

Q1- Add gender column for the student table[Enum]. It holds two value (male or female).

```
iti=# create type gender as enum ('male', 'female');
CREATE TYPE
iti=# alter table student add column gender type gender;
ERROR:  syntax error at or near "gender"
LINE 1: alter table student add column gender type gender;
                                             ^

iti=# alter table student add column gender gender;
ALTER TABLE
iti=# select * from student;
iti=#
```

Q2- Add birth date column for the student table.

```
iti=# alter table student add column birth_date date;
ALTER TABLE
```

Q3- Delete the name column and replace it with two columns first name and last name.

```
iti=# alter table student drop column name;
ALTER TABLE
iti=# alter table student add column first_name varchar(25);
ALTER TABLE
iti=# alter table student add column last_name varchar(25);
ALTER TABLE
iti=# \d student
               Table "public.student"
   Column   |      Type      | Collation | Nullable |      Default
-----+-----+-----+-----+-----
 student_id | integer        |           | not null | nextval('student_student_id_seq'::regclass)
 email      | character(100) |           |          |
 street     | character(25)  |           |          |
 city       | character(25)  |           |          |
 track_id   | integer        |           |          |
 gender     | gender         |           |          |
 birth_date | date           |           |          |
 first_name | character varying(25) |       |          |
 last_name  | character varying(25) |       |          |
Indexes:
    "student_pkey" PRIMARY KEY, btree (student_id)
Foreign-key constraints:
    "student_track_id_fkey" FOREIGN KEY (track_id) REFERENCES track(track_id)
Referenced by:
    TABLE "student_course" CONSTRAINT "student_course_student_id_fkey" FOREIGN KEY (student_id) REFERENCES student(student_id)
    TABLE "student_exam" CONSTRAINT "student_exam_student_id_fkey" FOREIGN KEY (student_id) REFERENCES student(student_id)
    TABLE "student_phone" CONSTRAINT "student_phone_student_id_fkey" FOREIGN KEY (student_id) REFERENCES student(student_id)
iti=#
```

Q4- Delete the address and email column and replace it with contact info (Address, email) as object/Composite Data type.

```
Activities Terminal 14:01 30
ahmed@ahmed-HP-EliteBook-840-G5: ~/Desktop

iti=# alter table student drop email;
ALTER TABLE
iti=# alter table student drop street;
ALTER TABLE
iti=# alter table student drop city;
ALTER TABLE
iti=# create type contact_info as (address varchar(100), email varchar(50));
CREATE TYPE
iti=# alter table add column contact_info contact_info;
ERROR: syntax error at or near "column"
LINE 1: alter table add column contact_info contact_info;
        ^
iti=# alter table student add column contact_info contact_info;
ALTER TABLE
iti=# update student set first_name = 'ahmed', last_name = 'nabil', contact_info = ('fayoun, egypt', 'ahmed@gmail.com');
ERROR: column "contact_info" of relation "student" does not exist
LINE 1: ...nt set first_name = 'ahmed', last_name = 'nabil', contact_in...
        ^
iti=# update student set first_name = 'ahmed', last_name = 'nabil', contact_info = ('fayoun, egypt', 'ahmed@gmail.com') where student_id = 1;
ERROR: column "contact_info" of relation "student" does not exist
LINE 1: ...nt set first_name = 'ahmed', last_name = 'nabil', contact_in...
        ^
iti=# update student set first_name = 'ahmed', last_name = 'nabil', contact_info = ('fayoun, egypt', 'ahmed@gmail.com') where student_id = 1;
UPDATE 1
iti=# alter table student rename column contact_info to contact_info;
ALTER TABLE
iti=# select * from student
iti=#
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----
          2 |         |       |            |            |            |
          3 |         |       |            |            |            |
          4 |         |       |            |            |            |
          5 |         |       |            |            |            |
          6 |         |       | 2024-07-30 | ahmed      | nabil     | ("fayoun, egypt",ahmed@gmail.com)
(6 rows)

iti=#
```

Q5- Change any Serial Datatype at your tables to smallInt

```
iti=# alter table student alter column student_id type smallint;
ALTER TABLE

iti=# alter table course alter column course_id type smallint;
ALTER TABLE
iti=# alter table exam alter column exam_id type smallint;
ALTER TABLE
iti=# alter table track alter column track_id type smallint;
ALTER TABLE
iti=#
```

Q6- Add/Alter foreign key constrains in Your Tables.
Done in last lab

Q7- Insert new data in all Tables.

```
Activities Terminal 15:12 ١٥ جول ٣٠
ahmed@ahmed-HP-EliteBook-840-G5: ~/Desktop

iti=# select * from student_exam;
student_id | exam_id | score
-----
1 | 1 | 80
2 | 1 | 90
3 | 3 | 98
5 | 4 | 87
5 | 3 | 70
(5 rows)

iti=# select * from student_phone;
student_id | phone
-----
1 | 01141020471
1 | 01092429329
3 | 88887665445
4 | 765543567757
(4 rows)

iti=# select * from track;
track_id | name
-----
1 | fullstack using python
2 | fullstack using .net
3 | cyber security
4 | aws
5 | 2d graphic
(5 rows)

iti=# select * from track_course;
track_id | course_id
-----
1 | 1
1 | 2
1 | 3
1 | 5
2 | 1
2 | 6
3 | 4
(7 rows)

iti=#
```

```
Activities Terminal 15:10 ١٥ جول ٣٠
ahmed@ahmed-HP-EliteBook-840-G5: ~/Desktop

iti=# select * from student;
iti-# ;
student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----
4 | 5 |  |  |  |  | 
5 | 3 |  |  |  |  | 
2 | 1 | male | 1999-04-14 | ali | ali | ("fayoun, egypt",fdfd@gm.com)
3 | 2 | female | 1999-04-02 | asma | ahmed | ("fayoun, egypt",fdfd@gm.com)
1 | 1 | female | 1999-04-02 | aya | ahmed | ("cairo, egypt",fdfd@gm.com)
6 |  | male | 1999-04-02 | osana | ahmed | ("cairo, egypt",fdfd@gm.com)
(6 rows)

iti=# select * from course;
course_id | name | description | max_score
-----
1 | client side | it is about html & css & js | 100
2 | database | it is about database | 100
3 | react | it is about react | 100
4 | networking | it is about networking | 100
5 | django | it is about django | 100
6 | .net | it is .net | 100
(6 rows)

iti=# select * from exam;
iti-# ;
exam_id | exam_date | course_id
-----
1 | 2024-07-29 18:53:22.26751 | 1
2 | 2024-04-14 18:50:50 | 2
3 | 2024-07-07 18:50:43 | 3
4 | 2024-07-29 18:53:22.26751 | 5
(4 rows)

iti=#
```

Q8- Display all students' information.

```
iti=# select * from student
iti=# ;
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----+-----+-----+-----+-----+-----+-----
          4 |         5 |       |           |           |           | 
          5 |         3 |       |           |           |           | 
          2 |         1 | male   | 1999-04-14 | ali        | ali        | ("fayoum, egypt",fdfd@gm.com)
          3 |         2 | female | 1999-04-02 | asma       | ahmed      | ("fayoum, egypt",fdfd@gm.com)
          1 |         1 | female | 1999-04-02 | aya        | ahmed      | ("cairo, egypt",fdfd@gm.com)
          6 |         | male   | 1999-04-02 | osama      | ahmed      | ("cairo, egypt",fdfd@gm.com)
(6 rows)
```

Q9- Display male students only.

```
iti=# select * from student where gender = 'male';
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----+-----+-----+-----+-----+-----+-----
          2 |         1 | male   | 1999-04-14 | ali        | ali        | ("fayoum, egypt",fdfd@gm.com)
          6 |         | male   | 1999-04-02 | osama      | ahmed      | ("cairo, egypt",fdfd@gm.com)
(2 rows)

iti=#
```

Q10- Display the number of female students.

```
iti=# select * from student;
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----+-----+-----+-----+-----+-----+-----
          6 |         | male   | 1991-08-01 | nabil      | ali        | ("fayoum, egypt",dsdds@dsd.com)
          5 |         3 | male   | 1991-08-01 | nabil      | ali        | ("fayoum, egypt",dsdds@dsd.com)
          1 |         1 | male   | 1991-08-01 | ahmed      | ali        | ("fayoum, egypt",dsdds@dsd.com)
          2 |         1 | male   | 1991-08-01 | Mohammed   | ali        | ("fayoum, egypt",dsdds@dsd.com)
          3 |         2 | female | 1991-08-01 | nabil      | ali        | ("fayoum, egypt",dsdds@dsd.com)
          4 |         5 | female | 1991-08-01 | nabil      | ali        | ("fayoum, egypt",dsdds@dsd.com)
          7 |         1 | male   | 2024-07-30 | ahmed      | nabil      | 
(7 rows)

iti=# select count(student_id) from student where gender = 'female';
 count
-----
      2
(1 row)
```

Q11- Display the students who are born before 1992-10-01

```
iti=# select * from student where birth_date < '1992-10-01';
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----+-----+-----+-----+-----+-----+-----
          5 |         3 | male   | 1992-08-01 | mo         | emad       | ("giza, egypt",dsd@dsd.com)
(1 row)

iti=#
```

Q12- Display male students who are born before 1991-10-01.

```
iti=# select * from student where gender = 'male' and birth_date < '1991-10-01';
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----+-----+-----+-----+-----+-----+-----
          4 |         5 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          2 |         1 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          3 |         2 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          1 |         1 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          6 |         | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          5 |         3 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
(6 rows)
```

Q13- Display subjects and their max score sorted by max score.

```
iti=# select name, max_score from course order by max_score;
  name      | max_score
-----+-----
  react     |         80
 database   |         85
  django    |         90
 client side |        100
 networking |        100
   .net     |        100
(6 rows)

iti=#
```

Q14- Display the subject with highest max score

```
iti=# select * from course order by max_score desc limit 1;
 course_id | name      | description          | max_score
-----+-----+-----+-----
          1 | client side | it is about html & css & js |        100
(1 row)

iti=#
```

Q15- Display students' names that begin with A.

```
iti=# select * from student where first_name like 'a%';
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----+-----+-----+-----+-----+-----+-----
          1 |         1 | male   | 1991-08-01 | ahmed      | ali       | ("fayoum, egypt",dsdds@dsd.com)
(1 row)

iti=#
```

Q16- Display the number of students' their name is "Mohammed"

```
iti=# select count(student_id) from student where first_name like 'Mohammed';
count
-----
1
(1 row)

iti=# select * from student;
 student_id | track_id | gender | birth_date | first_name | last_name | contact_info
-----+-----+-----+-----+-----+-----+-----
          4 |         5 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          3 |         2 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          6 |         1 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          5 |         3 | male   | 1991-08-01 | nabil      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          1 |         1 | male   | 1991-08-01 | ahmed      | ali       | ("fayoum, egypt",dsdds@dsd.com)
          2 |         1 | male   | 1991-08-01 | Mohammed  | ali       | ("fayoum, egypt",dsdds@dsd.com)
(6 rows)

iti=#
```

Q17- Display the number of males and females.

```
iti=# select gender, count(student_id) from student group by gender;
gender | count
-----+-----
female |     2
male   |     4
(2 rows)

iti=#
```

Q18- Display the repeated first names and their counts if higher than 2.

```
iti=# select first_name, count(*) from student group by first_name having count(*) > 2;
first_name | count
-----+-----
nabil      |     4
(1 row)
```

Q19- Display the all Students and track name that belong to it

```
iti=# select (first_name || ' ' || last_name) as full_name, track.name as track_name from student join track on student.track_id =
full_name | track_name
-----+-----
nabil ali | cyber security
ahmed ali | fullstack using python
Mohammed ali | fullstack using python
nabil ali | fullstack using .net
nabil ali | 2d graphic
(5 rows)

iti=#
```

Q20- Display students' names, their score and subject name.

```
iti=# select (first_name || ' ' || last_name) as full_name, course.name as course_name, score from student_exam join student on s
tudent.student_id = student_exam.student_id join exam on student_exam.exam_id = exam.exam_id join course on exam.course_id = cour
se.course_id;
 full_name | course_name | score
-----+-----+-----
 ahmed ali | client side |    80
Mohammed ali | client side |    90
 nabil ali | react      |    98
 nabil ali | django     |    87
 nabil ali | react      |    70
(5 rows)

iti=#
```

Lab 3

Q1- Insert new student and his score in exam in different subjects as transaction and save it.

```
iti=# begin;
BEGIN
iti=# insert into student (student_id, track_id, gender, birth_date, first_name, last_name) values (7, 1, 'male', now(), 'ahmed'
,'nabil');
INSERT 0 1
iti=# insert into student_exam (student_id, exam_id, score) values (7, 3, 95);
INSERT 0 1
iti=# commit;
COMMIT
iti=#
```

Q2- Insert new students and his score in exam in different subjects as transaction and undo it.

```
iti=# begin
iti-# ;
BEGIN
iti=# insert into student (student_id, track_id, gender, birth_date, first_name, last_name) values (8, 1, 'male', now(), 'ahmed'
,'nabil');
INSERT 0 1
iti=# insert into student_exam (student_id, exam_id, score) values (8, 3, 95);
INSERT 0 1
iti=# rollback;
ROLLBACK
iti=#
```

Q8- Create user and give him all privileges.

```
postgres=# create user ahmed with password '123';
CREATE ROLE
postgres=# \du
postgres=# grant all on *.* to ahmed;
ERROR:  syntax error at or near ".*"
LINE 1: grant all on *.* to ahmed;
                  ^
postgres=# grant all on DATABASE iti to ahmed;
GRANT
postgres=# \du
postgres=#
```

Q9- Create another new user and make the authentication method is “trust” and give him all privileges if he login from his “local” server.

```
postgres=# create user nabil with password '123';  
CREATE ROLE
```

```
# Database administrative login by Unix domain socket
```

```
local    all                postgres                                peer
```

```
# TYPE      DATABASE      USER      ADDRESS      METHOD
```

```
local      all                nabil                                trust
```

```
ahmed@ahmed-HP-EliteBook-840-G5:~/Desktop$ sudo service postgresql restart
```

```
postgres=# grant all on DATABASE iti to nabil;  
GRANT
```