In [1]:

```
# Name : Ashutosh Singh Kushwaha
# Admission No : 22MT0084
# ADBMS LAB 5
```

In [22]:

```
import mysql.connector as sc
import time
start = time.time()
myconn = sc.connect(
    host = "localhost",
    user = "root",
    password = "Kushashu123",
    database = "adbms"
)
end = time.time()
print("Time Taken : ", end-start)
print(myconn)
```

```
Time Taken :  0.03201913833618164
<mysql.connector.connection_cext.CMySQLConnection object at 0x000002C5A646E080>
```

In [3]:

```
cursor = myconn.cursor(buffered= True)
start = time.time()
cursor.execute('show tables')
for x in cursor:
    print(x)
end = time.time()
print("Time Taken : ", end-start)
```

```
('department_salary_total',)
('faculty',)
('instructor',)
('teaches',)
('teaches2',)
```

In [4]:

```
## Table View
start = time.time()
cursor.execute('select * from instructor')
print("------------Instructor Table----------")
for x in cursor:
    print(x)

cursor.execute('select * from teaches')
print("----------Teaches Table---------------")
for x in cursor:
    print(x)
end = time.time()
print("Time Taken : ", end-start)
```

```
------------Instructor Table----------
(10101, 'Srinivasan ', 'Comp. Sci.', 65000)
(10211, 'Smith', 'Biology', 66000)
(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)
----------Teaches Table---------------
(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)
```

In [23]:

```
## Question 1
start = time.time()
cursor.execute('select * from instructor order by salary')
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
(10212, 'Tom', 'Biology', None)
(15151, 'Mozart', 'Music', 40000)
(32343, 'El Said', 'History', 60000)
(58583, 'Califieri', 'History', 62000)
(10101, 'Srinivasan ', 'Comp. Sci.', 65000)
(10211, 'Smith', 'Biology', 66000)
(76766, 'Crick', 'Biology', 72000)
(45565, 'Katz', 'Comp. Sci.', 75000)
(76543, 'Singh', 'Finance', 80000)
(98345, 'Kim', 'Elec. Eng.', 80000)
(33456, 'Gold', 'Physics', 87000)
(12121, ' Wu', 'Finance', 90000)
(83821, 'Brandt', 'Comp. Sci.', 92000)
(22222, 'Einstein', 'Physics', 95000)
```

In [24]:

```
## Question 2
start = time.time()
query = "select distinct(Course_id) from teaches \
where (semester = 'fall' and  year = 2017) or (semester = 'spring' and year = 2018 )"
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
('CS-101',)
('CS-315',)
('CS-347',)
('FIN-201',)
('MU-199',)
('PHY-101',)
('HIS-351',)
('CS-319',)
```

In [25]:

```
## Question 3
## Find courses that ran in Fall 2017 and in Spring 2018
start = time.time()
query = "select distinct(Course_id) from teaches where (semester = 'fall' and year =
and Course_id in (select distinct(Course_id) from teaches where (semester = 'Spring'
cursor.execute(query)
print(cursor.rowcount)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
1
Time Taken :  0.008010149002075195
('CS-101',)
```

In [38]:

```
query = "delete from instructor where id = '10211'"
cursor.execute(query)
```

In [39]:

```
## Question 4
start = time.time()
query = "select distinct(Course_id) from teaches where (semester = 'fall' and year =
and Course_id not in (select distinct(Course_id) from teaches where (semester = 'Spri
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
print(cursor.rowcount)
for x in cursor:
    print(x)
```

```
Time Taken :  0.008012056350708008
2
('CS-347',)
('PHY-101',)
```

In [40]:

```
## Question 5
start = time.time()
query = "insert into instructor values (%s,%s,%s,%s)"
val = ('10211', 'Smith', 'Biology', 66000)
cursor.execute(query , val)
end = time.time()
print("Time Taken : ", end-start)
```

```
Time Taken :  0.008006811141967773
```

In [41]:

```
start = time.time()
val = ('10212', 'Tom', 'Biology',None)
cursor.execute(query , val)
end = time.time()
print("Time Taken : ", end-start)
```

```
Time Taken :  0.008014202117919922
```

In [42]:

```
## Question 6
start = time.time()
query = "select name from instructor where salary is Null"
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.008008241653442383
('Tom',)
```

In [43]:

```
## Question 7
start = time.time()
query = "select avg(salary) from instructor group by dept_name having dept_name = 'Co
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
(Decimal('77333.3333'),)
```

In [44]:

```
## Question 8
start = time.time()
query = "select count(*) from teaches where semester ='Spring' and  year = '2018'"
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
(7,)
```

In [45]:

```
## Question 9
## Find the number of tuples in the teaches relation
start = time.time()
query = "select count(*) from teaches "
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.007515907287597656
(15,)
```

In [46]:

```
## Question 10
## Find the average salary of instructors in each department
start = time.time()
query = "select dept_name ,avg(salary) from instructor group by dept_name"
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
('Comp. Sci.', Decimal('77333.3333'))
('Biology', Decimal('69000.0000'))
('Finance', Decimal('85000.0000'))
('Music', Decimal('40000.0000'))
('Physics', Decimal('91000.0000'))
('History', Decimal('61000.0000'))
('Elec. Eng.', Decimal('80000.0000'))
```

In [47]:

```
## Question 11
start = time.time()
query = "select dept_name , avg(salary) as Average_salary from instructor group by de
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.008013010025024414
('Comp. Sci.', Decimal('77333.3333'))
('Biology', Decimal('69000.0000'))
('Finance', Decimal('85000.0000'))
('Physics', Decimal('91000.0000'))
('History', Decimal('61000.0000'))
('Elec. Eng.', Decimal('80000.0000'))
```

In [48]:

```
## Question 12
## Name all instructors whose name is neither “Mozart” nor Einstein”.
start = time.time()
query = "select name from instructor where name<>'Mozart' and name <>'Einstein'"
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.008473634719848633
('Srinivasan ',)
('Smith',)
('Tom',)
(' Wu',)
('El Said',)
('Gold',)
('Katz',)
('Califieri',)
('Singh',)
('Crick',)
('Brandt',)
('Kim',)
```

In [49]:

```
## Question 13
## Find courses that ran in Fall 2017 and in Spring 2018
start = time.time()
query = "with T as (select course_id from teaches where semester = 'Fall' and year =
(select course_id from teaches where semester = 'Spring' and year = 2018) select dist
T.course_id from T ,S where T.course_id in (select S.course_id from S)"
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
('CS-101',)
```

In [50]:

```
## Question 14
## Find courses that ran in Fall 2017 but not in Spring 2018
start = time.time()
query = "with T as (select course_id from teaches where semester = 'Fall' and year =
(select course_id from teaches where semester = 'Spring' and year = 2018) select dist
T.course_id from T ,S where T.course_id not in (select S.course_id from S)"
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
('PHY-101',)
('CS-347',)
```

In [51]:

```
## Question 15
## List the names of instructors along with the course ID of the courses that they ta
start = time.time()
query = "Select name , course_id from teaches , instructor where teaches.id = instruc
cursor.execute(query)
end = time.time()
print("Time Taken : ", end-start)
for x in cursor:
    print(x)
```

```
Time Taken :  0.0
('Srinivasan ', 'CS-101')
('Srinivasan ', 'CS-315')
('Srinivasan ', 'CS-347')
(' Wu', 'FIN-201')
('Mozart', 'MU-199')
('Einstein', 'PHY-101')
('El Said', 'HIS-351')
('Katz', 'CS-101')
('Katz', 'CS-319')
('Crick', 'BIO-101')
('Crick', 'BIO-301')
('Brandt', 'CS-190')
('Brandt', 'CS-190')
('Brandt', 'CS-319')
('Kim', 'EE-181')
```

In [ ]: