Data Science in Practice: Data Management

Keys to in-class exercises

1. Open the Online SQL interpreter (https://www.db-book.com/db7/university-lab-dir/sqljs.html)
2. Write SQL codes to get a list of:
   i. Students IDs (hint: from the ***takes*** relation)

```
select distinct ID
from takes
```

   ii. Instructors

```
select distinct name
from instructor
```

   iii. Departments

```
select distinct dept_name
from department
```

3. Write in SQL codes to do following queries:
   i. Find the ID and name of each student who has taken at least one Comp. Sci. course; make sure there are no duplicate names in the result.

```
select      student.ID, name
from        student, takes, course
where       course.dept_name = 'Comp. Sci.'
            and student.ID = takes.ID
            and course.course_id = takes.course_id
```

   ii. Add grades to the list

```
select      student.ID, name, grade
from        student, takes, course
where       course.dept_name = 'Comp. Sci.'
and         student.ID = takes.ID
and         course.course_id = takes.course_id
```

   iii. Find the ID and name of each student who has not taken any course offered before 2017.

```
select distinct ID, name
from student
where ID not in (
select ID
from takes
```

where *year* < 2017)

iv. For each department, find the maximum salary of instructors in that department. You may assume that every department has at least one instructor.

```
select dept_name, max(salary)
from instructor
group by dept_name
```

v. Find the lowest, across all departments, of the per-department maximum salary computed by the preceding query.

```
select min(maxsalary)
from (select dept_name, max(salary) as maxsalary
from instructor group by dept_name)
```

vi. Add names to the list

```
select min(maxsalary), name
from (select dept_name, max(salary) as maxsalary, name
from instructor group by dept_name)
```

4. Find instructor (with name and ID) who has never given an A grade in any course she or he has taught. (Instructors who have never taught a course trivially satisfy this condition.)

```
select ID, name
from instructor
except
select distinct instructor.ID, instructor.name from instructor, teaches, takes
where instructor.ID = teaches.ID
and teaches.course_id = takes.course_id and teaches.year = takes.year
and teaches.semester= takes.semester and teaches.sec_id= takes.sec_id
and takes.grade = 'A';
```

5. Write SQL query to find the number of students in each section. The result columns should appear in the order "courseid, secid, year, semester, num". You do not need to output sections with 0 students.

```
select course_id, sec_id, year, semester, count(*) as num
from takes
group by course_id, sec_id, year, semester
```