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DBMS LAB PROGRAM – 9

9. STUDENT-FACULTY DATABASE

QUESTION :

CONSIDER THE FOLLOWING DATABASE FOR STUDENT ENROLMENT 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.

I. FIND THE NAMES OF ALL JUNIORS (LEVEL = JR) WHO ARE ENROLLED IN A CLASS TAUGHT BY

II. FIND THE NAMES OF ALL CLASSES THAT EITHER MEET IN ROOM R128 OR HAVE FIVE OR MORE STUDENTS ENROLLED.

III. FIND THE NAMES OF ALL STUDENTS WHO ARE ENROLLED IN TWO CLASSES THAT MEET AT THE SAME TIME.

IV. FIND THE NAMES OF FACULTY MEMBERS WHO TEACH IN EVERY ROOM IN WHICH SOME CLASS IS TAUGHT.

V. FIND THE NAMES OF FACULTY MEMBERS FOR WHOM THE COMBINED ENROLMENT OF THE COURSES THAT THEY TEACH IS LESS THAN FIVE.

VI. FIND THE NAMES OF STUDENTS WHO ARE NOT ENROLLED IN ANY CLASS.

VII. FOR EACH AGE VALUE THAT APPEARS IN STUDENTS, FIND THE LEVEL VALUE THAT APPEARS MOST OFTEN. FOR EXAMPLE, IF

THERE ARE MORE FR LEVEL STUDENTS AGED 18 THAN SR, JR, OR SO STUDENTS AGED 18, YOU SHOULD PRINT THE PAIR (18,

FR).

PROGRAM CODE :

```
CREATE DATABASE STUDENT_FACULTY;
USE STUDENT_FACULTY;
CREATE TABLE STUDENT(
SNUM INT,
SNAME VARCHAR(10),
MAJOR VARCHAR(2),
LVL VARCHAR(2),
AGE INT, PRIMARY KEY(SNUM));

CREATE TABLE FACULTY(
FID INT,FNAME VARCHAR(20),
DEPTID INT,
PRIMARY KEY(FID));

CREATE TABLE CLASS(
CNAME VARCHAR(20),
METTS_AT TIMESTAMP,
ROOM VARCHAR(10),
FID INT,
PRIMARY KEY(CNAME),
FOREIGN KEY(FID) REFERENCES FACULTY(FID));

CREATE TABLE ENROLLED(
SNUM INT,
CNAME VARCHAR(20),
PRIMARY KEY(SNUM,CNAME),
FOREIGN KEY(SNUM) REFERENCES STUDENT(SNUM),
FOREIGN KEY(CNAME) REFERENCES CLASS(CNAME));

INSERT INTO STUDENT VALUES(1, 'JHON', 'CS', 'SR', 19);
INSERT INTO STUDENT VALUES(2, 'SMITH', 'CS', 'JR', 20);
INSERT INTO STUDENT VALUES(3 , 'JACOB', 'CV', 'SR', 20);
INSERT INTO STUDENT VALUES(4, 'TOM ', 'CS', 'JR', 20);
INSERT INTO STUDENT VALUES(5, 'RAHUL', 'CS', 'JR', 20);
INSERT INTO STUDENT VALUES(6, 'RITA', 'CS', 'SR', 21);
SELECT * FROM STUDENT;
INSERT INTO FACULTY VALUES(11, 'HARISH', 1000);
INSERT INTO FACULTY VALUES(12, 'MV', 1000);
INSERT INTO FACULTY VALUES(13 , 'MIRA', 1001);
INSERT INTO FACULTY VALUES(14, 'SHIVA', 1002);
INSERT INTO FACULTY VALUES(15, 'NUPUR', 1000);
SELECT * FROM FACULTY;
INSERT INTO CLASS VALUES('CLASS1', '12/11/15 10:15:16', 'R1', 14);
INSERT INTO CLASS VALUES('CLASS10', '12/11/15 10:15:16', 'R128', 14);
INSERT INTO CLASS VALUES('CLASS2', '12/11/15 10:15:20', 'R2', 12);
```

```

INSERT INTO CLASS VALUES('CLASS3', '12/11/15 10:15:25', 'R3', 11);
INSERT INTO CLASS VALUES('CLASS4', '12/11/15 20:15:20', 'R4', 14);
INSERT INTO CLASS VALUES('CLASS5', '12/11/15 20:15:20', 'R3', 15);
INSERT INTO CLASS VALUES('CLASS6', '12/11/15 13:20:20', 'R2', 14);
INSERT INTO CLASS VALUES('CLASS7', '12/11/15 10:10:10', 'R3', 14);
SELECT * FROM CLASS;
INSERT INTO ENROLLED VALUES(1, 'CLASS1');
INSERT INTO ENROLLED VALUES(2, 'CLASS1');
INSERT INTO ENROLLED VALUES(3, 'CLASS3');
INSERT INTO ENROLLED VALUES(4, 'CLASS3');
INSERT INTO ENROLLED VALUES(5, 'CLASS4');
INSERT INTO ENROLLED VALUES(1, 'CLASS5');
INSERT INTO ENROLLED VALUES(2, 'CLASS5');
INSERT INTO ENROLLED VALUES(3, 'CLASS5');
INSERT INTO ENROLLED VALUES(4, 'CLASS5');
INSERT INTO ENROLLED VALUES(5, 'CLASS5');
SELECT * FROM ENROLLED;
-- QUERY 1
SELECT DISTINCT S.SNAME
FROM STUDENT S, CLASS C, ENROLLED E, FACULTY F
WHERE S.SNUM = E.SNUM AND E.CNAME = C.CNAME AND C.FID = F.FID AND
F.FNAME = 'HARISH' AND S.LVL = 'JR';
-- QUERY 2
SELECT DISTINCT CNAME
FROM CLASS
WHERE ROOM='ROOM128'
OR
CNAME IN (SELECT E.CNAME FROM ENROLLED E GROUP BY E.CNAME HAVING COUNT(*)>=5);
-- QUERY 3
SELECT DISTINCT S.SNAME
FROM STUDENT S
WHERE S.SNUM IN (SELECT E1.SNUM
FROM ENROLLED E1, ENROLLED E2, CLASS C1, CLASS C2
WHERE E1.SNUM = E2.SNUM AND E1.CNAME <> E2.CNAME
AND E1.CNAME = C1.CNAME
AND E2.CNAME = C2.CNAME AND C1.METTS_AT = C2.METTS_AT);
-- QUERY 4
SELECT F.FNAME, F.FID
FROM FACULTY F
WHERE F.FID IN ( SELECT FID FROM CLASS
GROUP BY FID HAVING COUNT(*)=(SELECT COUNT(DISTINCT ROOM) FROM CLASS) );
-- QUERY 5
SELECT DISTINCT F.FNAME
FROM FACULTY F
WHERE 5 > (SELECT COUNT(E.SNUM)
FROM CLASS C, ENROLLED E
WHERE C.CNAME = E.CNAME
AND C.FID = F.FID);

```

```
-- QUERY 6
SELECT DISTINCT S.SNAME
FROM STUDENT S
WHERE S.SNUM NOT IN (SELECT E.SNUM
FROM ENROLLED E );
-- QUERY 7
SELECT S.AGE, S.LVL
FROM STUDENT S
GROUP BY S.AGE, S.LVL
HAVING S.LVL IN (SELECT S1.LVL
FROM STUDENT S1
WHERE S1.AGE=S.AGE
GROUP BY S1.AGE, S1.LVL
HAVING COUNT(*) >= ALL (SELECT COUNT(*)
FROM STUDENT S2
WHERE S1.AGE=S2.AGE
GROUP BY S2.LVL, S2.AGE))
ORDER BY S.AGE;
```

SCREENSHOTS OF THE PROGRAM OUTPUT :

➔ CREATION AND INSERTION OF VALUES

The screenshot displays the MySQL Workbench interface. The top pane shows a series of SQL queries for creating and inserting data into a database. The bottom pane shows the execution results of these queries.

SQL Queries:

```
31 | INSERT INTO STUDENT VALUES(2, 'Smith', 'CS', '3rd', 20);
32 | INSERT INTO STUDENT VALUES(3, 'Jacob', 'CV', '5th', 20);
33 | INSERT INTO STUDENT VALUES(4, 'Tom', 'CS', '3rd', 20);
34 | INSERT INTO STUDENT VALUES(5, 'Rahul', 'CS', '3rd', 20);
35 | INSERT INTO STUDENT VALUES(6, 'Rita', 'CS', '5th', 21);
```

Result Grid:

snum	sname	major	lvl	age
1	Jhon	CS	5r	19
2	Smith	CS	3r	20
3	Jacob	CV	5r	20
4	Tom	CS	3r	20
5	Rahul	CS	3r	20
6	Rita	CS	5r	21

Output Log:

#	Time	Action	Message	Duration / Fetch
155	12:28:56	SELECT DISTINCT f.fname FROM Faculty F WHERE S > (SELECT COUNT(E.snum) FROM Class C, Enrolled E)	4 row(s) returned	0.000 sec / 0.000 sec
156	12:29:03	SELECT DISTINCT s.sname FROM Student S WHERE S.snum NOT IN (SELECT E.snum FROM Enrolled E)	1 row(s) returned	0.000 sec / 0.000 sec
157	12:30:40	SELECT DISTINCT sname FROM class WHERE room=room120 OR cname IN (SELECT e.cname FROM enr...	1 row(s) returned	0.000 sec / 0.000 sec
158	12:34:27	SELECT f.fname, f.fid FROM faculty f WHERE f.fid IN (SELECT f.fid FROM class GROUP BY f.fid HAVING C...	1 row(s) returned	0.000 sec / 0.000 sec
159	12:45:08	SELECT S.age, S.lvl FROM Student S GROUP BY S.age, S.lvl HAVING S.lvl IN (SELECT S1.lvl FROM Stude...	Error Code: 1054: You have an error in your SQL syntax; check the manual that corresponds to your MySQL se...	0.000 sec
160	12:48:22	SELECT S.age, S.lvl FROM STUDENT S GROUP BY S.age, S.lvl HAVING S.lvl IN (SELECT S1.lvl...	Error Code: 1054: Unknown column 'S.lvl' in 'field list'	0.000 sec
161	12:48:33	SELECT S.age, S.lvl FROM STUDENT S GROUP BY S.age, S.lvl HAVING S.lvl IN (SELECT S1.lvl...	Error Code: 1054: Unknown column 'S.lvl' in 'field list'	0.000 sec
162	12:49:31	SELECT S.age, S.lvl FROM STUDENT S GROUP BY S.age, S.lvl HAVING S.lvl IN (SELECT S1.lvl FR...	Error Code: 1054: Unknown column 'S.lvl' in 'field list'	0.000 sec
163	12:49:52	SELECT S.age, S.lvl FROM STUDENT S GROUP BY S.age, S.lvl HAVING S.lvl IN (SELECT S1.lvl FROM ST...	3 row(s) returned	0.000 sec / 0.000 sec
164	12:56:04	select * from STUDENT LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec

MySQL Workbench

Local instance MySQL80 x MySQL Model x

File Edit View Query Database Server Tools Scripting Help

Navigator

MANAGEMENT

- Server Status
- Client Connections
- Users and Privileges
- Status and System Variables
- Data Export
- Data Import/Restore

INSTANCE

- Startup / Shutdown
- Server Logs
- Options File

PERFORMANCE

- Dashboard
- Performance Reports
- Performance Schema Setup

Administration Schemas

Information

No object selected

SQL File 0*

```

40 INSERT INTO FACULTY VALUES(14, 'Shiva', 1002);
41 INSERT INTO FACULTY VALUES(15, 'Nupur', 1000);
42 SELECT * FROM FACULTY;
43 Insert into class values('class1', '12/11/15 10:15:16', 'R1', 14);
44 Insert into class values('class10', '12/11/15 10:15:16', 'R128', 14);

```

Result Grid

fd	fname	deptid
11	Harsh	1000
12	My	1000
13	Mra	1001
14	Shiva	1002
15	Nupur	1000

Output

#	Time	Action	Message	Duration / Fetch
156	12:29:03	SELECT DISTINCT S.sname FROM Student S WHERE S.sname NOT IN (SELECT E.sname FROM Enrolled E ...)	1 row(s) returned	0.000 sec / 0.000 sec
157	12:30:40	SELECT DISTINCT cname FROM class WHERE room=room128 OR cname IN (SELECT e.cname FROM enr...	1 row(s) returned	0.000 sec / 0.000 sec
158	12:34:27	SELECT f.fname,f.fid FROM faculty f WHERE f.fid in (SELECT fd.fid FROM class GROUP BY fd HAVING C...	1 row(s) returned	0.000 sec / 0.000 sec
159	12:45:08	SELECT S.age, S.M FROM Student S GROUP BY S.age, S.M HAVING S.M IN (SELECT S1.M FROM Stude...	Error Code: 1064. You have an error in your SQL syntax; check the manual that corresponds to your MySQL se...	0.000 sec
160	12:48:22	SELECT S.age, S.slevel FROM STUDENT S GROUP BY S.age, S.slevel HAVING S.slevel IN (SELECT S1.al...	Error Code: 1054. Unknown column 'S.slevel' in field list	0.000 sec
161	12:48:33	SELECT S.age, S.slevel FROM STUDENT S GROUP BY S.age, S.slevel HAVING S.slevel IN (SELECT S1.al...	Error Code: 1054. Unknown column 'S.slevel' in field list	0.000 sec
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163	12:49:52	SELECT S.age, S.M FROM STUDENT S GROUP BY S.age, S.M HAVING S.M IN (SELECT S1.M FROM ST...	3 row(s) returned	0.000 sec / 0.000 sec
164	12:56:04	select * from STUDENT LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec
165	12:56:21	select * from FACULTY LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec

Query Completed

MySQL Workbench

Local instance MySQL80 x MySQL Model x

File Edit View Query Database Server Tools Scripting Help

Navigator

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- Performance Schema Setup

Administration Schemas

Information

No object selected

SQL File 0*

```

49 Insert into class values('class6', '12/11/15 13:20:20', 'R2', 14);
50 Insert into class values('class7', '12/11/15 10:15:16', 'R3', 14);
51 Select * from class;
52 Insert into enrolled values(1, 'class1');
53 Insert into enrolled values(2, 'class1');

```

Result Grid

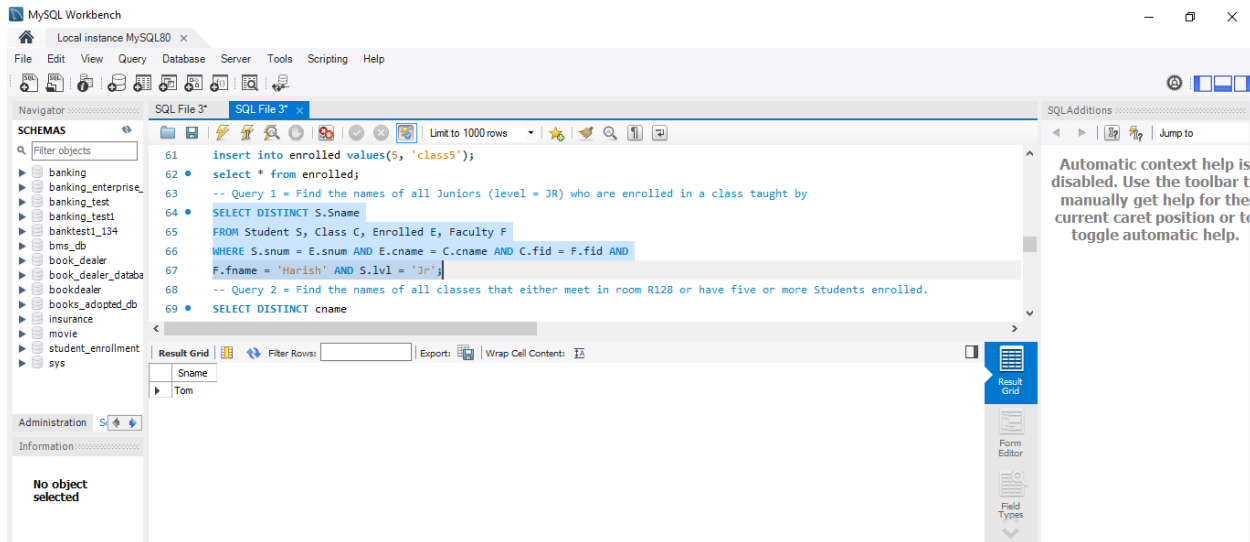
cname	metts_at	room	fd
class1	2012-11-15 10:15:16	R1	14
class10	2012-11-15 10:15:16	R128	14
class2	2012-11-15 10:15:20	R2	12
class3	2012-11-15 10:15:25	R3	11
class4	2012-11-15 20:15:20	R4	14
class5	2012-11-15 20:15:20	R3	15
class6	2012-11-15 13:20:20	R2	14
class7	2012-11-15 10:15:10	R3	14

Output

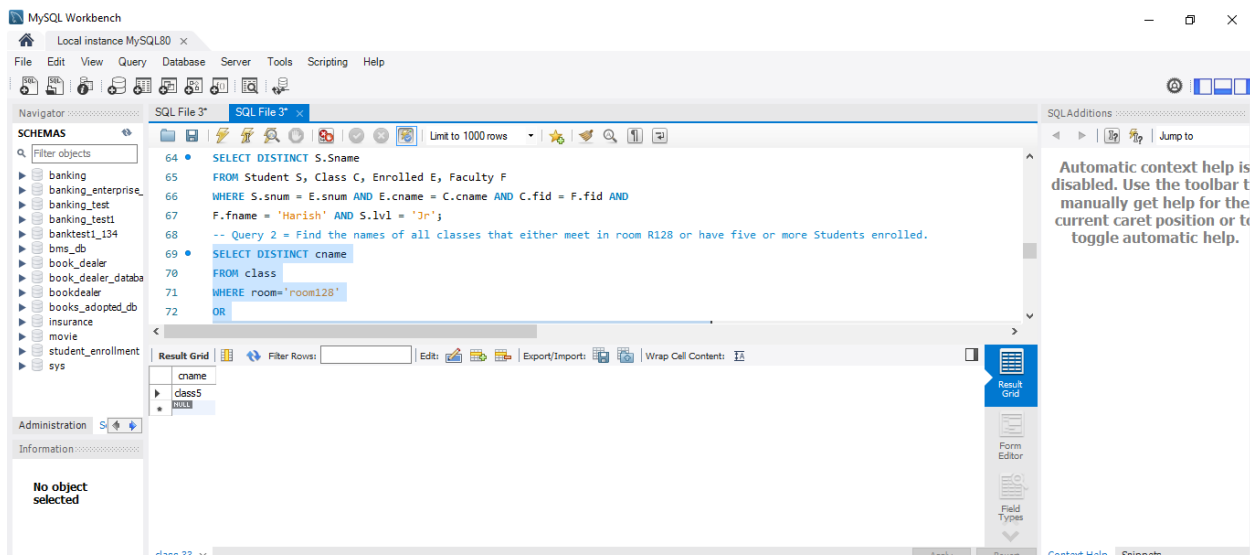
#	Time	Action	Message	Duration / Fetch
157	12:30:40	SELECT DISTINCT cname FROM class WHERE room=room128 OR cname IN (SELECT e.cname FROM enr...	1 row(s) returned	0.000 sec / 0.000 sec
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163	12:49:52	SELECT S.age, S.M FROM STUDENT S GROUP BY S.age, S.M HAVING S.M IN (SELECT S1.M FROM ST...	3 row(s) returned	0.000 sec / 0.000 sec
164	12:56:04	select * from STUDENT LIMIT 0, 1000	6 row(s) returned	0.000 sec / 0.000 sec
165	12:56:21	select * from FACULTY LIMIT 0, 1000	5 row(s) returned	0.000 sec / 0.000 sec
166	12:56:30	select * from class LIMIT 0, 1000	8 row(s) returned	0.000 sec / 0.000 sec

Query Completed

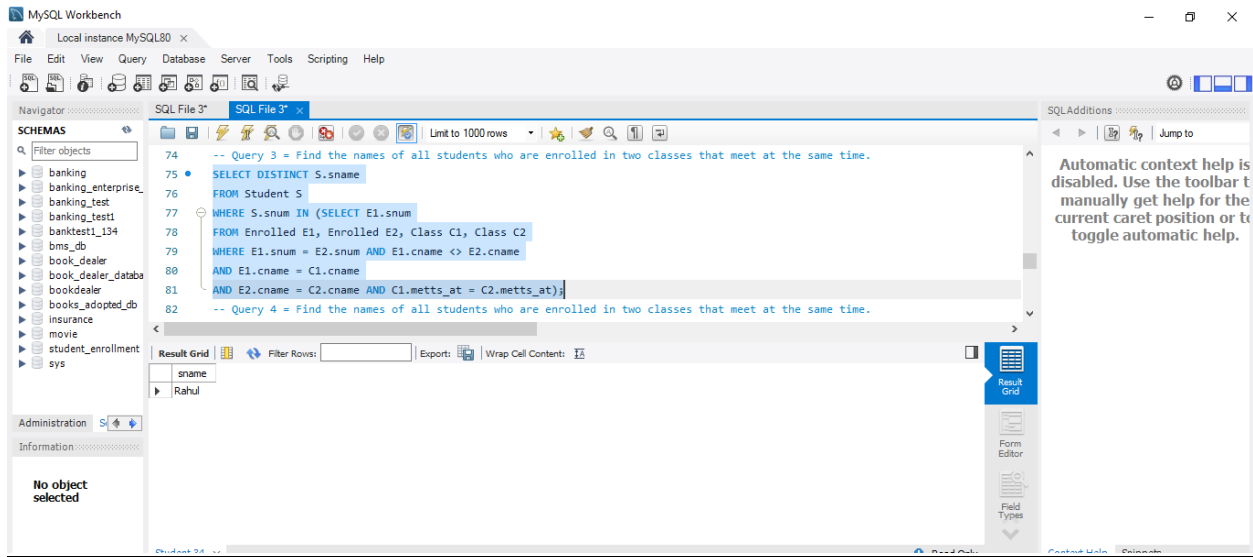
QUERY 1 = FIND THE NAMES OF ALL JUNIORS (LEVEL = JR) WHO ARE ENROLLED IN A CLASS TAUGHT BY



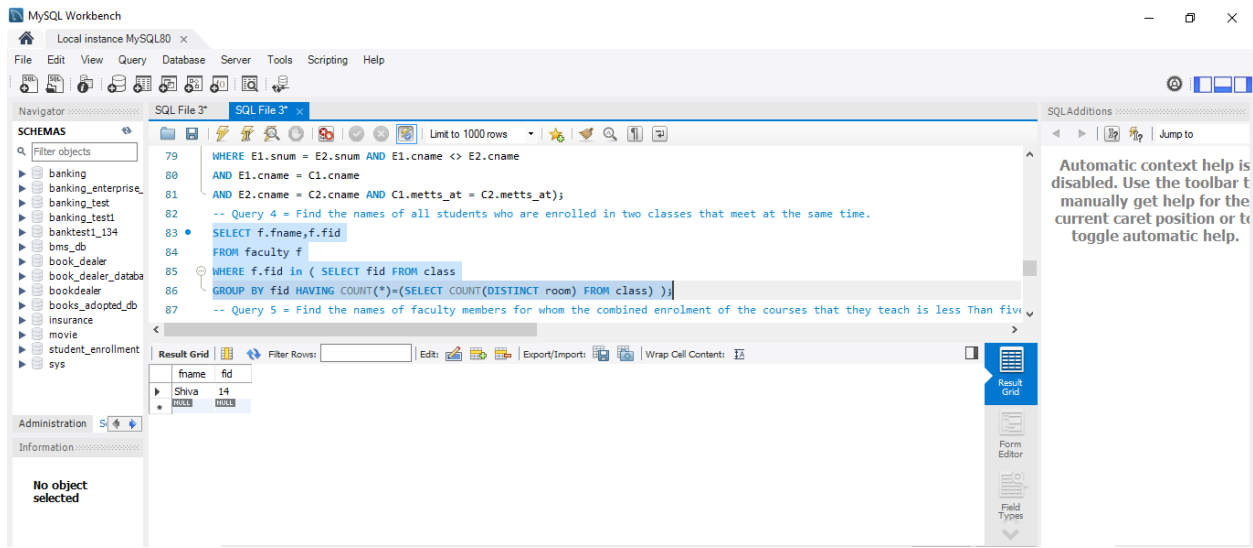
QUERY 2 = FIND THE NAMES OF ALL CLASSES THAT EITHER MEET IN ROOM R128 OR HAVE FIVE OR MORE STUDENTS ENROLLED.



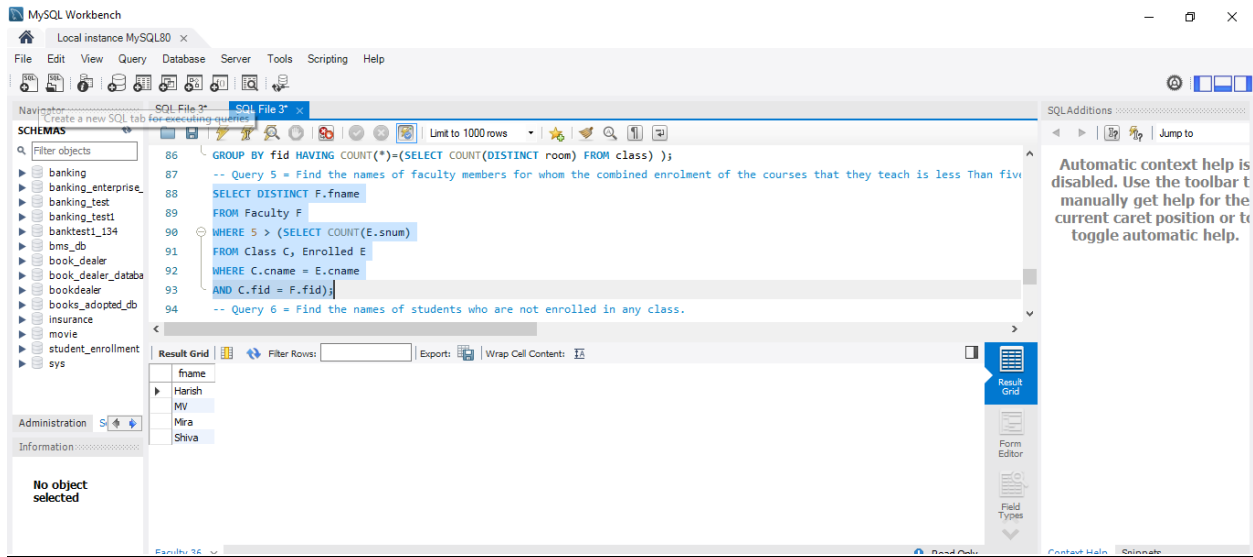
QUERY 3 = FIND THE NAMES OF ALL STUDENTS WHO ARE ENROLLED IN TWO CLASSES THAT MEET AT THE SAME TIME.



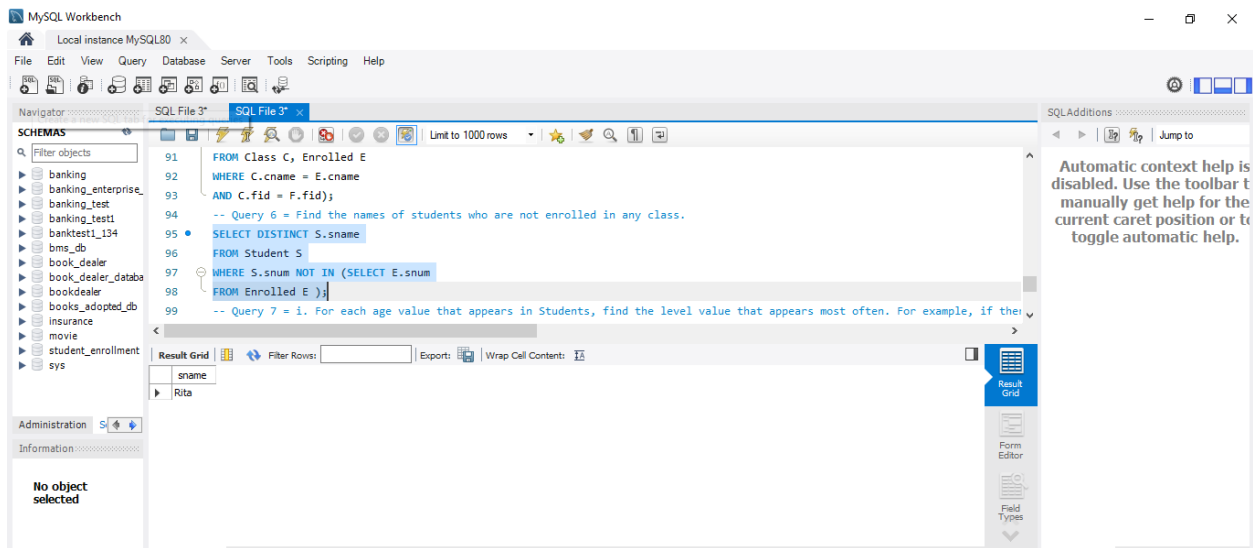
QUERY 4 = FIND THE NAMES OF ALL STUDENTS WHO ARE ENROLLED IN TWO CLASSES THAT MEET AT THE SAME TIME.



QUERY 5 = FIND THE NAMES OF FACULTY MEMBERS FOR WHOM THE COMBINED ENROLMENT OF THE COURSES THAT THEY TEACH IS LESS THAN FIVE.



QUERY 6 = FIND THE NAMES OF STUDENTS WHO ARE NOT ENROLLED IN ANY CLASS.



QUERY 7 = I. FOR EACH AGE VALUE THAT APPEARS IN STUDENTS, FIND THE LEVEL VALUE THAT APPEARS MOST OFTEN. FOR EXAMPLE, IF THERE ARE MORE FR LEVEL STUDENTS AGED 18 THAN SR, JR, OR SO STUDENTS AGED 18, YOU SHOULD PRINT THE PAIR (18,FR)

MySQL Workbench

Local instance MySQL80 x

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

Filter objects

- banking
- banking_enterprise
- banking_test
- banking_test1
- banktest1_134
- bms_db
- book_dealer
- book_dealer_database
- bookdealer
- books_adopted_db
- insurance
- movie
- student_enrollment
- sys

Administration

Information

No object selected

SQL File 3*

SQL File 3*

Limit to 1000 rows

```
92 WHERE C.cname = E.cname
93 AND C.fid = F.fid);
94 -- Query 6 = Find the names of students who are not enrolled in any class.
95 • SELECT DISTINCT S.sname
96 FROM Student S
97 WHERE S.snum NOT IN (SELECT E.snum
98 FROM Enrolled E );
99 -- Query 7 = i. For each age value that appears in Students, find the level value that appears most often. For example, if the
100 • SELECT S.age, S.lvl
```

Result Grid

age	lvl
19	Sr
20	Jr
21	Sr

Filter Rows: Export: Wrap Cell Content: 12

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Result Grid

Form Editor

Field Types