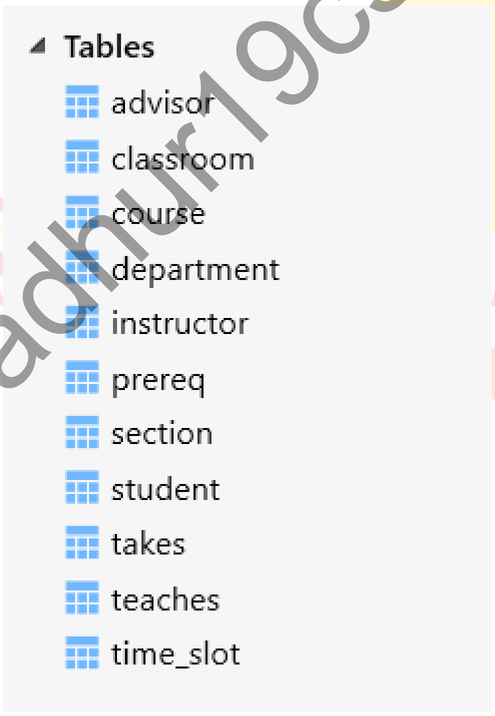
Madhur19csu169

Practical Drill – SQL

1. Define the following UNIVERSITY schema in SQL

classroom(building, room_number, capacity)
department(dept_name, building, budget)
course(course_id, title, dept_name, credits)
instructor(ID, name, dept_name, salary)
section(course_id, sec_id, semester, year, building, room_number, time_slot_id)
teaches(ID, course_id, sec_id, semester, year)
student(ID, name, dept_name, tot_cred)
takes(ID, course_id, sec_id, semester, year, grade)
advisor(s_ID, i_ID)
time_slot(time_slot_id, day, start_time, end_time)
prereq(course_id, prereq_id)



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SQL CODE TO CREATE THE TABLES

```
-- Creating the tables

CREATE TABLE classroom(
   building VARCHAR(30),
   room_number char(3),
   capacity int,
   PRIMARY KEY(building, room_number)
);

CREATE TABLE department(
   dept_name VARCHAR(50) PRIMARY KEY,
   building VARCHAR(30),
   budget int
);

CREATE TABLE course(
   course_id char(4) PRIMARY KEY,
   title VARCHAR(100),
   dept_name VARCHAR(50),
   credits tinyint,

   FOREIGN KEY (dept_name) REFERENCES department(dept_name)
);

CREATE TABLE instructor(
   ID char(4) PRIMARY KEY,
   name VARCHAR(50),
   dept_name VARCHAR(50),
   salary int,

   FOREIGN KEY (dept_name) REFERENCES department(dept_name)
);

CREATE TABLE time_slot(
   time_slot_id int,
   day varchar(12),
   start_time CHAR(5),
   end_time CHAR(5),
   PRIMARY KEY(time_slot_id, day, start_time)
);

CREATE TABLE section(
   course_id char(4),
   sec_id char(1),
   semester VARCHAR(10),
   year YEAR,
```

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```
  building VARCHAR(30),
   room_number char(3),
   time_slot_id int,
   PRIMARY KEY (sec_id, semester, year),
   FOREIGN KEY (course_id) REFERENCES course(course_id),
   FOREIGN KEY (building, room_number) REFERENCES classroom(building, room_number),
   FOREIGN KEY (time_slot_id) REFERENCES time_slot(time_slot_id)
);
CREATE TABLE teaches(
   ID char(4),
   course_id char(4),
   sec_id char(1),
   semester VARCHAR(10),
   year YEAR,
   FOREIGN KEY (ID) REFERENCES instructor(ID),
   FOREIGN KEY (course_id) REFERENCES course(course_id),
   FOREIGN KEY (sec_id, semester, year) REFERENCES section(sec_id, semester, year)
);
CREATE TABLE student(
   ID char(4),
   name VARCHAR(50),
   dept_name VARCHAR(30),
   tot_cred SMALLINT,
   PRIMARY KEY (ID)
   FOREIGN KEY (dept_name) REFERENCES department(dept_name)
);
CREATE TABLE takes(
   ID char(4),
   course_id char(4),
   sec_id char(1),
   semester VARCHAR(10),
   year YEAR,
   grade char(1),
   FOREIGN KEY (ID) REFERENCES student(ID),
   FOREIGN KEY (course_id) REFERENCES course(course_id),
   FOREIGN KEY (sec_id, semester, year) REFERENCES section(sec_id, semester, year)
);
CREATE TABLE advisor(
   s_ID CHAR(2) PRIMARY KEY,
   i_ID CHAR(2)
);


CREATE TABLE prereq(
   course_id CHAR(4),
   prereq_id VARCHAR(5) PRIMARY KEY,

   FOREIGN KEY (course_id) REFERENCES course(course_id)
);
```

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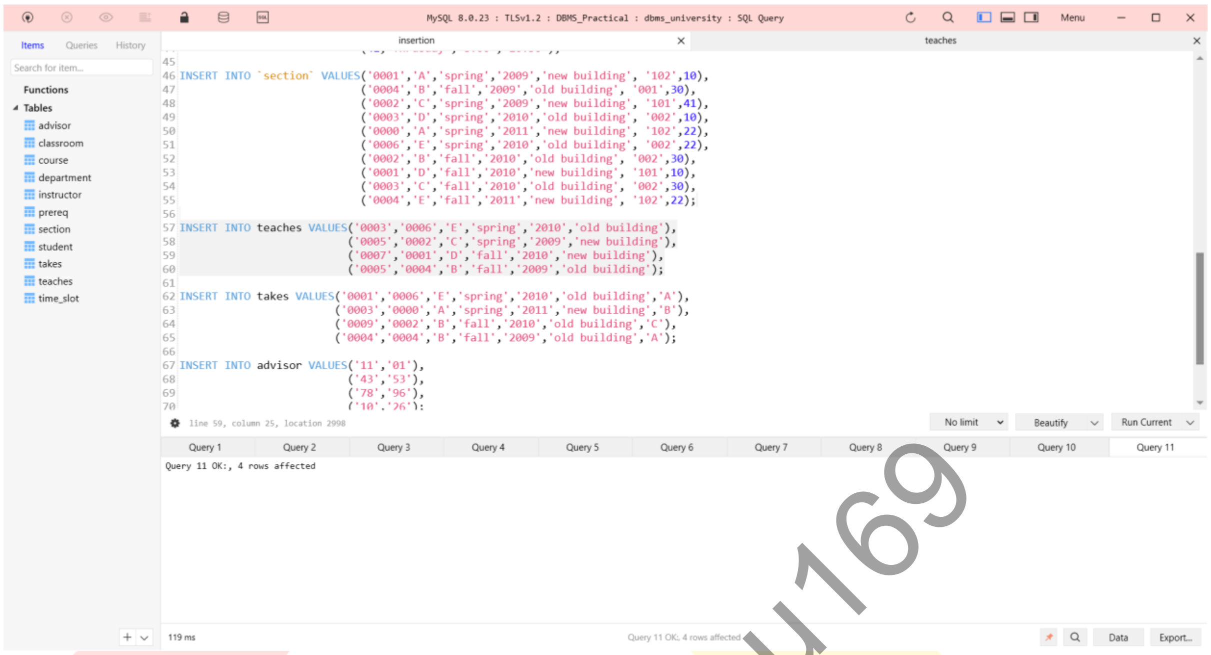
2. Insert minimum 4 entries in each table



MySQL 8.0.23 : TLSv1.2 : DBMS_Practical : dbms_university : SQL Query

```
INSERT INTO `section` VALUES('0001','A','spring','2009','new building', '102',10),
                            ('0004','B','fall','2009','old building', '001',30),
                            ('0002','C','spring','2009','new building', '101',41),
                            ('0003','D','spring','2010','old building', '002',10),
                            ('0000','A','spring','2011','new building', '102',22),
                            ('0006','E','spring','2010','old building', '002',22),
                            ('0002','B','fall','2010','old building', '002',30),
                            ('0001','D','fall','2010','new building', '101',10),
                            ('0003','C','fall','2010','old building', '002',30),
                            ('0004','E','fall','2011','new building', '102',22);

INSERT INTO teaches VALUES('0003','0006','E','spring','2010','old building'),
                          ('0005','0002','C','spring','2009','new building'),
                          ('0007','0001','D','fall','2010','new building'),
                          ('0005','0004','B','fall','2009','old building');

INSERT INTO takes VALUES('0001','0006','E','spring','2010','old building','A'),
                        ('0003','0000','A','spring','2011','new building','B'),
                        ('0009','0002','B','fall','2010','old building','C'),
                        ('0004','0004','B','fall','2009','old building','A');

INSERT INTO advisor VALUES('11','01'),
                          ('43','53'),
                          ('78','96'),
                          ('10','26');
```

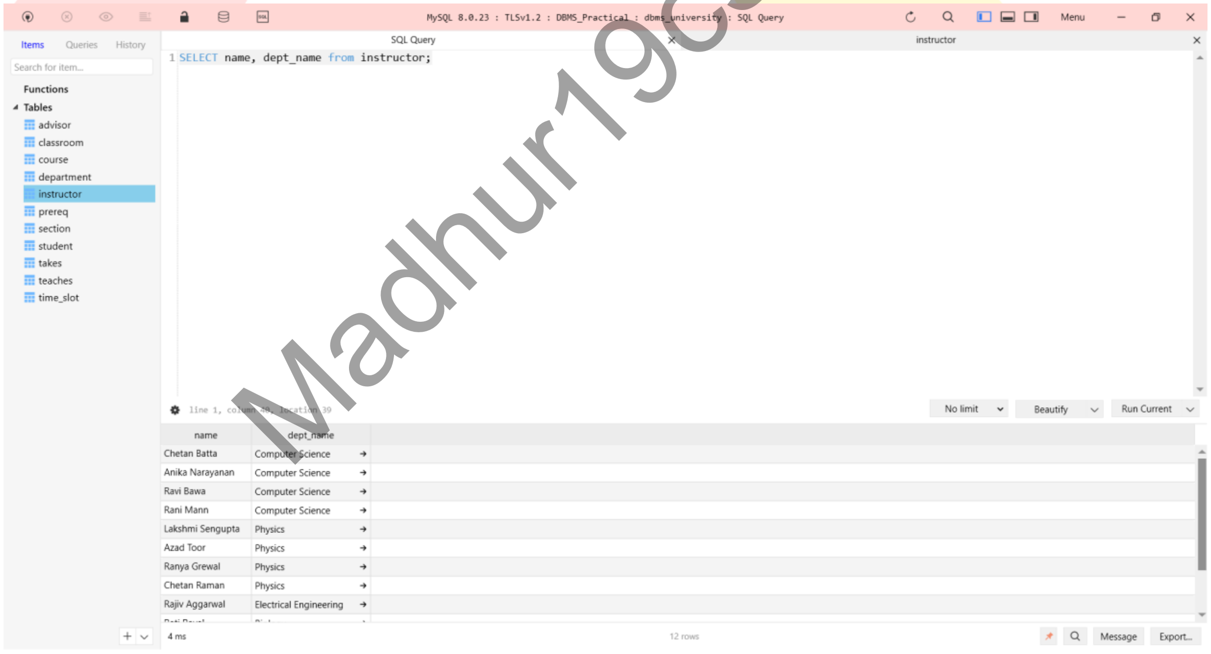
```
line 59, column 25, location 2998
```

```
Query 11 OK:, 4 rows affected
```

119 ms

Query 11 OK; 4 rows affected

3. Find the name and department of each instructor



MySQL 8.0.23 : TLSv1.2 : DBMS_Practical : dbms_university : SQL Query

```
SELECT name, dept_name from instructor;
```

```
line 1, column 40, location 39
```

name	dept_name
Chetan Batta	Computer Science
Anika Narayanan	Computer Science
Ravi Bawa	Computer Science
Rani Mann	Computer Science
Lakshmi Sengupta	Physics
Azad Toor	Physics
Ranya Grewal	Physics
Chetan Raman	Physics
Rajiv Aggarwal	Electrical Engineering

4 ms

12 rows

4. Find the department names in the University

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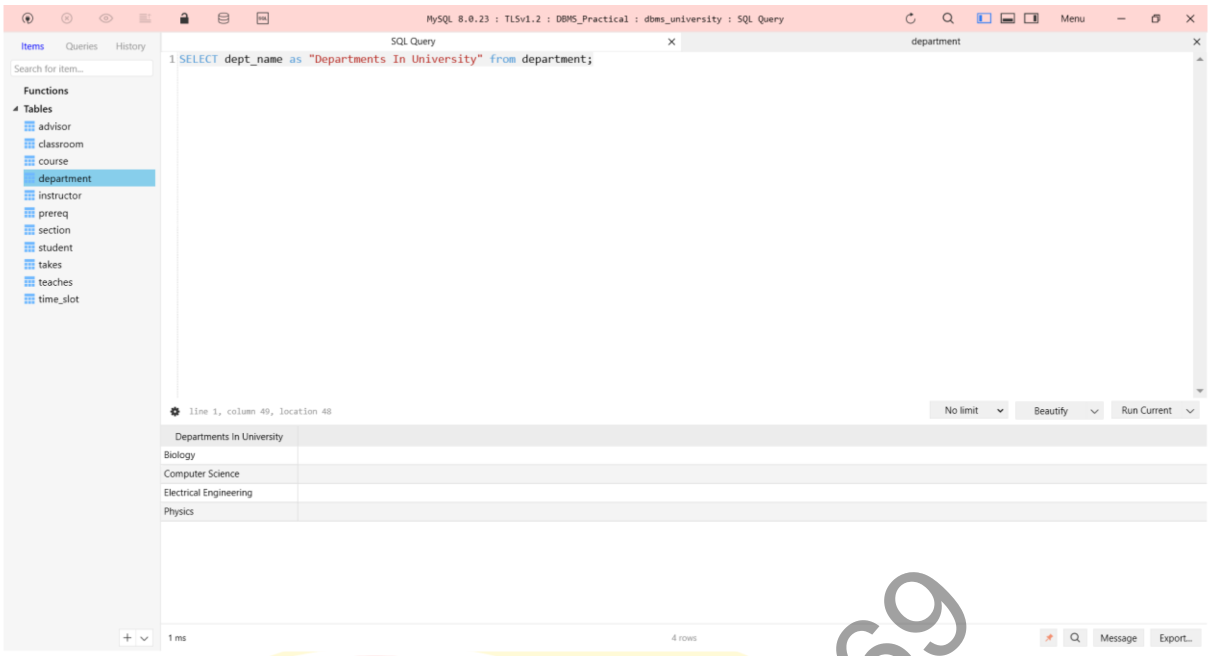

```
SELECT dept_name as "Departments In University" from department;
```

```
line 1, column 49, location 48
```

Departments In University
Biology
Computer Science
Electrical Engineering
Physics

```
1 ms                    4 rows
```

5. Display the ID, name, department name and salary of instructors after giving a 10% raise to each instructor

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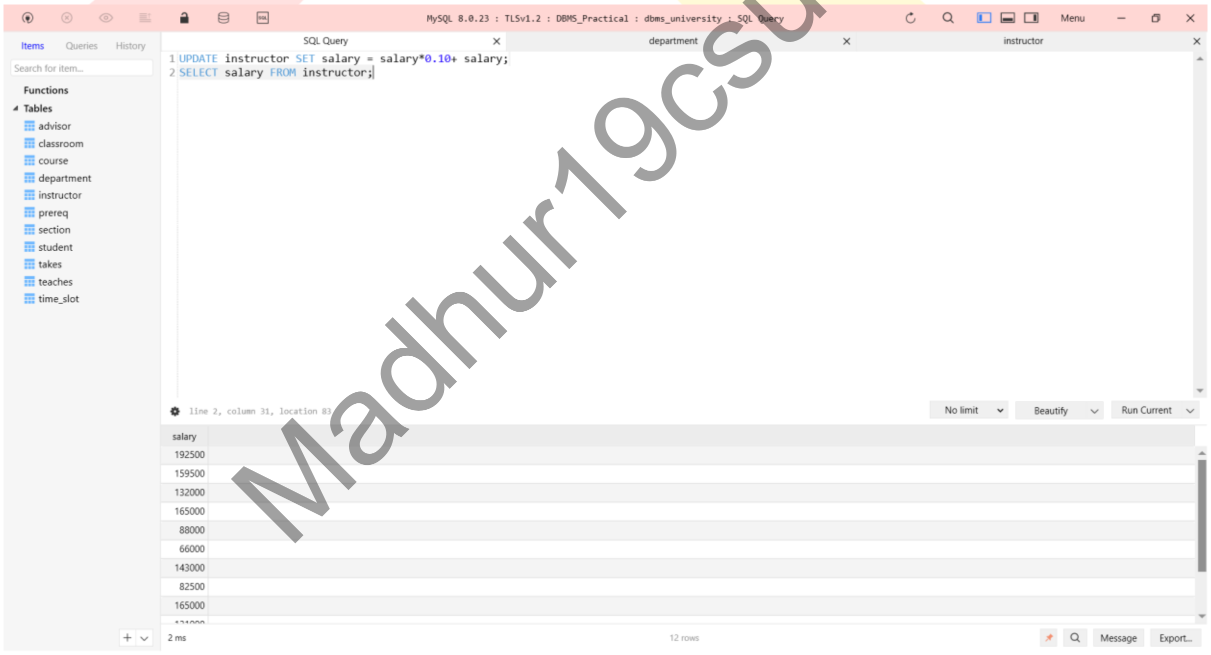

```
UPDATE instructor SET salary = salary*0.10+ salary;
SELECT salary FROM instructor;
```

```
line 2, column 31, location 83
```

salary
192500
159500
132000
165000
88000
66000
143000
82500
165000
[illegible]

```
2 ms                    12 rows
```

6. Retrieve the names of all instructors, along with their department names and department building name.

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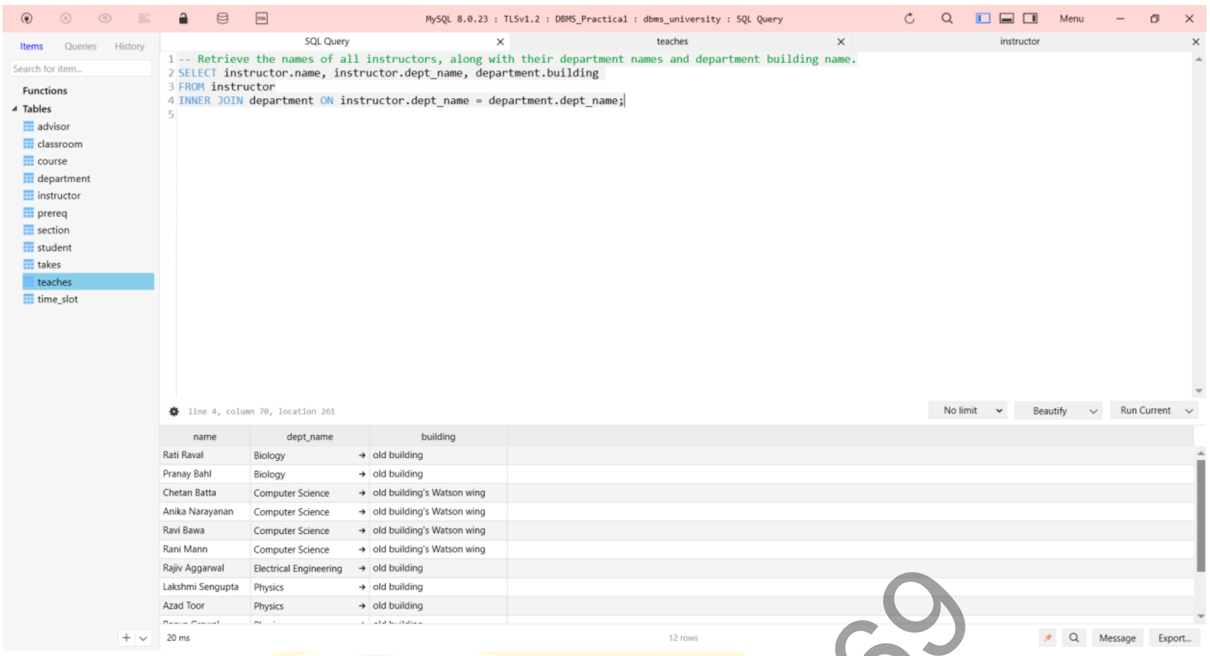


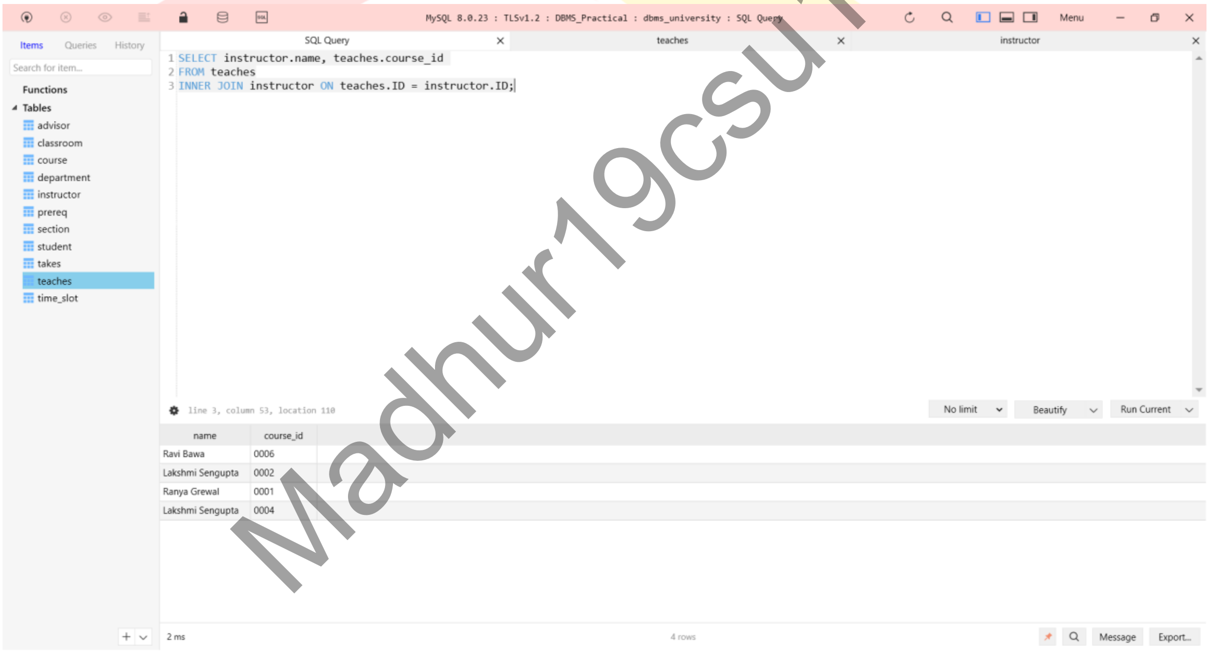
```
-- Retrieve the names of all instructors, along with their department names and department building name.
SELECT instructor.name, instructor.dept_name, department.building
FROM instructor
INNER JOIN department ON instructor.dept_name = department.dept_name;
```

line 4, column 70, location 261

name	dept_name	building
Rati Raval	Biology	old building
Pranay Bahl	Biology	old building
Chetan Batta	Computer Science	old building's Watson wing
Anika Narayanan	Computer Science	old building's Watson wing
Ravi Bawa	Computer Science	old building's Watson wing
Rani Mann	Computer Science	old building's Watson wing
Rajiv Aggarwal	Electrical Engineering	old building
Lakshmi Sengupta	Physics	old building
Azad Toor	Physics	old building

20 ms 12 rows

7. Retrieve the name and corresponding course id of instructors who have taught some course



```
SELECT instructor.name, teaches.course_id
FROM teaches
INNER JOIN instructor ON teaches.ID = instructor.ID;
```

line 3, column 53, location 110

name	course_id
Ravi Bawa	0006
Lakshmi Sengupta	0002
Ranya Grewal	0001
Lakshmi Sengupta	0004

2 ms 4 rows

8. Find instructor names and course identifiers for instructors in the Computer Science department

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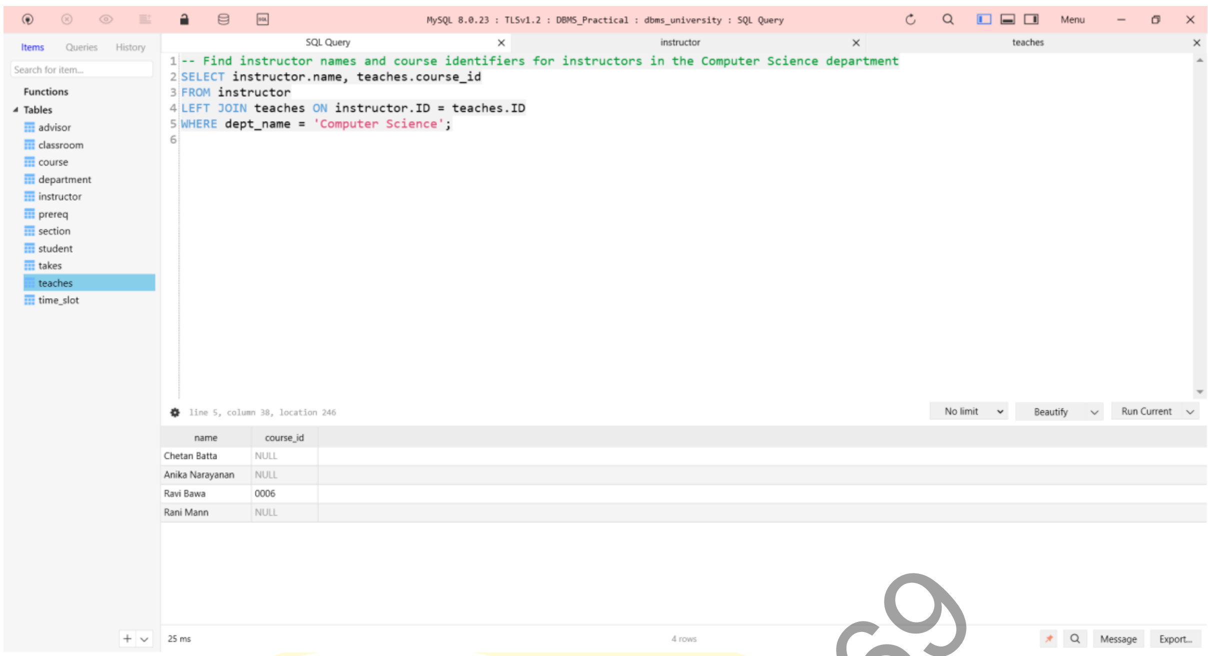


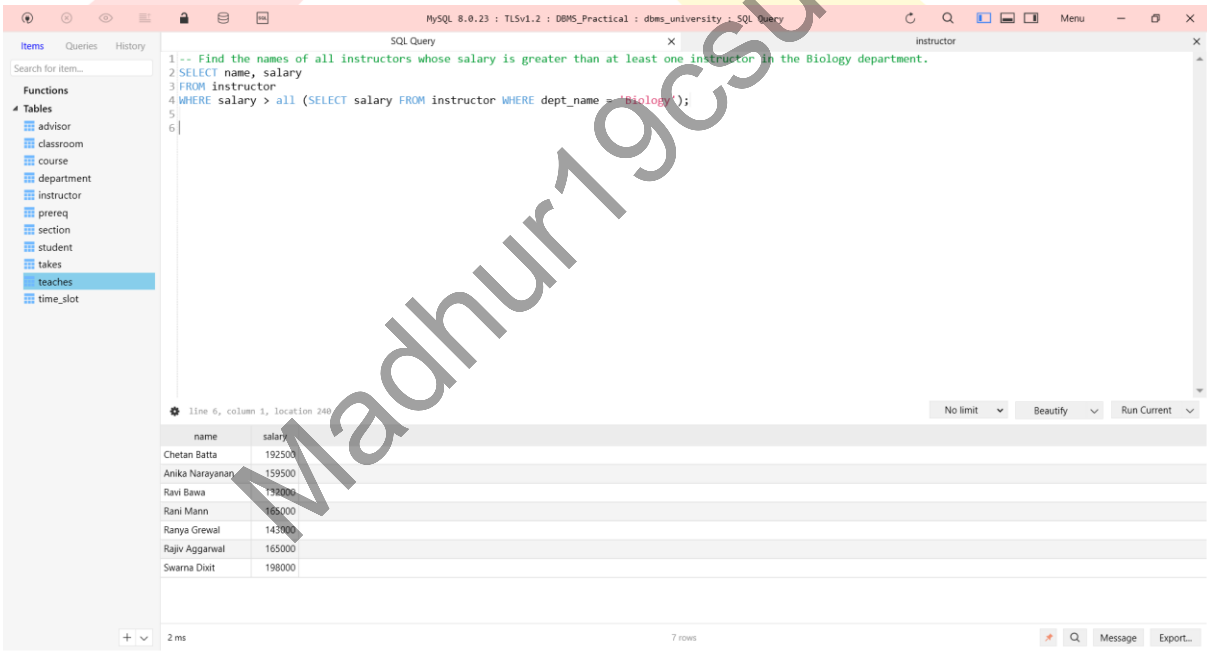
```
-- Find instructor names and course identifiers for instructors in the Computer Science department
SELECT instructor.name, teaches.course_id
FROM instructor
LEFT JOIN teaches ON instructor.ID = teaches.ID
WHERE dept_name = 'Computer Science';
```

line 5, column 38, location 246

name	course_id
Chetan Batta	NULL
Anika Narayanan	NULL
Ravi Bawa	0006
Rani Mann	NULL

25 ms 4 rows

9. Find the names of all instructors whose salary is greater than at least one instructor in the Biology department.

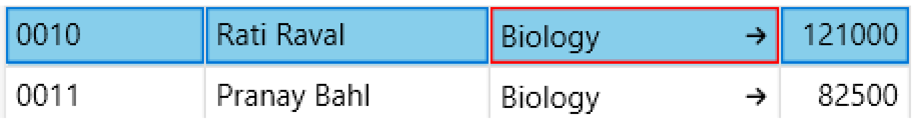


```
-- Find the names of all instructors whose salary is greater than at least one instructor in the Biology department.
SELECT name, salary
FROM instructor
WHERE salary > all (SELECT salary FROM instructor WHERE dept_name = 'Biology');
```

line 6, column 1, location 240

name	salary
Chetan Batta	192500
Anika Narayanan	159500
Ravi Bawa	132000
Rani Mann	165000
Ranya Grewal	143000
Rajiv Aggarwal	165000
Swarna Dixit	198000

2 ms 7 rows



0010	Rati Raval	Biology →	121000
0011	Pranay Bahl	Biology →	82500

10. Find the names of all departments whose building name includes the substring 'Watson'.

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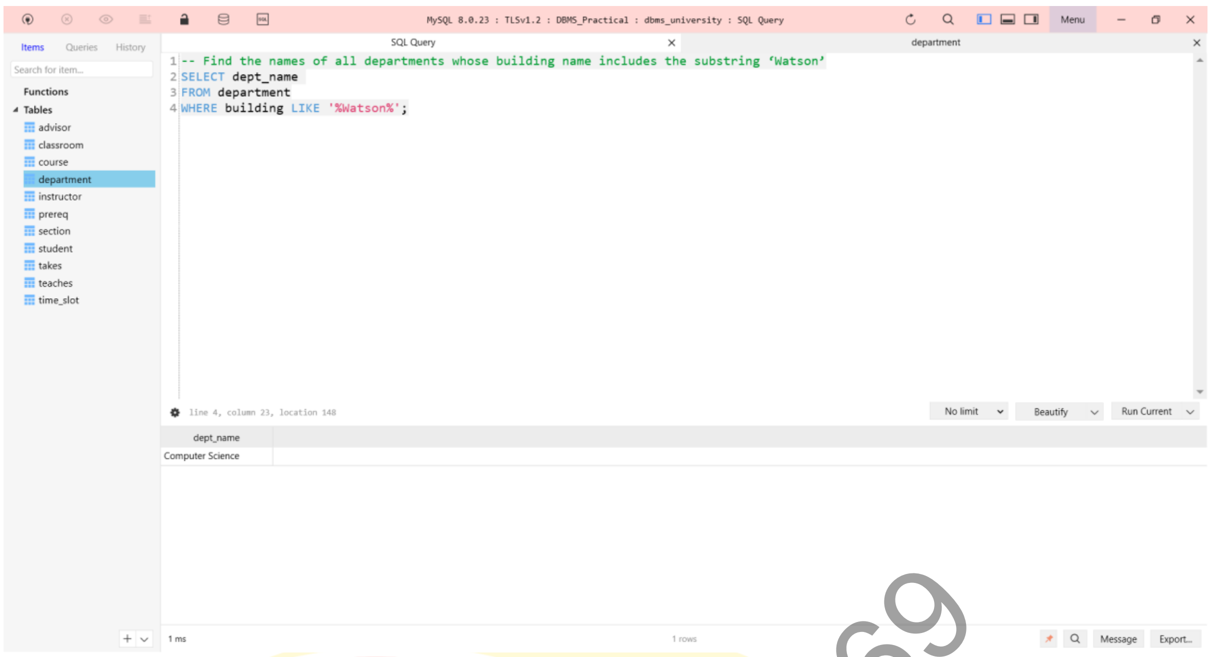
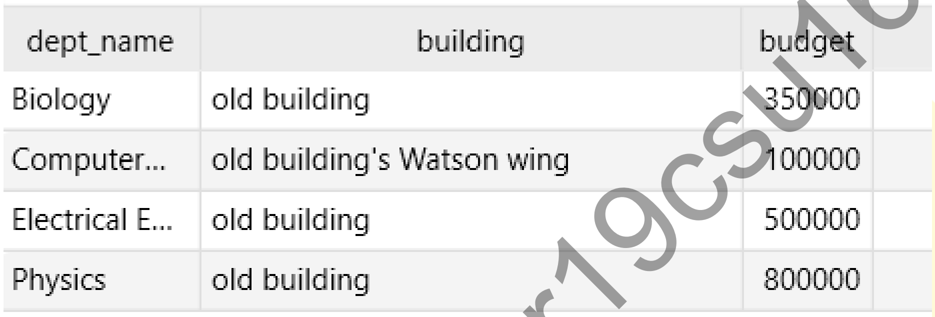


```sql
-- Find the names of all departments whose building name includes the substring 'Watson'
SELECT dept_name
FROM department
WHERE building LIKE '%Watson%';
```

line 4, column 23, location 148

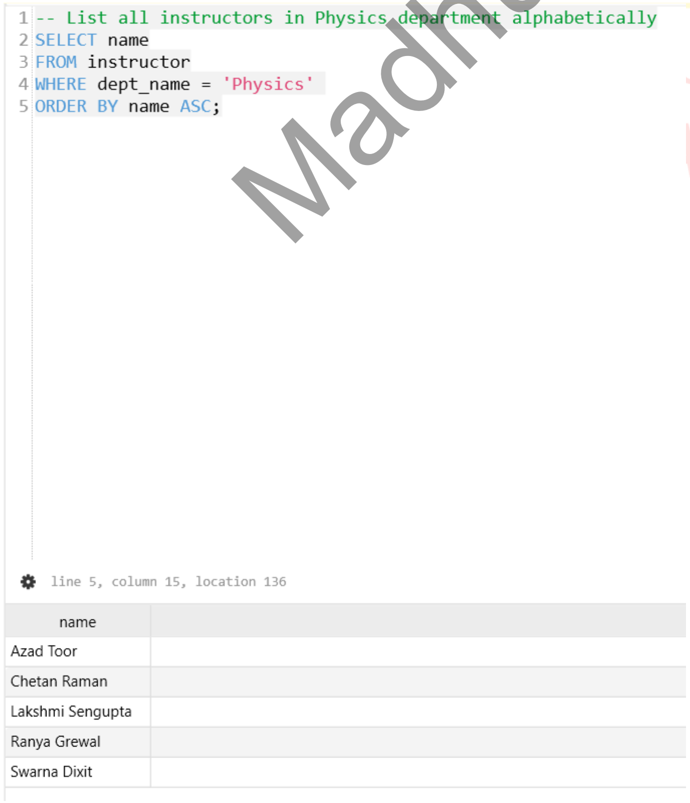
dept_name
Computer Science

1 ms 1 rows



dept_name	building	budget
Biology	old building	350000
Computer...	old building's Watson wing	100000
Electrical E...	old building	500000
Physics	old building	800000

11. List all instructors in Physics department alphabetically



```sql
-- List all instructors in Physics department alphabetically
SELECT name
FROM instructor
WHERE dept_name = 'Physics'
ORDER BY name ASC;
```

line 5, column 15, location 136

name
Azad Toor
Chetan Raman
Lakshmi Sengupta
Ranya Grewal
Swarna Dixit

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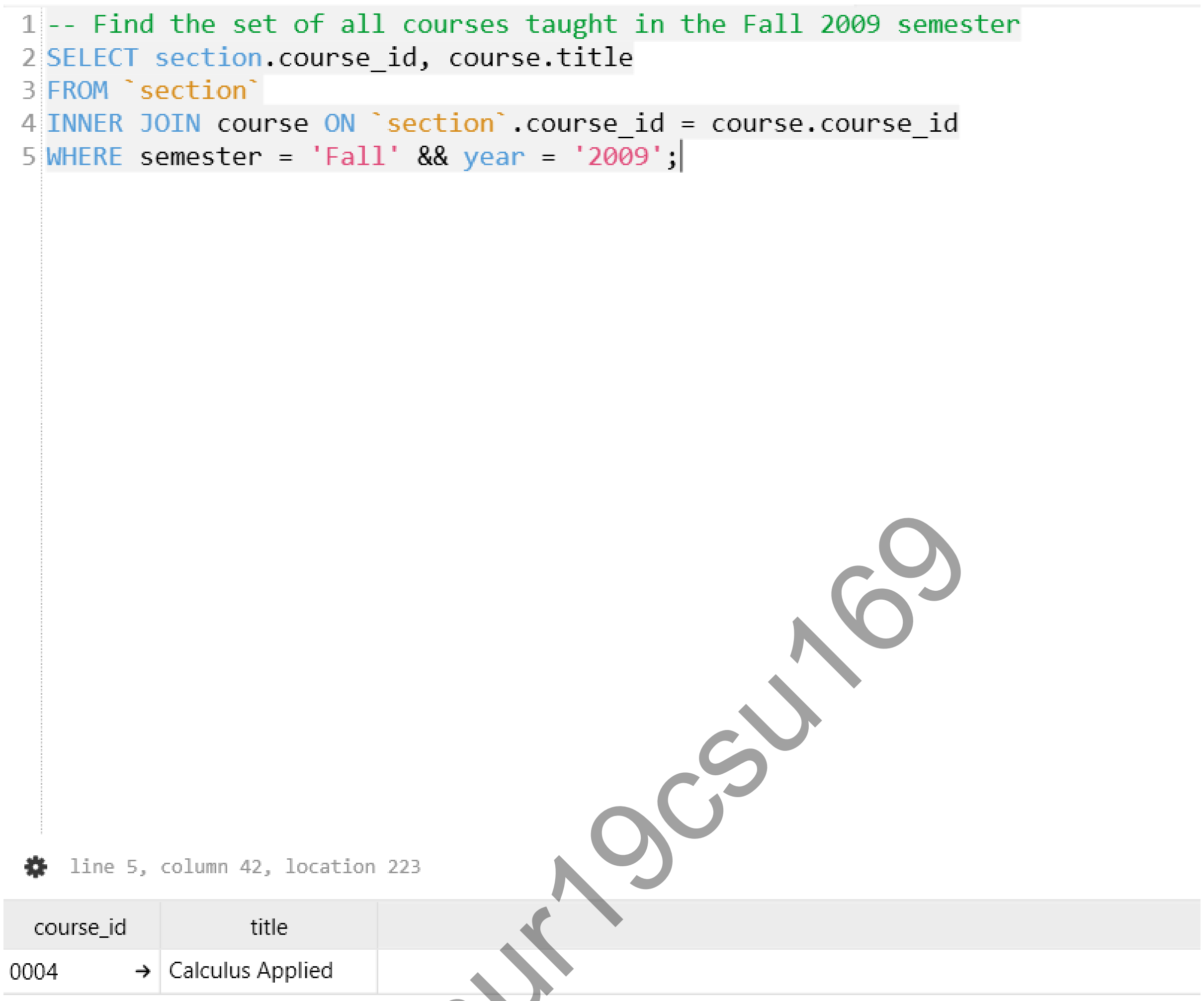
12. Find the set of all courses taught in the Fall 2009 semester



```
-- Find the set of all courses taught in the Fall 2009 semester
SELECT section.course_id, course.title
FROM `section`
INNER JOIN course ON `section`.course_id = course.course_id
WHERE semester = 'Fall' && year = '2009';
```

```
line 5, column 42, location 223
```

course_id	title
0004 →	Calculus Applied

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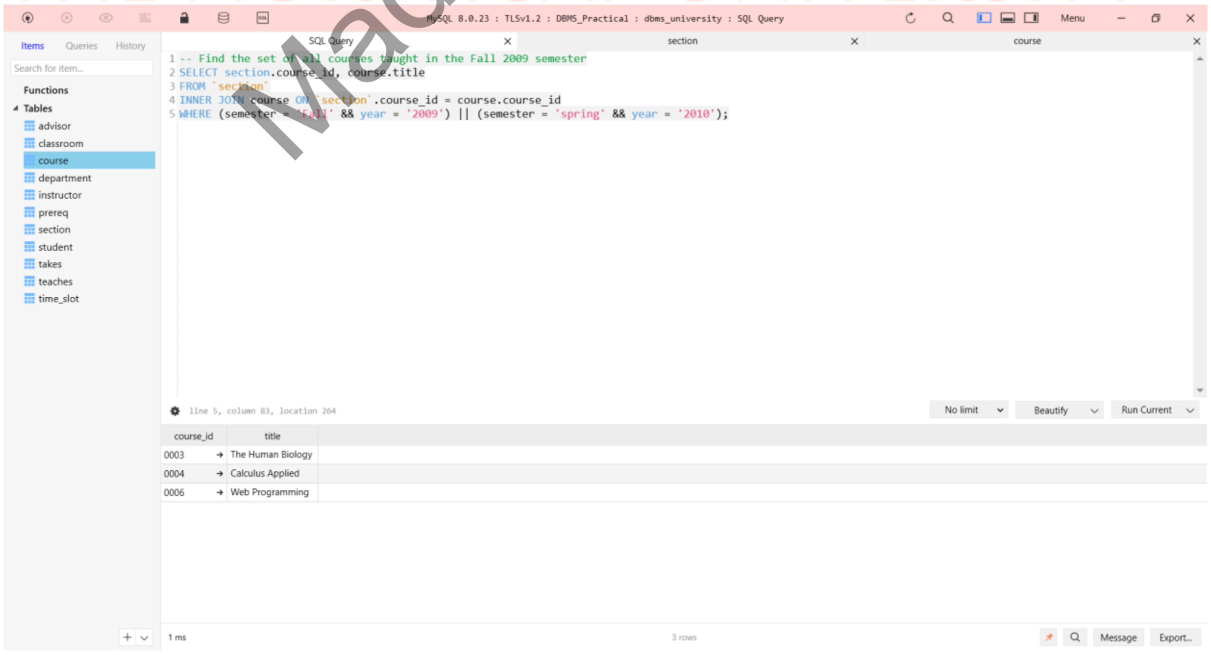
13. Find the set of all courses taught either in Fall 2009 or in Spring 2010, or both



```
MySQL 8.0.23 : TLSv1.2 : DBMS_Practical : dbms_university : SQL Query
```

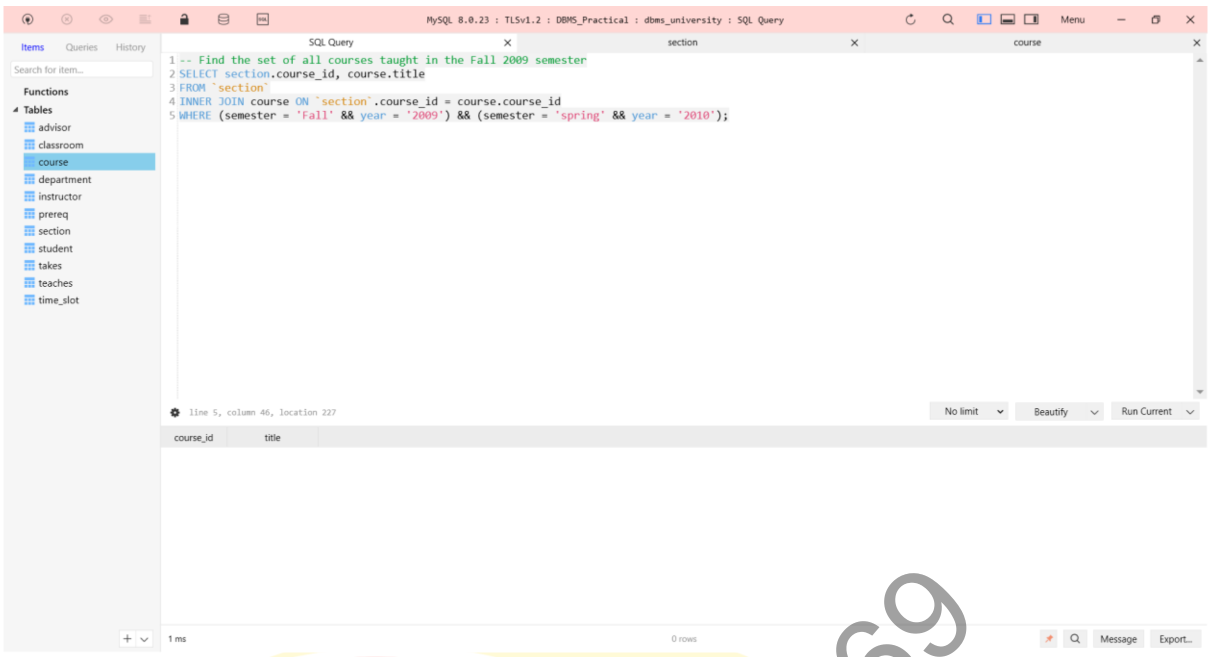
```
-- Find the set of all courses taught in the Fall 2009 semester
SELECT section.course_id, course.title
FROM `section`
INNER JOIN course ON `section`.course_id = course.course_id
WHERE (semester = 'Fall' && year = '2009') || (semester = 'spring' && year = '2010');
```

```
line 5, column 83, location 264
```

course_id	title
0003 →	The Human Biology
0004 →	Calculus Applied
0006 →	Web Programming

```
1 ms                                3 rows
```

14. Find the set of all courses taught in the Fall 2009 as well as in Spring 2010



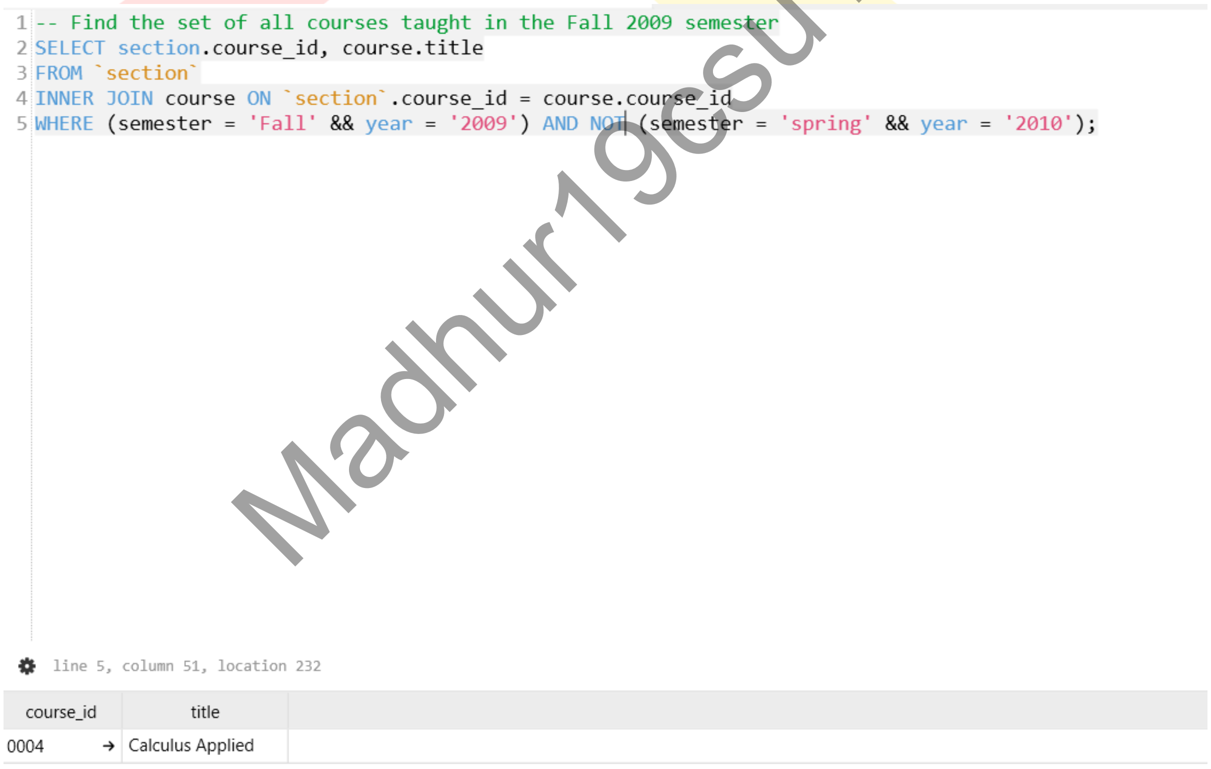
```
-- Find the set of all courses taught in the Fall 2009 semester
SELECT section.course_id, course.title
FROM `section`
INNER JOIN course ON `section`.course_id = course.course_id
WHERE (semester = 'Fall' && year = '2009') && (semester = 'spring' && year = '2010');
```

line 5, column 46, location 227

course_id	title

1 ms   0 rows

15. Find all courses taught in the Fall 2009 semester but not in the Spring 2010 semester



```
-- Find the set of all courses taught in the Fall 2009 semester
SELECT section.course_id, course.title
FROM `section`
INNER JOIN course ON `section`.course_id = course.course_id
WHERE (semester = 'Fall' && year = '2009') AND NOT (semester = 'spring' && year = '2010');
```

line 5, column 51, location 232

course_id	title
0004	Calculus Applied

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