In [1]:
```
import psycopg2
import time
```

In [2]:
```
TEST_COUNT = 5

INSERT_COUNT = 5000
UPDATE_COUNT = 5000
DELETE_COUNT = 5000
READ_COUNT = 5000

INSERT_TIME = []
UPDATE_TIME = []
DELETE_TIME = []
READ_TIME = []
```

In [3]:
```
mydb = psycopg2.connect(database="CSPA_EVAL", user='admin', password='admin', host=
```

In [4]:
```
mycursor = mydb.cursor()
```

In [5]:
```
def createTable():
    mycursor.execute("CREATE TABLE Student (id int PRIMARY KEY,fname varchar(255),l
    mydb.commit()
```

In [6]:
```
def dropTable():
    mycursor.execute('DROP TABLE Student')
    mydb.commit()
```

In [7]:
```
def insertData():
    start=time.time()

    for i in range(1,INSERT_COUNT+1):
        id=i
        fname='studf_{}'.format(i)
        lname='studl_{}'.format(i)
        email='stud_{}@mail.com'.format(i)
        grade='A'
        statement = "INSERT INTO Student VALUES({},'{}','{}','{}','{}');".format(id
#         print(statement)
        mycursor.execute(statement)
        mydb.commit()

    stop=time.time()
    time_taken = stop - start
    INSERT_TIME.append(time_taken)
    print('Inserted in ',time_taken)
```

In [8]:
```
def updateData():
    start=time.time()

    for i in range(1,UPDATE_COUNT+1):
        id=i
        new_grade='B'
```

```
        statement = "UPDATE Student SET grade = '{}' WHERE id = {};".format(new_gra
#         print(statement)
        mycursor.execute(statement)
        mydb.commit()

    stop=time.time()
    time_taken = stop - start
    UPDATE_TIME.append(time_taken)
    print('Updated in ',time_taken)
```

In [9]:
```
def deleteData():
    start=time.time()

    for i in range(1,DELETE_COUNT+1):
        id=i
        statement = "DELETE FROM Student WHERE id = {};".format(id)
#         print(statement)
        mycursor.execute(statement)
        mydb.commit()

    stop=time.time()
    time_taken = stop - start
    DELETE_TIME.append(time_taken)
    print('Deleted in ',time_taken)
```

In [10]:
```
def readData():
    start=time.time()

    for i in range(1,READ_COUNT+1):
        id=i
        statement = "SELECT * FROM Student WHERE id = {};".format(id)
#         print(statement)
        mycursor.execute(statement)
        my_result = mycursor.fetchall()
#         print(my_result)

    stop=time.time()
    time_taken = stop - start
    READ_TIME.append(time_taken)
    print('Read in ',time_taken)
```

In [11]:
```
print('Testing for {} times'.format(TEST_COUNT))
for i in range(1,TEST_COUNT+1):
    print('\n---------- TEST {} ----------\n'.format(i))
    createTable()

    insertData()
    updateData()
    readData()
    deleteData()

    dropTable()

#Averaging
def average(lst):
```

```
    sum = 0
    for e in lst:
        sum = sum + e

    return sum/len(lst)
print('\n\n============ RESULT ============\n')
print('Average Insert time: {}s'.format(average(INSERT_TIME)))
print('Average Update time: {}s'.format(average(UPDATE_TIME)))
print('Average Read time: {}s'.format(average(READ_TIME)))
print('Average Delete time: {}s'.format(average(DELETE_TIME)))

mydb.close()
```

```
Testing for 5 times

---------- TEST 1 ----------

Inserted in  1.917508840560913
Updated in  1.9613265991210938
Read in  0.7029409408569336
Deleted in  2.042280673980713

---------- TEST 2 ----------

Inserted in  2.2599332332611084
Updated in  2.2341208457946777
Read in  0.6158087253570557
Deleted in  2.3101806640625

---------- TEST 3 ----------

Inserted in  1.9416894912719727
Updated in  3.1101410388946533
Read in  0.9380600452423096
Deleted in  2.947625160217285

---------- TEST 4 ----------

Inserted in  1.8748767375946045
Updated in  2.1416447162628174
Read in  0.668717622756958
Deleted in  2.420727252960205

---------- TEST 5 ----------

Inserted in  1.933046579360962
Updated in  2.676555871963501
Read in  0.8050656318664551
Deleted in  2.268627882003784


============ RESULT ============

Average Insert time: 1.9854109764099122s
Average Update time: 2.4247578144073487s
Average Read time: 0.7461185932159424s
Average Delete time: 2.3978883266448974s
```