

PROGRAM 4

Consider the following Student enrolment database for course:

STUDENT (snum: integer, sname: string, major: string, level: string, age:integer)

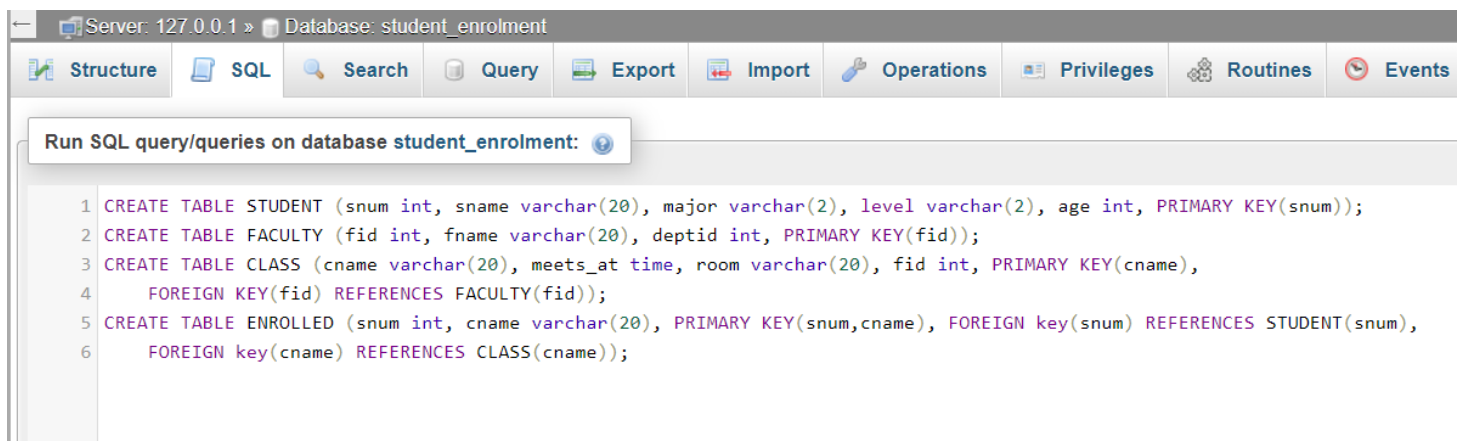
CLASS (name: string, meets at: time, room: string, fid: integer)

ENROLLED (snum: integer, cname: string)

FACULTY (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

Write the following queries in SQL. No duplicates should be printed in any of the answers.

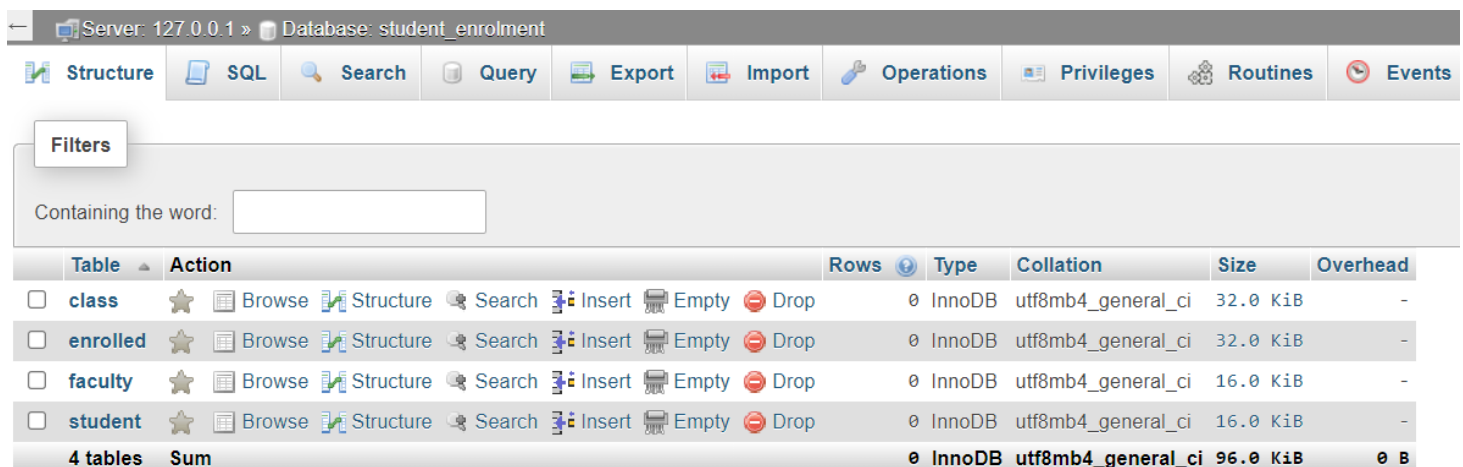


Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import Operations Privileges Routines Events

Run SQL query/queries on database student_enrolment:

```
1 CREATE TABLE STUDENT (snum int, sname varchar(20), major varchar(2), level varchar(2), age int, PRIMARY KEY(snum));
2 CREATE TABLE FACULTY (fid int, fname varchar(20), deptid int, PRIMARY KEY(fid));
3 CREATE TABLE CLASS (cname varchar(20), meets_at time, room varchar(20), fid int, PRIMARY KEY(cname),
4   FOREIGN KEY(fid) REFERENCES FACULTY(fid));
5 CREATE TABLE ENROLLED (snum int, cname varchar(20), PRIMARY KEY(snum,cname), FOREIGN key(snum) REFERENCES STUDENT(snum),
6   FOREIGN key(cname) REFERENCES CLASS(cname));
```



Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import Operations Privileges Routines Events

Filters

Containing the word:

Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> class	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
<input type="checkbox"/> enrolled	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
<input type="checkbox"/> faculty	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
<input type="checkbox"/> student	★ Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
4 tables	Sum	0	InnoDB	utf8mb4_general_ci	96.0 KiB	0 B

'STUDENT' table:

Server: 127.0.0.1 » Database: student_enrolment » Table: student

Browse Structure SQL Search Insert Export Import Privileges Operations

Run SQL query/queries on table student_enrolment.student:

```
1 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (1,'John','CS','Sr',19);
2 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (2,'Smith','CS','Jr',20);
3 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (3,'Jacob','CV','Sr',20);
4 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (4,'Tom','CS','Jr',20);
5 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (5,'Rahul','CS','Jr',20);
6 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (6,'Rita','CS','Sr',21);
```

Server: 127.0.0.1 » Database: student_enrolment » Table: student

Browse Structure SQL Search Insert Export Import

✓ Showing rows 0 - 5 (6 total, Query took 0.0009 seconds.)

SELECT * FROM `student`

☐ Show all | Number of rows: 25 Filter rows: Search this table Sort by

+ Options

			snum	sname	major	level	age	
<input type="checkbox"/>	Edit	Copy	Delete	1	John	CS	Sr	19
<input type="checkbox"/>	Edit	Copy	Delete	2	Smith	CS	Jr	20
<input type="checkbox"/>	Edit	Copy	Delete	3	Jacob	CV	Sr	20
<input type="checkbox"/>	Edit	Copy	Delete	4	Tom	CS	Jr	20
<input type="checkbox"/>	Edit	Copy	Delete	5	Rahul	CS	Jr	20
<input type="checkbox"/>	Edit	Copy	Delete	6	Rita	CS	Sr	21

'FACULTY' table:

Server: 127.0.0.1 » Database: student_enrolment » Table: faculty

Browse Structure SQL Search Insert Export Import

Run SQL query/queries on table student_enrolment.faculty:

```
1 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (11,'Harish',1000);
2 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (12,'MV',1000);
3 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (13,'Mira',1001);
4 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (14,'Shiva',1002);
5 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (15,'Nupur',1000);
```

Server: 127.0.0.1 » Database: student_enrolment » Table: faculty

Browse Structure SQL Search Insert Export

✓ Showing rows 0 - 4 (5 total, Query took 0.0006 seconds.)

```
SELECT * FROM `faculty`
```

☐ Show all | Number of rows: 25 ▼ Filter rows: Search this table

+ Options

				fid	fname	deptid
<input type="checkbox"/>	Edit	Copy	Delete	11	Harish	1000
<input type="checkbox"/>	Edit	Copy	Delete	12	MV	1000
<input type="checkbox"/>	Edit	Copy	Delete	13	Mira	1001
<input type="checkbox"/>	Edit	Copy	Delete	14	Shiva	1002
<input type="checkbox"/>	Edit	Copy	Delete	15	Nupur	1000

'CLASS' table:

Server: 127.0.0.1 » Database: student_enrolment » Table: class

Browse Structure SQL Search Insert Export Import Privileges Operations

Run SQL query/queries on table student_enrolment.class: ?

```
1 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class1','12/11/15 10:15:16','R1',14);
2 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class10','12/11/15 10:15:16','R128',14);
3 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class2','12/11/15 10:15:20','R2',12);
4 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class3','12/11/15 10:15:25','R3',11);
5 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class4','12/11/15 20:15:20','R4',14);
6 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class5','12/11/15 20:15:20','R3',15);
7 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class6','12/11/15 13:20:20','R2',14);
8 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class7','12/11/15 10:10:10','R3',14);
```

Server: 127.0.0.1 » Database: student_enrolment » Table: class

Browse Structure SQL Search Insert Export

✓ Showing rows 0 - 7 (8 total, Query took 0.0007 seconds.)

```
SELECT * FROM `class`
```

☐ Show all | Number of rows: 25 ▼ Filter rows:

+ Options

				cname	meets_at	room	fid
<input type="checkbox"/>	Edit	Copy	Delete	class1	10:15:16	R1	14
<input type="checkbox"/>	Edit	Copy	Delete	class10	10:15:16	R128	14
<input type="checkbox"/>	Edit	Copy	Delete	class2	10:15:20	R2	12
<input type="checkbox"/>	Edit	Copy	Delete	class3	10:15:25	R3	11
<input type="checkbox"/>	Edit	Copy	Delete	class4	20:15:20	R4	14
<input type="checkbox"/>	Edit	Copy	Delete	class5	20:15:20	R3	15
<input type="checkbox"/>	Edit	Copy	Delete	class6	13:20:20	R2	14
<input type="checkbox"/>	Edit	Copy	Delete	class7	10:10:10	R3	14

'ENROLLED' table:

Server: 127.0.0.1 » Database: student_enrolment » Table: enrolled

Browse Structure SQL Search Insert Export Import

Run SQL query/queries on table student_enrolment.enrolled: ?

```
1 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (1,'class1');
2 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (2,'class1');
3 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (3,'class3');
4 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (4,'class3');
5 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (5,'class4');
6 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (1,'class5');
7 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (2,'class5');
8 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (3,'class5');
9 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (4,'class5');
10 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (5,'class5');
```

Server: 127.0.0.1 » Database: student_enrolment » Table: enrolled

Browse Structure SQL Search Insert Export

✓ Showing rows 0 - 9 (10 total, Query took 0.0007 seconds.)

SELECT * FROM `enrolled`

☐ Show all | Number of rows: 25 Filter rows: Search this table

+ Options

	snum	cname
<input type="checkbox"/> Edit Copy Delete	1	class1
<input type="checkbox"/> Edit Copy Delete	1	class5
<input type="checkbox"/> Edit Copy Delete	2	class1
<input type="checkbox"/> Edit Copy Delete	2	class5
<input type="checkbox"/> Edit Copy Delete	3	class3
<input type="checkbox"/> Edit Copy Delete	3	class5
<input type="checkbox"/> Edit Copy Delete	4	class3
<input type="checkbox"/> Edit Copy Delete	4	class5
<input type="checkbox"/> Edit Copy Delete	5	class4
<input type="checkbox"/> Edit Copy Delete	5	class5

1) Find the names of all Juniors (level = Jr) who are enrolled in a class taught by 'Harish'.

Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import

Run SQL query/queries on database student_enrolment: ?

```
1 SELECT DISTINCT S.sname
2 FROM STUDENT S, CLASS C, ENROLLED E, FACULTY F
3 WHERE S.snum=E.snum AND E.cname=C.cname AND C.fid=F.fid AND
4       F.fname='Harish' AND S.level='Jr';
```

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export Import

Show query box

✓ Showing rows 0 - 0 (1 total, Query took 0.0036 seconds.)

```
SELECT DISTINCT S.sname FROM STUDENT S, CLASS C, ENROLLED E, FACULTY F WHERE S.snum=E
S.level='Jr'
```

☐ Show all | Number of rows: 25 ▼ Filter rows: Search this table

+ Options

← T → sname

☐ Edit Copy Delete Tom

2) Find the names of all classes that either meet in room R128 or have five or more Students enrolled.

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export

Run SQL query/queries on table student_enrolment.STUDENT: ?

```
1 SELECT DISTINCT cname
2 FROM class
3 WHERE room='R128' OR cname IN (SELECT E.cname
4                                FROM ENROLLED E GROUP BY E.cname
5                                HAVING COUNT(*) >= 5);
```

Server: 127.0.0.1 » Database: student_enrolment » Table: class

Browse Structure SQL Search Insert Export Import

Show query box

✓ Showing rows 0 - 1 (2 total, Query took 0.0266 seconds.)

```
SELECT DISTINCT cname FROM class WHERE room='R128' OR cname IN (SELECT E.cname FROM E
```

☐ Show all | Number of rows: 25 ▼ | Filter rows: Search this table | Sort by k

+ Options

				cname
<input type="checkbox"/>	Edit	Copy	Delete	class10
<input type="checkbox"/>	Edit	Copy	Delete	class5

3) Find the names of all students who are enrolled in two classes that meet at the same time.

Server: 127.0.0.1 » Database: student_enrolment » Table: class

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table student_enrolment.class: ?

```
1 SELECT DISTINCT S.sname
2 FROM STUDENT S
3 WHERE S.snum IN (SELECT E1.snum
4                  FROM ENROLLED E1, ENROLLED E2, CLASS C1, CLASS C2
5                  WHERE E1.snum=E2.snum AND E1.cname<>E2.cname AND
6                  E1.cname=C1.cname AND E2.cname=C2.cname AND C1.meets_at=C2.meets_at);
```

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export

Show query box

✓ Showing rows 0 - 0 (1 total, Query took 0.1082 seconds.)

```
SELECT DISTINCT S.sname FROM STUDENT S WHERE S.snum IN (SELECT E1.snum F
E1.cname<>E2.cname AND E1.cname=C1.cname AND E2.cname=C2.cname AND C1.me
```

☐ Show all | Number of rows: 25 ▼ Filter rows: Search this table

+ Options

← T → sname

☐ Edit Copy Delete Rahul

4) Find the names of faculty members who teach in every room in which some class is taught.

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export Import

Run SQL query/queries on table student_enrolment.STUDENT:

```
1 SELECT F.fname, F.fid
2 FROM FACULTY F
3 WHERE F.fid IN (SELECT fid
4                 FROM CLASS
5                 GROUP BY fid
6                 HAVING COUNT(*) = (SELECT COUNT(DISTINCT room)
7                                    FROM CLASS));
```

Server: 127.0.0.1 » Database: student_enrolment » Table: FACULTY

Browse Structure SQL Search Insert Export Import

Show query box

✓ Showing rows 0 - 0 (1 total, Query took 0.1073 seconds.)

```
SELECT F.fname, F.fid FROM FACULTY F WHERE F.fid IN (SELECT fid FROM CLASS GROUP BY
```

☐ Show all | Number of rows: 25 | Filter rows: Search this table

+ Options

	fname	fid
<input type="checkbox"/> Edit <input type="button" value="Copy"/> <input type="button" value="Delete"/>	Shiva	14

5) Find the names of faculty members for whom the combined enrolment of the courses that they teach is less than five.

Server: 127.0.0.1 » Database: student_enrolment » Table: FACULTY

Browse Structure SQL Search Insert Export

Run SQL query/queries on table student_enrolment.FACULTY: ?

```
1 SELECT DISTINCT F.fname
2 FROM FACULTY F
3 WHERE 5 > (SELECT COUNT(E.snum)
4           FROM CLASS C, ENROLLED E
5           WHERE C.cname=E.cname AND C.fid=F.fid);
6
```

Server: 127.0.0.1 » Database: student_enrolment » Table: FACULTY

Browse Structure SQL Search Insert Export

Show query box

✓ Showing rows 0 - 3 (4 total, Query took 0.0020 seconds.)

```
SELECT DISTINCT F.fname FROM FACULTY F WHERE 5 > (SELECT COUNT(E.snum) FROM FACULTY F, ENROLLED E WHERE F.fid=E.fid AND F.cname=E.cname)
```

☐ Show all | Number of rows: 25 ▼ Filter rows: Search this table

+ Options

	fname
<input type="checkbox"/> Edit Copy Delete	Harish
<input type="checkbox"/> Edit Copy Delete	MV
<input type="checkbox"/> Edit Copy Delete	Mira
<input type="checkbox"/> Edit Copy Delete	Shiva

6) Find the names of students who are not enrolled in any class.

Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import

Run SQL query/queries on database student_enrolment: ?

```
1 SELECT DISTINCT S.sname
2 FROM STUDENT S
3 WHERE S.snum NOT IN (SELECT E.snum
4                       FROM ENROLLED E);
```

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export

Show query box

✓ Showing rows 0 - 0 (1 total, Query took 0.0018 seconds.)

SELECT DISTINCT S.sname FROM STUDENT S WHERE S.snum NOT IN (SELECT E.snum

☐ Show all | Number of rows: 25 ▼ Filter rows: Search this table

+ Options

← T → sname

☐ Edit Copy Delete Rita

7) For each age value that appears in Students, find the level value that appears most often. For ex, if there are more FR level students aged 18 than SR, JR, or SO students aged 18, you should print the pair (18, FR).

Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import Operations

Run SQL query/queries on database student_enrolment:

```

1 SELECT S.age, S.level
2 FROM STUDENT S
3 GROUP BY S.age, S.level
4 HAVING S.level IN (SELECT S1.level
5                     FROM STUDENT S1
6                     WHERE S1.age=S.age
7                     GROUP BY S1.age, S1.level
8                     HAVING COUNT(*) >= ALL (SELECT COUNT(*)
9                                             FROM STUDENT S2
10                                            WHERE S1.age=S2.age
11                                            GROUP BY S2.level, S2.age))
12 ORDER BY S.age;

```

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export Import

Show query box

Showing rows 0 - 2 (3 total, Query took 0.0049 seconds.) [age: 19... - 21...]

```

SELECT S.age, S.level FROM STUDENT S GROUP BY S.age, S.level HAVING S.level IN (SELECT
COUNT(*) >= ALL (SELECT COUNT(*) FROM STUDENT S2 WHERE S1.age=S2.age GROUP BY S2.level

```

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by k

+ Options

	age	level
<input type="checkbox"/> Edit Copy Delete	19	Sr
<input type="checkbox"/> Edit Copy Delete	20	Jr
<input type="checkbox"/> Edit Copy Delete	21	Sr