# Database Management Systems

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**TY Comp Div-2,  T4 Batch**

# Asssignment - 3

## University Schema

```
MariaDB [University]> show tables;
+----------------------+
| Tables_in_university |
+----------------------+
| advisor              |
| classroom            |
| course               |
| department           |
| instructor           |
| prereq               |
| section              |
| student              |
| takes                |
| teaches              |
| teaching_assistant   |
| time_slot            |
+----------------------+
12 rows in set (0.001 sec)
```

Each offering of a course (i.e. a section) can have many Teaching assistants; each teaching assistant is a student. Extend the existing schema(Add/Alter tables) to accommodate this requirement.

```
MariaDB [University]> desc course;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| course_id | varchar(8)  | NO   | PRI | NULL    |       |
| title     | varchar(50) | YES  |     | NULL    |       |
| dept_name | varchar(20) | YES  | MUL | NULL    |       |
| credits   | decimal(2,0)| YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
4 rows in set (0.010 sec)


MariaDB [University]> alter table course
    → add column teaching_assistant varchar(5) default NULL,
    → add foreign key (teaching_assistant) references student(ID) on
delete set NULL;
Query OK, 13 rows affected (0.087 sec)
Records: 13  Duplicates: 0  Warnings: 0

MariaDB [University]> desc course;
+--------------------+-------------+------+-----+---------+-------+
| Field              | Type        | Null | Key | Default | Extra |
+--------------------+-------------+------+-----+---------+-------+
| course_id          | varchar(8)  | NO   | PRI | NULL    |       |
| title              | varchar(50) | YES  |     | NULL    |       |
| dept_name          | varchar(20) | YES  | MUL | NULL    |       |
| credits            | decimal(2,0)| YES  |     | NULL    |       |
| teaching_assistant | varchar(5)  | YES  | MUL | NULL    |       |
+--------------------+-------------+------+-----+---------+-------+
5 rows in set (0.012 sec)
```

COEP Tech

Alter the schema to allow a student to have multiple advisors and make sure that you are able to insert multiple advisors for a student.

```
MariaDB [university]> create table student_advisor (
    →        student_ID varchar(5),
    →        advisor_ID varchar(5),
    →        primary key (student_ID, advisor_ID),
    →        foreign key (student_ID) references student(ID) on del
ete cascade,
    →        foreign key (advisor_ID) references instructor(ID)
    → );
Query OK, 0 rows affected (0.047 sec)

MariaDB [university]> desc student_advisor;
+------------+------------+------+-----+---------+-------+
| Field      | Type       | Null | Key | Default | Extra |
+------------+------------+------+-----+---------+-------+
| student_ID | varchar(5) | NO   | PRI | NULL    |       |
| advisor_ID | varchar(5) | NO   | PRI | NULL    |       |
+------------+------------+------+-----+---------+-------+
2 rows in set (0.017 sec)

MariaDB [university]> 
```

insert into course values ('CS-101L', 'CS-101 Labs', 'Comp. Sci.', '1', '00128');
insert into course values ('CS-101A', 'CS-101 Labs', 'Comp. Sci.', '4', '44553');
insert into course values ('PHY-201', 'Physics Labs', 'Physics', '4', '54321');

```
MariaDB [university]> insert into course values ('CS-101L', 'CS-101 Labs', 'Comp. Sci.', '1', '00128');
Query OK, 1 row affected (0.008 sec)

MariaDB [university]> insert into course values ('CS-101A', 'CS-101 Labs', 'Comp. Sci.', '4', '44553');
Query OK, 1 row affected (0.005 sec)

MariaDB [university]> insert into course values ('PHY-201', 'Physics Labs', 'Physics', '4', '54321');
Query OK, 1 row affected (0.003 sec)
```

COEP Tech

```
MariaDB [university]> insert into student_advisor values ('00128', '10101');
Query OK, 1 row affected (0.005 sec)

MariaDB [university]> insert into student_advisor values ('12345', '10101');
Query OK, 1 row affected (0.003 sec)

MariaDB [university]> insert into student_advisor values ('12345', '83821');
Query OK, 1 row affected (0.008 sec)

MariaDB [university]> insert into student_advisor values ('44553', '22222');
Query OK, 1 row affected (0.004 sec)

MariaDB [university]> insert into student_advisor values ('45678', '22222');
Query OK, 1 row affected (0.004 sec)

MariaDB [university]> insert into student_advisor values ('76543', '10101');
Query OK, 1 row affected (0.004 sec)

MariaDB [university]> insert into student_advisor values ('76543', '45565');
Query OK, 1 row affected (0.004 sec)

MariaDB [university]> insert into student_advisor values ('76543', '83821');
Query OK, 1 row affected (0.005 sec)

MariaDB [university]>
```

## Find all students who have more than 3 advisors

```
MariaDB [university]> SELECT s.ID, s.name, COUNT(a.advisor_ID) AS num_advisors
    → FROM student AS s
    → LEFT JOIN student_advisor AS a ON s.ID = a.student_ID
    → GROUP BY s.ID
    → HAVING num_advisors ≥ 3;
+-------+-------+--------------+
| ID    | name  | num_advisors |
+-------+-------+--------------+
| 76543 | Brown |            3 |
+-------+-------+--------------+
1 row in set (0.001 sec)
```

SELECT s.ID, s.name, COUNT(a.advisor_ID) AS num_advisors
FROM student AS s
LEFT JOIN student_advisor AS a ON s.ID = a.student_ID
GROUP BY s.ID
HAVING num_advisors >= 3;

```
MariaDB [university]> SELECT s.ID, s.name
    → FROM student AS s
    → JOIN student_advisor AS sa1 ON s.ID = sa1.student_ID
    → JOIN student_advisor AS sa2 ON s.ID = sa2.student_ID
    → JOIN instructor AS i1 ON sa1.advisor_ID = i1.ID AND i1.name = 'Srinivasan';
+--------+---------+
| ID     | name    |
+--------+---------+
| 00128  | Zhang   |
| 12345  | Shankar |
| 12345  | Shankar |
| 76543  | Brown   |
| 76543  | Brown   |
| 76543  | Brown   |
+--------+---------+
6 rows in set (0.001 sec)

MariaDB [university]> SELECT s.ID, s.name
    → FROM student AS s
    → JOIN student_advisor AS sa1 ON s.ID = sa1.student_ID
    → JOIN student_advisor AS sa2 ON s.ID = sa2.student_ID
    → JOIN instructor AS i1 ON sa1.advisor_ID = i1.ID AND i1.name = 'Ashok';
Empty set (0.000 sec)
```

SELECT s.ID, s.name
FROM student AS s
JOIN student_advisor AS sa1 ON s.ID = sa1.student_ID
JOIN student_advisor AS sa2 ON s.ID = sa2.student_ID
JOIN instructor AS i1 ON sa1.advisor_ID = i1.ID AND i1.name = 'Srinivasan';

```
MariaDB [University]> insert into student_advisor values ('55739', '58583');
Query OK, 1 row affected (0.006 sec)

MariaDB [University]> SELECT s.ID, s.name, s.dept_name AS student_department, i1.name AS advisor_name, i1.dept_name AS a
dvisor_department
    → FROM student AS s
    → JOIN student_advisor AS sa ON s.ID = sa.student_ID
    → JOIN instructor AS i1 ON sa.advisor_ID = i1.ID
    → WHERE s.dept_name ≠ i1.dept_name;
+--------+---------+--------------------+--------------+---------------------+
| ID     | name    | student_department | advisor_name | advisor_department  |
+--------+---------+--------------------+--------------+---------------------+
| 55739  | Sanchez | Music              | Califieri    | History             |
+--------+---------+--------------------+--------------+---------------------+
1 row in set (0.001 sec)
```

SELECT s.ID, s.name, s.dept_name AS student_department, i1.name AS advisor_name, i1.dept_name AS advisor_department
FROM student AS s
JOIN student_advisor AS sa ON s.ID = sa.student_ID
JOIN instructor AS i1 ON sa.advisor_ID = i1.ID
WHERE s.dept_name != i1.dept_name;

```
MariaDB [University]> DELETE FROM section WHERE (YEAR(NOW()) - year) > 10;
Query OK, 15 rows affected (0.045 sec)



MariaDB [University]> ALTER TABLE prereq
    → ADD FOREIGN KEY (prereq_id)
    → REFERENCES course(course_id)
    → ON DELETE CASCADE;
Query OK, 7 rows affected (0.073 sec)
Records: 7  Duplicates: 0  Warnings: 0

MariaDB [University]> select * from prereq;
+-----------+-----------+
| course_id | prereq_id |
+-----------+-----------+
| BIO-301   | BIO-101   |
| BIO-399   | BIO-101   |
| CS-190    | CS-101    |
| CS-315    | CS-101    |
| CS-319    | CS-101    |
| CS-347    | CS-101    |
| EE-181    | PHY-101   |
+-----------+-----------+
7 rows in set (0.001 sec)
```