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

### **ADVANCED DBMS LAB**

(Semester & Batch: S2 MCA 2020 B Batch)

### **CYCLE-1**

**CO 1** 

Design and build a simple relational database system and demonstrate competence with the fundamentals tasks involved with modelling, designing and implementing a database.

## **CYBER COLLEGE DATABASE:**

1. Table Name: STUDENT

COLUMN NAME	DATATYPE(LENGTH)	CONSTRAINTS
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)	

#### 2) Table Name: INSTRUCTOR

COLUMN NAME	DATATYPE(LENGTH)	CONSTRAINTS
Instructor_id	VARCHAR(5)	PRIMARY KEY
Instructor_lname	VARCHAR(30)	
Instructor_fname	VARCHAR(20)	
Instructor_phone	VARCHAR(8)	

#### 3) Table Name: COURSE

COLUMN NAME	DATATYPE(LENGTH)	CONSTRAINTS
Course_Code	VARCHAR(6)	PRIMARY KEY
Course_Title	VARCHAR(25)	
Course_Hours	NUMBER(2,0)	
Semester	VARCHAR(20)	

#### 4) Table Name: SECTION

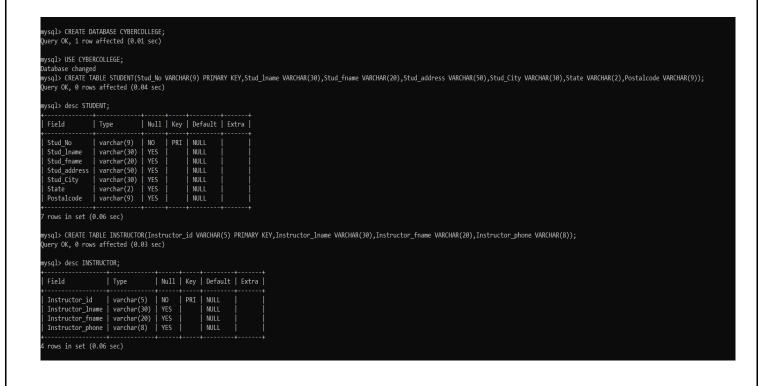
COLUMN NAME	DATATYPE(LENGTH)	CONSTRAINTS
Section_id	NUMBER	PRIMARY KEY
Time_Offered	VARCHAR(10)	
Days_Offered	VARCHAR(10)	
Section_Room	VARCHAR(8)	
Class_Size	NUMBER(3,0)	CHECK >=0
Number_Enrolled	NUMBER(3,0)	CHECK >=0
Instructor_id	VARCHAR(5)	FOREIGN KEY
Course_Code	VARCHAR(6)	FOREIGN KEY

#### 5) Table Name: ENROLMENT

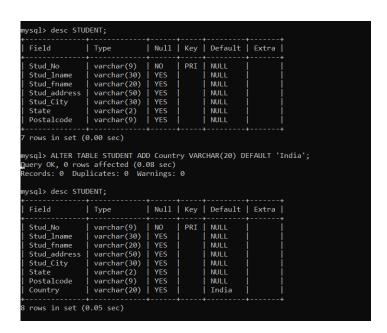
COLUMN NAME	DATATYPE(LENGTH)	CONSTRIANTS
Stud_No	VARCHAR(9)	PRIMARY KEY, FOREIGN KEY
Section_id	VARCHAR(7)	PRIMARY KEY, FOREIGN KEY
Grade	VARCHAR(2)	

#### I. 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.



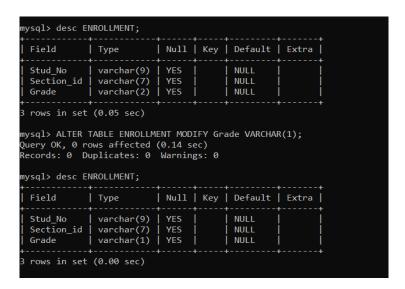
2. Add a field Country to the STUDENT table with the default value set to 'India'.



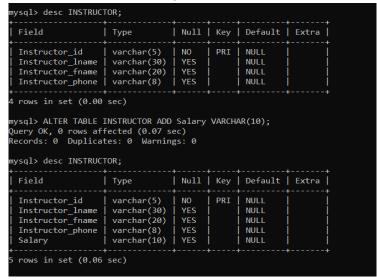
3. Add a constraint to the Grade field in the ENROLMENT table that accepts only the values 'A', 'B', 'C' and 'D'.

```
mysql> ALTER TABLE ENROLLMENT ADD CONSTRAINT Grade CHECK(Grade IN('A','B','C'));
Query OK, 0 rows affected (0.57 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

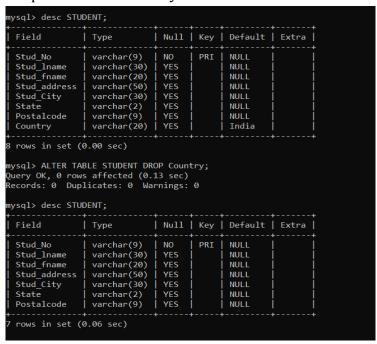
4. Modify the ENROLMENT table by changing the width of the field Grade to 1



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



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.

```
mysql> create view INST as select i.Instructor_id,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 a nd s.Course_Code=c.Course_Code;
Query OK, 0 rows affected (0.02 sec)

mysql> select * from INST;

Instructor_id | Instructor_lname | Instructor_phone | Course_Title |

202 | Ashna | 99999991 | AI |

201 | Asha | 99999990 | ADBMS |

2 rows in set (0.01 sec)
```

#### 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.

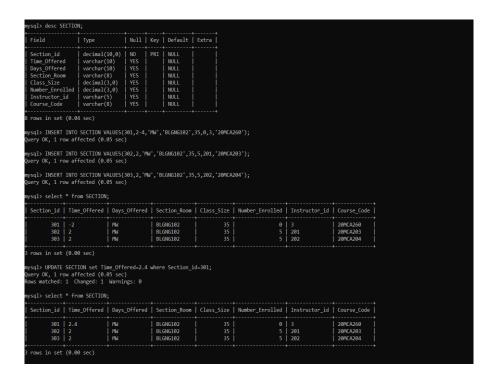
```
mysql> INSERT INTO STUDENT VALUES(101,'Miranta','Johny','ABC','KLM','K',686691);
Query OK, 1 row affected (0.06 sec)
mysql> INSERT INTO STUDENT VALUES(102,'Kavya','Boban','DEF','ANGAMALY','K',683572);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO STUDENT VALUES(103,'Nimisha','MM','GHI','ANGAMALY','K',683572);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO STUDENT VALUES(104,'Anagha','Chacko','JKL','KLM','K',686691);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO STUDENT VALUES(105,'Irin','Ali','MNO','MUVATTUPUZHA','K',686661);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO STUDENT VALUES(106,'Bhavya','Manoj','PQR','MUVATTUPUZHA','K',686661);
Query OK, 1 row affected (0.05 sec)
mysql> select * from STUDENT;
 Stud_No | Stud_Iname | Stud_fname | Stud_address | Stud_City
                                                                   | State | Postalcode |
 101
           Miranta
                         Johny
                                      ABC
                                                                             686691
 102
                         Boban
                                                      ANGAMALY
                                                                             683572
           Kavya
           Nimisha
                                      GHI
                                                      ANGAMALY
                                                                             683572
 104
                                                                             686691
           Anagha
                         Chacko
                                      JKL
                                                     KLM
                                                     MUVATTUPUZHA
            Irin
                                      MNO
                                                                             686661
                                                     MUVATTUPUZHA
 106
           Bhavya
                         Manoj
                                      PQR
                                                                             686661
 rows in set (0.00 sec)
```

mysql> desc INSTR	UCTOR;						
Field	Type	Null	Key	Default	Extra		
Instructor_id   Instructor_lnam   Instructor_fnam   Instructor_phon   Salary	e   varchar(20)   e   varchar(8)	NO YES YES YES YES	PRI     	NULL NULL NULL NULL NULL	       		
+ 5 rows in set (0.	06 sec)		+	+	+		
2 1	O INSTRUCTOR VALUE		,'Asha'	','',99999	990,20000	9);	
	O INSTRUCTOR VALUE		,'Ashna	a','',9999	9991,2050	90);	
	O INSTRUCTOR VALUE		,'Sande	eep','',99	999992,30	9000);	
	O INSTRUCTOR VALUE		,'Asifa	a','',9999	9993,4000	90);	
	O INSTRUCTOR VALUE		,'Georg	ge','',999	99994,100	900);	
mysql> select * f	rom INSTRUCTOR;						
Instructor_id	Instructor_lname	Ins	tructor	_fname	Instructo	or_phone	Salary
201   202   203   204   205	Asha Ashna Sandeep Asifa George			į	99999990 99999991 999999992 999999993 999999994		20000     20500     30000     40000     10000
++ 5 rows in set (0.	05 sec)	+		+-			++

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> INSERT INTO COURSE VALUES('20MCA101','MFCS',4,1);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO COURSE VALUES('20MCA102','DIGITAL',3,1);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO COURSE VALUES('20MCA103','ADS',3,1);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO COURSE VALUES('20MCA104','ASE',5,1);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO COURSE VALUES('20MCA201','ADBMS',4,2);
Query OK, 1 row affected (0.02 sec)
mysql> INSERT INTO COURSE VALUES('20MCA202','ACN',4,2);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO COURSE VALUES('20MCA203','0B',2,2);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO COURSE VALUES('20MCA204','AI',2,2);
Query OK, 1 row affected (0.05 sec)
mysql> INSERT INTO COURSE VALUES('20MCA260','DATA MINING',4,2);
Query OK, 1 row affected (0.05 sec)
mysql> select * from COURSE;
| Course_Code | Course_Title | Course_Hours | Semester |
                                                    4 | 1
3 | 1
5 | 1
4 | 2
4 | 2
2 | 2
2 | 2
4 | 2
  20MCA101
                   DIGITAL
  20MCA102
  20MCA103
  20MCA104
  20MCA201
                   ADBMS
  20MCA202
                   ACN
                  ОВ
  20MCA203
  20MCA204
  20MCA260
                  DATA MINING
  rows in set (0.05 sec)
```

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



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> INSERT INTO ENROLLMENT VALUES(101,301,'');
Query OK, 1 row affected (0.05 sec)

mysql> INSERT INTO ENROLLMENT VALUES(102,302,'');
Query OK, 1 row affected (0.05 sec)

mysql> INSERT INTO ENROLLMENT VALUES(103,303,'');
Query OK, 1 row affected (0.05 sec)

mysql> select * from ENROLLMENT;

| Stud_No | Section_id | Grade | |
| 101 | 301 | |
| 102 | 302 | |
| 103 | 303 | |
| 103 | 303 | |
| 104 | 105 | 106 | 106 |
| 107 | 108 | 108 | 108 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 109 |
| 109 | 109 | 109 | 10
```

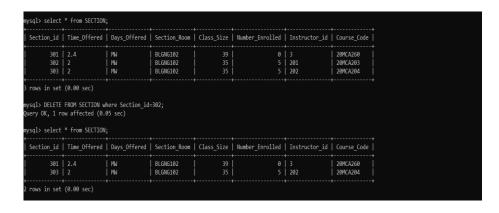
12. Update the 301 section, and increase the class sizes by 10%.

mysql> select	* from SECTION;	;						
Section_id	Time_Offered	Days_Offered	Section_Room	Class_Size	Number_Enrolled	Instructor_id	Course_Code	
301   302   303		Mid Mid Mid	BLGNG102 BLGNG102 BLGNG102	35 35 35		3   201   202	20MCA260 20MCA203 20MCA204	
Query OK, 1 ro Rows matched:	SECTION set Cla	warning (0.05 se Warnings: 1		se *10/100) wh	nere Section_id=30:	1;		
Section_id	Time_Offered	Days_Offered	Section_Room	Class_Size	Number_Enrolled	Instructor_id	Course_Code	
301   302   303		Mu Mu Mu	BLGNG102 BLGNG102 BLGNG102	39 35 35		3   201   202	20MCA260 20MCA203 20MCA204	
3 rows in set	(0.00 sec)					<b>.</b>		

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



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



#### III. <u>TCL Commands:</u>

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> 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.

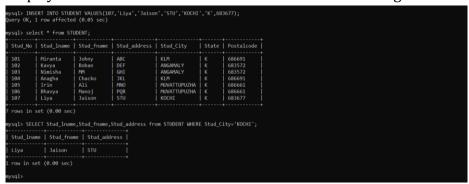
18. Revoke the delete privilege from U1

```
mysql> revoke update on EMBOLINENT from U1;
Query OK, 0 rows affected (0.05 sec)
mysql> show grants for 'U1';

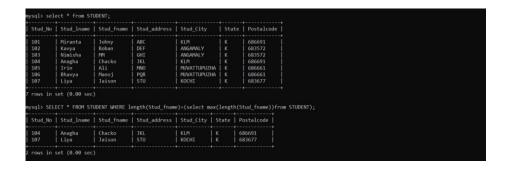
| Grants for U1@%
| GRANT USAGE ON *.* TO 'U1'@'%
| GRANT SELECT ON 'cybercollege'.'enrollment' TO 'U1'@'%'
| rows in set (0.00 sec)
```

## 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.



20. List the student details who has longest first name

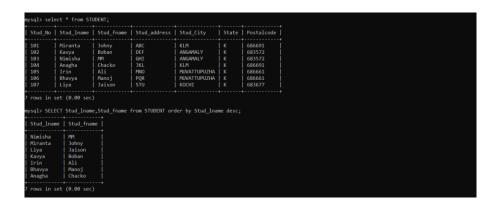


21. Display the name and phone number of the instructors who is handling the courses AOS and ADBMS.

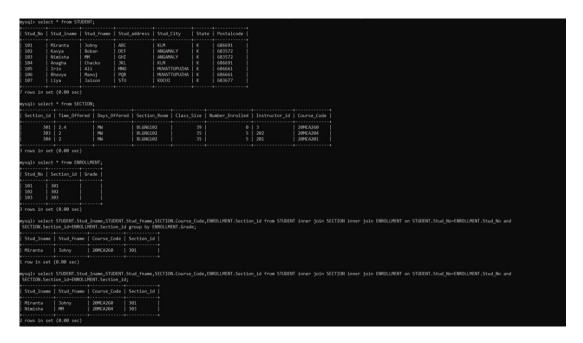


22. List the codes, titles, and credit hours for courses worth 4 hours. Order the results in descending order of course code.

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

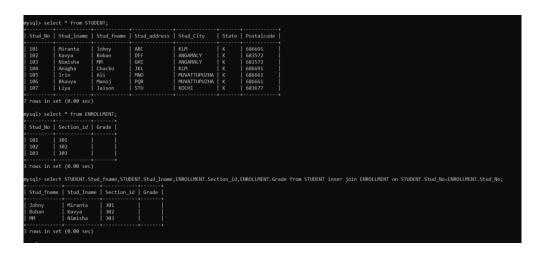


24. List the student's name, course code and section id grouping the students by their grade.

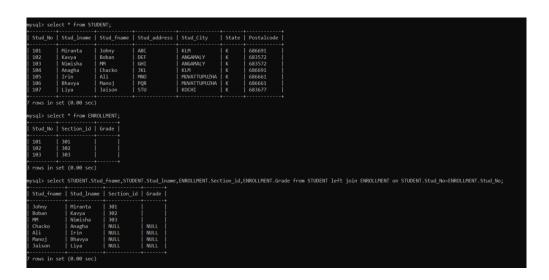


## V. Optimizing databases (Join, Aggregate & Set operations, Other operators like arithmetic, logical, special etc):

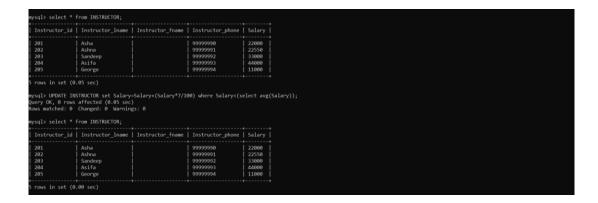
25. Use an inner join between the STUDENT and ENROLMENT tables for showing the full name, Section id and Grade.



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.



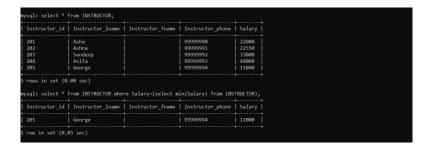
27. Give a 7% salary raise to instructors whose salary is less than the average.



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.

