HW # 3

IM EPPS 6354; Spring 2024

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Q2 –Write SQL codes to get a list of;

- **Student IDs (hint from the *takes* relation)**

Enter SQL commands here

```
1  select distinct id from takes-- enter your commands here
```

| 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

i) Students – all attributes

Enter SQL commands here

```
1  select * from student;-- enter your commands here
```

Execute   Save the db   Load an SQLite database file: Choose File No file chosen

ID	name	dept_name	tot_cred
00128	Zhang	Comp. Sci.	102
12345	Shankar	Comp. Sci.	32
19991	Brandt	History	80
23121	Chavez	Finance	110
44553	Peltier	Physics	56
45678	Levy	Physics	46
54321	Williams	Comp. Sci.	54
55739	Sanchez	Music	38
70557	Snow	Physics	0
76543	Brown	Comp. Sci.	58
76653	Aoi	Elec. Eng.	60
98765	Bourikas	Elec. Eng.	98
98988	Tanaka	Biology	120

Q 2

- ## ii) list of instructors:

Enter SQL commands here

```
1  select name from instructor-- enter your commands here
```

| Execute | Save the db | Load an SQLite database file: Choose File No file chosen |

name
Srinivasan
Wu
Mozart
Einstein
El Said
Gold
Katz
Califieri
Singh
Crick
Brandt
Kim

ii) List of instructors with ID

Enter SQL commands here

```
1 select ID, name from instructor-- enter your commands here
```

Execute   Save the db   Load an SQLite database file: Choose File No file chosen

ID	name
10101	Srinivasan
12121	Wu
15151	Mozart
22222	Einstein
32343	El Said
33456	Gold
45565	Katz
58583	Califieri
76543	Singh
76766	Crick
83821	Brandt
98345	Kim

ii) List of instructors with ID, dept name, and salary

Enter SQL commands here

```
1  select * from instructor;-- enter your commands here
```

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) List of departments

Enter SQL commands here

```
1  select dept_name from department-- enter your commands here
```

Execute   Save the db   Load an SQLite database file: [Choose File] No file chosen

dept_name
Biology
Comp. Sci.
Elec. Eng.
Finance
History
Music
Physics

iii) All attributes of the department

Enter SQL commands here

```
1 select * from department;-- enter your commands here
```

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

Q3.i) find the ID and name of each student who has taken at least 1 comp sci course, make sure there are no duplicate names.

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.';
```

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

From class practice

Enter SQL commands here

```
1  select distinct  student.id, name
2  from student, takes, course
3  where student.id = takes.id and
4  course.course_id = takes.course_id and
5  course.dept_name = 'Comp. Sci.';
```

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

Q3.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.';
```

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

From class practice

Enter SQL commands here

```
1  select distinct  student.id, name, grade
2  from student, takes, course
3  where student.id = takes.id and
4  course.course_id = takes.course_id and
5  course.dept_name = 'Comp. Sci.';
```

| 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

Q3.iii)Find the name and ID of each student who has not taken any course offered before 2017

Enter SQL commands here

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

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

From Dr. Ho in class Q3.iii)Find the name and ID of each student who has not taken any course offered before 2017

Enter SQL commands here

```
1 select distinct ID, name
2 from student
3 where ID not in(
4 select ID
5 from takes
6 where year <2017)
```

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

Q3.iv) for each department, find the maximum salary of instructors in that department. Assume that each dept has at least 1 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;
```

| Execute | Save the db | Load an SQLite database file: | 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

Q3.v) Find the lowest , across all departments, of the per-department salary computed by the preceding query

Enter SQL commands here

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

Execute | Save the db | Load an SQLite database file: Choose File No file chosen

lowest_max_salary
40000

Q3.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_salary
8  JOIN department d ON i.dept_name = d.dept_name
9  ORDER BY d.dept_name;
```

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
Comp. Sci.	Katz	75000
Comp. Sci.	Srinivasan	65000
Elec. Eng.	Kim	80000
Finance	Singh	80000
Finance	Wu	90000
History	Califieri	62000
History	El Said	60000
Music	Mozart	40000
Physics	Einstein	95000
Physics	Gold	87000

Q4. 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 );
```

Execute   Save the db   Load an SQLite database file: Choose File No file chosen

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

Q4 by Dr. Ho

Enter SQL commands here

```
1  select ID, 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' )
```

Execute	Save the db	Load an SQLite database file:	Choose File	No file chosen

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

Q5.

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.

Enter SQL commands here

```
1  select course_id, sec_id,year, semester
2  from takes
```

Execute   Save the db   Load an SQLite database file: Choose File No file chosen

course_id	sec_id	year	semester
CS-101	1	2017	Fall
CS-347	1	2017	Fall
CS-101	1	2017	Fall
CS-190	2	2017	Spring
CS-315	1	2018	Spring
CS-347	1	2017	Fall
HIS-351	1	2018	Spring
FIN-201	1	2018	Spring
PHY-101	1	2017	Fall
CS-101	1	2017	Fall
CS-101	1	2018	Spring
CS-319	1	2018	Spring
CS-101	1	2017	Fall
CS-190	2	2017	Spring
MU-199	1	2018	Spring
CS-101	1	2017	Fall
CS-319	2	2018	Spring
EE-181	1	2017	Spring
CS-101	1	2017	Fall
CS-315	1	2018	Spring
BIO-101	1	2017	Summer
BIO-301	1	2018	Summer

Q5. version 2

Enter SQL commands here

```
1 select course_id, sec_id, year, semester, count(*) as number
2 from takes
3 group by course_id, sec_id, year, semester
```

| Execute | Save the db | Load an SQLite database file: | Choose File | No file chosen |

course_id	sec_id	year	semester	number
BIO-101	1	2017	Summer	1
BIO-301	1	2018	Summer	1
CS-101	1	2017	Fall	6
CS-101	1	2018	Spring	1
CS-190	2	2017	Spring	2
CS-315	1	2018	Spring	2
CS-319	1	2018	Spring	1
CS-319	2	2018	Spring	1
CS-347	1	2017	Fall	2
EE-181	1	2017	Spring	1
FIN-201	1	2018	Spring	1
HIS-351	1	2018	Spring	1
MU-199	1	2018	Spring	1
PHY-101	1	2017	Fall	1