DBMS ASSIGNMENT 2

Aggregates and grouping and ordering

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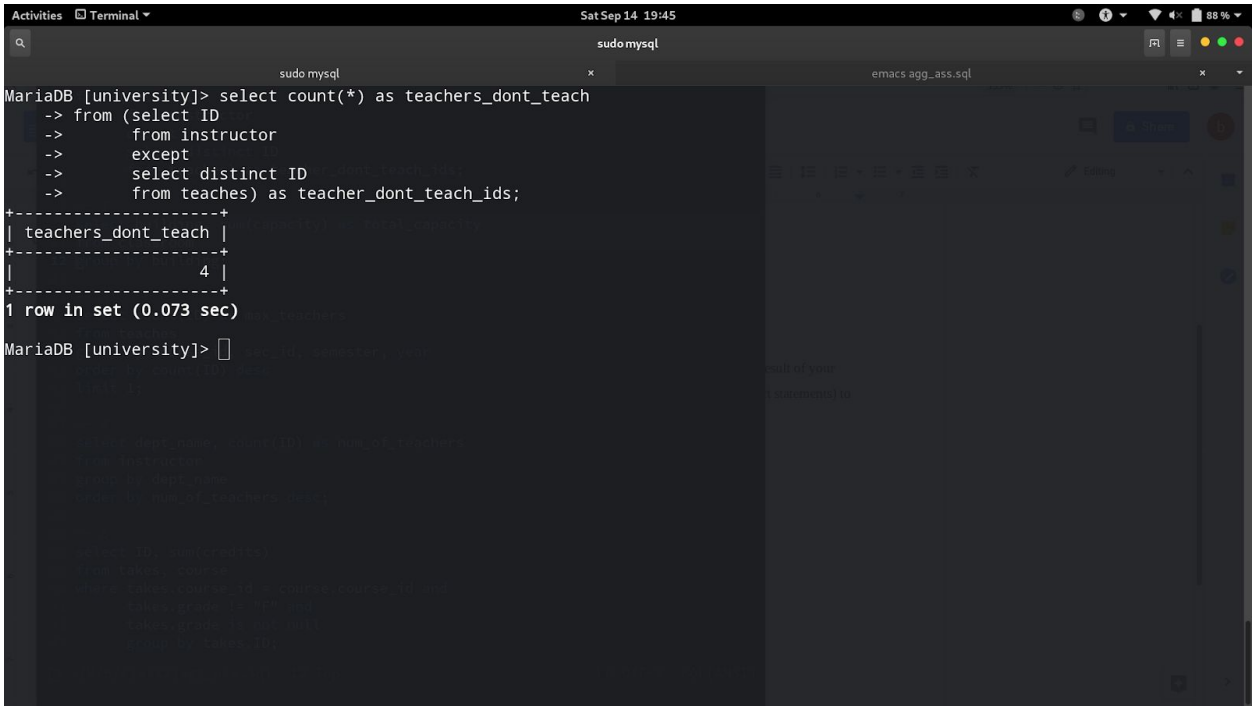
Batch: T3
Year: TY

- Find the number of instructors who have never taught any course. If the result of your query is empty, add the appropriate data (and include corresponding insert statements) to ensure the result is not empty.

  Query: select count(*) as teachers_dont_teach
  from (select ID
  from instructor
  except
  select distinct ID
  from teaches) as teacher_dont_teach_ids;

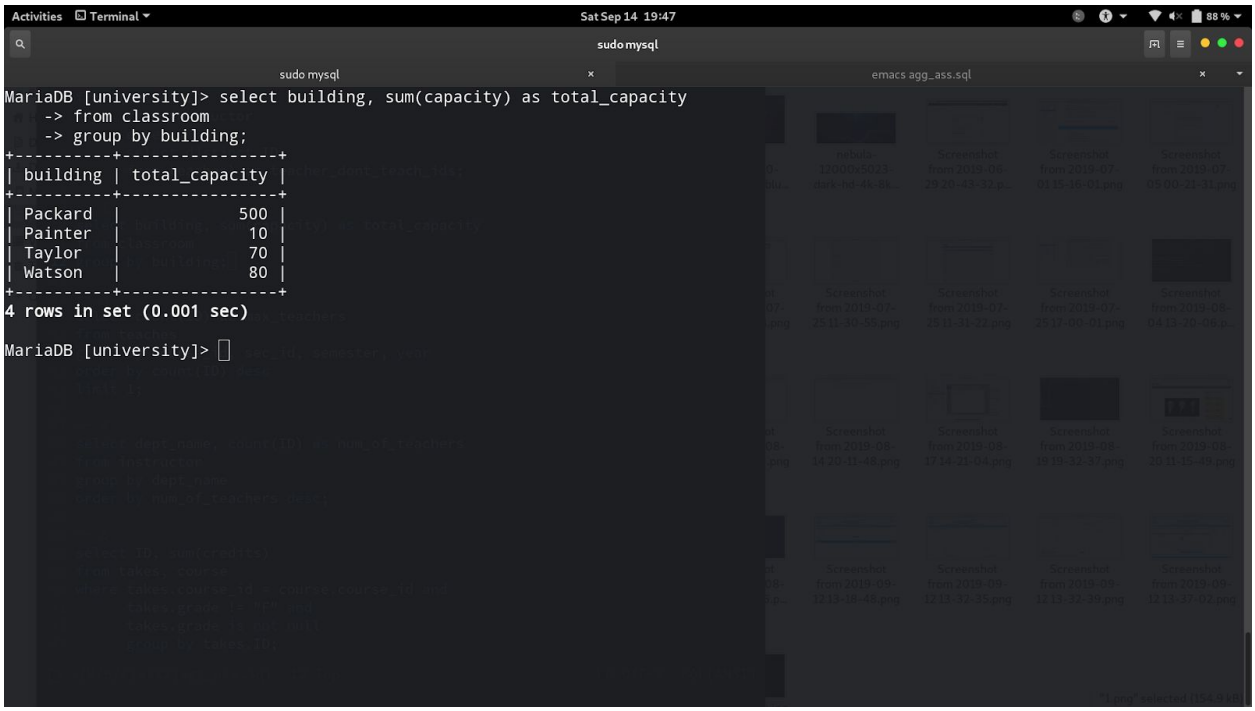
  Result:



- Find the total capacity of every building in the university.

  Query: select building, sum(capacity) as total_capacity
  from classroom
  group by building;

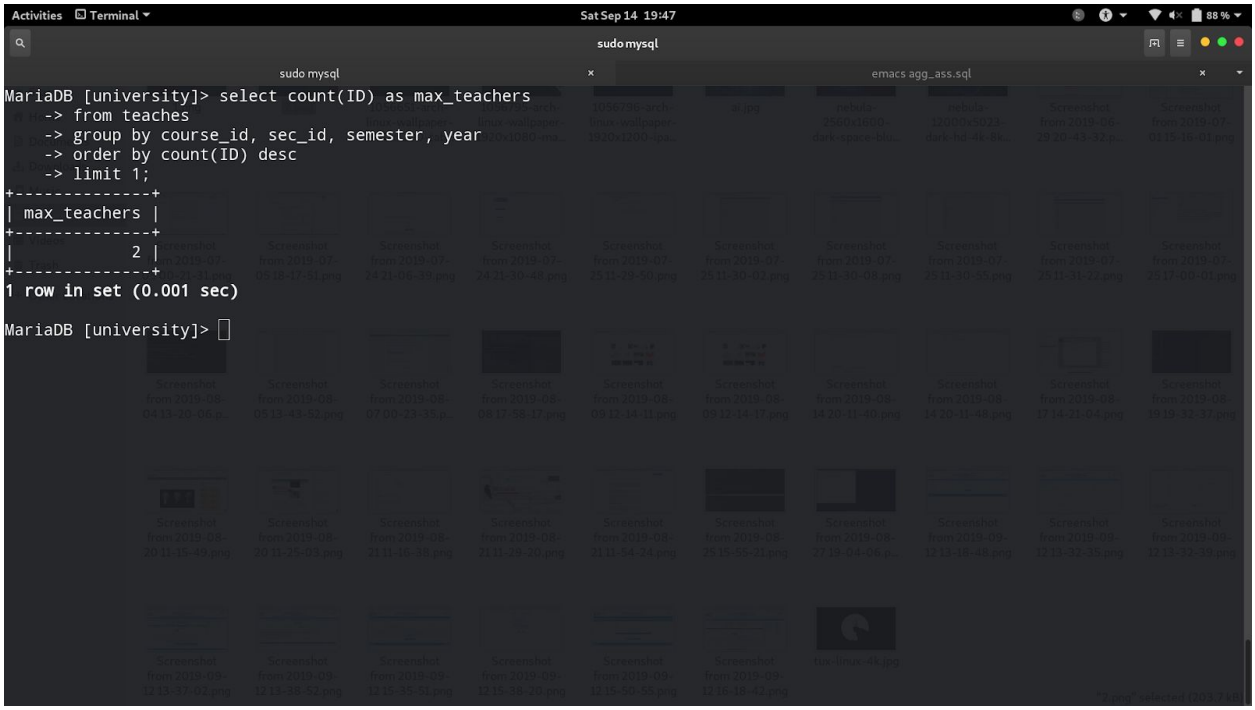
  Result:



- Find the maximum number of teachers for any single course section. Your output should be a single number. For example, if CS-101 section 1 in Spring 2012 had 3 instructors teaching the course, and no other section had more instructors teaching the section, your answer would be 3.

  Query: select count(ID) as max_teachers
  from teaches
  group by course_id, sec_id, semester, year
  order by count(ID) desc
  limit 1;

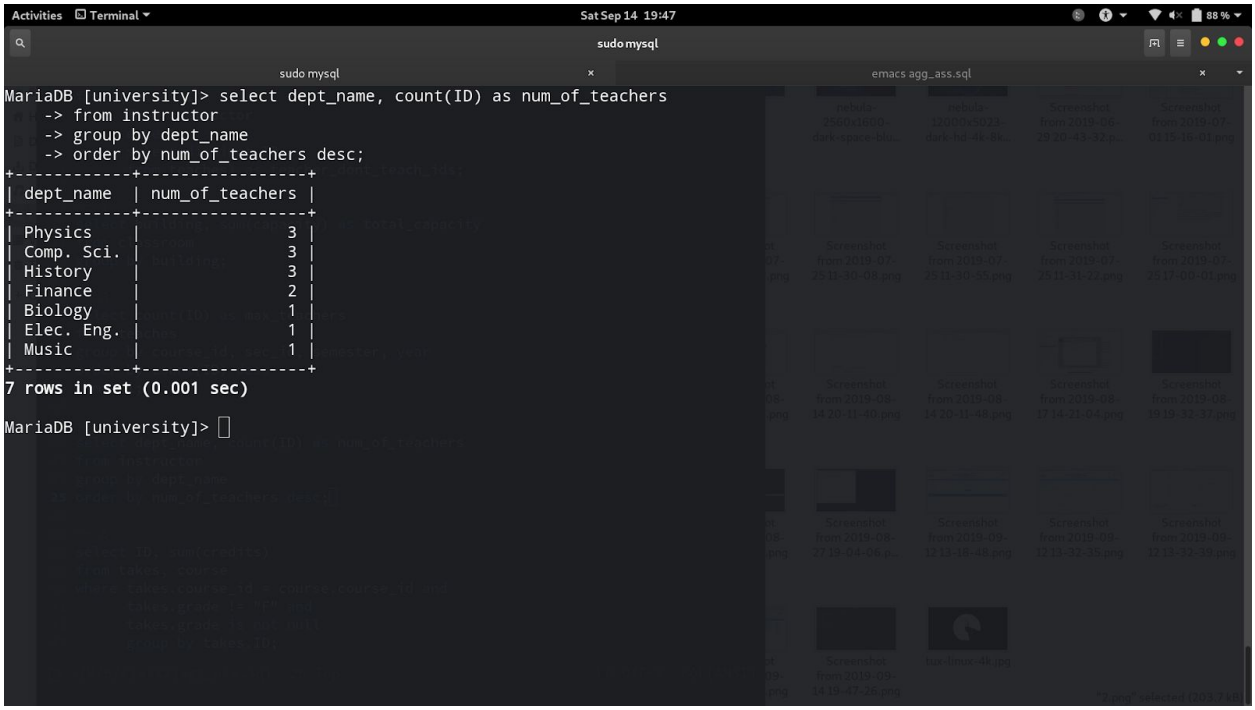
  Result:



- Find all departments that have at least one instructor, and list the names of the departments along with the number of instructors; order the result in descending order of number of instructors.

  Query: select dept_name, count(ID) as num_of_teachers
  from instructor
  group by dept_name
  order by num_of_teachers desc;

  Result:



- For each student, compute the total credits they have successfully completed, i.e. total credits of courses they have taken, for which they have a non-null grade other than 'F'. Do NOT use the tot_creids attribute of student.

  Query: select ID, sum(credits)

  from takes, course

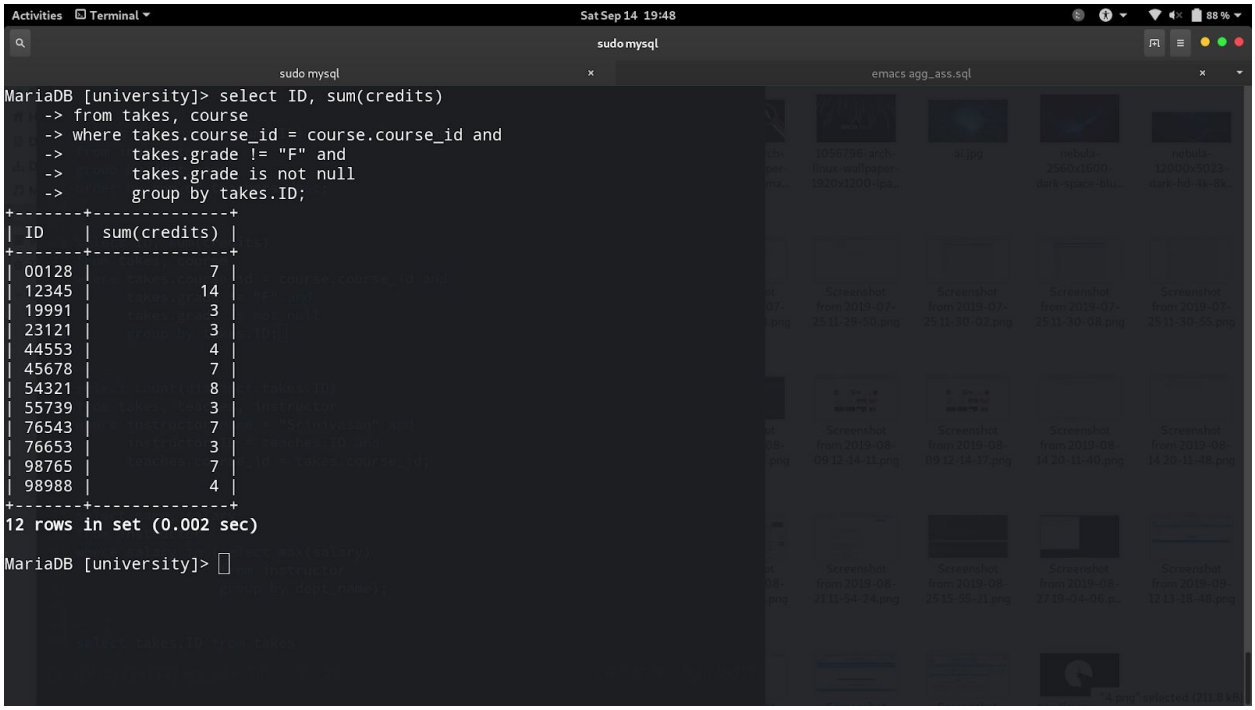
  where takes.course_id = course.course_id and

  takes.grade != "F" and

  takes.grade is not null

  group by takes.ID;

  Result:



- Find the number of students who have been taught (at any time) by an instructor named 'Srinivasan'. Make sure you count a student only once even if the student has taken more than one course from Srinivasan.

  Query: select count(distinct takes.ID)

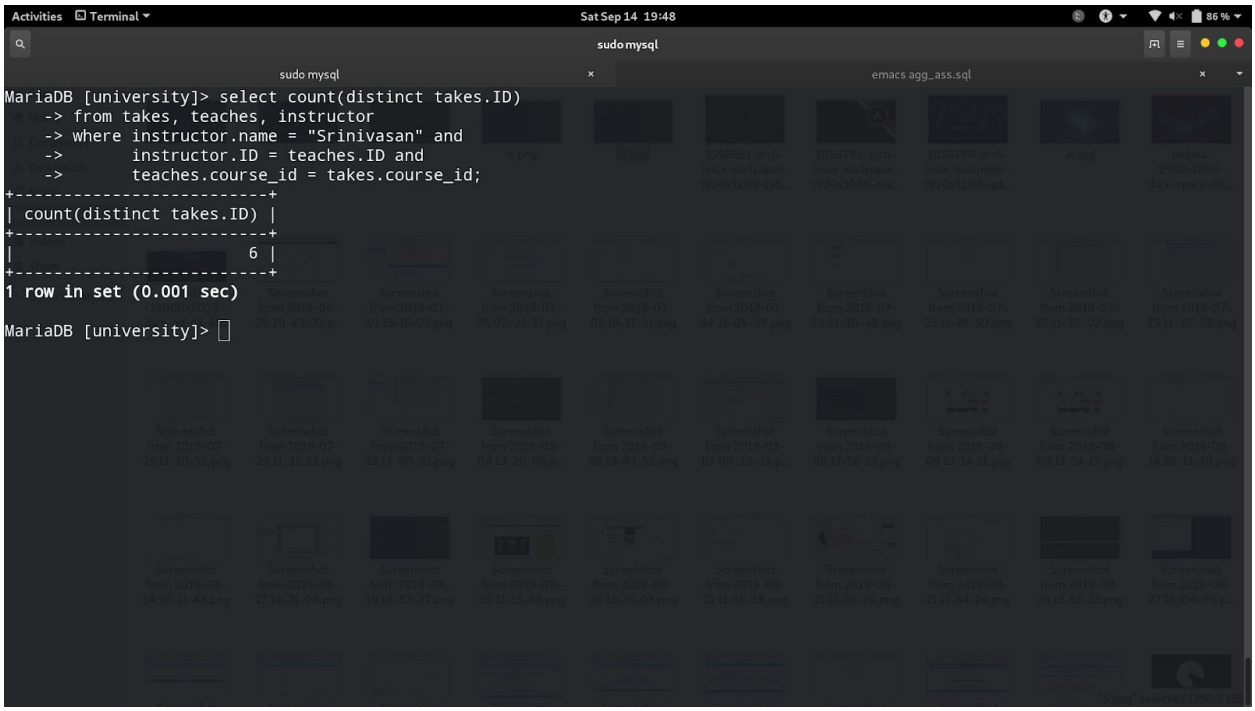
  from takes, teaches, instructor

  where instructor.name = "Srinivasan" and

  instructor.ID = teaches.ID and

  teaches.course_id = takes.course_id;

  Result:



- Find the name of all instructors who get the highest salary in their department.

  Query: select name, salary

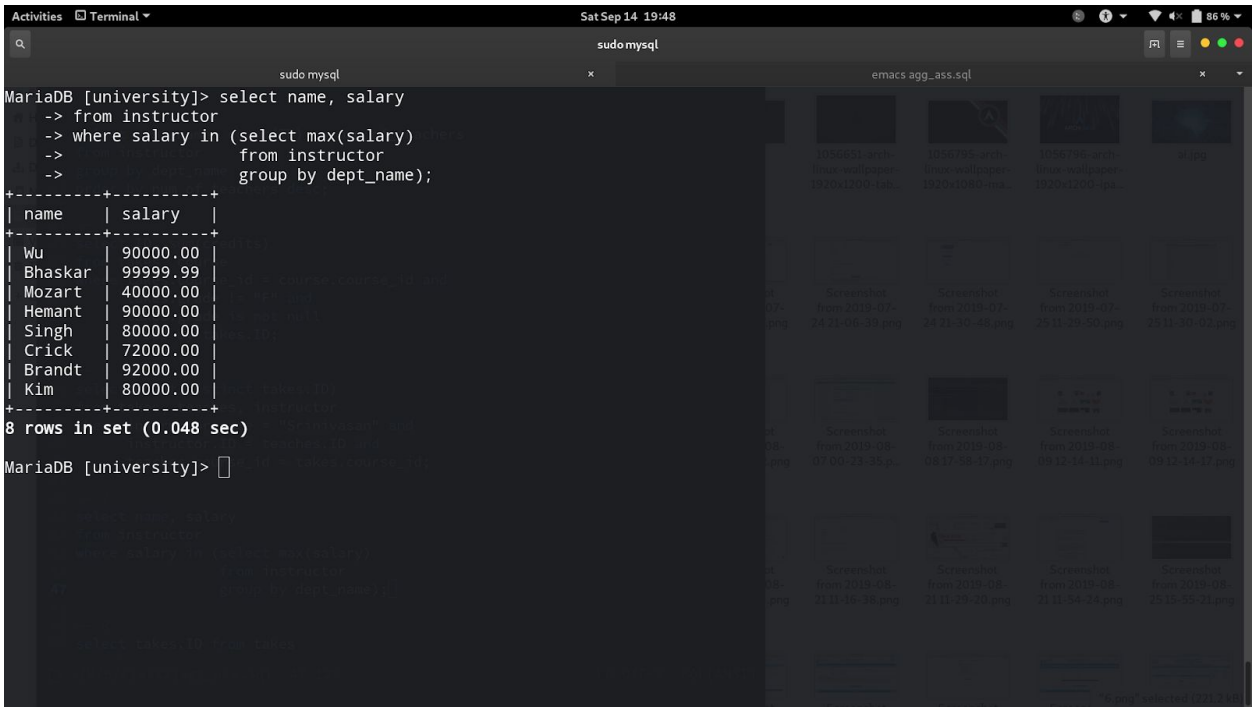
  from instructor

  where salary in (select max(salary)

  from instructor

  group by dept_name);

  Result:



- Find all students who have taken all courses taken by instructor 'Srinivasan'. (This is the division operation of relational algebra.) You can implement it by counting the number of courses taught by Srinivasan, and for each student (i.e. group by student), find the number of courses taken by that student, which were taught by Srinivasan. Make sure to count each course ID only once.

  Query: select takes.ID from takes

  except

  select students_not_in_all_srinivasan.ID from

  (select student.ID, srinivasan_courses.course_id

  from student, (select teaches.course_id

  from teaches, instructor

  where instructor.name = "Srinivasan" and

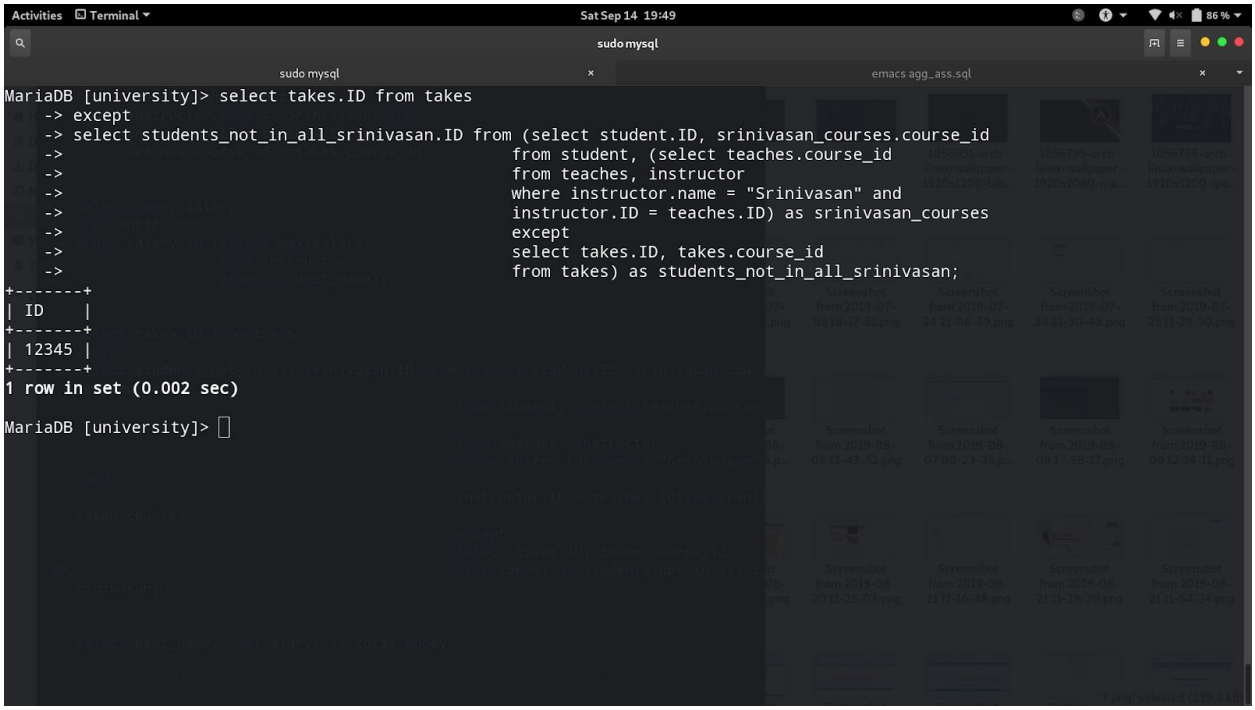
  instructor.ID = teaches.ID) as srinivasan_courses

  except

  select takes.ID, takes.course_id

  from takes) as students_not_in_all_srinivasan;

  Result:



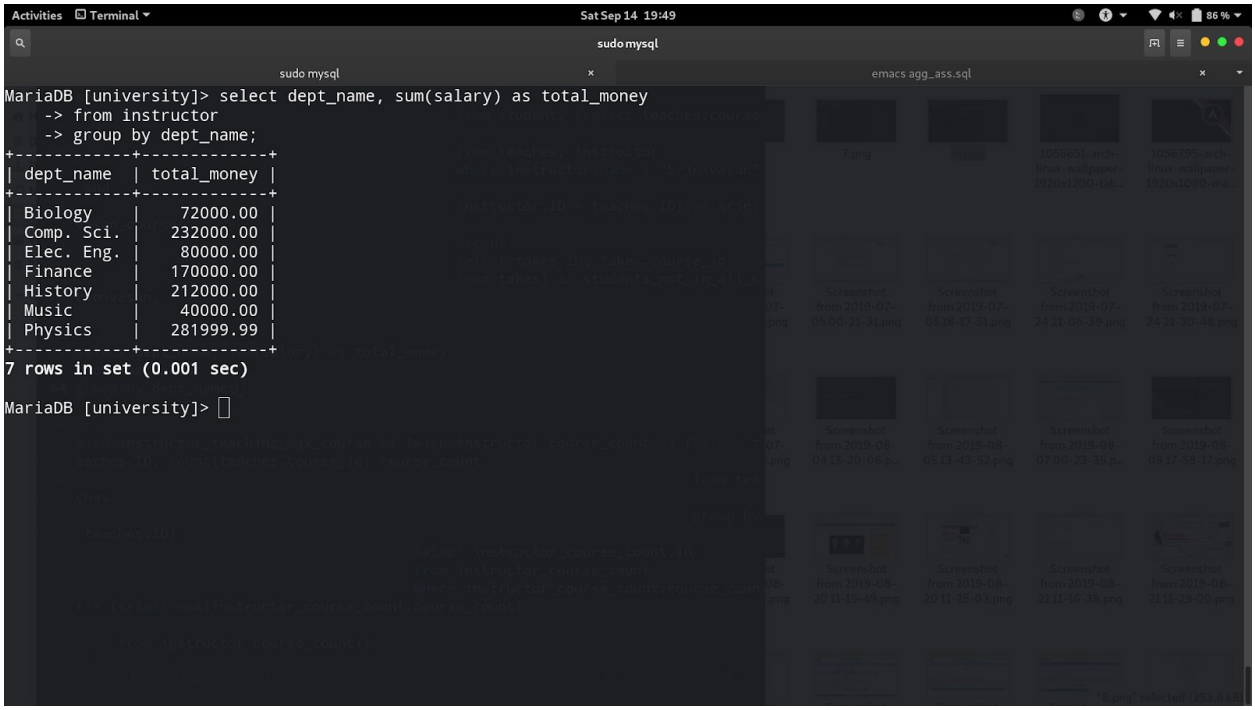
- Find the total money spent by each department for salaries of instructors of that department.

  Query: select dept_name, sum(salary) as total_money

  from instructor

  group by dept_name;

  Result:



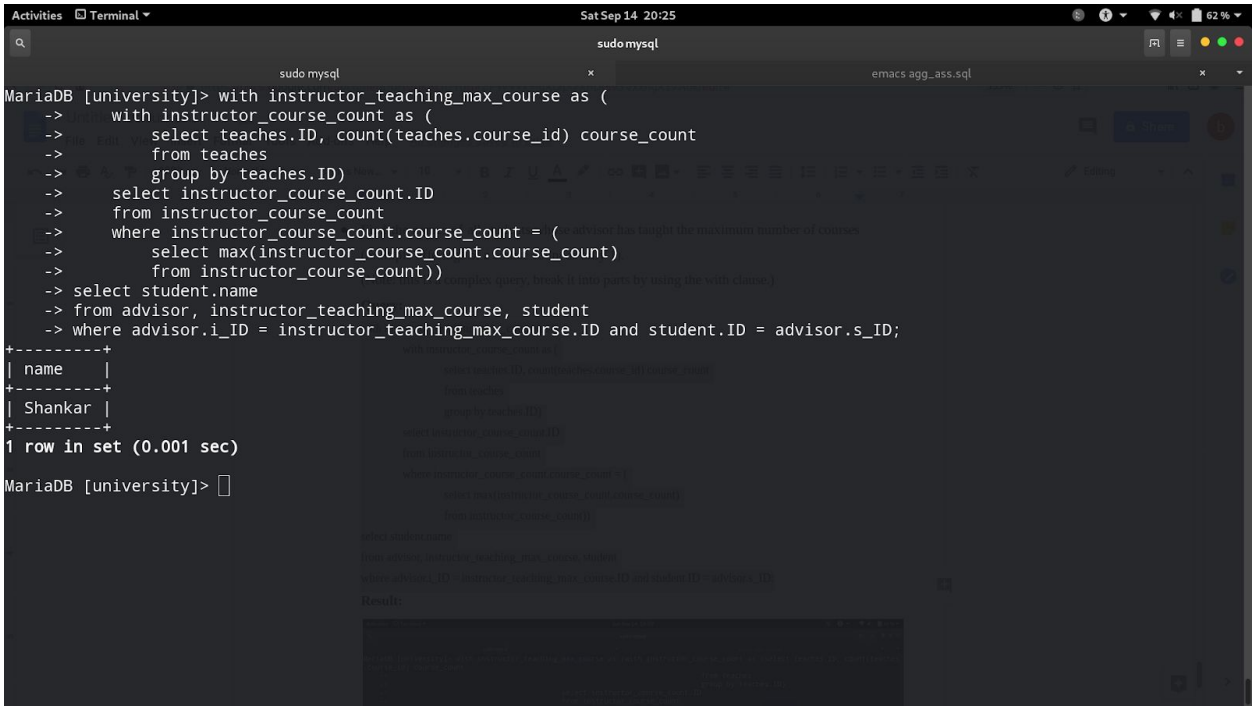
- Find the names of all students whose advisor has taught the maximum number of courses (multiple offerings of a course count as only 1).

  (Note: this is a complex query, break it into parts by using the with clause.)

  Query:

```
with instructor_teaching_max_course as (
        with instructor_course_count as (
                select teaches.ID, count(teaches.course_id) course_count
                from teaches
                group by teaches.ID)
        select instructor_course_count.ID
        from instructor_course_count
        where instructor_course_count.course_count = (
                select max(instructor_course_count.course_count)
                from instructor_course_count))
select student.name
from advisor, instructor_teaching_max_course, student
where advisor.i_ID = instructor_teaching_max_course.ID and student.ID = advisor.s_ID;
```

  Result:



- Find the id and title of all courses which do not require any prerequisites.

  Query:

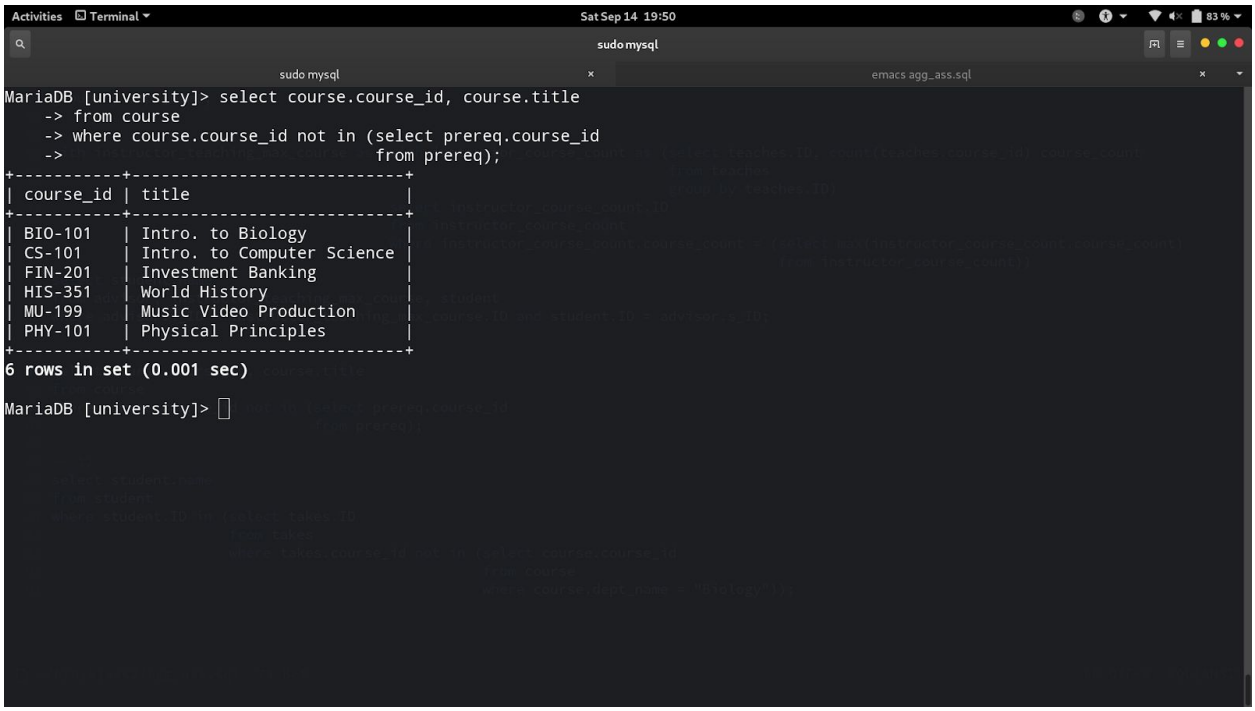
  select course.course_id, course.title

  from course

  where course.course_id not in (select prereq.course_id

  from prereq);

  Result:



- Find the names of students who have not taken any biology dept. courses.

  Query:

  ```
  select student.name
  from student
  where student.ID in (select takes.ID
                       from takes
                       where takes.course_id not in (select course.course_id
                                                     from course
                                                     where course.dept_name = "Biology"));
  ```

  Result: