FEDERAL INSTITUTE OF SCIENCE AND TECHNOLOGY (FISAT)
DEPARTMENT OF COMPUTER APPLICATIONS

ADVANCED DBMS LAB

CYCLE -1   Rahul Roy

I. <u>DDL Commands:</u>

1. Create the database named CYBERCOLLEGE and the above tables in the CYBERCOLLEGE database; include the Primary Key Constraint, Referential Integrity Constraints, and Check Constraints.

```
MySQL 8.0 Command Line Client                                          —   □   ×

mysql> create database cybercollege;
Query OK, 1 row affected (0.01 sec)

mysql> use cybercollege;
Database changed
mysql> create table student (stud_no varchar(9) primary key, stud_lname varchar(30), stud_fname varchar(20), stud_address
 varchar(50), stud_city varchar(30), state varchar(2), postalcode varchar(9));
Query OK, 0 rows affected (0.05 sec)

mysql> desc student;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| stud_no      | varchar(9)  | NO   | PRI | NULL    |       |
| stud_lname   | varchar(30) | YES  |     | NULL    |       |
| stud_fname   | varchar(20) | YES  |     | NULL    |       |
| stud_address | varchar(50) | YES  |     | NULL    |       |
| stud_city    | varchar(30) | YES  |     | NULL    |       |
| state        | varchar(2)  | YES  |     | NULL    |       |
| postalcode   | varchar(9)  | YES  |     | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
7 rows in set (0.02 sec)

mysql>
```

```
MySQL 8.0 Command Line Client                                          —   □   ×

mysql> create table instructor (instructor_id varchar(5) primary key, instructor_lname varchar(30),
    -> instructor_fname varchar(20), instructor_phone varchar(8));
Query OK, 0 rows affected (0.02 sec)

mysql> desc instructor;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| instructor_id   | varchar(5)  | NO   | PRI | NULL    |       |
| instructor_lname| varchar(30) | YES  |     | NULL    |       |
| instructor_fname| varchar(20) | YES  |     | NULL    |       |
| instructor_phone| varchar(8)  | YES  |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql>
```

```
mysql> create table course (course_code varchar(6) primary key, course_title varchar(25), course_hours numeric(2,0),
    -> semester varchar(20));
Query OK, 0 rows affected (0.03 sec)

mysql> desc course;
+--------------+--------------+------+-----+---------+-------+
| Field        | Type         | Null | Key | Default | Extra |
+--------------+--------------+------+-----+---------+-------+
| course_code  | varchar(6)   | NO   | PRI | NULL    |       |
| course_title | varchar(25)  | YES  |     | NULL    |       |
| course_hours | decimal(2,0) | YES  |     | NULL    |       |
| semester     | varchar(20)  | YES  |     | NULL    |       |
+--------------+--------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql>
```

```
mysql> create table section(section_id numeric primary key, time_offered varchar(10),
    -> day_offered varchar(10), section_room varchar(8), class_size numeric(3,0) check(class_size>=0),
    -> number_enrolled numeric(3,0) check(number_enrolled>=0), instructor_id varchar(5) references
    -> instructor(instructor_id), course_code varchar(6) references course(course_code));
Query OK, 0 rows affected (0.03 sec)

mysql> desc section;
+-----------------+---------------+------+-----+---------+-------+
| Field           | Type          | Null | Key | Default | Extra |
+-----------------+---------------+------+-----+---------+-------+
| section_id      | decimal(10,0) | NO   | PRI | NULL    |       |
| time_offered    | varchar(10)   | YES  |     | NULL    |       |
| day_offered     | varchar(10)   | YES  |     | NULL    |       |
| section_room    | varchar(8)    | YES  |     | NULL    |       |
| class_size      | decimal(3,0)  | YES  |     | NULL    |       |
| number_enrolled | decimal(3,0)  | YES  |     | NULL    |       |
| instructor_id   | varchar(5)    | YES  |     | NULL    |       |
| course_code     | varchar(6)    | YES  |     | NULL    |       |
+-----------------+---------------+------+-----+---------+-------+
8 rows in set (0.01 sec)

mysql>
```

```
mysql> create table enrolment(stud_no varchar(9) not null references student(stud_no), section_id varchar(7)
    -> not null references section(section_id), grade varchar(2), primary key(stud_no, section_id));
Query OK, 0 rows affected (0.02 sec)

mysql> desc enrolment;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| stud_no    | varchar(9)  | NO   | PRI | NULL    |       |
| section_id | varchar(7)  | NO   | PRI | NULL    |       |
| grade      | varchar(2)  | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
3 rows in set (0.01 sec)

mysql>
```

2. Add a field Country to the STUDENT table with the default value set to 'India'.

```
MySQL 8.0 Command Line Client                                              −   □   ×

mysql> alter table student add country varchar(20) default 'India';
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc student;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| stud_no      | varchar(9)  | NO   | PRI | NULL    |       |
| stud_lname   | varchar(30) | YES  |     | NULL    |       |
| stud_fname   | varchar(20) | YES  |     | NULL    |       |
| stud_address | varchar(50) | YES  |     | NULL    |       |
| stud_city    | varchar(30) | YES  |     | NULL    |       |
| state        | varchar(2)  | YES  |     | NULL    |       |
| postalcode   | varchar(9)  | YES  |     | NULL    |       |
| country      | varchar(20) | YES  |     | India   |       |
+--------------+-------------+------+-----+---------+-------+
8 rows in set (0.01 sec)

mysql>
```

3. Add a constraint to the Grade field in the ENROLMENT table that accepts only the values 'A', 'B', 'C' and 'D'.


```
MySQL 8.0 Command Line Client                                              −   □   ×
8 rows in set (0.01 sec)

mysql> alter table enrolment add constraint grade check (grade in ('A', 'B', 'C', 'D'));
Query OK, 0 rows affected (0.05 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql>
```

4. Modify the ENROLMENT table by changing the width of the field Grade to 2


```
MySQL 8.0 Command Line Client                                              −   □   ×
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table enrolment modify grade varchar(2);
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql>
```

5. Add a new column, salary to the INSTRUCTOR table and display its modified schema.


```
MySQL 8.0 Command Line Client                                              −   □   ×

mysql> alter table instructor add ssalary varchar(10);
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc instructor;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| instructor_id   | varchar(5)  | NO   | PRI | NULL    |       |
| instructor_lname| varchar(30) | YES  |     | NULL    |       |
| instructor_fname| varchar(20) | YES  |     | NULL    |       |
| instructor_phone| varchar(8)  | YES  |     | NULL    |       |
| ssalary         | varchar(10) | YES  |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql>
```

6. Drop the column Country from the STUDENT table.

7. Create a view for instructors to display the courses taught by an instructor. Display the personal details but by hiding salary information.

II. DML Commands:

8. Insert details of you and your 5 friends in STUDENT table and the details of 5 instructors with names (Asha, Ashna, Sandeep, Asifa, George) in INSTRUCTOR table.

9. Add details of the first and second semester courses. Also add a new course for Data Mining with a course code of 20MCA260 worth with credit of 4 hours

```
MySQL 8.0 Command Line Client                                              —    □    ×

mysql> insert into course values('20MCA101', 'MFCS', 4, 1);
Query OK, 1 row affected (0.00 sec)

mysql> insert into course values('20MCA102', 'ADS', 3, 1);
Query OK, 1 row affected (0.00 sec)

mysql> insert into course values('20MCA103', 'DIGITAL', 3, 1);
Query OK, 1 row affected (0.00 sec)

mysql> insert into course values('20MCA104', 'ASE', 5, 1);
Query OK, 1 row affected (0.01 sec)

mysql> insert into course values('20MCA201', 'DBMS', 4, 2);
Query OK, 1 row affected (0.00 sec)

mysql> insert into course values('20MCA202', 'ACN', 4, 2);
Query OK, 1 row affected (0.00 sec)

mysql> insert into course values('20MCA203', 'AOS', 2, 2);
Query OK, 1 row affected (0.01 sec)

mysql> insert into course values('20MCA204', 'AI', 2, 2);
Query OK, 1 row affected (0.00 sec)

mysql> insert into course values('20MCA260', 'DATA MINING', 4, 2);
Query OK, 1 row affected (0.01 sec)

mysql> select * from course;
+-------------+--------------+--------------+----------+
| course_code | course_title | course_hours | semester |
+-------------+--------------+--------------+----------+
| 20MCA101    | MFCS         |            4 | 1        |
| 20MCA102    | ADS          |            3 | 1        |
| 20MCA103    | DIGITAL      |            3 | 1        |
| 20MCA104    | ASE          |            5 | 1        |
| 20MCA201    | DBMS         |            4 | 2        |
| 20MCA202    | ACN          |            4 | 2        |
| 20MCA203    | AOS          |            2 | 2        |
| 20MCA204    | AI           |            2 | 2        |
| 20MCA260    | DATA MINING  |            4 | 2        |
+-------------+--------------+--------------+----------+
9 rows in set (0.00 sec)

mysql>
```

10. Add a new section for this new course with section ID as 301.The section should meet in
    2-4 on MW in BLGNG102. The class size should be 35, and number enrolled should be 0.
    The instructor should be 3, and the course is 20MCA260. Also add sections 302 and 303
    for the courses AOS and OB and enrol 5 students each to these courses.

```
MySQL 8.0 Command Line Client                                              —    □    ×

mysql> insert into section values(301, 2.4,'MW', 'BLGNG102', 35, 0, 3, '20MCA260');
Query OK, 1 row affected (0.01 sec)

mysql> insert into section values(302, 2, 'MW', 'BLGNG102', 35, 5, 201, '20MCA203');
Query OK, 1 row affected (0.01 sec)

mysql> insert into section values(303, 2, 'MW', 'BLGNG102', 35, 5, 202, '20MCA204');
Query OK, 1 row affected (0.00 sec)

mysql> select * from section;
+------------+--------------+-------------+--------------+------------+-----------------+---------------+-------------+
| section_id | time_offered | day_offered | section_room | class_size | number_enrolled | instructor_id | course_code |
+------------+--------------+-------------+--------------+------------+-----------------+---------------+-------------+
|        301 | 2.4          | MW          | BLGNG102     |         35 |               0 | 3             | 20MCA260    |
|        302 | 2            | MW          | BLGNG102     |         35 |               5 | 201           | 20MCA203    |
|        303 | 2            | MW          | BLGNG102     |         35 |               5 | 202           | 20MCA204    |
+------------+--------------+-------------+--------------+------------+-----------------+---------------+-------------+
3 rows in set (0.00 sec)

mysql>
```

11. Register yourself along with your 3 friends for this new course by adding a row to the ENROLMENT table. The grade should be null.

```
MySQL 8.0 Command Line Client                                                    —    □    ×

mysql> insert into enrolment values(101, 201, null);
Query OK, 1 row affected (0.01 sec)

mysql> insert into enrolment values(101, 301, null);
Query OK, 1 row affected (0.00 sec)

mysql> insert into enrolment values(102, 301, null);
Query OK, 1 row affected (0.00 sec)

mysql> insert into enrolment values(103, 301, null);
Query OK, 1 row affected (0.01 sec)

mysql> select * from enrolment;
+---------+------------+-------+
| stud_no | section_id | grade |
+---------+------------+-------+
| 101     | 201        | NULL  |
| 101     | 301        | NULL  |
| 102     | 301        | NULL  |
| 103     | 301        | NULL  |
+---------+------------+-------+
4 rows in set (0.00 sec)

mysql>
```

12. Update the 301 section, and increase the class sizes by 10%.

```
MySQL 8.0 Command Line Client                                                    —    □    ×

mysql> update section set class_size=class_size+(class_size * 10/100) where section_id=301;
Query OK, 1 row affected, 1 warning (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 1

mysql> select * from section;
+------------+-------------+------------+--------------+------------+-----------------+---------------+-------------+
| section_id | time_offered | day_offered | section_room | class_size | number_enrolled | instructor_id | course_code |
+------------+-------------+------------+--------------+------------+-----------------+---------------+-------------+
|        301 | 2.4         | MW         | BLGNG102     |         39 |               0 | 3             | 20MCA260    |
|        302 | 2           | MW         | BLGNG102     |         35 |               5 | 201           | 20MCA203    |
|        303 | 2           | MW         | BLGNG102     |         35 |               5 | 202           | 20MCA204    |
+------------+-------------+------------+--------------+------------+-----------------+---------------+-------------+
3 rows in set (0.00 sec)

mysql>
```

13. Give a 10% increment in salary for all instructors.

```
mysql> update instructor set salary=salary+(salary*10/100);
Query OK, 5 rows affected (0.01 sec)
Rows matched: 5  Changed: 5  Warnings: 0

mysql> select * from instructor;
+---------------+-----------------+-----------------+-----------------+--------+
| instructor_id | instructor_lname | instructor_fname | instructor_phone | salary |
+---------------+-----------------+-----------------+-----------------+--------+
| 201           | Thomas          | Asha            | 99998900        | 44000  |
| 202           | Francis         | Ashna           | 98798909        | 49500  |
| 203           | Krishna         | Sandeep         | 89089876        | 44000  |
| 204           | Abdula          | Asifa           | 98765678        | 46200  |
| 205           | Thomas          | George          | 90098897        | 41800  |
+---------------+-----------------+-----------------+-----------------+--------+
5 rows in set (0.00 sec)

mysql>
```

14. Delete Section 302 and verify for the rows in ENROLMENT table for that section.

```
mysql> delete from section where section_id=302;
Query OK, 1 row affected (0.01 sec)

mysql> select * from section;
+------------+-------------+------------+--------------+------------+-----------------+---------------+-------------+
| section_id | time_offered | day_offered | section_room | class_size | number_enrolled | instructor_id | course_code |
+------------+-------------+------------+--------------+------------+-----------------+---------------+-------------+
|        301 | 2.4         | MW         | BLGNG102     |         39 |               0 | 3             | 20MCA260    |
|        303 | 2           | MW         | BLGNG102     |         35 |               5 | 202           | 20MCA204    |
+------------+-------------+------------+--------------+------------+-----------------+---------------+-------------+
2 rows in set (0.00 sec)

mysql> select * from enrolment;
+---------+------------+-------+
| stud_no | section_id | grade |
+---------+------------+-------+
| 101     | 201        | NULL  |
| 101     | 301        | NULL  |
| 102     | 301        | NULL  |
| 103     | 301        | NULL  |
+---------+------------+-------+
4 rows in set (0.00 sec)
```

III. TCL Commands:

15. Undo the previous delete operation

```
mysql> rollback;
Query OK, 0 rows affected (0.00 sec)

mysql>
```

16. Save all the transactions to the database.
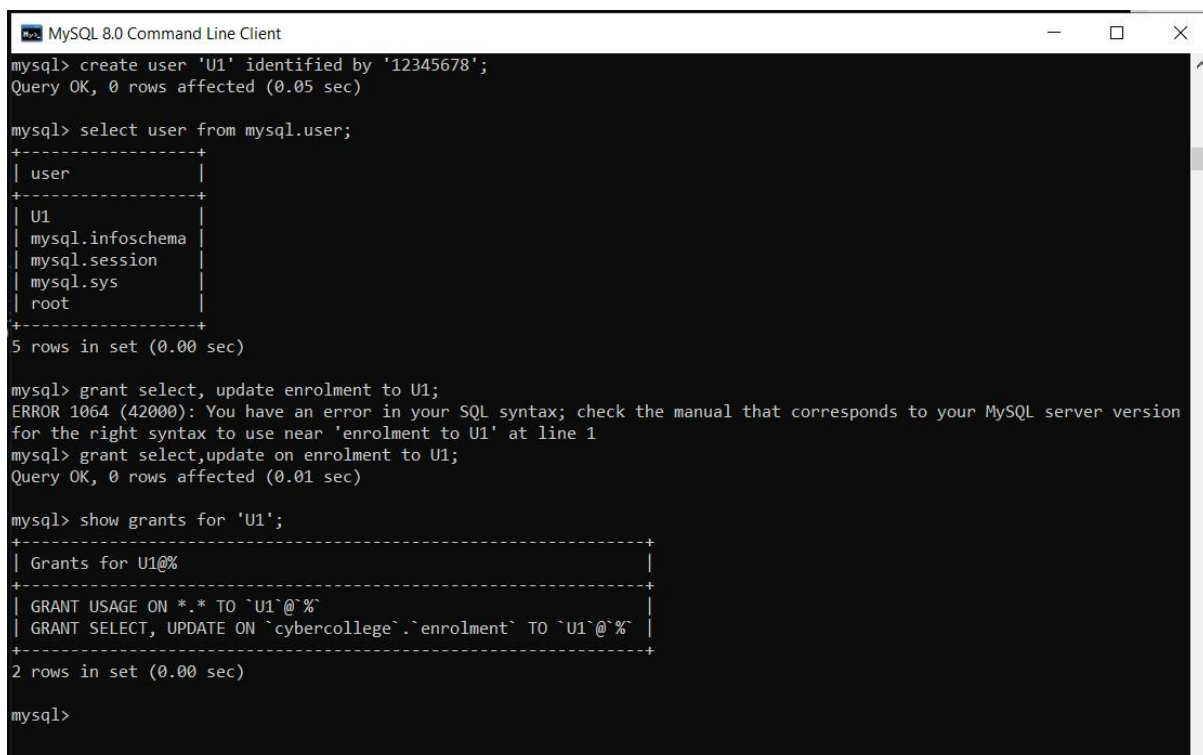
```
MySQL 8.0 Command Line Client                                    —    □    ×
mysql> commit;
Query OK, 0 rows affected (0.00 sec)

mysql>
```

17. Grant the privilege to read and delete from the ENROLMENT table to the User U1.

```
MySQL 8.0 Command Line Client                                                        —    □    ×
mysql> create user 'U1' identified by '12345678';
Query OK, 0 rows affected (0.05 sec)

mysql> select user from mysql.user;
+------------------+
| user             |
+------------------+
| U1               |
| mysql.infoschema |
| mysql.session    |
| mysql.sys        |
| root             |
+------------------+
5 rows in set (0.00 sec)

mysql> grant select, update enrolment to U1;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version
for the right syntax to use near 'enrolment to U1' at line 1
mysql> grant select,update on enrolment to U1;
Query OK, 0 rows affected (0.01 sec)

mysql> show grants for 'U1';
+-----------------------------------------------------------+
| Grants for U1@%                                           |
+-----------------------------------------------------------+
| GRANT USAGE ON *.* TO `U1`@`%`                            |
| GRANT SELECT, UPDATE ON `cybercollege`.`enrolment` TO `U1`@`%` |
+-----------------------------------------------------------+
2 rows in set (0.00 sec)

mysql>
```

18. Revoke the delete privilege from U1

```
MySQL 8.0 Command Line Client                                                —    □    ×
mysql> revoke delete on enrolment from U1;
Query OK, 0 rows affected (0.01 sec)

mysql> show grants for 'U1';
+-----------------------------------------------------------+
| Grants for U1@%                                           |
+-----------------------------------------------------------+
| GRANT USAGE ON *.* TO `U1`@`%`                            |
| GRANT SELECT, UPDATE ON `cybercollege`.`enrolment` TO `U1`@`%` |
+-----------------------------------------------------------+
2 rows in set (0.00 sec)

mysql>
```

IV. Accessing database (SELECT, Filtering using WHERE, HAVING, GROUP BY, ORDER BY Clauses, Subquery):

19. Display the full name and contact details of students living in Kochi.

```
MySQL 8.0 Command Line Client                                                    —    □    ✕

mysql> select * from student;
+---------+-----------+------------+--------------+-----------+-------+------------+
| stud_no | stud_lname | stud_fname | stud_address | stud_city | state | postalcode |
+---------+-----------+------------+--------------+-----------+-------+------------+
| 101     | Roy       | Rahul      | Kachappilly  | Thrissur  | K     | 680683     |
| 102     | Francis   | Kevin      | Alapatt      | Ernakulam | K     | 678456     |
| 103     | Harper    | Charlie    | Tharayil     | Kottayam  | K     | 678890     |
| 104     | Thomas    | David      | Chirayath    | Kozhikode | K     | 656678     |
| 105     | Irfan     | Amal       | Palakkal     | Thrissur  | K     | 677678     |
| 106     | George    | Jose       | Alukkal      | Palakkad  | K     | 699789     |
| 107     | Parker    | Peter      | Alukkal      | Kochi     | K     | 699789     |
+---------+-----------+------------+--------------+-----------+-------+------------+
7 rows in set (0.00 sec)

mysql> select stud_fname, stud_lname, stud_address from student where stud_city='Kochi';
+------------+------------+--------------+
| stud_fname | stud_lname | stud_address |
+------------+------------+--------------+
| Peter      | Parker     | Alukkal      |
+------------+------------+--------------+
1 row in set (0.00 sec)

mysql>
```

20. List the student details who has longest first name

```
MySQL 8.0 Command Line Client                                                    —    □    ✕
1 row in set (0.00 sec)

mysql> select * from student;
+---------+-----------+------------+--------------+-----------+-------+------------+
| stud_no | stud_lname | stud_fname | stud_address | stud_city | state | postalcode |
+---------+-----------+------------+--------------+-----------+-------+------------+
| 101     | Roy       | Rahul      | Kachappilly  | Thrissur  | K     | 680683     |
| 102     | Francis   | Kevin      | Alapatt      | Ernakulam | K     | 678456     |
| 103     | Harper    | Charlie    | Tharayil     | Kottayam  | K     | 678890     |
| 104     | Thomas    | David      | Chirayath    | Kozhikode | K     | 656678     |
| 105     | Irfan     | Amal       | Palakkal     | Thrissur  | K     | 677678     |
| 106     | George    | Jose       | Alukkal      | Palakkad  | K     | 699789     |
| 107     | Parker    | Peter      | Alukkal      | Kochi     | K     | 699789     |
+---------+-----------+------------+--------------+-----------+-------+------------+
7 rows in set (0.00 sec)

mysql> select * from student where length(stud_fname)=(select max(length(stud_fname))from student);
+---------+-----------+------------+--------------+-----------+-------+------------+
| stud_no | stud_lname | stud_fname | stud_address | stud_city | state | postalcode |
+---------+-----------+------------+--------------+-----------+-------+------------+
| 103     | Harper    | Charlie    | Tharayil     | Kottayam  | K     | 678890     |
+---------+-----------+------------+--------------+-----------+-------+------------+
1 row in set (0.00 sec)

mysql>
```

21. Display the name and phone number of the instructors who is handling the courses AOS and ADBMS.

```
MySQL 8.0 Command Line Client                                          —    □    ×

mysql> select instructor_fname, instructor_phone from instructor i join course c join section s where i.instructor_id=s.i
nstructor_id and s.course_code and c.course_title='AOS' or 'ADBMS';
+------------------+------------------+
| instructor_fname | instructor_phone |
+------------------+------------------+
| Ashna            | 98798909         |
+------------------+------------------+
1 row in set, 3 warnings (0.00 sec)

mysql>
```

22. List the codes, titles, and credit hours for courses worth 4 hours. Order the results in descending order of course code.

```
MySQL 8.0 Command Line Client                                          —    □    ×

mysql> select course_code, course_title, course_hours from course where course_hours=4 order by course_code desc;
+-------------+--------------+--------------+
| course_code | course_title | course_hours |
+-------------+--------------+--------------+
| 20MCA260    | DATA MINING  |            4 |
| 20MCA202    | ACN          |            4 |
| 20MCA201    | DBMS         |            4 |
| 20MCA101    | MFCS         |            4 |
+-------------+--------------+--------------+
4 rows in set (0.00 sec)

mysql>
```

23. Display the names of the students in the descending order along with their phone number.

```
MySQL 8.0 Command Line Client                                          —    □    ×

mysql> select stud_fname, stud_lname from student order by stud_fname desc;
+------------+------------+
| stud_fname | stud_lname |
+------------+------------+
| Rahul      | Roy        |
| Peter      | Parker     |
| Kevin      | Francis    |
| Jose       | George     |
| David      | Thomas     |
| Charlie    | Harper     |
| Amal       | Irfan      |
+------------+------------+
7 rows in set (0.00 sec)

mysql>
```

24. List the student's name, course code and section id grouping the students by their grade.

V. Optimizing databases (Join, Aggregate & Set operations, Other operators like arithmetic, logical, special etc):

25. Use an inner join between the STUDENT and ENROLMENT tables for showing the full name, Section id and Grade.

26. Use an outer join between the STUDENT and ENROLMENT tables for showing the full name, Section id and Grade. Include all the students regardless of whether they have a matching section.

```
MySQL 8.0 Command Line Client                                                    —    □    ×

mysql> select student.stud_fname, student.stud_lname, enrolment.section_id, enrolment.grade from student left join enrolm
ent on student.stud_no=enrolment.stud_no;
+------------+------------+------------+-------+
| stud_fname | stud_lname | section_id | grade |
+------------+------------+------------+-------+
| Rahul      | Roy        | 201        | NULL  |
| Rahul      | Roy        | 301        | NULL  |
| Kevin      | Francis    | 301        | NULL  |
| Charlie    | Harper     | 301        | NULL  |
| David      | Thomas     | NULL       | NULL  |
| Amal       | Irfan      | NULL       | NULL  |
| Jose       | George     | NULL       | NULL  |
| Peter      | Parker     | NULL       | NULL  |
+------------+------------+------------+-------+
8 rows in set (0.00 sec)

mysql>
```

27. Give a 7% salary raise to instructors whose salary is less than the average.

```
MySQL 8.0 Command Line Client                                                         —    □    ×

mysql> select * from instructor;
+---------------+-----------------+-----------------+------------------+--------+
| instructor_id | instructor_lname | instructor_fname | instructor_phone | salary |
+---------------+-----------------+-----------------+------------------+--------+
| 201           | Thomas          | Asha            | 99998900         | 44000  |
| 202           | Francis         | Ashna           | 98798909         | 49500  |
| 203           | Krishna         | Sandeep         | 89089876         | 44000  |
| 204           | Abdula          | Asifa           | 98765678         | 46200  |
| 205           | Thomas          | George          | 90098897         | 41800  |
+---------------+-----------------+-----------------+------------------+--------+
5 rows in set (0.00 sec)

mysql>
```

28. List full name and salary of instructors whose last name ends with 'a' and earns highest salary.

29. Display the details of instructor who draws lowest salary.

30. List the students details who lived in Kochi, Kerala or in Bangalore, Karnataka or both.

```
MySQL 8.0 Command Line Client                                                    —    □    ×

mysql> select * from student;
+---------+------------+------------+--------------+-----------+-------+------------+
| stud_no | stud_lname | stud_fname | stud_address | stud_city | state | postalcode |
+---------+------------+------------+--------------+-----------+-------+------------+
| 101     | Roy        | Rahul      | Kachappilly  | Thrissur  | K     | 680683     |
| 102     | Francis    | Kevin      | Alapatt      | Ernakulam | K     | 678456     |
| 103     | Harper     | Charlie    | Tharayil     | Kottayam  | K     | 678890     |
| 104     | Thomas     | David      | Chirayath    | Kozhikode | K     | 656678     |
| 105     | Irfan      | Amal       | Palakkal     | Thrissur  | K     | 677678     |
| 106     | George     | Jose       | Alukkal      | Palakkad  | K     | 699789     |
| 107     | Parker     | Peter      | Alukkal      | Kochi     | K     | 699789     |
+---------+------------+------------+--------------+-----------+-------+------------+
7 rows in set (0.00 sec)

mysql> select * from student where stud_city='Kochi' and 'Kerala' or 'Bangalore' and 'Karnataka' or stud_city in ('Kochi'
, 'Kerala', 'Bangalore', 'Karnataka');
+---------+------------+------------+--------------+-----------+-------+------------+
| stud_no | stud_lname | stud_fname | stud_address | stud_city | state | postalcode |
+---------+------------+------------+--------------+-----------+-------+------------+
| 107     | Parker     | Peter      | Alukkal      | Kochi     | K     | 699789     |
+---------+------------+------------+--------------+-----------+-------+------------+
1 row in set, 2 warnings (0.00 sec)

mysql>
```