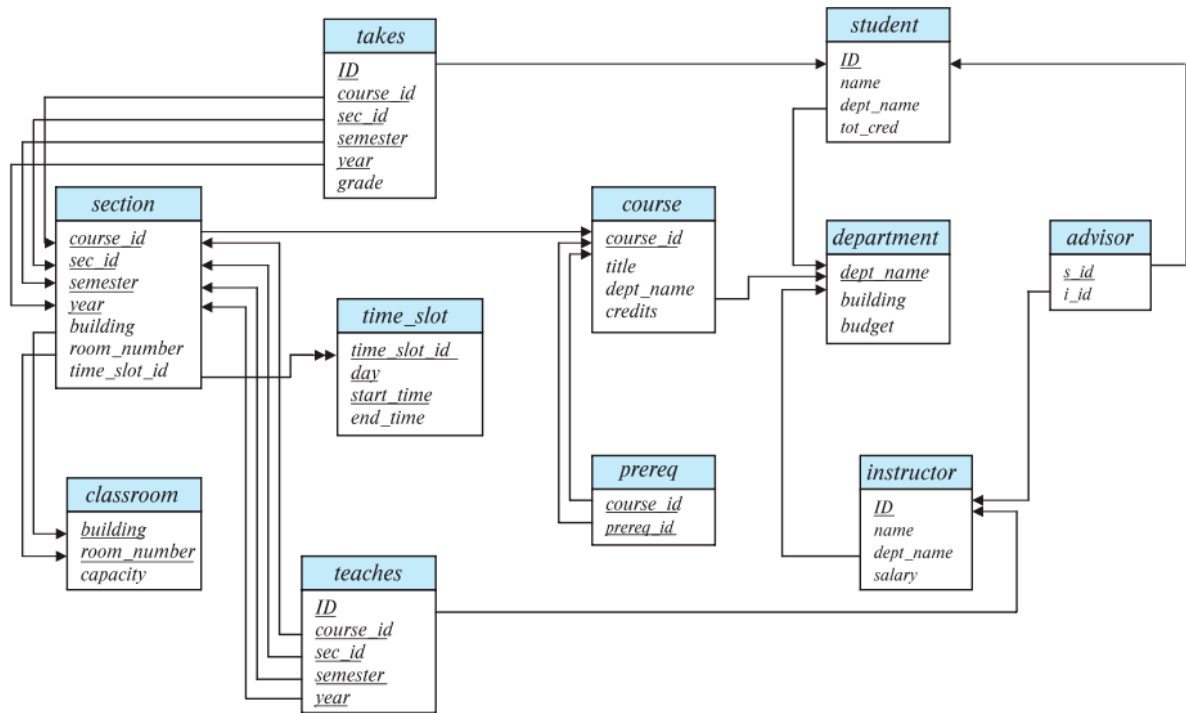


Consider this schema from the textbook for a university database:



Schema Diagram for University Database



Write the following queries in SQL, using this schema. You can test your answers at <https://www.db-book.com/db7/university-lab-dir/sqljs.html>. The expected output is given for each query when run on [large-university.db](#) (download this file and run SQLite locally via `sqlite3 large-university.db` or upload to the browser-based version).

Find the names of those departments whose budget is higher than that of Astronomy. List them in alphabetic order.¹

```

dept_name
Athletics
Biology
Cybernetics
Finance
History
Math
Physics
Psychology
    
```

Display a list of all instructors, showing each instructor's ID and the number of sections taught. Make sure to show the number of sections as 0 for instructors who have not taught any section.²

```

ID  number_of_sections
16807  0
31955  0
    
```

35579	0
37687	0
4034 0	
50885	0
52647	0
57180	0
58558	0
59795	0
63395	0
64871	0
72553	0
74426	0
78699	0
79653	0
95030	0
96895	0
97302	0
15347	1
25946	1
4233 1	
42782	1
48507	1
48570	1
50330	1
65931	1
73623	1
80759	1
90376	1
90643	1
14365	2
28097	2
28400	2
3335 2	
63287	2
81991	2
19368	3
34175	3
41930	3
3199 4	
43779	4
95709	4
36897	5
74420	6
77346	6
79081	6
99052	9
6569 10	
22591	13

For each student who has retaken a course at least twice (i.e., the student has taken the course at least three times), show the course ID and the student's ID. Please display your results in order of course ID and do not display duplicate rows.³

course_id	ID
362	16480
362	16969
362	27236
362	39925
362	39978
362	44881
362	49611
362	5414

362	69581
362	9993

Find the names of Biology students who have taken at least 3 Accounting courses.⁴

```

name
Michael
Dalton
Shoji
Wehen
Uchiyama
Schill
Kaminsky
Giannoulis

```

Find the sections that had maximum enrollment in Fall 2010.⁵

course_id	sec_id
867	2

Find student names and the number of law courses taken for students who have taken at least half of the available law courses. (These courses are named things like 'Tort Law' or 'Environmental Law').⁶

name	course_count
Nakajima	4
Nikut	4
Hahn-	4
Nanda	4
Schinag	4

Find the rank and name of the 10 students who earned the most A grades (A-, A, A+). Use alphabetical order by name to break ties. Note: the browser SQLite does not support window functions.⁷

rank	name
1	Neuhold
2	Greene
3	Hons
4	Lepp
5	Lingamp
6	Mandviwall
7	Drig
8	Fabregas
9	Haigh
10	Heilprin

1. Find out the ID and salary of the instructors.
2. Find out the ID and salary of the instructor who gets more than \$85,000.
3. Find out the department names and their budget at the university.
4. List out the names of the instructors from Computer Science who have more than \$70,000.
5. For all instructors in the university who have taught some course, find their names and the course ID of all courses they taught.
6. Find the names of all instructors whose salary is greater than at least one instructor in the Biology department.

7. Find the advisor of the student with ID 12345
8. Find the average salary of all instructors.
9. Find the names of all departments whose building name includes the substring 'Watson'.
10. Find the names of instructors with salary amounts between \$90,000 and \$100,000.
11. Find the instructor names and the courses they taught for all instructors in the Biology department who have taught some course.
12. Find the courses taught in Fall-2009 semester.
13. Find the set of all courses taught either in Fall-2009 or in Spring-2010.
14. Find the set of all courses taught in the Fall-2009 as well as in Spring-2010.
15. Find all courses taught in the Fall-2009 semester but not in the Spring-2010 semester.
16. Find all instructors who appear in the *instructor* relation with null values for *salary*.
17. Find the average salary of instructors in the Finance department.
18. Find the total number of instructors who teach a course in the Spring-2010 semester.
19. Find the average salary in each department.
20. Find the number of instructors in each department who teach a course in the Spring-2010 semester.
21. List out the departments where the average salary of the instructors is more than \$42,000.
22. For each course section offered in 2009, find the average total credits (*tot cred*) of all students enrolled in the section, if the section had at least 2 students.
23. Find all the courses taught in both the Fall-2009 and Spring-2010 semesters.
24. Find all the courses taught in the Fall-2009 semester but not in the Spring-2010 semester.
25. Select the names of instructors whose names are neither "Mozart" nor "Einstein".
26. Find the total number of (distinct) students who have taken course sections taught by the instructor with ID 110011.
27. Find the ID and names of all instructors whose salary is greater than at least one instructor in the History department.
28. Find the names of all instructors that have a salary value greater than that of each instructor in the Biology department.
29. Find the departments that have the highest average salary.
30. Find all courses taught in both the Fall 2009 semester and in the Spring-2010 semester.
31. Find all students who have taken all the courses offered in the Biology department.
32. Find all courses that were offered at most once in 2009.
33. Find all courses that were offered at least twice in 2009.
34. Find the average instructors' salaries of those departments where the average salary is greater than \$42,000.
35. Find the maximum across all departments of the total salary at each department.
36. List all departments along with the number of instructors in each department.

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37. Find the titles of courses in the Comp. Sci. department that has 3 credits.
38. Find the IDs of all students who were taught by an instructor named Einstein; make sure there are no duplicates in the result.
39. Find the highest salary of any instructor.
40. Find all instructors earning the highest salary (there may be more than one with the same salary).
41. Find the enrollment of each section that was offered in Autumn-2009.
42. Find the maximum enrollment, across all sections, in Autumn-2009.
43. Find the salaries after the following operation: Increase the salary of each instructor in the Comp. Sci. department by 10%.
44. Find all students who have not taken a course.
45. List all course sections offered by the Physics department in the Fall-2009 semester, with the building and room number of each section.
46. Find the student names who take courses in Spring-2010 semester at Watson Building.
47. List the students who take courses teaches by 'Brandt'.
48. Find out the average salary of the instructor in each department.
49. Find the number of students who take the course titled 'Intro. To Computer Science'.
50. Find out the total salary of the instructors of the Computer Science department who take a course(s) in Watson building.
51. Find out the course titles which starts between 10:00 to 12:00.
52. List the course names where 'CS-101' is the pre-requisite course.
53. List the student names who get more than B+ grades in their respective courses.
54. Find the student who takes the maximum credit from each department.
55. Find out the student ID and grades who take a course(s) in Spring-2009 semester.
56. Find the building(s) where the student takes the course titled 'Image Processing'.
57. Find the room no. and the building where the student from Fall-2009 semester can take a course(s)