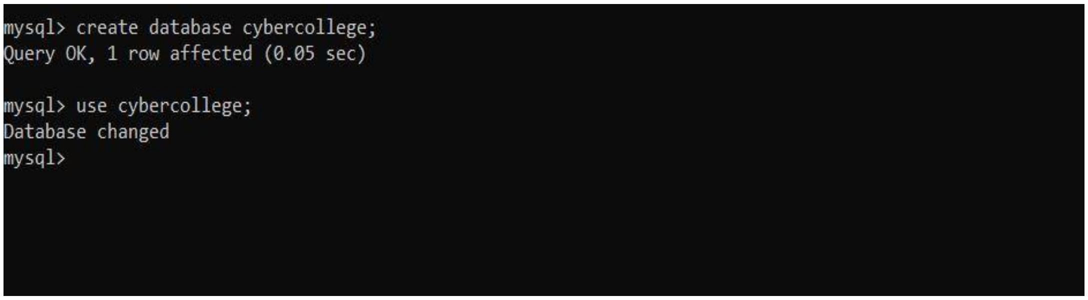
DBMS LAB CYCLE 1

Q1. Design and built a simple relational database system and demonstrate competence with the fundamental tasks involved with modelling, designing and implementing a database.

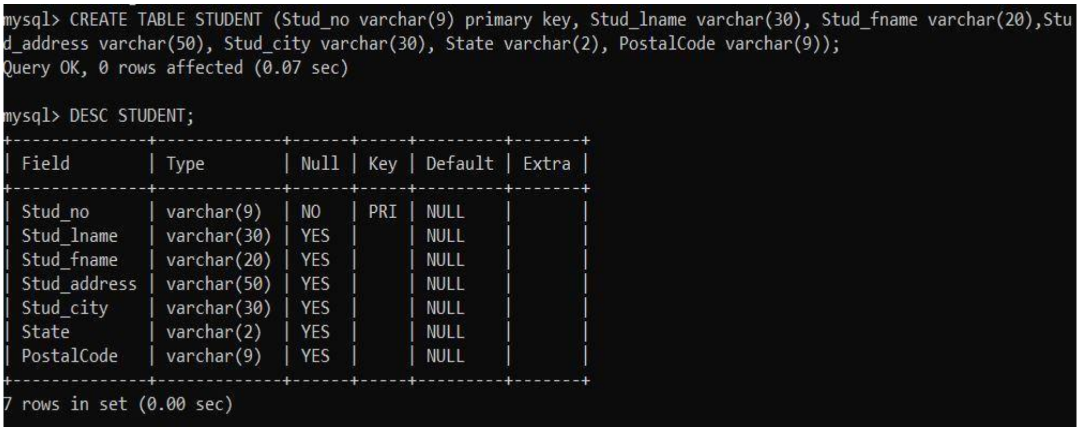
DDL Commands:

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.



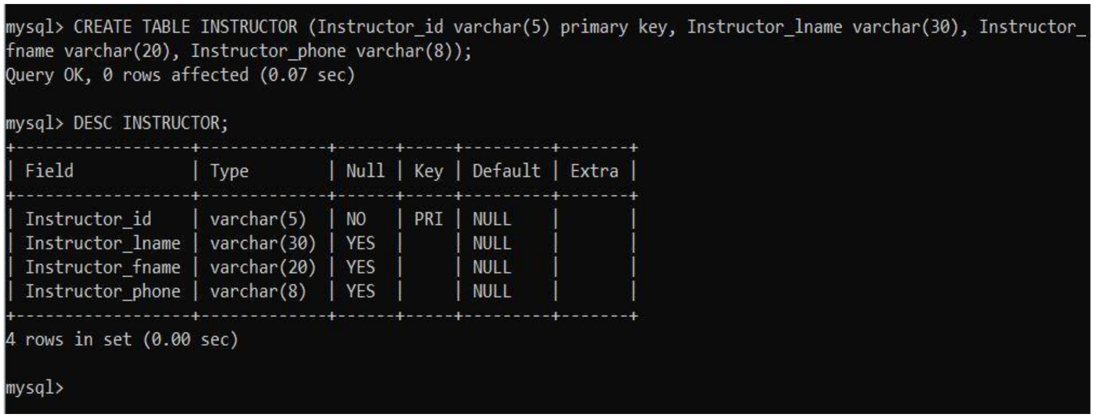
```
mysql> create database cybercollege;
Query OK, 1 row affected (0.05 sec)

mysql> use cybercollege;
Database changed
mysql>
```

Table Name: **STUDENT**



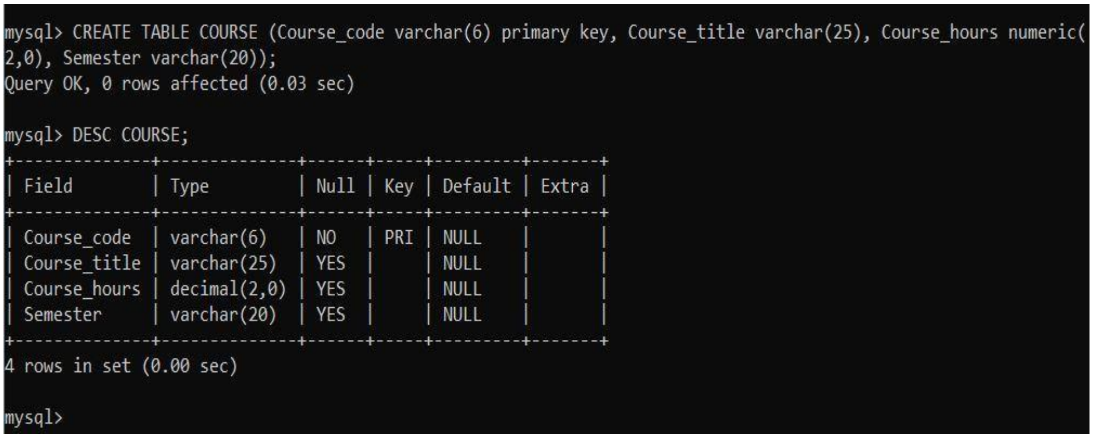
```
mysql> CREATE TABLE STUDENT (Stud_no varchar(9) primary key, Stud_lname varchar(30), Stud_fname varchar(20),Stu
d_address varchar(50), Stud_city varchar(30), State varchar(2), PostalCode varchar(9));
Query OK, 0 rows affected (0.07 sec)

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 (0.00 sec)
```

Table Name: **INSTRUCTOR**



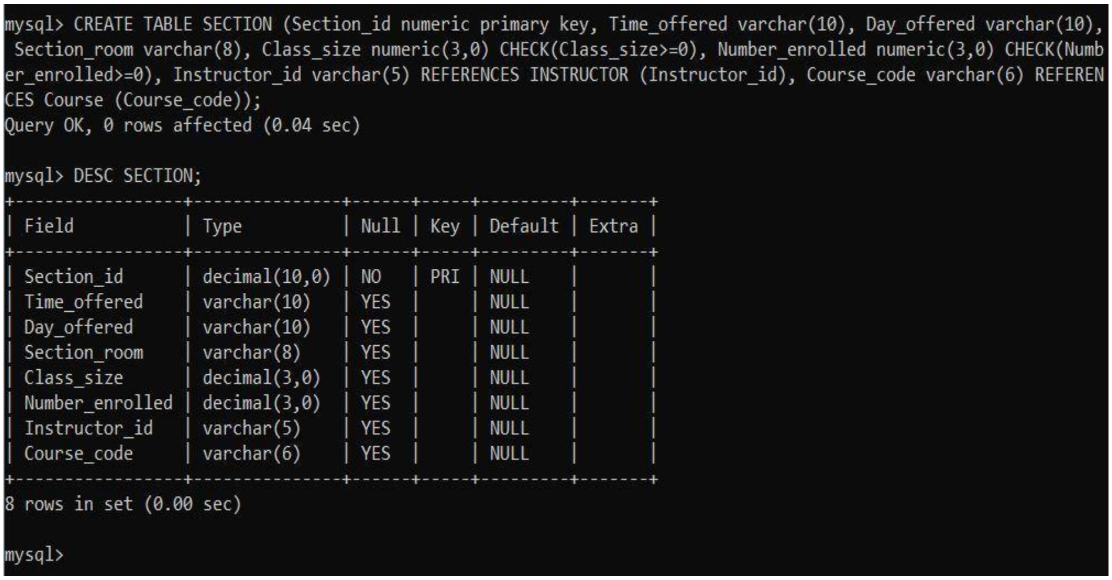
```
mysql> CREATE TABLE INSTRUCTOR (Instructor_id varchar(5) primary key, Instructor_lname varchar(30), Instructor_
fname varchar(20), Instructor_phone varchar(8));
Query OK, 0 rows affected (0.07 sec)

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 (0.00 sec)

mysql>
```

Table Name: **COURSE**



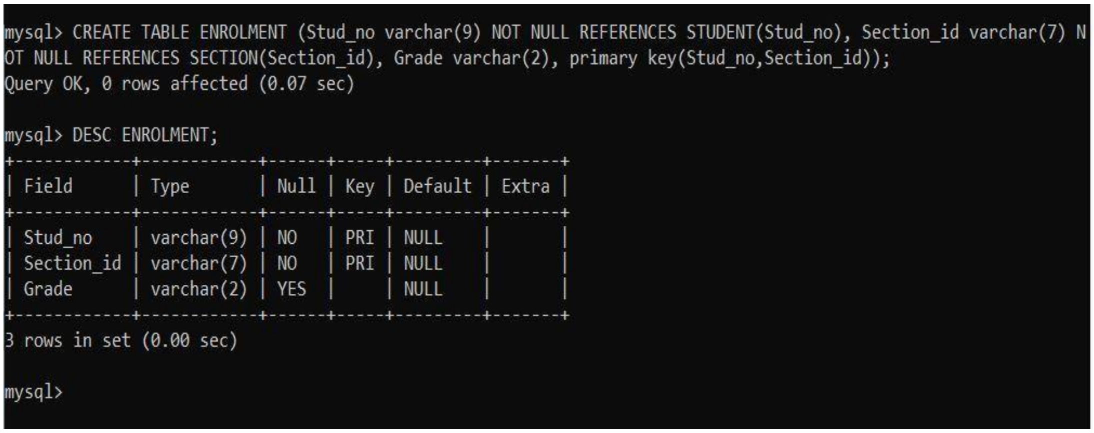
```
mysql> CREATE TABLE COURSE (Course_code varchar(6) primary key, Course_title varchar(25), Course_hours numeric(
2,0), Semester varchar(20));
Query OK, 0 rows affected (0.03 sec)

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 (0.00 sec)

mysql>
```

Table Name: **SECTION**



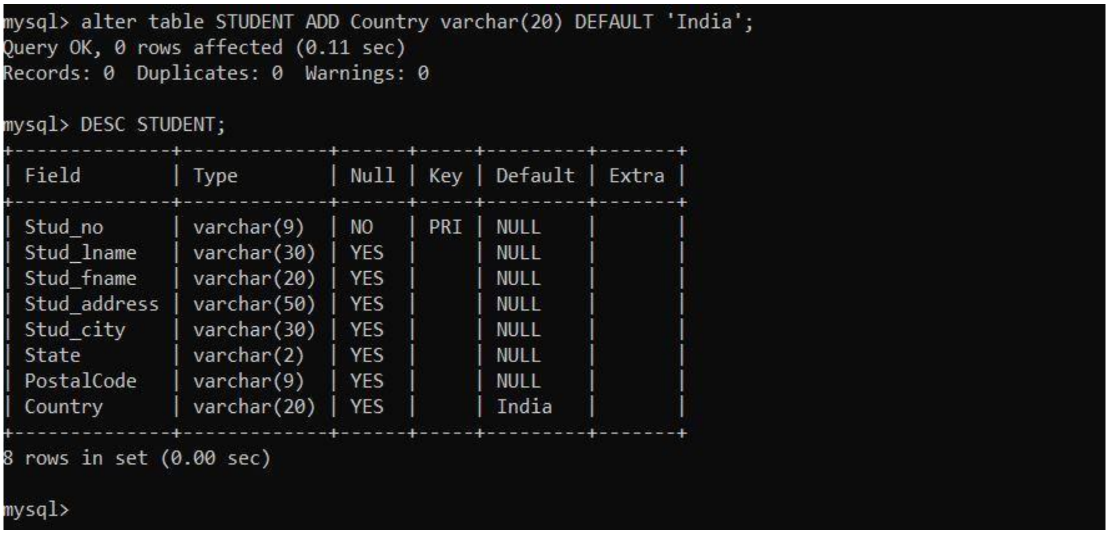
```
mysql> CREATE TABLE SECTION (Section_id numeric primary key, Time_offered varchar(10), Day_offered varchar(10),
 Section_room varchar(8), Class_size numeric(3,0) CHECK(Class_size>=0), Number_enrolled numeric(3,0) CHECK(Numb
er_enrolled>=0), Instructor_id varchar(5) REFERENCES INSTRUCTOR (Instructor_id), Course_code varchar(6) REFEREN
CES Course (Course_code));
Query OK, 0 rows affected (0.04 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 (0.00 sec)

mysql>
```

Table Name: **ENROLMENT**



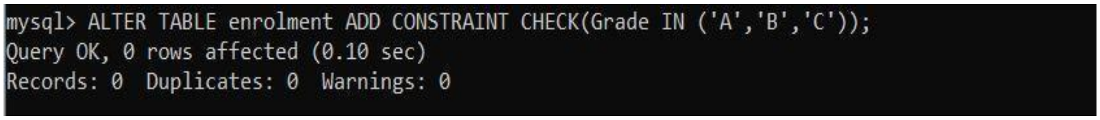
```
mysql> CREATE TABLE ENROLMENT (Stud_no varchar(9) NOT NULL REFERENCES STUDENT(Stud_no), Section_id varchar(7) N
OT NULL REFERENCES SECTION(Section_id), Grade varchar(2), primary key(Stud_no,Section_id));
Query OK, 0 rows affected (0.07 sec)

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 (0.00 sec)

mysql>
```

2. Add a field Country to the STUDENT table with the default values set to “India”.



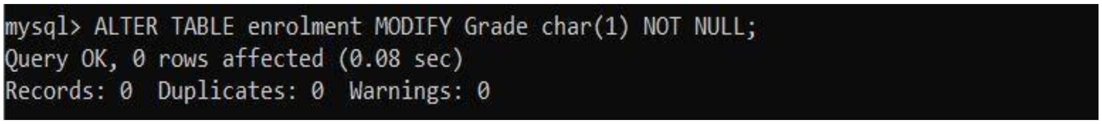
```
mysql> alter table STUDENT ADD Country varchar(20) DEFAULT 'India';
Query OK, 0 rows affected (0.11 sec)
Records: 0  Duplicates: 0  Warnings: 0

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 (0.00 sec)

mysql>
```

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



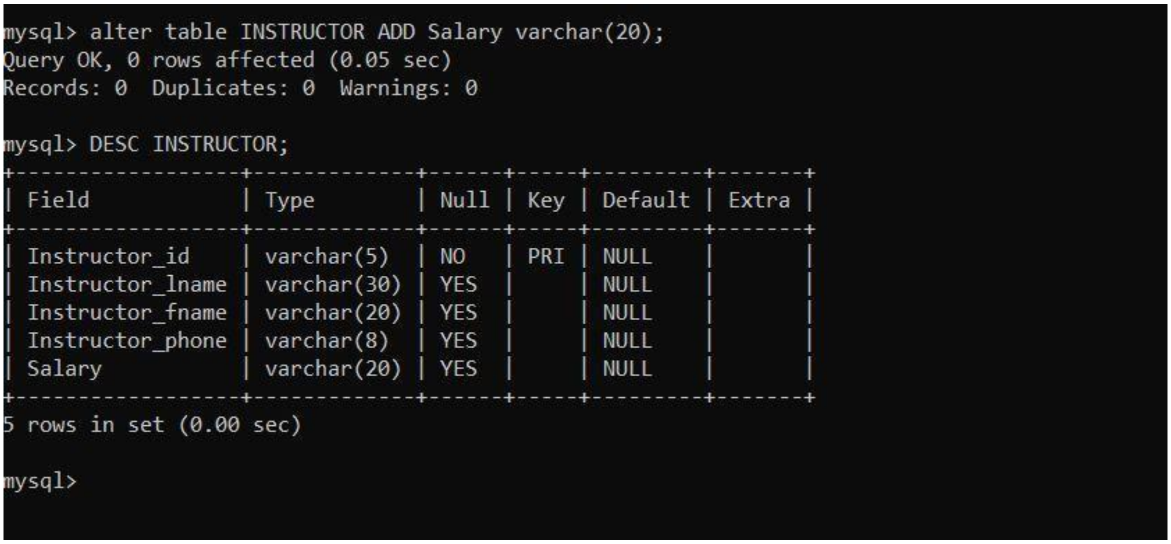
```
mysql> ALTER TABLE enrolment ADD CONSTRAINT CHECK(Grade IN ('A','B','C'));
Query OK, 0 rows affected (0.10 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

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



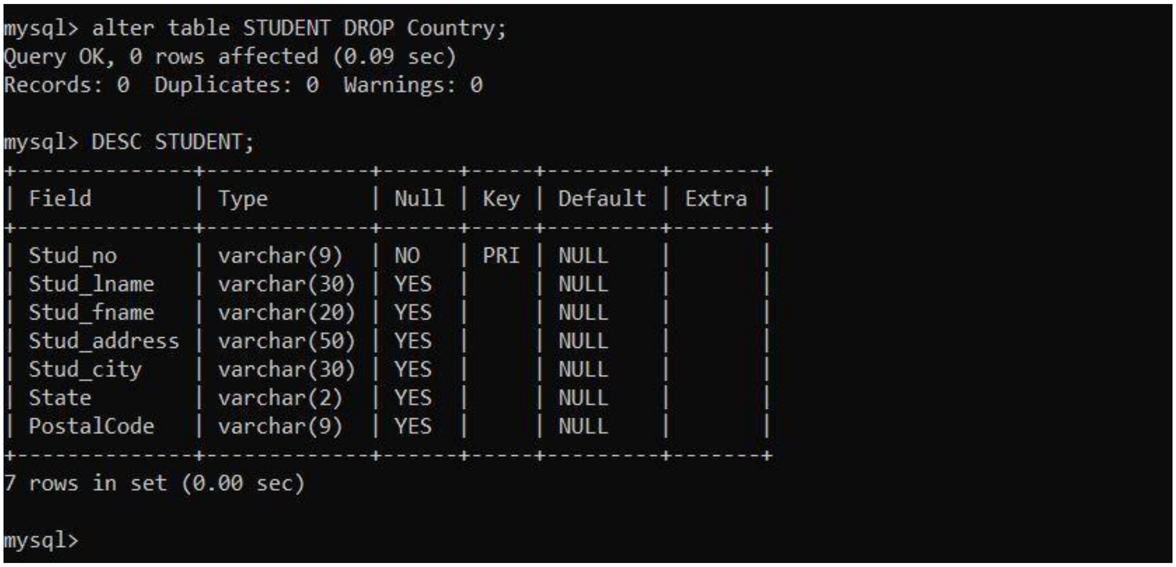
```
mysql> ALTER TABLE enrolment MODIFY Grade char(1) NOT NULL;
Query OK, 0 rows affected (0.08 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

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



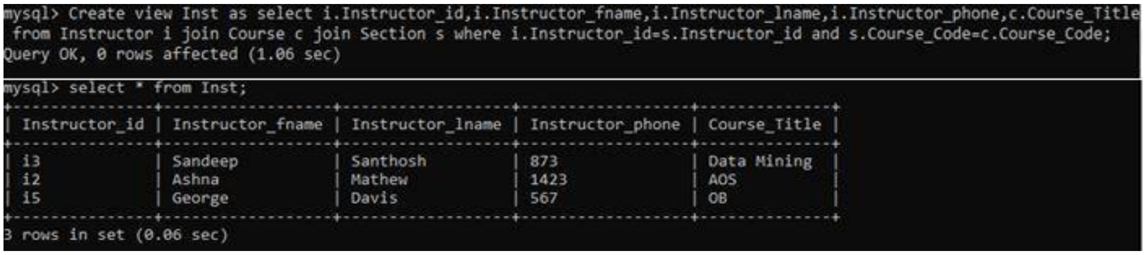
```
mysql> alter table INSTRUCTOR ADD Salary varchar(20);
Query OK, 0 rows affected (0.05 sec)
Records: 0  Duplicates: 0  Warnings: 0

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    |       |
| Salary           | varchar(20) | YES  |     | NULL    |       |
+------------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql>
```

6. Drop the column Country from the STUDENT table.



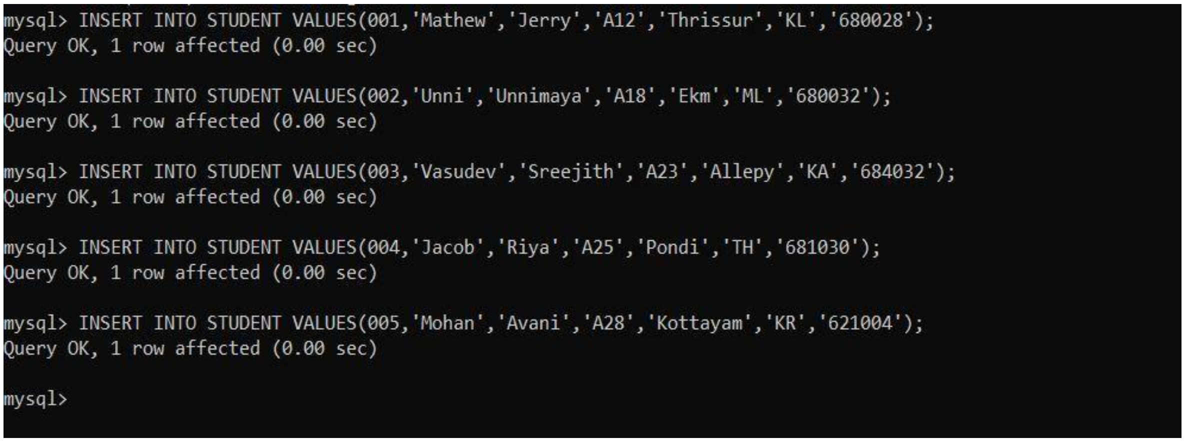
```
mysql> alter table STUDENT DROP Country;
Query OK, 0 rows affected (0.09 sec)
Records: 0  Duplicates: 0  Warnings: 0

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    |       |
+--------------+-------------+------+-----+---------+-------+
7 rows in set (0.00 sec)

mysql>
```

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

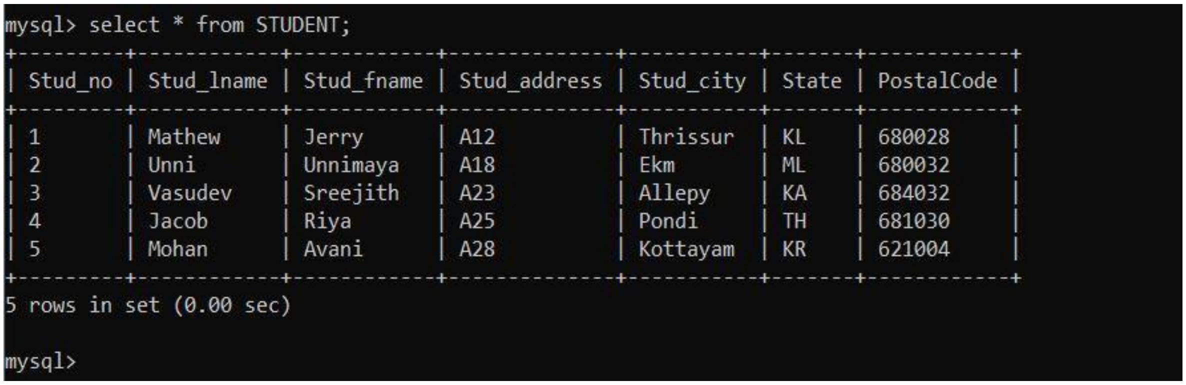


```
mysql> Create view Inst as select i.Instructor_id,i.Instructor_fname,i.Instructor_lname,i.Instructor_phone,c.Course_Title
 from Instructor i join Course c join Section s where i.Instructor_id=s.Instructor_id and s.Course_Code=c.Course_Code;
Query OK, 0 rows affected (1.06 sec)

mysql> select * from Inst;
+---------------+------------------+------------------+------------------+--------------+
| Instructor_id | Instructor_fname | Instructor_lname | Instructor_phone | Course_Title |
+---------------+------------------+------------------+------------------+--------------+
| i3            | Sandeep          | Santhosh         | 873              | Data Mining  |
| i2            | Ashna            | Mathew           | 1423             | AOS          |
| i5            | George           | Davis            | 567              | OB           |
+---------------+------------------+------------------+------------------+--------------+
3 rows in set (0.06 sec)
```

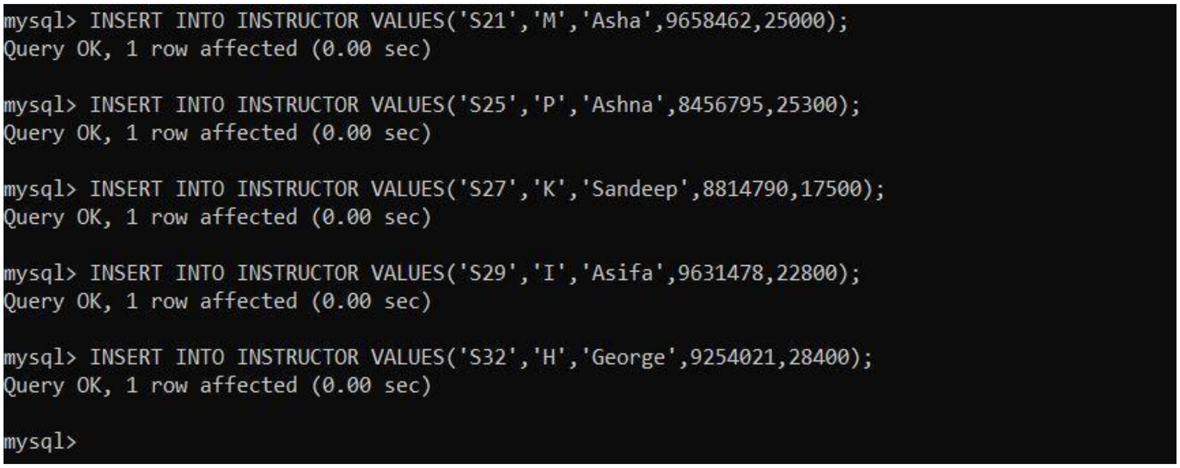
8. Insert details of you and your 5 friends in STUDENT table and the details of 5 instructors with names (Asha, Ashna, Sandeep, Asifa, George) in INSTRUCTOR table.



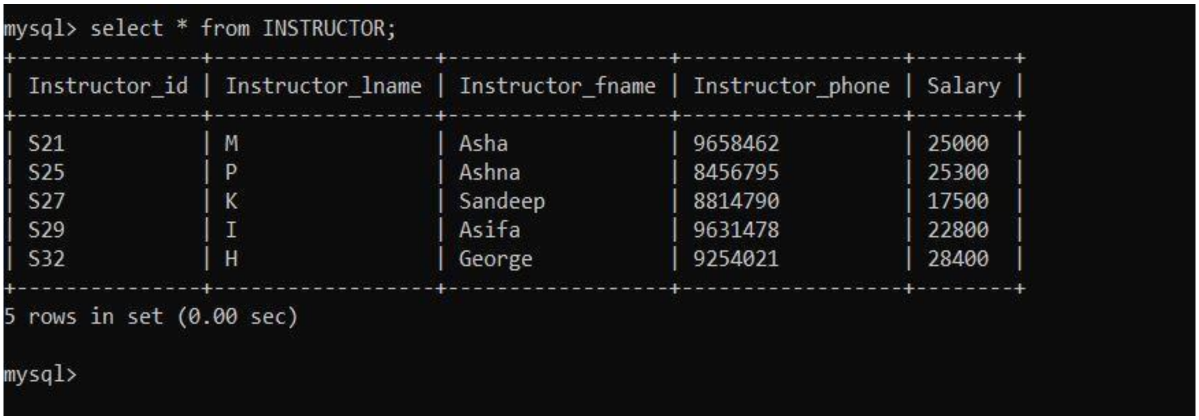
```
mysql> INSERT INTO STUDENT VALUES(001,'Mathew','Jerry','A12','Thrissur','KL','680028');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO STUDENT VALUES(002,'Unni','Unnimaya','A18','Ekm','ML','680032');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO STUDENT VALUES(003,'Vasudev','Sreejith','A23','Allepy','KA','684032');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO STUDENT VALUES(004,'Jacob','Riya','A25','Pondi','TH','681030');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO STUDENT VALUES(005,'Mohan','Avani','A28','Kottayam','KR','621004');
Query OK, 1 row affected (0.00 sec)

mysql>
```



```
mysql> select * from STUDENT;
+---------+------------+------------+--------------+-----------+-------+------------+
| Stud_no | Stud_lname | Stud_fname | Stud_address | Stud_city | State | PostalCode |
+---------+------------+------------+--------------+-----------+-------+------------+
| 1       | Mathew     | Jerry      | A12          | Thrissur  | KL    | 680028     |
| 2       | Unni       | Unnimaya   | A18          | Ekm       | ML    | 680032     |
| 3       | Vasudev    | Sreejith   | A23          | Allepy    | KA    | 684032     |
| 4       | Jacob      | Riya       | A25          | Pondi     | TH    | 681030     |
| 5       | Mohan      | Avani      | A28          | Kottayam  | KR    | 621004     |
+---------+------------+------------+--------------+-----------+-------+------------+
5 rows in set (0.00 sec)

mysql>
```

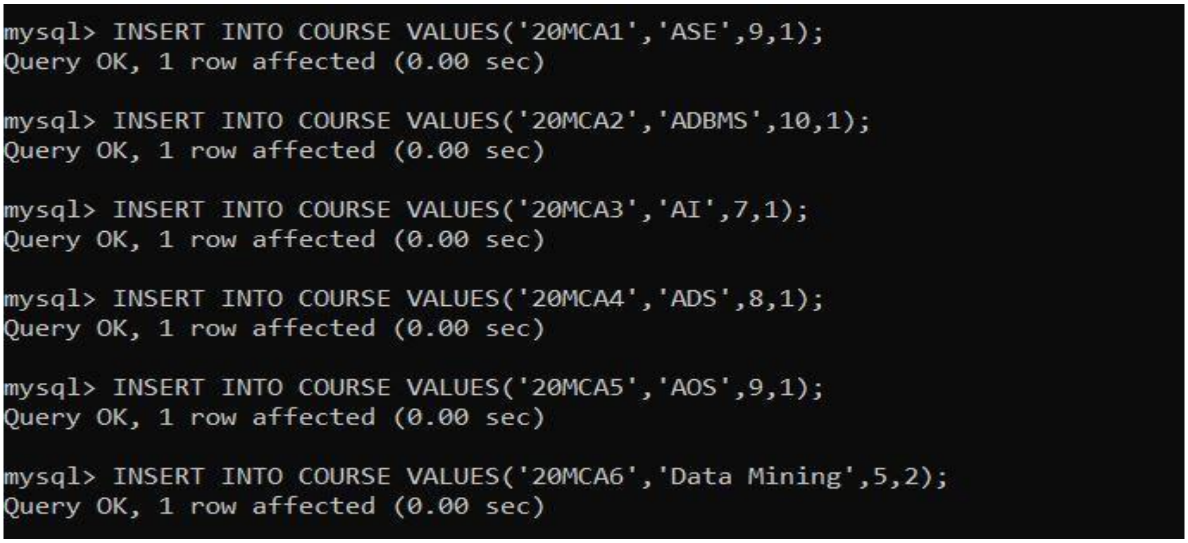


```
mysql> INSERT INTO INSTRUCTOR VALUES('S21','M','Asha',9658462,25000);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO INSTRUCTOR VALUES('S25','P','Ashna',8456795,25300);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO INSTRUCTOR VALUES('S27','K','Sandeep',8814790,17500);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO INSTRUCTOR VALUES('S29','I','Asifa',9631478,22800);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO INSTRUCTOR VALUES('S32','H','George',9254021,28400);
Query OK, 1 row affected (0.00 sec)

mysql>
```

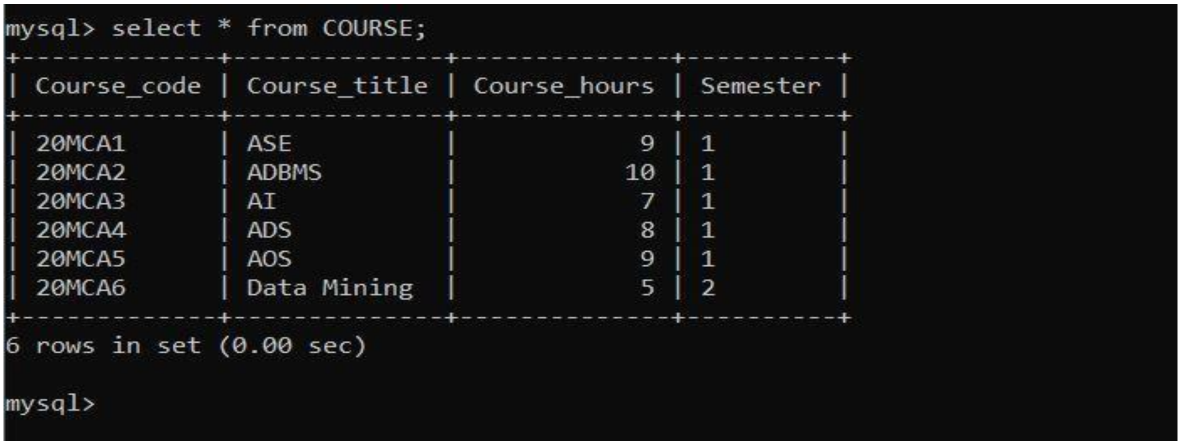


```
mysql> select * from INSTRUCTOR;
+---------------+------------------+------------------+------------------+--------+
| Instructor_id | Instructor_lname | Instructor_fname | Instructor_phone | Salary |
+---------------+------------------+------------------+------------------+--------+
| S21           | M                | Asha             | 9658462          | 25000  |
| S25           | P                | Ashna            | 8456795          | 25300  |
| S27           | K                | Sandeep          | 8814790          | 17500  |
| S29           | I                | Asifa            | 9631478          | 22800  |
| S32           | H                | George           | 9254021          | 28400  |
+---------------+------------------+------------------+------------------+--------+
5 rows in set (0.00 sec)

mysql>
```

9. Add details of the first and second semester courses. Also add a new course for Data Mining with a course code of 201CA260 worth with credit of 4 hours.

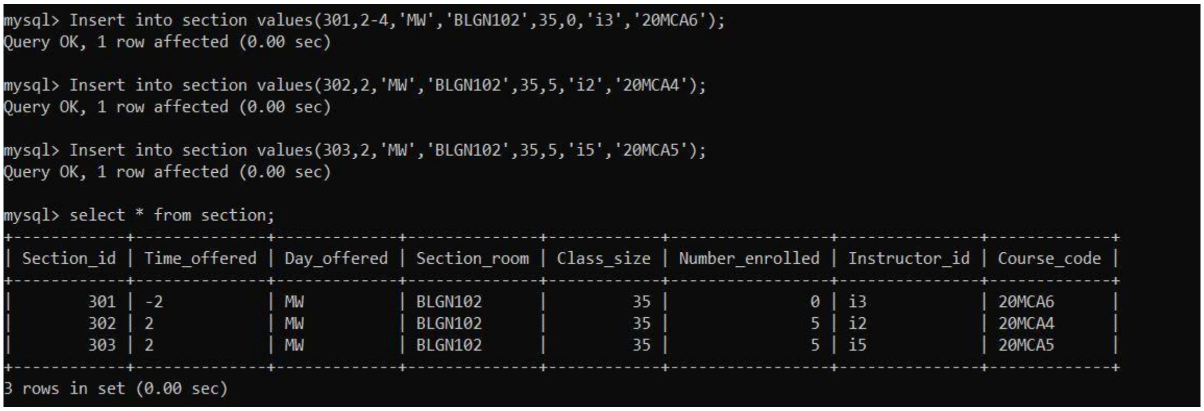


```
mysql> INSERT INTO COURSE VALUES('20MCA1','ASE',9,1);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO COURSE VALUES('20MCA2','ADBMS',10,1);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO COURSE VALUES('20MCA3','AI',7,1);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO COURSE VALUES('20MCA4','ADS',8,1);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO COURSE VALUES('20MCA5','AOS',9,1);
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO COURSE VALUES('20MCA6','Data Mining',5,2);
Query OK, 1 row affected (0.00 sec)
```



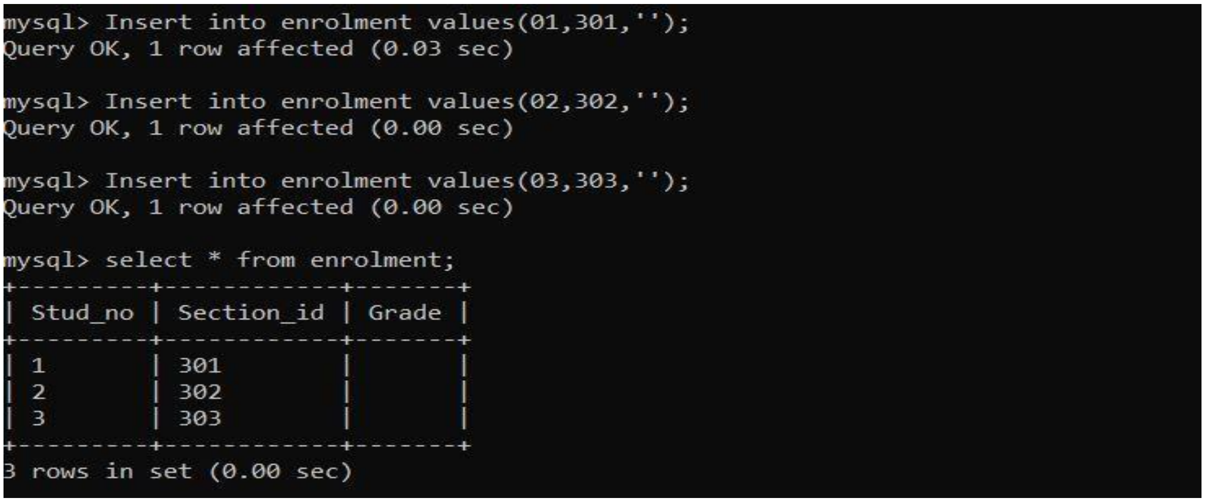
```
mysql> select * from COURSE;
+-------------+--------------+--------------+----------+
| Course_code | Course_title | Course_hours | Semester |
+-------------+--------------+--------------+----------+
| 20MCA1      | ASE          |            9 | 1        |
| 20MCA2      | ADBMS        |           10 | 1        |
| 20MCA3      | AI           |            7 | 1        |
| 20MCA4      | ADS          |            8 | 1        |
| 20MCA5      | AOS          |            9 | 1        |
| 20MCA6      | Data Mining  |            5 | 2        |
+-------------+--------------+--------------+----------+
6 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 enroll 5 students each to these courses.



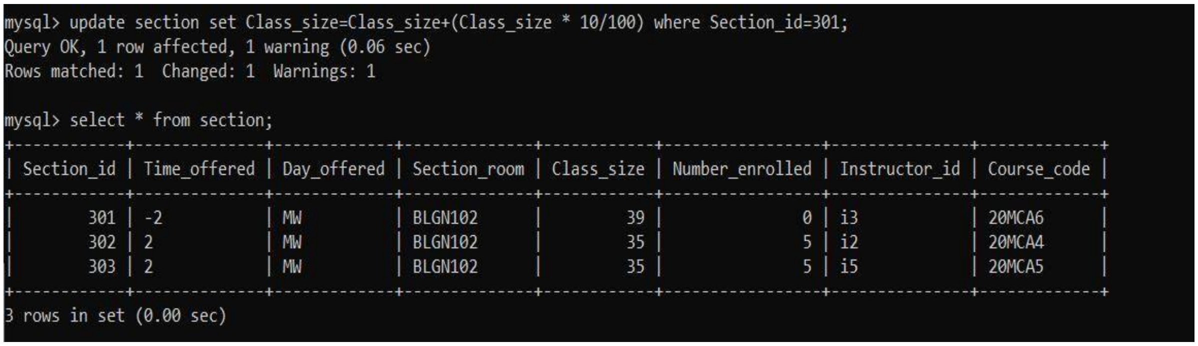
```
mysql> Insert into section values(301,2-4,'MW','BLGN102',35,0,'i3','20MCA6');
Query OK, 1 row affected (0.00 sec)

mysql> Insert into section values(302,2,'MW','BLGN102',35,5,'i2','20MCA4');
Query OK, 1 row affected (0.00 sec)

mysql> Insert into section values(303,2,'MW','BLGN102',35,5,'i5','20MCA5');
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           | MW          | BLGN102      |         35 |               0 | i3            | 20MCA6      |
|        302 | 2            | MW          | BLGN102      |         35 |               5 | i2            | 20MCA4      |
|        303 | 2            | MW          | BLGN102      |         35 |               5 | i5            | 20MCA5      |
+------------+--------------+-------------+--------------+------------+-----------------+---------------+-------------+
3 rows in set (0.00 sec)
```

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 12.



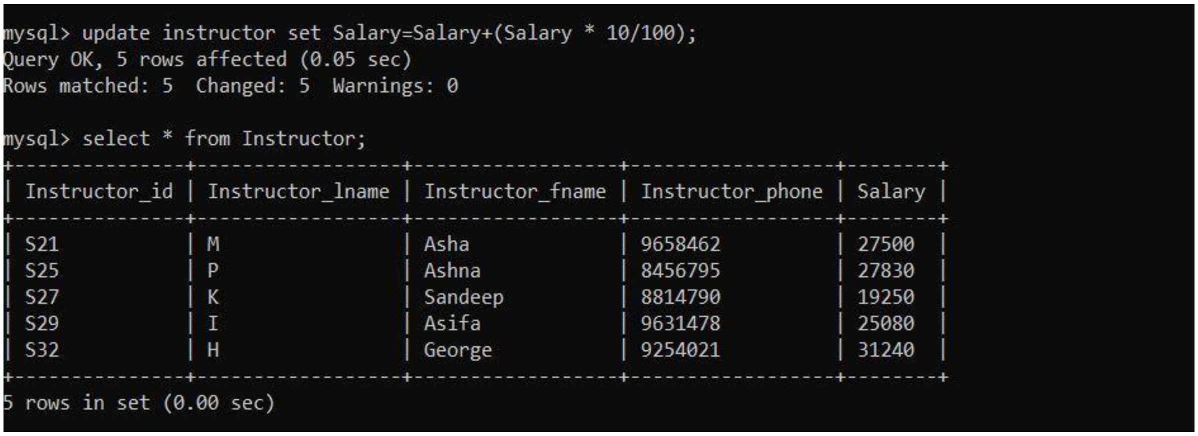
```
mysql> Insert into enrolment values(01,301,'');
Query OK, 1 row affected (0.03 sec)

mysql> Insert into enrolment values(02,302,'');
Query OK, 1 row affected (0.00 sec)

mysql> Insert into enrolment values(03,303,'');
Query OK, 1 row affected (0.00 sec)

mysql> select * from enrolment;
+---------+------------+-------+
| Stud_no | Section_id | Grade |
+---------+------------+-------+
| 1       | 301        |       |
| 2       | 302        |       |
| 3       | 303        |       |
+---------+------------+-------+
3 rows in set (0.00 sec)
```

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



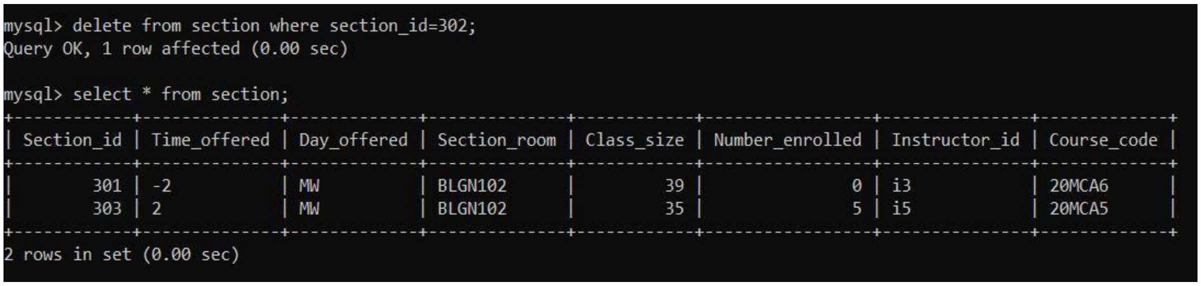
```
mysql> update section set Class_size=Class_size+(Class_size * 10/100) where Section_id=301;
Query OK, 1 row affected, 1 warning (0.06 sec)
Rows matched: 1  Changed: 1  Warnings: 1

mysql> select * from section;
+------------+--------------+------------+--------------+------------+-----------------+---------------+-------------+
| Section_id | Time_offered | Day_offered | Section_room | Class_size | Number_enrolled | Instructor_id | Course_code |
+------------+--------------+------------+--------------+------------+-----------------+---------------+-------------+
|        301 | -2           | MW          | BLGN102      |         39 |               0 | i3            | 20MCA6      |
|        302 | 2            | MW          | BLGN102      |         35 |               5 | i2            | 20MCA4      |
|        303 | 2            | MW          | BLGN102      |         35 |               5 | i5            | 20MCA5      |
+------------+--------------+------------+--------------+------------+-----------------+---------------+-------------+
3 rows in set (0.00 sec)
```

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



```
mysql> update instructor set Salary=Salary+(Salary * 10/100);
Query OK, 5 rows affected (0.05 sec)
Rows matched: 5  Changed: 5  Warnings: 0

mysql> select * from Instructor;
+---------------+------------------+------------------+------------------+--------+
| Instructor_id | Instructor_lname | Instructor_fname | Instructor_phone | Salary |
+---------------+------------------+------------------+------------------+--------+
| S21           | M                | Asha             | 9658462          | 27500  |
| S25           | P                | Ashna            | 8456795          | 27830  |
| S27           | K                | Sandeep          | 8814790          | 19250  |
| S29           | I                | Asifa            | 9631478          | 25080  |
| S32           | H                | George           | 9254021          | 31240  |
+---------------+------------------+------------------+------------------+--------+
5 rows in set (0.00 sec)
```

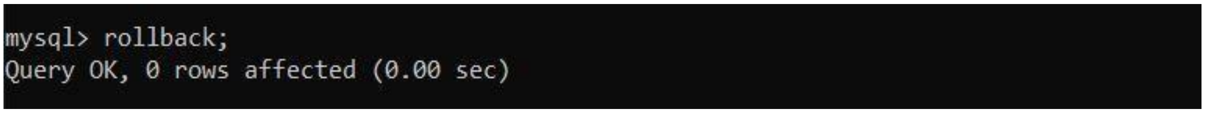
14. Delete Section 302 and verify for the rows in ENROLMENT table for that section.



```
mysql> delete from section where section_id=302;
Query OK, 1 row affected (0.00 sec)

mysql> select * from section;
+------------+--------------+-------------+--------------+------------+-----------------+---------------+-------------+
| Section_id | Time_offered | Day_offered | Section_room | Class_size | Number_enrolled | Instructor_id | Course_code |
+------------+--------------+-------------+--------------+------------+-----------------+---------------+-------------+
|        301 | -2           | MW          | BLGN102      |         39 |               0 | i3            | 20MCA6      |
|        303 | 2            | MW          | BLGN102      |         35 |               5 | i5            | 20MCA5      |
+------------+--------------+-------------+--------------+------------+-----------------+---------------+-------------+
2 rows in set (0.00 sec)
```

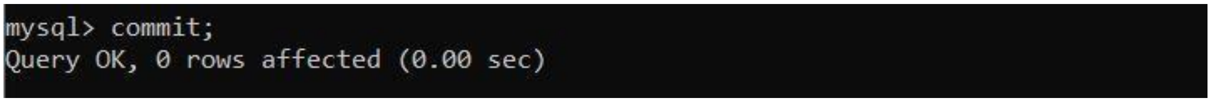
TCL Commands:

15. Undo the previous delete operation.



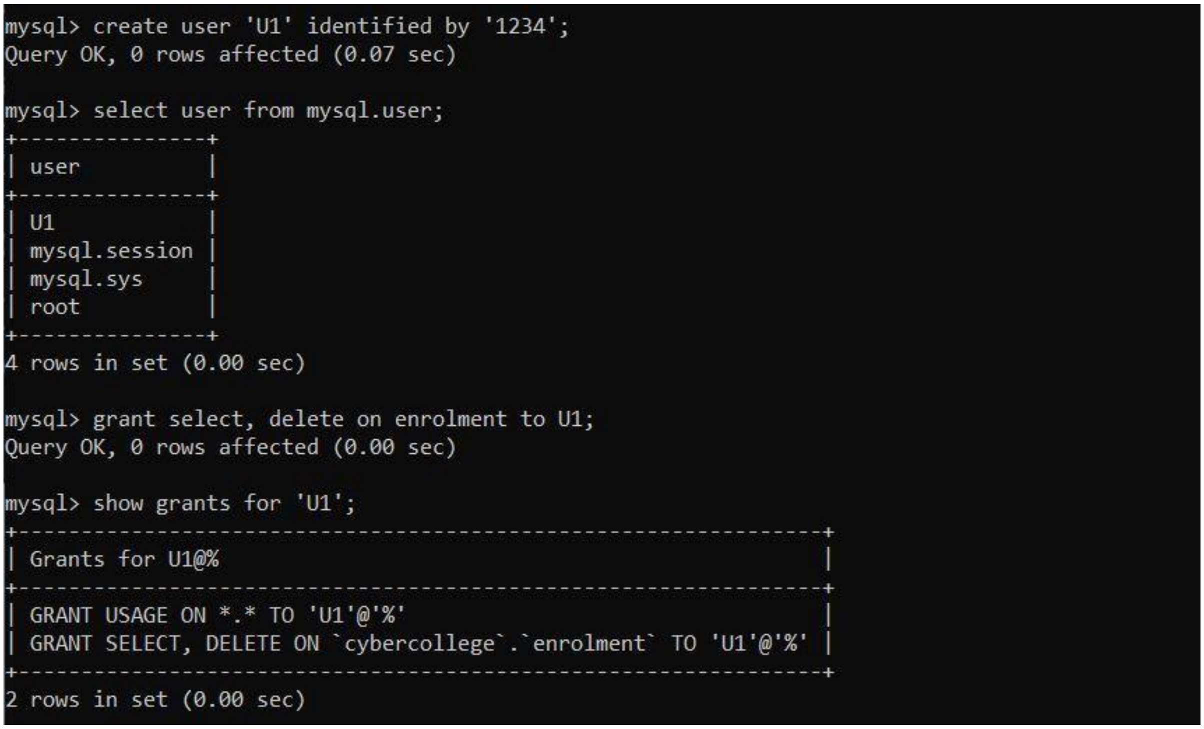
```
mysql> rollback;
Query OK, 0 rows affected (0.00 sec)
```

16. Save all the transactions to the database.



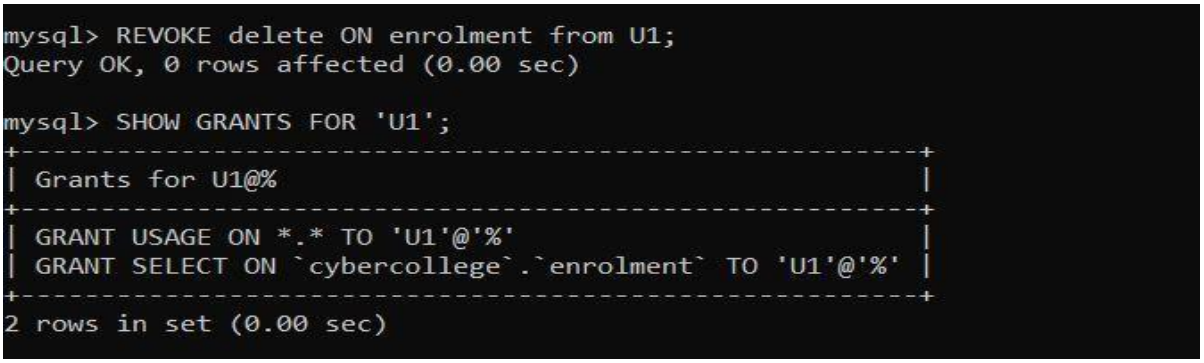
```
mysql> commit;
Query OK, 0 rows affected (0.00 sec)
```

17. Grant the privilege to read and delete from the Enrolment table to the userU1.



```
mysql> create user 'U1' identified by '1234';
Query OK, 0 rows affected (0.07 sec)

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

mysql> grant select, delete on enrolment to U1;
Query OK, 0 rows affected (0.00 sec)

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

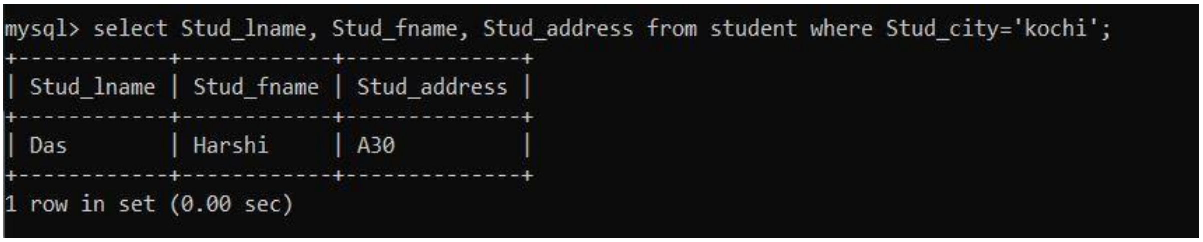
18. Revoke the delete privilege from U1.



```
mysql> REVOKE delete ON enrolment from U1;
Query OK, 0 rows affected (0.00 sec)

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

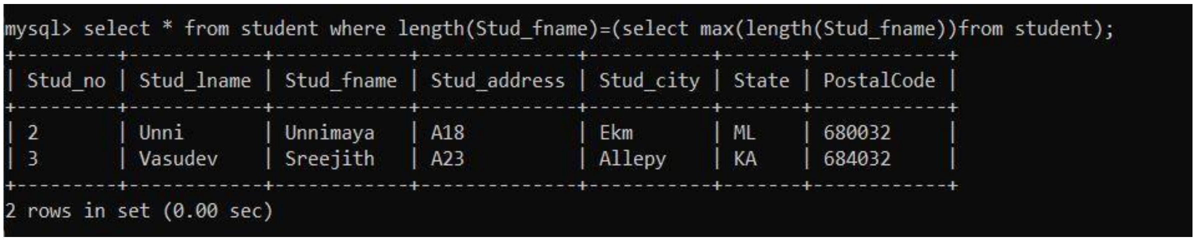
Accessing database (SELECT, Filtering using WHERE, HAVING, GROUP BY, ORDER BY Clauses, Subquery):

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



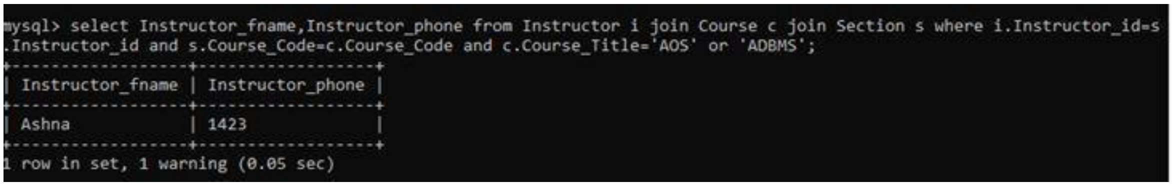
```
mysql> select Stud_lname, Stud_fname, Stud_address from student where Stud_city='kochi';
+------------+------------+--------------+
| Stud_lname | Stud_fname | Stud_address |
+------------+------------+--------------+
| Das        | Harshi     | A30          |
+------------+------------+--------------+
1 row in set (0.00 sec)
```

20. List the student details who has longest first name.



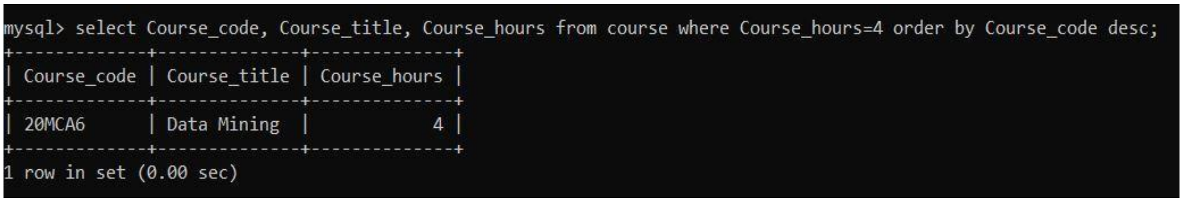
```
mysql> select * from student where length(Stud_fname)=(select max(length(Stud_fname))from student);
+---------+------------+------------+--------------+-----------+-------+------------+
| Stud_no | Stud_lname | Stud_fname | Stud_address | Stud_city | State | PostalCode |
+---------+------------+------------+--------------+-----------+-------+------------+
| 2       | Unni       | Unnimaya   | A18          | Ekm       | ML    | 680032     |
| 3       | Vasudev    | Sreejith   | A23          | Allepy    | KA    | 684032     |
+---------+------------+------------+--------------+-----------+-------+------------+
2 rows in set (0.00 sec)
```

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



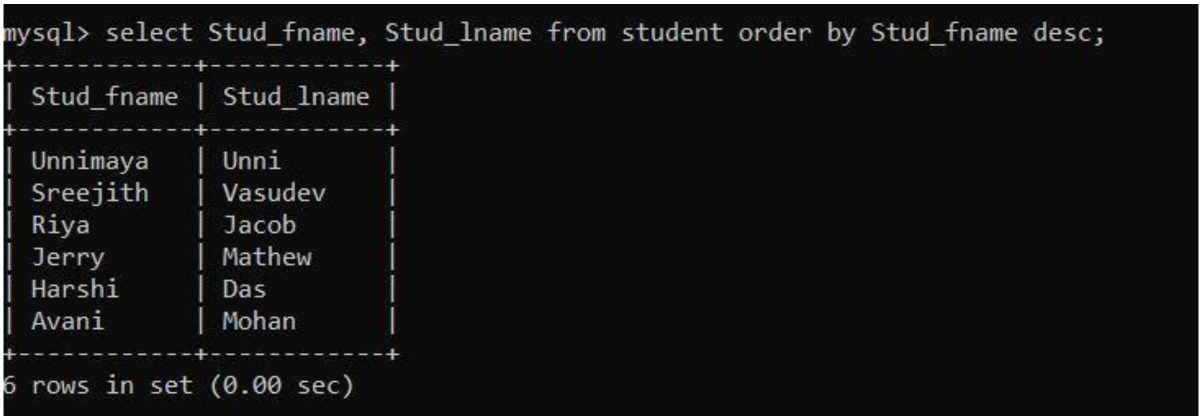
```
mysql> select Instructor_fname,Instructor_phone from Instructor i join Course c join Section s where i.Instructor_id=s
.Instructor_id and s.Course_Code=c.Course_Code and c.Course_Title='AOS' or 'ADBMS';
+------------------+------------------+
| Instructor_fname | Instructor_phone |
+------------------+------------------+
| Ashna            | 1423             |
+------------------+------------------+
1 row in set, 1 warning (0.05 sec)
```

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



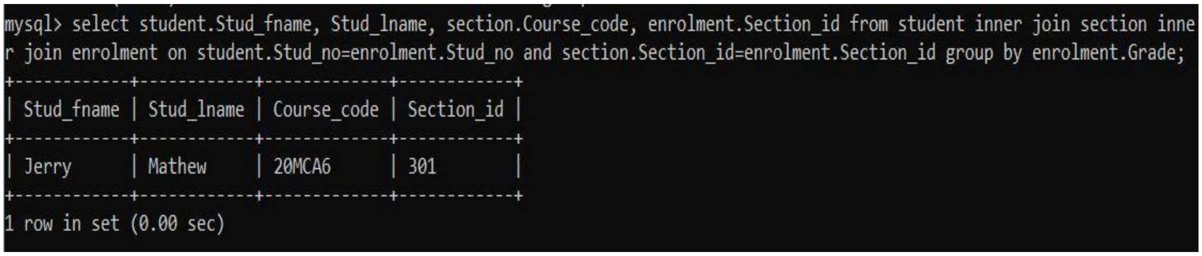
```
mysql> select Course_code, Course_title, Course_hours from course where Course_hours=4 order by Course_code desc;
+-------------+--------------+--------------+
| Course_code | Course_title | Course_hours |
+-------------+--------------+--------------+
| 20MCA6      | Data Mining  |            4 |
+-------------+--------------+--------------+
1 row in set (0.00 sec)
```

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



```
mysql> select Stud_fname, Stud_lname from student order by Stud_fname desc;
+------------+------------+
| Stud_fname | Stud_lname |
+------------+------------+
| Unnimaya   | Unni       |
| Sreejith   | Vasudev    |
| Riya       | Jacob      |
| Jerry      | Mathew     |
| Harshi     | Das        |
| Avani      | Mohan      |
+------------+------------+
6 rows in set (0.00 sec)
```

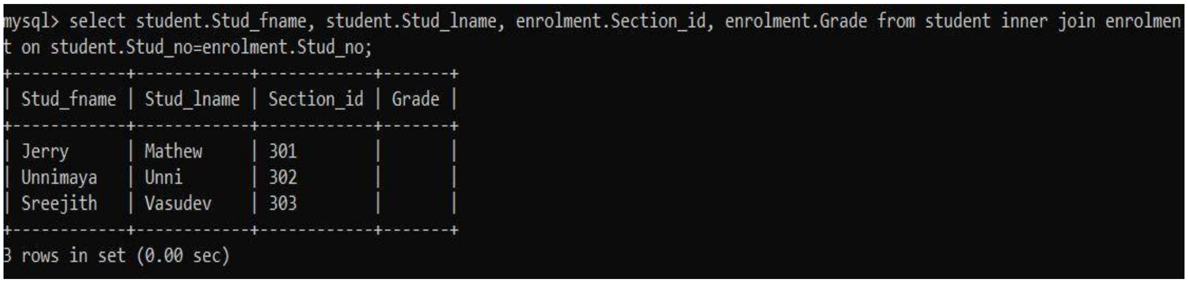
24. List the Student‟s name, course code and section id grouping the students by their grade.



```
mysql> select student.Stud_fname, Stud_lname, section.Course_code, enrolment.Section_id from student inner join section inne
r join enrolment on student.Stud_no=enrolment.Stud_no and section.Section_id=enrolment.Section_id group by enrolment.Grade;
+------------+------------+-------------+------------+
| Stud_fname | Stud_lname | Course_code | Section_id |
+------------+------------+-------------+------------+
| Jerry      | Mathew     | 20MCA6      | 301        |
+------------+------------+-------------+------------+
1 row in set (0.00 sec)
```

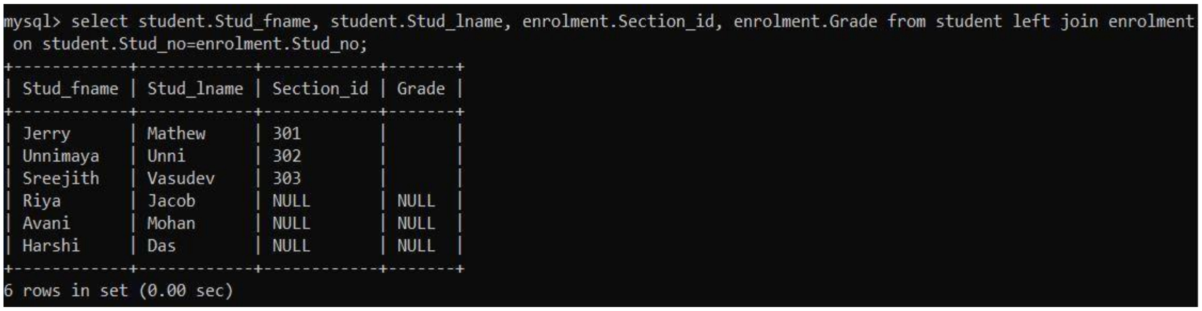
Optimizing databases (Join, Aggregate &amp; Set operations, Other operators like arithmetic, logical, special etc):

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



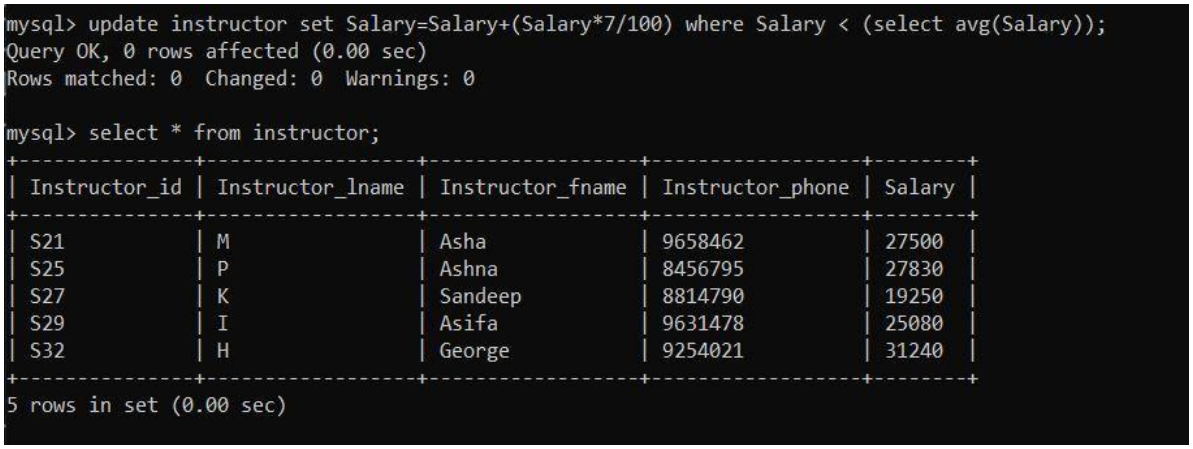
```
mysql> select student.Stud_fname, student.Stud_lname, enrolment.Section_id, enrolment.Grade from student inner join enrolmen
t on student.Stud_no=enrolment.Stud_no;
+------------+------------+------------+-------+
| Stud_fname | Stud_lname | Section_id | Grade |
+------------+------------+------------+-------+
| Jerry      | Mathew     | 301        |       |
| Unnimaya   | Unni       | 302        |       |
| Sreejith   | Vasudev    | 303        |       |
+------------+------------+------------+-------+
3 rows in set (0.00 sec)
```

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.



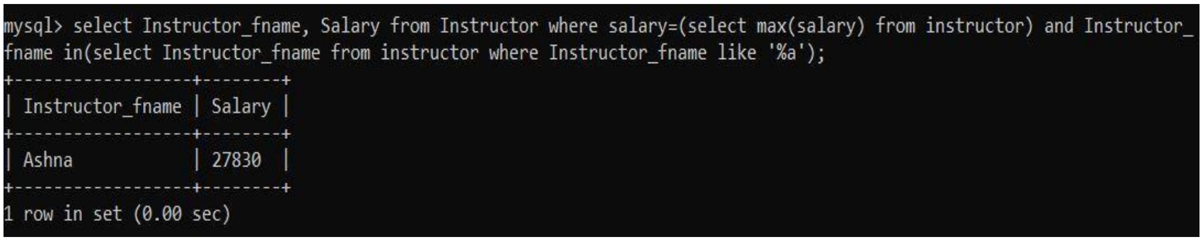
```
mysql> select student.Stud_fname, student.Stud_lname, enrolment.Section_id, enrolment.Grade from student left join enrolment
 on student.Stud_no=enrolment.Stud_no;
+------------+------------+------------+-------+
| Stud_fname | Stud_lname | Section_id | Grade |
+------------+------------+------------+-------+
| Jerry      | Mathew     | 301        |       |
| Unnimaya   | Unni       | 302        |       |
| Sreejith   | Vasudev    | 303        |       |
| Riya       | Jacob      | NULL       | NULL  |
| Avani      | Mohan      | NULL       | NULL  |
| Harshi     | Das        | NULL       | NULL  |
+------------+------------+------------+-------+
6 rows in set (0.00 sec)
```

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



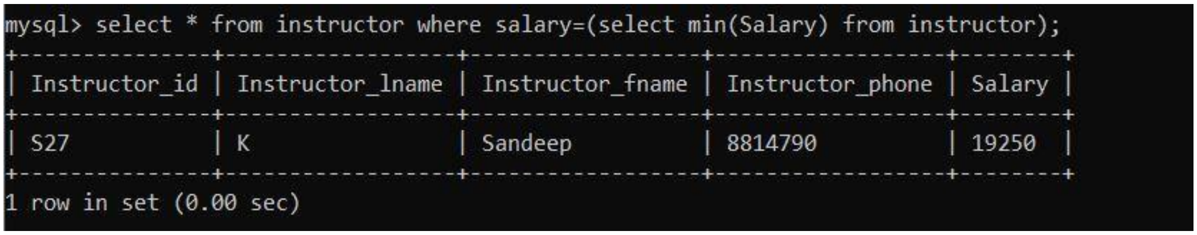
```
mysql> update instructor set Salary=Salary+(Salary*7/100) where Salary < (select avg(Salary));
Query OK, 0 rows affected (0.00 sec)
Rows matched: 0  Changed: 0  Warnings: 0

mysql> select * from instructor;
+---------------+------------------+------------------+------------------+--------+
| Instructor_id | Instructor_lname | Instructor_fname | Instructor_phone | Salary |
+---------------+------------------+------------------+------------------+--------+
| S21           | M                | Asha             | 9658462          | 27500  |
| S25           | P                | Ashna            | 8456795          | 27830  |
| S27           | K                | Sandeep          | 8814790          | 19250  |
| S29           | I                | Asifa            | 9631478          | 25080  |
| S32           | H                | George           | 9254021          | 31240  |
+---------------+------------------+------------------+------------------+--------+
5 rows in set (0.00 sec)
```

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



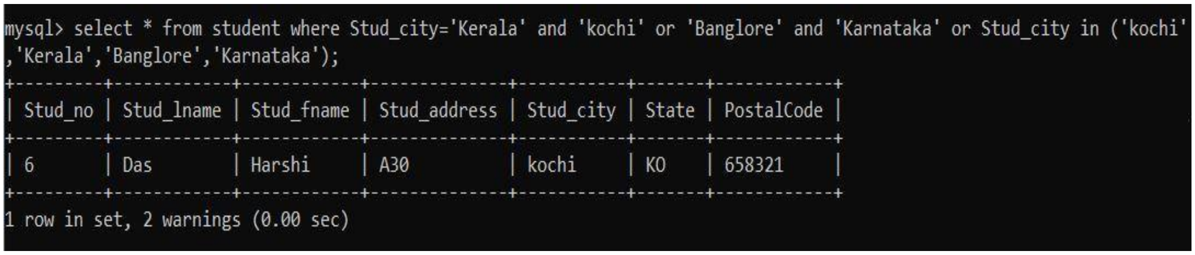
```
mysql> select Instructor_fname, Salary from Instructor where salary=(select max(salary) from instructor) and Instructor_
fname in(select Instructor_fname from instructor where Instructor_fname like '%a');
+------------------+--------+
| Instructor_fname | Salary |
+------------------+--------+
| Ashna            | 27830  |
+------------------+--------+
1 row in set (0.00 sec)
```

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



```
mysql> select * from instructor where salary=(select min(Salary) from instructor);
+---------------+------------------+------------------+------------------+--------+
| Instructor_id | Instructor_lname | Instructor_fname | Instructor_phone | Salary |
+---------------+------------------+------------------+------------------+--------+
| S27           | K                | Sandeep          | 8814790          | 19250  |
+---------------+------------------+------------------+------------------+--------+
1 row in set (0.00 sec)
```

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



```
mysql> select * from student where Stud_city='Kerala' and 'kochi' or 'Banglore' and 'Karnataka' or Stud_city in ('kochi'
,'Kerala','Banglore','Karnataka');
+---------+------------+------------+--------------+-----------+-------+------------+
| Stud_no | Stud_lname | Stud_fname | Stud_address | Stud_city | State | PostalCode |
+---------+------------+------------+--------------+-----------+-------+------------+
| 6       | Das        | Harshi     | A30          | kochi     | KO    | 658321     |
+---------+------------+------------+--------------+-----------+-------+------------+
1 row in set, 2 warnings (0.00 sec)
```