

2. Write SQL codes to get a list of:

i. Students IDs (hint: from the takes relation)

Enter SQL commands here

```
1 SELECT DISTINCT ID
2 FROM takes;
3
4
```

Execute

Save the db

Load an SQLite database file:

Choose File No file chosen

ID
00128
12345
19991
23121
44553
45678
54321
55739
76543
76653
98765
98988

ii. Instructors

Enter SQL commands here

```
1 SELECT *
2 FROM instructor;
3
```

Execute

Save the db

Load an SQLite database file:

Choose File No file chosen

ID	name	dept_name	salary
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
22222	Einstein	Physics	95000
32343	El Said	History	60000
33456	Gold	Physics	87000
45565	Katz	Comp. Sci.	75000
58583	Califieri	History	62000
76543	Singh	Finance	80000
76766	Crick	Biology	72000
83821	Brandt	Comp. Sci.	92000
98345	Kim	Elec. Eng.	80000

iii. Departments

Enter SQL commands here

```
1 SELECT *  
2 FROM department;
```

Execute

Save the db

Load an SQLite database file:

Choose File

No file chosen

dept_name	building	budget
Biology	Watson	90000
Comp. Sci.	Taylor	100000
Elec. Eng.	Taylor	85000
Finance	Painter	120000
History	Painter	50000
Music	Packard	80000
Physics	Watson	70000

Write in SQL codes to do the 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.

Enter SQL commands here

```
1 SELECT DISTINCT s.ID, s.name  
2 FROM student s  
3 JOIN takes t ON s.ID = t.ID  
4 JOIN course c ON t.course_id = c.course_id  
5 WHERE c.dept_name = 'Comp. Sci.';  
6
```

Execute

Save the db

Load an SQLite database file:

Choose File

No file chosen

ID	name
00128	Zhang
12345	Shankar
45678	Levy
54321	Williams
76543	Brown
98765	Bourikas

- ii. Add grades to the list

Enter SQL commands here

```
1 SELECT DISTINCT s.ID, s.name, t.grade
2 FROM student s
3 JOIN takes t ON s.ID = t.ID
4 JOIN course c ON t.course_id = c.course_id
5 WHERE c.dept_name = 'Comp. Sci.';
6
```

Execute

Save the db

Load an SQLite database file:

Choose File No file chosen

ID	name	grade
00128	Zhang	A
00128	Zhang	A-
12345	Shankar	C
12345	Shankar	A
45678	Levy	F
45678	Levy	B+
45678	Levy	B
54321	Williams	A-
54321	Williams	B+
76543	Brown	A
98765	Bourikas	C-
98765	Bourikas	B

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

Enter SQL commands here

```
1 SELECT s.ID, s.name
2 FROM student s
3 WHERE NOT EXISTS (
4     SELECT 1
5     FROM takes t
6     JOIN section sec ON t.course_id = sec.course_id
7     WHERE s.ID = t.ID AND sec.year < 2017
8 );
9
```

Execute

Save the db

Load an SQLite database file:

Choose File No file chosen

ID	name
00128	Zhang
12345	Shankar
19991	Brandt
23121	Chavez
44553	Peltier
45678	Levy
54321	Williams
55739	Sanchez
70557	Snow
76543	Brown
76653	Aoi
98765	Bourikas
98988	Tanaka

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

Enter SQL commands here

```
1 SELECT d.dept_name, MAX(i.salary) as max_salary
2 FROM department d
3 JOIN instructor i ON d.dept_name = i.dept_name
4 GROUP BY d.dept_name;
5
```

Execute

Save the db

Load an SQLite datab

Choose File

No file chosen

dept_name	max_salary
Biology	72000
Comp. Sci.	92000
Elec. Eng.	80000
Finance	90000
History	62000
Music	40000
Physics	95000

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

Enter SQL commands here

```
1 SELECT MIN(max_salary) as lowest_max_salary
2 FROM (
3     SELECT MAX(i.salary) as max_salary
4     FROM instructor i
5     GROUP BY i.dept_name
6 ) as max_salaries;
7
```

Execute

Save the db

Load an SQLite dat

Choose File

No file chosen

lowest_max_salary
40000

- vi. Add names to the list

Enter SQL commands here

```
1 SELECT d.dept_name, i.name, i.salary as max_salary
2 FROM (
3     SELECT dept_name, MAX(salary) as max_salary
4     FROM instructor
5     GROUP BY dept_name
6 ) as max_salaries
7 JOIN instructor i ON max_salaries.dept_name = i.dept_name AND max_salaries.max
8 JOIN department d ON i.dept_name = d.dept_name
9 ORDER BY d.dept_name;
10
```

Execute

Save the db

Load an SQLite database file:

Choose File

No file chosen

dept_name	name	max_salary
Biology	Crick	72000
Comp. Sci.	Brandt	92000
Elec. Eng.	Kim	80000
Finance	Wu	90000
History	Califieri	62000
Music	Mozart	40000
Physics	Einstein	95000

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.)

Enter SQL commands here

```
1 SELECT i.ID, i.name
2 FROM instructor i
3 WHERE NOT EXISTS (
4     SELECT 1
5     FROM teaches t
6     JOIN takes tk ON t.course_id = tk.course_id
7     WHERE i.ID = t.ID AND tk.grade = 'A'
8 );
9
```

Execute

Save the db

Load an SQLite database

Choose File

No file chosen

ID	name
12121	Wu
15151	Mozart
22222	Einstein
32343	El Said
33456	Gold
45565	Katz
58583	Califieri
76543	Singh
98345	Kim