instructor
    -> set salary=salary*1.1;
Query OK, 12 rows affected (0.002 sec)
Rows matched: 12  Changed: 12  Warnings: 0
```

```
MariaDB [university]> select *
    -> from advisor_dept_budg;
+-------+-------------+-------------+-----------+
| ID    | name        | dept_name   | salary    |
+-------+-------------+-------------+-----------+
| 10101 | Srinivasan  | Comp. Sci.  |  71500.00 |
| 22222 | Einstein    | Physics     | 104500.00 |
| 45565 | Katz        | Comp. Sci.  |  82500.00 |
| 76543 | Singh       | Finance     |  88000.00 |
+-------+-------------+-------------+-----------+
4 rows in set (0.001 sec)
```

5. **Create a view to display the ID, instructor name, course_id, sec_id, semester, building,room_number of all the courses taught in the year 2009**

```
MariaDB [university]> create view courses_in_2009 as (
    ->     select instructor.ID, instructor.name, course_id,
    ->           sec_id, semester, section.building, section.room_number
    ->     from teaches
    ->             inner join instructor using (ID)
    ->             inner join section using (sec_id, course_id, semester, year)
    ->     where year=2009
    -> );
Query OK, 0 rows affected (0.004 sec)
```

```
MariaDB [university]> select *
    -> from courses_in_2009;
+-------+-------------+-----------+--------+----------+----------+-------------+
| ID    | name        | course_id | sec_id | semester | building | room_number |
+-------+-------------+-----------+--------+----------+----------+-------------+
| 10101 | Srinivasan  | CS-101    | 1      | Fall     | Packard  | 101         |
| 10101 | Srinivasan  | CS-347    | 1      | Fall     | Taylor   | 3128        |
| 22222 | Einstein    | PHY-101   | 1      | Fall     | Watson   | 100         |
| 76766 | Crick       | BIO-101   | 1      | Summer   | Painter  | 514         |
| 83821 | Brandt      | CS-190    | 1      | Spring   | Taylor   | 3128        |
| 83821 | Brandt      | CS-190    | 2      | Spring   | Taylor   | 3128        |
| 98345 | Kim         | EE-181    | 1      | Spring   | Taylor   | 3128        |
+-------+-------------+-----------+--------+----------+----------+-------------+
7 rows in set (0.017 sec)
```

6. **Display student id, student name and their department name for all students who have not taken any course?**

```
MariaDB [university]> select student.ID as ID, name, dept_name
    -> from student
    -> left join takes on student.ID = takes.ID
    -> where takes.ID is null;
+-------+------+------------+
| ID    | name | dept_name  |
+-------+------+------------+
| 70557 | Snow | Physics    |
+-------+------+------------+
1 row in set (0.001 sec)
```

7. **Create a view to display all the students (along with the corresponding courseID) who got an 'A' grade in the year 2009.**

```
MariaDB [university]> create view A_graders_2009 as (
    -> select student.ID ,student.name, course_id
    -> from takes
    -> inner join student on takes.ID = student.ID
    -> where year=2009 and grade='A'
    -> );
Query OK, 0 rows affected (0.008 sec)
```

```
MariaDB [university]> select *
    -> from A_graders_2009;
+-------+---------+-----------+
| ID    | name    | course_id |
+-------+---------+-----------+
| 00128 | Zhang   | CS-101    |
| 12345 | Shankar | CS-190    |
| 12345 | Shankar | CS-347    |
| 76543 | Brown   | CS-101    |
| 98988 | Tanaka  | BIO-101   |
+-------+---------+-----------+
5 rows in set (0.020 sec)
```

8. **Using nested query display all the instructors who have taught two or more courses.**

```
MariaDB [university]> select instructor.ID, name,number_of_courses
    -> from
    -> (select ID, count(course_id) as number_of_courses
    ->       from teaches
    ->       group by ID
    ->       having number_of_courses≥2
    ->     ) as two_or_more
    ->          inner join instructor on two_or_more.ID=instructor.ID;
+-------+------------+--------------------+
| ID    | name       | number_of_courses  |
+-------+------------+--------------------+
| 10101 | Srinivasan |                  3 |
| 45565 | Katz       |                  2 |
| 76766 | Crick      |                  2 |
| 83821 | Brandt     |                  3 |
+-------+------------+--------------------+
4 rows in set (0.001 sec)
```

9. **Create a view to display the instructors who doesn't taught in the year 2010 (without using set operators).**

```
MariaDB [university]> create view not_teach_2010 as (
    -> select instructor.*
    -> from (
    ->         select ID
    ->         from teaches
    ->         where year=2010
    ->     ) as teaches_2010
    ->         right join instructor on instructor.ID=teaches_2010.ID
    -> where teaches_2010.ID is null
    -> );
Query OK, 0 rows affected (0.007 sec)
```

```
MariaDB [university]> select *
    -> from not_teach_2010;
+-------+------------+--------------+------------+
| ID    | name       | dept_name    | salary     |
+-------+------------+--------------+------------+
| 22222 | Einstein   | Physics      | 104500.00 |
| 33456 | Gold       | Physics      |  95700.00 |
| 58583 | Califieri  | History      |  68200.00 |
| 76543 | Singh      | Finance      |  88000.00 |
| 98345 | Kim        | Elec. Eng.   |  88000.00 |
+-------+------------+--------------+------------+
5 rows in set (0.017 sec)
```

10. **Using inner join on department table, display the list of all department name, building such that each building has more than one department.**

```
MariaDB [university]> select dept_name, department.building
    -> from (
    ->      select building
    ->      from department
    ->      group by building
    ->      having count(dept_name)>1
    ->  ) as more_than_one
    -> inner join department on
    ->  department.building=more_than_one.building;
+-------------+-----------+
| dept_name   | building  |
+-------------+-----------+
| Biology     | Watson    |
| Comp. Sci.  | Taylor    |
| Elec. Eng.  | Taylor    |
| Finance     | Painter   |
| History     | Painter   |
| Physics     | Watson    |
+-------------+-----------+
6 rows in set (0.001 sec)
```

11. Display the student-advisor pairs(names) in which both the student and instructor took atleast one course in the year 2010.

```
MariaDB [university]> select student.name,instructor.name
    -> from (
    ->  select s_ID, i_ID
    ->  from advisor
    ->            inner join (
    ->      select ID
    ->      from teaches
    ->      where year=2010
    ->      group by ID
    ->      having count(course_id)≥1
    ->  ) as teaches_2010_gte1 on advisor.i_ID=teaches_2010_gte1.ID
    ->            inner join (
    ->      select ID
    ->      from takes
    ->      where year=2010
    ->      group by ID
    ->      having count(course_id)≥1
    ->  ) as takes_2010_gte1 on advisor.s_ID=takes_2010_gte1.ID
    -> ) as desired_ID_pairs
    -> inner join student on student.ID=desired_ID_pairs.s_ID
    -> inner join instructor on instructor.ID=desired_ID_pairs.i_ID;
+---------+------------+
| name    | name       |
+---------+------------+
| Shankar | Srinivasan |
| Brown   | Katz       |
| Tanaka  | Crick      |
+---------+------------+
3 rows in set (0.001 sec)
```