# Assignment-2

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30th August 2022

1. The following table contains all the integrity constraints for each table definition in the university schema.

| Table | Primary Key | Domain of PK | Foreign Key | Not NULL |
|---|---|---|---|---|
| classroom | building, room_number | varchar | None | building, room_number |
| department | dept_name | varchar | None | dept_name, budget |
| course | course_id | varchar | dept_name (*references department*) | course_id, credits |
| instructor | ID | Varchar | dept_name (*references department*) | ID, name, salary |
| section | course_id, sec_id, semester, year | varchar, numeric | course_id (*references course*), building, room_number (*references classroom*) | course_id, sec_id, semester, year |
| teaches | ID, course_id, sec_id, semester, year | varchar, numeric | course_id, sec_id, semester, year (*references section*), ID (*references instructor*) | ID, course_id, sec_id, semester, year |
| student | ID | varchar | dept_name (*references department*) | ID, name |
| takes | ID, course_id, sec_id, semester, year | varchar, numeric | course_id, sec_id, semester, year (*references section*), ID | ID, course_id, sec_id, semester, year |

| | | | | |
|---|---|---|---|---|
| | | | (*references student*) | |
| advisor | s_ID | varchar | i_ID (*references instructor (ID)*), s_ID (*references student (ID)*) | s_ID |
| time_slot | time_slot_id, day, start_hr, start_min | varchar, numeric | None | time_slot_id, day, start_hr, start_min |
| prereq | course_id, prereq_id | varchar | course_id (*references course*), prereq_id (*references course*) | course_id, prereq_id |

2. Query used:

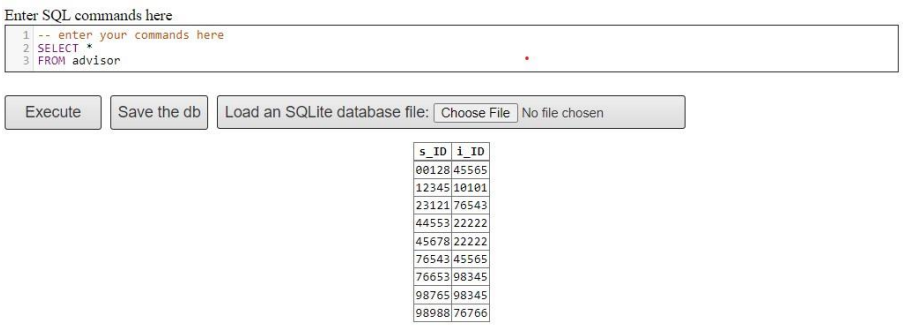
**SELECT** *
**FROM** student s, department d, takes t, advisor a, instructor i
**WHERE** s.name = 'Brown' **and** s.id = t.id **and** s.id = a.s_id **and** a.i_ID = i.id **and** s.dept_name = d.dept_name;

Output:

| ID | name | dept_name | tot_cred | dept_name | building | budget | ID | course_id | sec_id | semester | year | grade | s_ID | i_ID | ID | name | dept_name | salary |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76543 | Brown | Comp. Sci. | 58 | Comp. Sci. | Taylor | 100000 | 76543 | CS-101 | 1 | Fall | 2017 | A | 76543 | 45565 | 45565 | Katz | Comp. Sci. | 75000 |
| 76543 | Brown | Comp. Sci. | 58 | Comp. Sci. | Taylor | 100000 | 76543 | CS-319 | 2 | Spring | 2018 | A | 76543 | 45565 | 45565 | Katz | Comp. Sci. | 75000 |

3. The following answer contains 2 images for each table 1st before running the query and 2nd the output after running the query.

*a. Advisor*




| s_ID | i_ID |
|---|---|
| 00128 | 45565 |
| 12345 | 10101 |
| 23121 | 76543 |
| 44553 | 22222 |
| 45678 | 22222 |
| 76543 | 45565 |
| 76653 | 98345 |
| 98765 | 98345 |
| 98988 | 76766 |

*Figure 1 Advisor Table*

Query:

**SELECT** s_id

**FROM** advisor

**WHERE** s_id%2 == 0

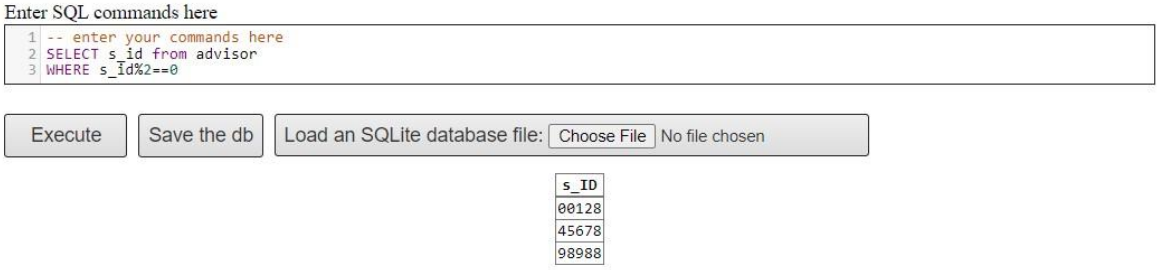



*Figure 2 Output after running above query on Advisor*

*b. classroom*

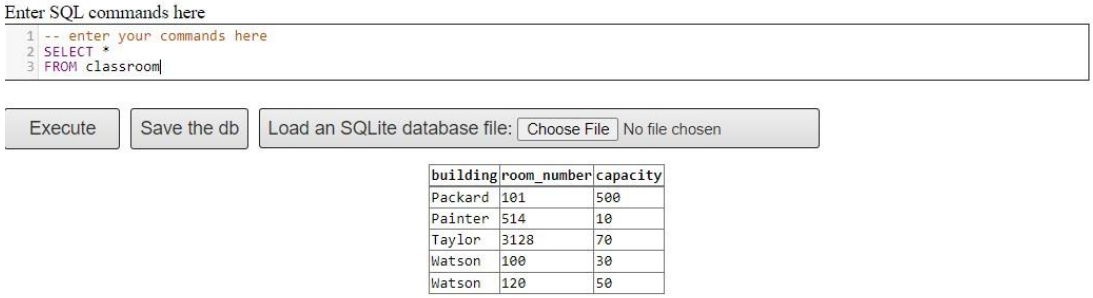



*Figure 3 classroom table*

Query:

**INSERT INTO** classroom

**VALUES** ('IIT', 2000, 150);

**SELECT** * **FROM** classroom

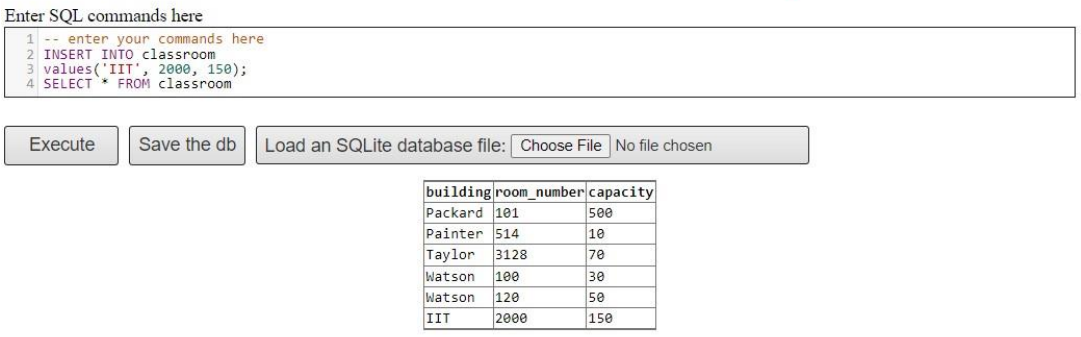



*Figure 4 Output after running the above query*

## c. *course*

Enter SQL commands here

```
-- enter your commands here
SELECT *
FROM course
```

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

| course_id | title | dept_name | credits |
|---|---|---|---|
| BIO-101 | Intro. to Biology | Biology | 4 |
| BIO-301 | Genetics | Biology | 4 |
| BIO-399 | Computational Biology | Biology | 3 |
| CS-101 | Intro. to Computer Science | Comp. Sci. | 4 |
| CS-190 | Game Design | Comp. Sci. | 4 |
| CS-315 | Robotics | Comp. Sci. | 3 |
| CS-319 | Image Processing | Comp. Sci. | 3 |
| CS-347 | Database System Concepts | Comp. Sci. | 3 |
| EE-181 | Intro. to Digital Systems | Elec. Eng. | 3 |
| FIN-201 | Investment Banking | Finance | 3 |
| HIS-351 | World History | History | 3 |
| MU-199 | Music Video Production | Music | 3 |
| PHY-101 | Physical Principles | Physics | 4 |

*Figure 5 course table*

Query:

**UPDATE** course
**SET** TITLE = Biology For Engineers', credits = 6
**WHERE** course_id = 'BIO-101';
**SELECT** * **FROM** course

Enter SQL commands here

```
UPDATE course
SET TITLE = 'Biology For Engineers', credits = 6
WHERE course_id = 'BIO-101';
SELECT * FROM course
```

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

| course_id | title | dept_name | credits |
|---|---|---|---|
| BIO-101 | Biology For Engineers | Biology | 6 |
| BIO-301 | Genetics | Biology | 4 |
| BIO-399 | Computational Biology | Biology | 3 |
| CS-101 | Intro. to Computer Science | Comp. Sci. | 4 |
| CS-190 | Game Design | Comp. Sci. | 4 |
| CS-315 | Robotics | Comp. Sci. | 3 |
| CS-319 | Image Processing | Comp. Sci. | 3 |
| CS-347 | Database System Concepts | Comp. Sci. | 3 |
| EE-181 | Intro. to Digital Systems | Elec. Eng. | 3 |
| FIN-201 | Investment Banking | Finance | 3 |
| HIS-351 | World History | History | 3 |
| MU-199 | Music Video Production | Music | 3 |
| PHY-101 | Physical Principles | Physics | 4 |

*Figure 6 Output after running above Query*

## d. *department*

Enter SQL commands here

```
-- enter your commands here
SELECT *
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 |

*Figure 7 department table*

Query:

**DROP TABLE** department

Enter SQL commands here

```
-- enter your commands here
DROP TABLE department
```

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

*Figure 8 Output after running above query*

## *e. instructor*

Enter SQL commands here

```
-- enter your commands here
SELECT *
FROM instructor
```

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 |

*Figure 9 instructor table*

Query:

**DELETE FROM** instructor

**WHERE** salary=65000;

**SELECT** * **FROM** instructor

Enter SQL commands here

```
DELETE FROM instructor
WHERE salary=65000;
SELECT * FROM instructor
```

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

| ID | name | dept_name | salary |
|---|---|---|---|
| 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 |

*Figure 10 Output after running above query*

## *f. prereq*

Enter SQL commands here

```
-- enter your commands here
SELECT * from prereq
```

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

| course_id | prereq_id |
|---|---|
| BIO-301 | BIO-101 |
| BIO-399 | BIO-101 |
| CS-190 | CS-101 |
| CS-315 | CS-101 |
| CS-319 | CS-101 |
| CS-347 | CS-101 |
| EE-181 | PHY-101 |

*Figure 11 prereq table*

Query:

**SELECT** course_id

**FROM** prereq

**WHERE** prereq_id **LIKE** 'C%'

Enter SQL commands here

```
-- enter your commands
SELECT course_id
FROM prereq
WHERE prereq_id LIKE 'C%'
```

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

| course_id |
|---|
| CS-190 |
| CS-315 |
| CS-319 |
| CS-347 |

*Figure 12 output after running above query*

## *g. section*

Enter SQL commands here

```
-- enter your commands here
SELECT * FROM section
```

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

| course_id | sec_id | semester | year | building | room_number | time_slot_id |
|---|---|---|---|---|---|---|
| BIO-101 | 1 | Summer | 2017 | Painter | 514 | B |
| BIO-301 | 1 | Summer | 2018 | Painter | 514 | A |
| CS-101 | 1 | Fall | 2017 | Packard | 101 | H |
| CS-101 | 1 | Spring | 2018 | Packard | 101 | F |
| CS-190 | 1 | Spring | 2017 | Taylor | 3128 | E |
| CS-190 | 2 | Spring | 2017 | Taylor | 3128 | A |
| CS-315 | 1 | Spring | 2018 | Watson | 120 | D |
| CS-319 | 1 | Spring | 2018 | Watson | 100 | B |
| CS-319 | 2 | Spring | 2018 | Taylor | 3128 | C |
| CS-347 | 1 | Fall | 2017 | Taylor | 3128 | A |
| EE-181 | 1 | Spring | 2017 | Taylor | 3128 | C |
| FIN-201 | 1 | Spring | 2018 | Packard | 101 | B |
| HIS-351 | 1 | Spring | 2018 | Painter | 514 | C |
| MU-199 | 1 | Spring | 2018 | Packard | 101 | D |
| PHY-101 | 1 | Fall | 2017 | Watson | 100 | A |

*Figure 13 section table*

Query:

**DELETE FROM** section

**WHERE** semester = 'Spring' **and** room_number = 3128;

**SELECT** * **FROM** section

Enter SQL commands here

```
1 DELETE FROM section
2 WHERE semester='Spring' and room_number = 3128;
3 SELECT * FROM section
```

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

| course_id | sec_id | semester | year | building | room_number | time_slot_id |
|---|---|---|---|---|---|---|
| BIO-101 | 1 | Summer | 2017 | Painter | 514 | B |
| BIO-301 | 1 | Summer | 2018 | Painter | 514 | A |
| CS-101 | 1 | Fall | 2017 | Packard | 101 | H |
| CS-101 | 1 | Spring | 2018 | Packard | 101 | F |
| CS-315 | 1 | Spring | 2018 | Watson | 120 | D |
| CS-319 | 1 | Spring | 2018 | Watson | 100 | B |
| CS-347 | 1 | Fall | 2017 | Taylor | 3128 | A |
| FIN-201 | 1 | Spring | 2018 | Packard | 101 | B |
| HIS-351 | 1 | Spring | 2018 | Painter | 514 | C |
| MU-199 | 1 | Spring | 2018 | Packard | 101 | D |
| PHY-101 | 1 | Fall | 2017 | Watson | 100 | A |

*Figure 14 output after running above query*

## *h. student*

Enter SQL commands here

```
1 -- enter your commands here
2 SELECT *
3 from student
```

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 |

*Figure 15 student table*

Query:

**SELECT** *

**FROM** student **ORDER BY** name

Enter SQL commands here

```
-- enter your commands here
SELECT *
from student ORDER BY name
```

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

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

*Figure 16 result after running above query*

### *i. takes*

Enter SQL commands here

```
-- enter your commands here
SELECT *
FROM takes
```

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

| ID | course_id | sec_id | semester | year | grade |
|---|---|---|---|---|---|
| 00128 | CS-101 | 1 | Fall | 2017 | A |
| 00128 | CS-347 | 1 | Fall | 2017 | A- |
| 12345 | CS-101 | 1 | Fall | 2017 | C |
| 12345 | CS-190 | 2 | Spring | 2017 | A |
| 12345 | CS-315 | 1 | Spring | 2018 | A |
| 12345 | CS-347 | 1 | Fall | 2017 | A |
| 19991 | HIS-351 | 1 | Spring | 2018 | B |
| 23121 | FIN-201 | 1 | Spring | 2018 | C+ |
| 44553 | PHY-101 | 1 | Fall | 2017 | B- |
| 45678 | CS-101 | 1 | Fall | 2017 | F |
| 45678 | CS-101 | 1 | Spring | 2018 | B+ |
| 45678 | CS-319 | 1 | Spring | 2018 | B |
| 54321 | CS-101 | 1 | Fall | 2017 | A- |
| 54321 | CS-190 | 2 | Spring | 2017 | B+ |
| 55739 | MU-199 | 1 | Spring | 2018 | A- |
| 76543 | CS-101 | 1 | Fall | 2017 | A |
| 76543 | CS-319 | 2 | Spring | 2018 | A |
| 76653 | EE-181 | 1 | Spring | 2017 | C |
| 98765 | CS-101 | 1 | Fall | 2017 | C- |
| 98765 | CS-315 | 1 | Spring | 2018 | B |
| 98988 | BIO-101 | 1 | Summer | 2017 | A |
| 98988 | BIO-301 | 1 | Summer | 2018 | |

*Figure 17 takes*

Query:

**ALTER TABLE** takes

**ADD** Result varchar (50);

**SELECT** * **FROM** takes

Enter SQL commands here

```
-- enter your commands here
ALTER TABLE takes
ADD Result varchar(50);
SELECT * FROM takes
```

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

| ID | course_id | sec_id | semester | year | grade | Result |
|---|---|---|---|---|---|---|
| 00128 | CS-101 | 1 | Fall | 2017 | A | |
| 00128 | CS-347 | 1 | Fall | 2017 | A- | |
| 12345 | CS-101 | 1 | Fall | 2017 | C | |
| 12345 | CS-190 | 2 | Spring | 2017 | A | |
| 12345 | CS-315 | 1 | Spring | 2018 | A | |
| 12345 | CS-347 | 1 | Fall | 2017 | A | |
| 19991 | HIS-351 | 1 | Spring | 2018 | B | |
| 23121 | FIN-201 | 1 | Spring | 2018 | C+ | |
| 44553 | PHY-101 | 1 | Fall | 2017 | B- | |
| 45678 | CS-101 | 1 | Fall | 2017 | F | |
| 45678 | CS-101 | 1 | Spring | 2018 | B+ | |
| 45678 | CS-319 | 1 | Spring | 2018 | B | |
| 54321 | CS-101 | 1 | Fall | 2017 | A- | |
| 54321 | CS-190 | 2 | Spring | 2017 | B+ | |
| 55739 | MU-199 | 1 | Spring | 2018 | A- | |
| 76543 | CS-101 | 1 | Fall | 2017 | A | |
| 76543 | CS-319 | 2 | Spring | 2018 | A | |
| 76653 | EE-181 | 1 | Spring | 2017 | C | |
| 98765 | CS-101 | 1 | Fall | 2017 | C- | |
| 98765 | CS-315 | 1 | Spring | 2018 | B | |

*Figure 18 output after running above query*

### *j. teaches*

Enter SQL commands here

```
-- enter your commands here
SELECT *
FROM teaches
```

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

| ID | course_id | sec_id | semester | year |
|---|---|---|---|---|
| 10101 | CS-101 | 1 | Fall | 2017 |
| 10101 | CS-315 | 1 | Spring | 2018 |
| 10101 | CS-347 | 1 | Fall | 2017 |
| 12121 | FIN-201 | 1 | Spring | 2018 |
| 15151 | MU-199 | 1 | Spring | 2018 |
| 22222 | PHY-101 | 1 | Fall | 2017 |
| 32343 | HIS-351 | 1 | Spring | 2018 |
| 45565 | CS-101 | 1 | Spring | 2018 |
| 45565 | CS-319 | 1 | Spring | 2018 |
| 76766 | BIO-101 | 1 | Summer | 2017 |
| 76766 | BIO-301 | 1 | Summer | 2018 |
| 83821 | CS-190 | 1 | Spring | 2017 |
| 83821 | CS-190 | 2 | Spring | 2017 |
| 83821 | CS-319 | 2 | Spring | 2018 |
| 98345 | EE-181 | 1 | Spring | 2017 |

*Figure 19 teaches table*

Query:

**SELECT** * **FROM** teaches **ORDER BY** year;

Enter SQL commands here

```
-- enter your commands here
SELECT * FROM teaches ORDER BY year;
```

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

| ID | course_id | sec_id | semester | year |
|---|---|---|---|---|
| 10101 | CS-101 | 1 | Fall | 2017 |
| 10101 | CS-347 | 1 | Fall | 2017 |
| 22222 | PHY-101 | 1 | Fall | 2017 |
| 76766 | BIO-101 | 1 | Summer | 2017 |
| 83821 | CS-190 | 1 | Spring | 2017 |
| 83821 | CS-190 | 2 | Spring | 2017 |
| 98345 | EE-181 | 1 | Spring | 2017 |
| 10101 | CS-315 | 1 | Spring | 2018 |
| 12121 | FIN-201 | 1 | Spring | 2018 |
| 15151 | MU-199 | 1 | Spring | 2018 |
| 32343 | HIS-351 | 1 | Spring | 2018 |
| 45565 | CS-101 | 1 | Spring | 2018 |
| 45565 | CS-319 | 1 | Spring | 2018 |
| 76766 | BIO-301 | 1 | Summer | 2018 |
| 83821 | CS-319 | 2 | Spring | 2018 |

*Figure 20 output after running above query*

### *k. time_slot*

Enter SQL commands here

```
-- enter your commands here
SELECT * FROm time_slot
```

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

| time_slot_id | day | start_hr | start_min | end_hr | end_min |
|---|---|---|---|---|---|
| A | M | 8 | 0 | 8 | 50 |
| A | W | 8 | 0 | 8 | 50 |
| A | F | 8 | 0 | 8 | 50 |
| B | M | 9 | 0 | 9 | 50 |
| B | W | 9 | 0 | 9 | 50 |
| B | F | 9 | 0 | 9 | 50 |
| C | M | 11 | 0 | 11 | 50 |
| C | W | 11 | 0 | 11 | 50 |
| C | F | 11 | 0 | 11 | 50 |
| D | M | 13 | 0 | 13 | 50 |
| D | W | 13 | 0 | 13 | 50 |
| D | F | 13 | 0 | 13 | 50 |
| E | T | 10 | 30 | 11 | 45 |
| E | R | 10 | 30 | 11 | 45 |
| F | T | 14 | 30 | 15 | 45 |
| F | R | 14 | 30 | 15 | 45 |
| G | M | 16 | 0 | 16 | 50 |
| G | W | 16 | 0 | 16 | 50 |
| G | F | 16 | 0 | 16 | 50 |
| H | W | 10 | 0 | 12 | 30 |

*Figure 21 time_slot table*

Query:

**SELECT** time_slot_id, day

**FROM** time_slot

**WHERE** start_min = 0 **and** end_hr<10

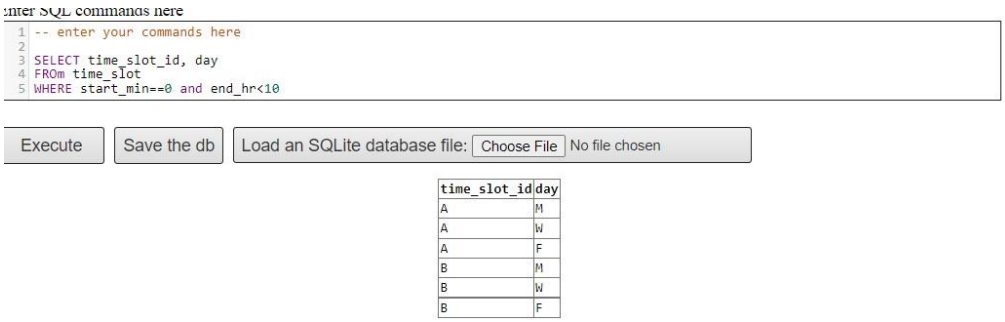



*Figure 22 output after running above query*

4. a)

In these question I have taken xxx = 'Music' and yyy = 'Packard'

Query:

**SELECT DISTINCT** student.ID, student.name
**FROM** student, department, section
**WHERE** department.dept_name = 'Music' **and** department.building = 'Packard' **and** student.dept_name = department.dept_name and section.building = department.building


*Figure 23 Output*

b)

Query:

**SELECT** student.ID, student.name

**FROM** takes, student

**WHERE** grade = 'A' **and** student.id = takes.id

INTERSECT

**SELECT** student.ID, student.name

**FROM** takes, student

**WHERE** grade = 'C' **and** student.id = takes.id

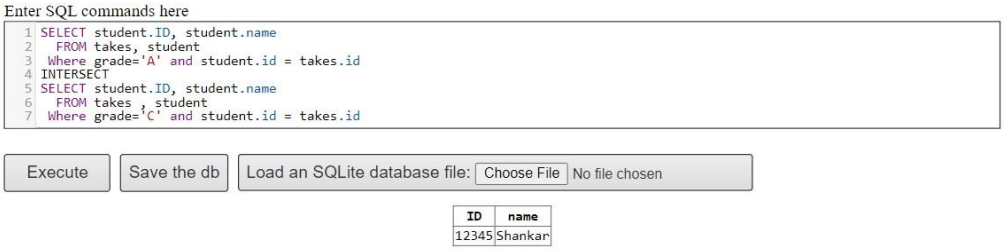



*Figure 24 output*

c)

Query:

**SELECT DISTINCT** classroom.building, classroom.room_number

**FROM** section, classroom, time_slot

**WHERE** classroom.building = section.building **and** classroom.room_number = section.room_number **and** section.time_slot_id = time_slot.time_slot_id **and** day = 'W'

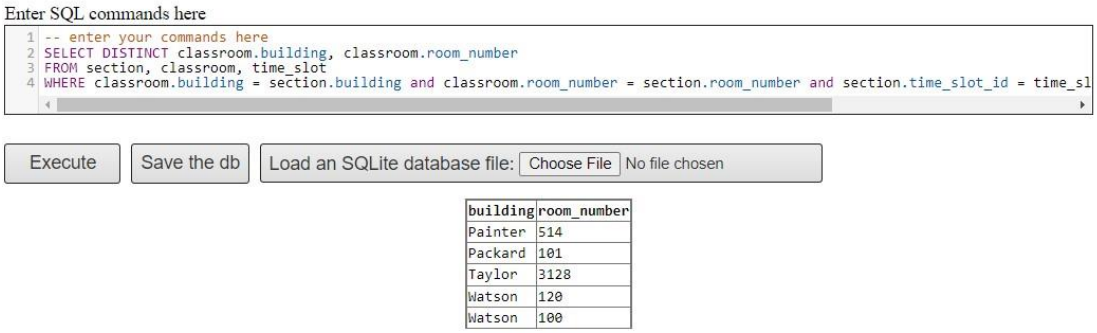



*Figure 25 output*