



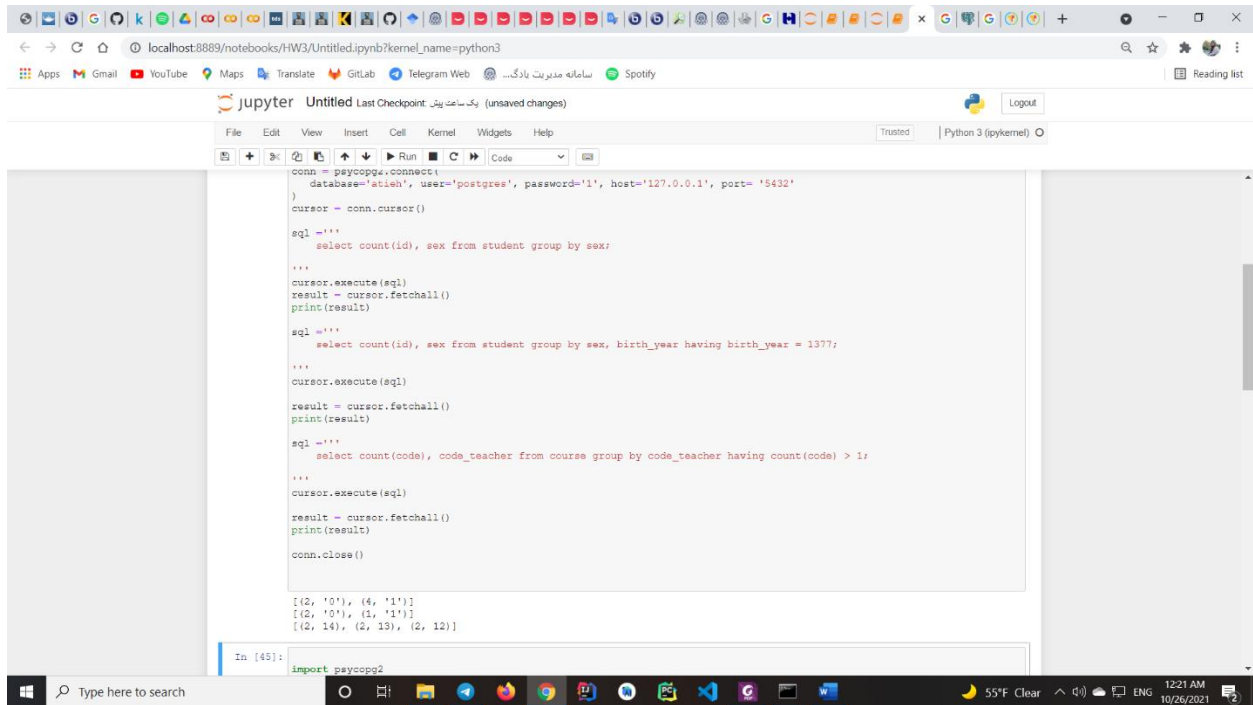
دانشگاه صنعتی امیرکبیر
(پلی تکنیک تهران)

تمرین سوم

آزمایشگاه پایگاه داده

عطیه براتی نیا ۹۶۳۱۰۱۰

سوال ۱



```
conn = psycopg2.connect(
    database='atish', user='postgres', password='1', host='127.0.0.1', port= '5432'
)
cursor = conn.cursor()

sql ='''
select count(id), sex from student group by sex;
'''
cursor.execute(sql)
result = cursor.fetchall()
print(result)

sql ='''
select count(id), sex from student group by sex, birth_year having birth_year = 1377;
'''
cursor.execute(sql)
result = cursor.fetchall()
print(result)

sql ='''
select count(code), code_teacher from course group by code_teacher having count(code) > 1;
'''
cursor.execute(sql)
result = cursor.fetchall()
print(result)

conn.close()

[(2, '0'), (4, '1')]
```

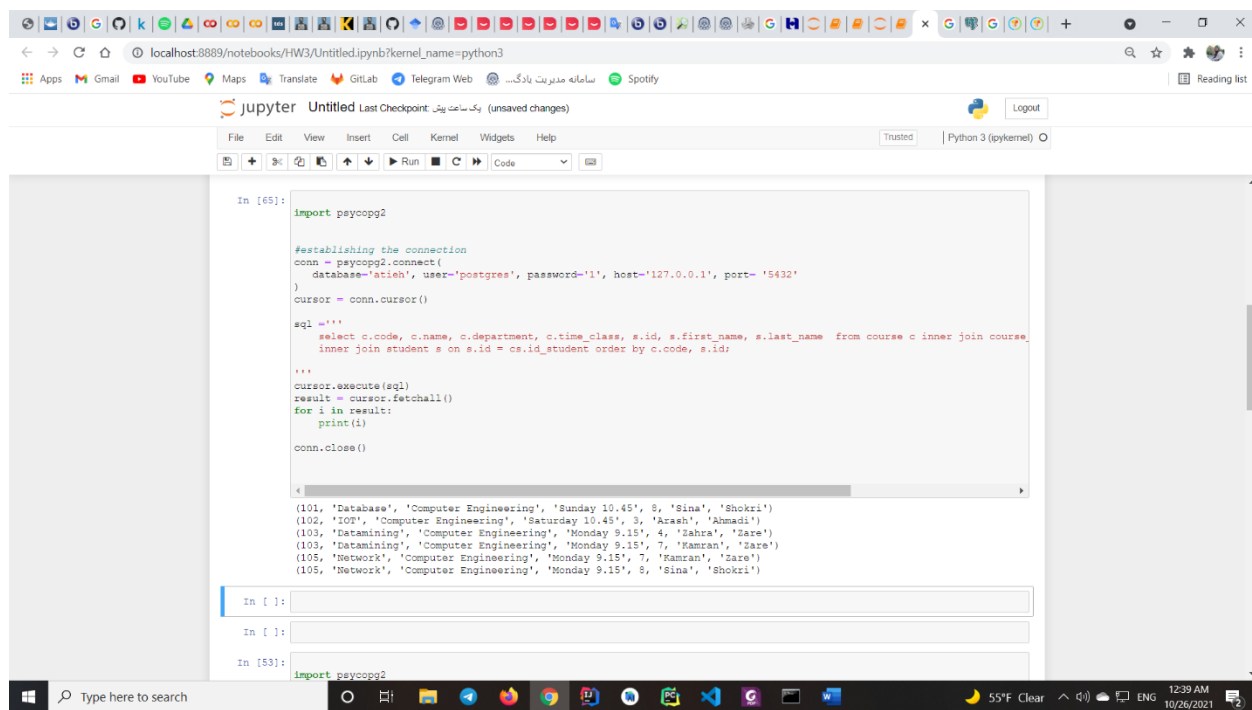
کوثری اول: از هر جنسیت چند دانشجو داریم. (۱ نشان دهنده‌ی پسر و ۰ نشان دهنده‌ی دختر)

کوثری دوم: از هر جنسیت متولد سال ۷۷ چند دانشجو داریم.

کوثری سوم: استادهایی که بیش از دو درس دارند.

سوال ۲

در هر کلاس کدام دانشجوها ثبت نام کرده اند به ترتیب کد کلاس و سپس کد دانشجو



The screenshot shows a Jupyter Notebook running on a local host. The notebook contains a Python script that connects to a PostgreSQL database and queries student information. The output of the script is displayed in the console.

```
In [65]:
import psycopg2

#establishing the connection
conn = psycopg2.connect(
    database='stieh', user='postgres', password='1', host='127.0.0.1', port= '5432'
)
cursor = conn.cursor()

sql ='''
select c.code, c.name, c.department, c.time_class, s.id, s.first_name, s.last_name from course c inner join course_
inner join student s on s.id = cs.id_student order by c.code, s.id;

'''

cursor.execute(sql)
result = cursor.fetchall()
for i in result:
    print(i)

conn.close()

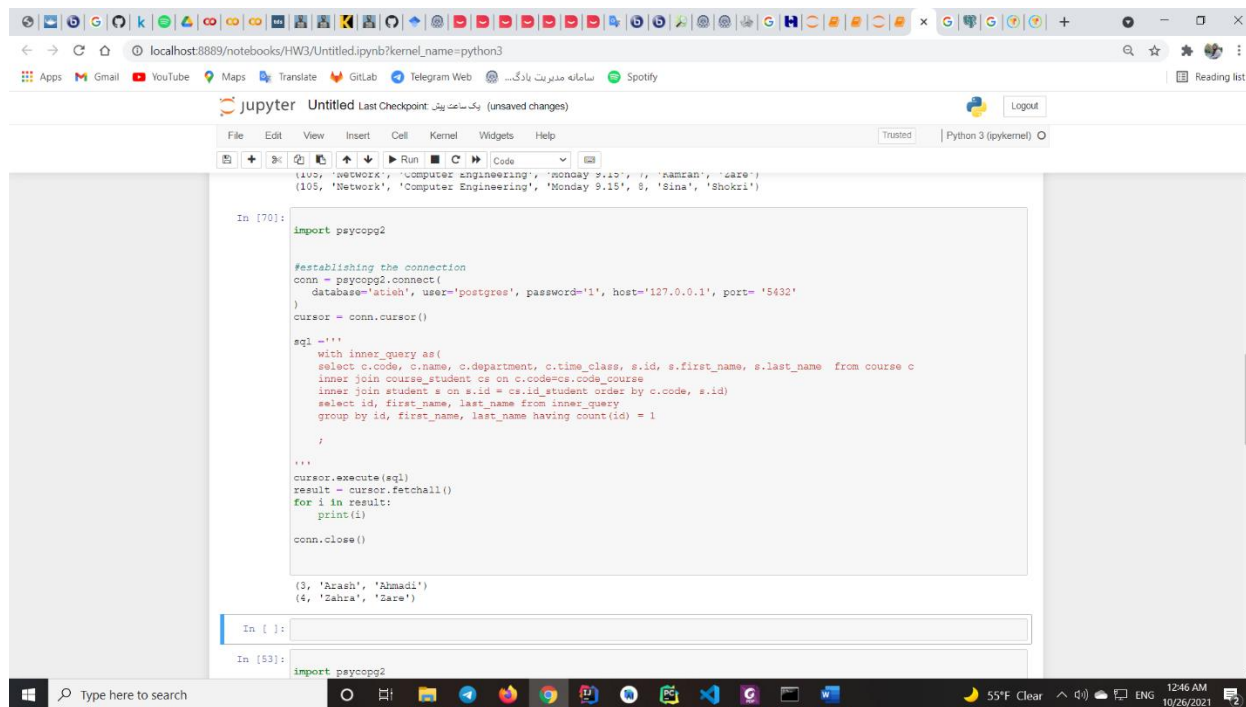
(101, 'Database', 'Computer Engineering', 'Sunday 10.45', 8, 'Sina', 'Shokri')
(102, 'IoT', 'Computer Engineering', 'Saturday 10.45', 3, 'Arash', 'Ahmadi')
(103, 'Data Mining', 'Computer Engineering', 'Monday 9.15', 4, 'Zahra', 'Zare')
(105, 'Data Mining', 'Computer Engineering', 'Monday 9.15', 7, 'Kamran', 'Zare')
(105, 'Network', 'Computer Engineering', 'Monday 9.15', 7, 'Kamran', 'Zare')
(105, 'Network', 'Computer Engineering', 'Monday 9.15', 8, 'Sina', 'Shokri')
```

The console output shows the following results:

```
In [ ]:
In [ ]:
In [53]:
import psycopg2
```

سوال ۳

دانشجویانی که فقط یک درس برداشته اند.



The screenshot shows a Jupyter Notebook running on a local host. The notebook contains a Python script that connects to a PostgreSQL database and executes an SQL query. The query is designed to find students who have taken only one course. The output of the script shows two students: Arash Ahmadi and Zahra Zare.

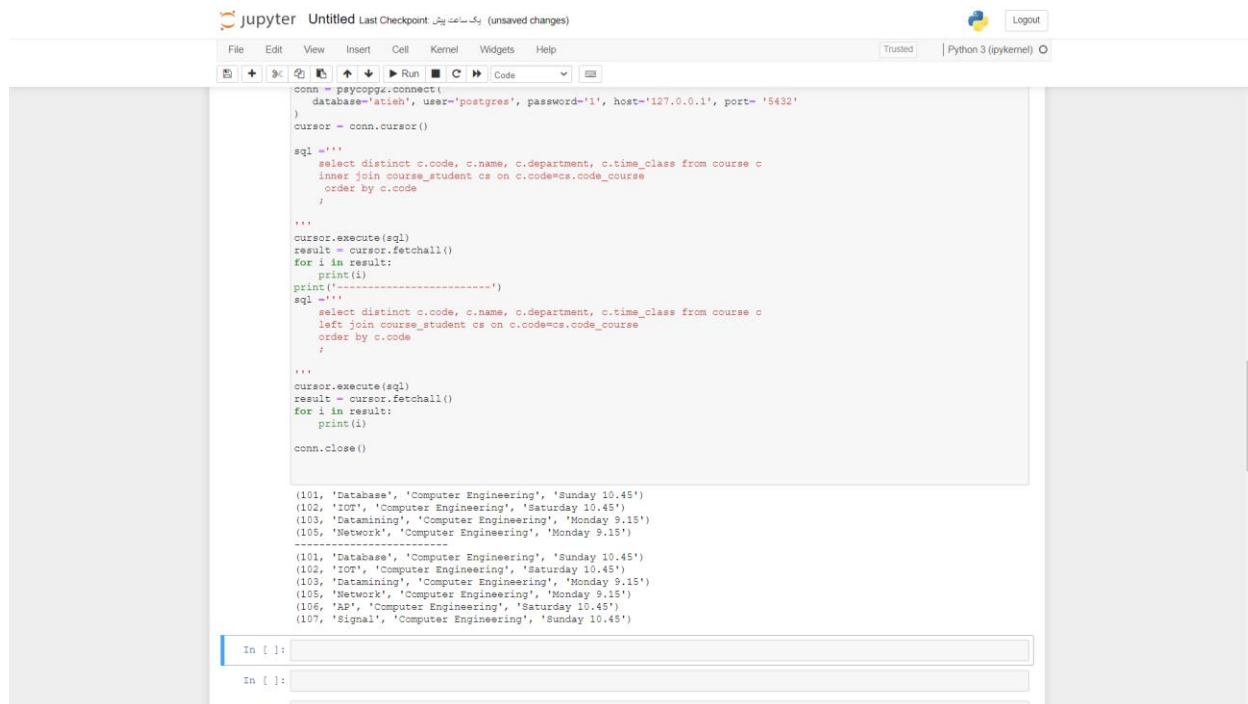
```
In [70]:  
  
import psycopg2  
  
#establishing the connection  
conn = psycopg2.connect(  
    database='atish', user='postgres', password='1', host='127.0.0.1', port= '5432'  
)  
cursor = conn.cursor()  
  
sql = '''  
with inner_query as(  
    select c.code, c.name, c.department, c.time_class, s.id, s.first_name, s.last_name from course c  
    inner join course_student cs on c.code=cs.code_course  
    inner join student s on s.id = cs.id_student order by c.code, s.id)  
    select id, first_name, last_name from inner_query  
    group by id, first_name, last_name having count(id) = 1  
    ;  
'''  
  
cursor.execute(sql)  
result = cursor.fetchall()  
for i in result:  
    print(i)  
  
conn.close()  
  
(3, 'Arash', 'Ahmadi')  
(4, 'Zahra', 'Zare')
```

In []:

In [53]:

import psycopg2

سوال ۴



```
jupyter Untitled Last Checkpoint: یک ساعت پیش (unsaved changes) Logout

File Edit View Insert Cell Kernel Widgets Help Trusted Python 3 (ipykernel)

conn = psycopg2.connect(
    database='latihan', user='postgres', password='1', host='127.0.0.1', port= '5432'
)
cursor = conn.cursor()

sql = """
select distinct c.code, c.name, c.department, c.time_class from course c
inner join course_student cs on c.code=cs.code_course
order by c.code
;

'''
cursor.execute(sql)
result = cursor.fetchall()
for i in result:
    print(i)
print('-----')
sql = """
select distinct c.code, c.name, c.department, c.time_class from course c
left join course_student cs on c.code=cs.code_course
order by c.code
;

'''
cursor.execute(sql)
result = cursor.fetchall()
for i in result:
    print(i)

conn.close()

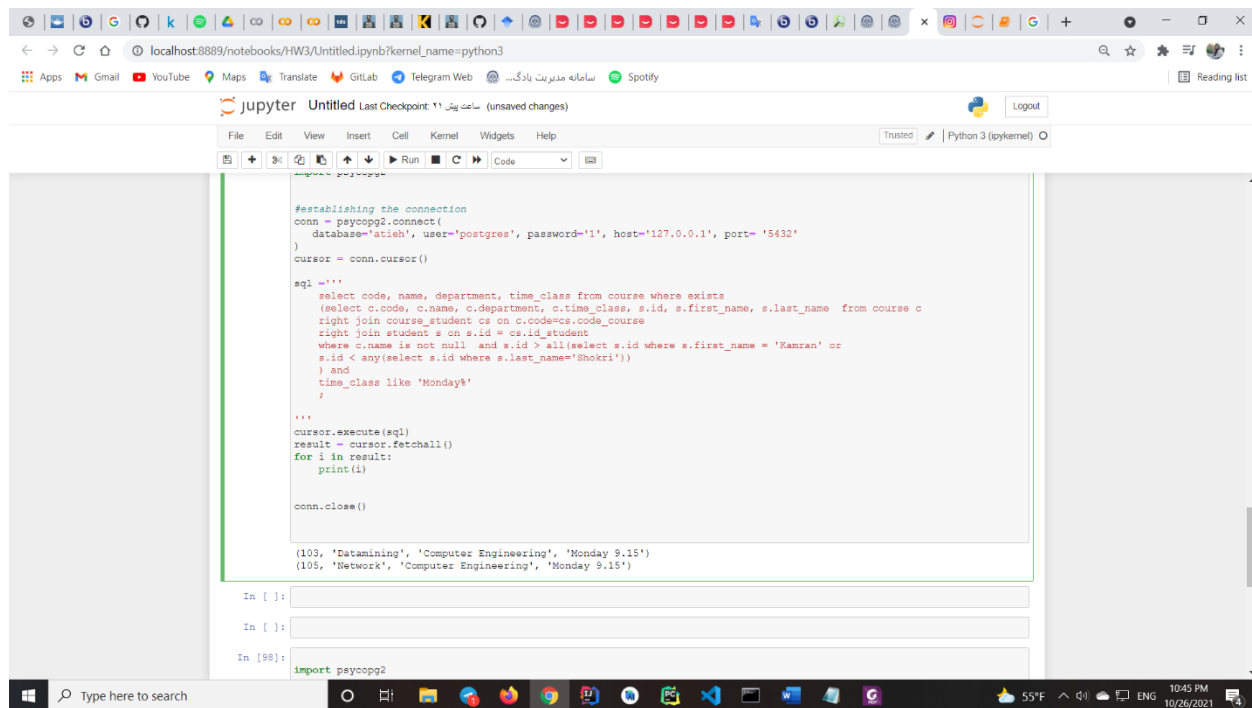
(101, 'Database', 'Computer Engineering', 'Sunday 10.45')
(102, 'IoT', 'Computer Engineering', 'Saturday 10.45')
(103, 'Data Mining', 'Computer Engineering', 'Monday 9.15')
(105, 'Network', 'Computer Engineering', 'Monday 9.15')
-----
(101, 'Database', 'Computer Engineering', 'Sunday 10.45')
(102, 'IoT', 'Computer Engineering', 'Saturday 10.45')
(103, 'Data Mining', 'Computer Engineering', 'Monday 9.15')
(105, 'Network', 'Computer Engineering', 'Monday 9.15')
(106, 'AP', 'Computer Engineering', 'Saturday 10.45')
(107, 'Signal', 'Computer Engineering', 'Sunday 10.45')
```

کوئری اول: کد درس‌هایی که دانشجویهایی آن درس را برداشته اند. (با inner join)

کوئری دوم: تمام درس‌های موجود (با left join)

سوال ۵

در تصویر زیر یک نمونه کوئری که شامل تمام کلمات خواسته شده باشد آمده است.



```
#establishing the connection
conn = psycopg2.connect(
    database='atleh', user='postgres', password='1', host='127.0.0.1', port= '5432'
)
cursor = conn.cursor()

sql = """
select code, name, department, time_class from course where exists
(select c.code, c.name, c.department, c.time_class, s.id, s.first_name, s.last_name from course c
right join course_student cs on c.code=cs.code_course
right join student s on s.id = cs.id_student
where c.name is not null and s.id > all(select s.id where s.first_name = 'Hamran' or
s.id < any(select s.id where s.last_name='Shokri'))
) and
time_class like 'Monday%'
;

"""

cursor.execute(sql)
result = cursor.fetchall()
for i in result:
    print(i)

conn.close()

(103, 'Detamining', 'Computer Engineering', 'Monday 9.15')
(105, 'Network', 'Computer Engineering', 'Monday 9.15')
```

In []:

In []:

In [98]:

```
import psycopg2
```