

DISTRIBUTED SYSTEM

Overview:

Three different server Montreal (MTL), Laval (LVL) and Dollard-des-Ormeaux (DDO) are implemented using RMI and for each server a Udp server is created so that servers can communicate with each other. The server for each center maintains records of two types of TeacherRecord and StudentRecord. A Record on each server can be identified by a unique RecordID .

The Records are created as arraylists in a hash map according to the first letter of the last name indicated in the records as the key value.

Each server also maintains a log containing all the operations that have been performed on that server, at what time and who performed the operation.

The managers carry with them a log (text file) of the actions they performed on the system and they can perform the following function:-

- 1.createSRecord (firstName, lastName, courseRegistered, status, statusDate)
- 2.getRecordCounts ()
- 3.editRecord (recordID, fieldName, newValue)
4. display ()
5. createTRecord (firstName, lastName, address, phone, specialization, location) :

Working:

Three different servers are started which start their own UDP servers.

Each server binds their object references in the registry using a unique name .

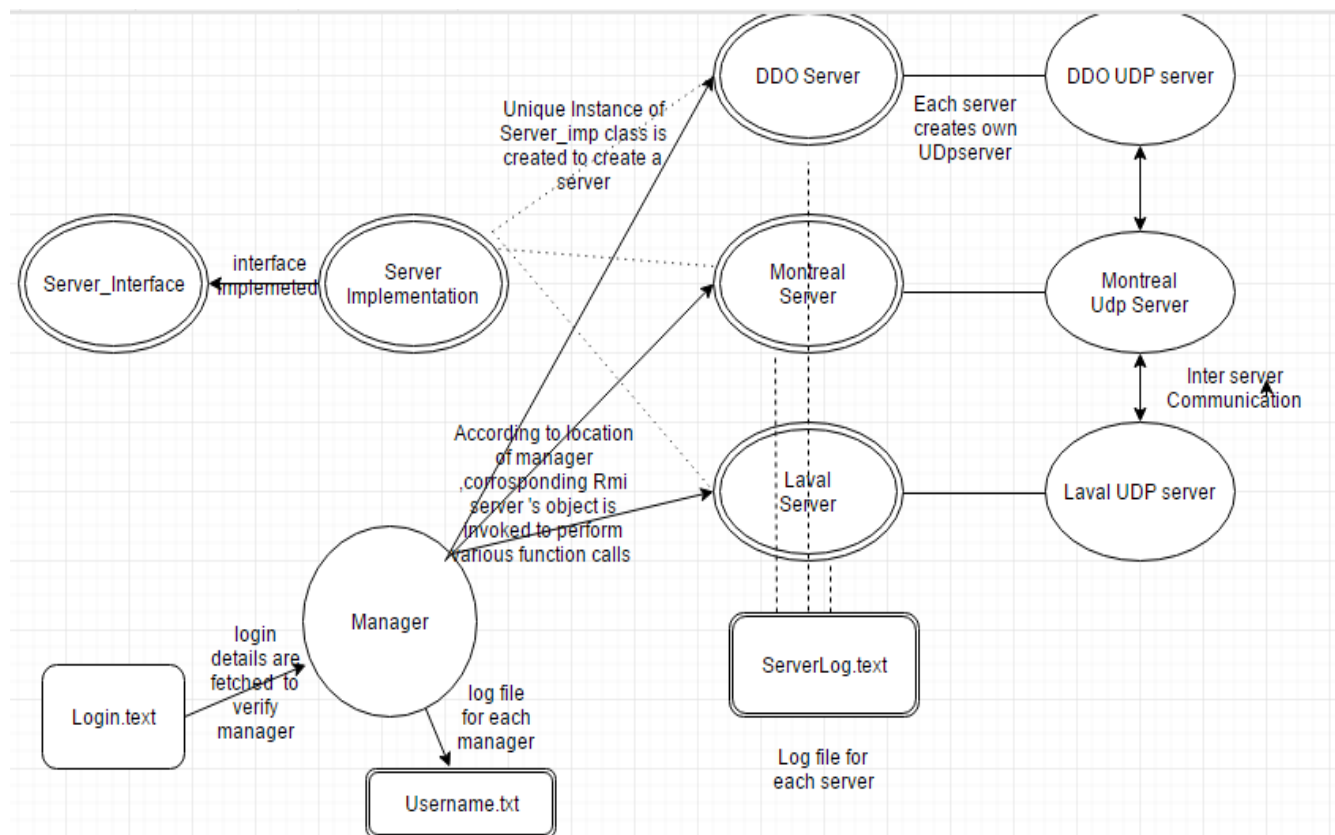
The manager has been allocated a server based on the loacation,and it logins using login details(Uername and password) which are validated from an external text file which contains records of all server managers.

After login the server manager looks in the registry and search for the object reference using which he creates reference of that object at client side and invokes the different functions provided in the interface of that server.

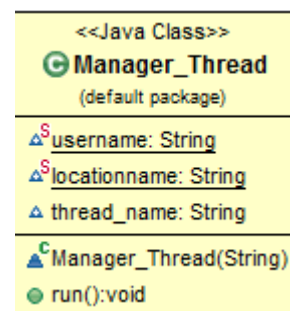
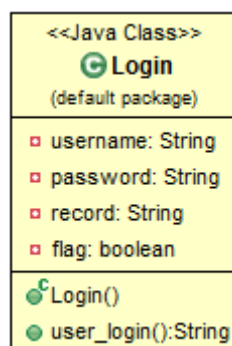
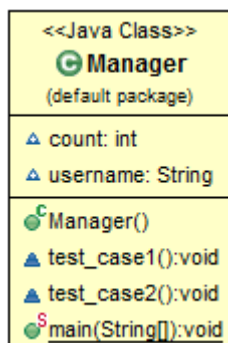
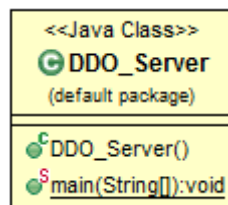
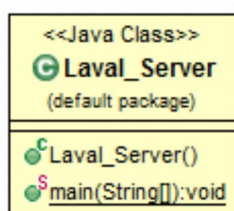
All the functions performed by the different clients on a server are stored in the one unique file for the each server.

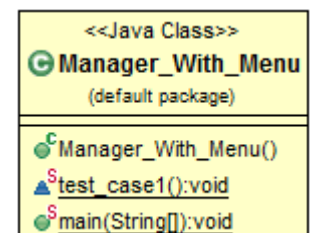
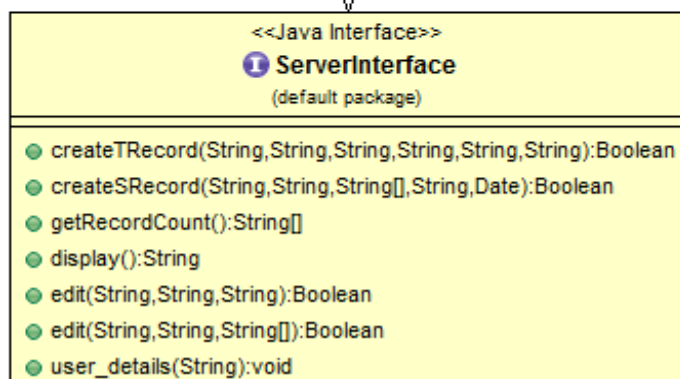
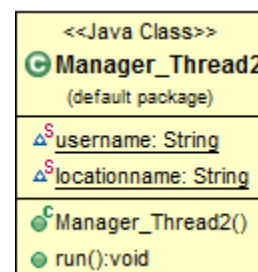
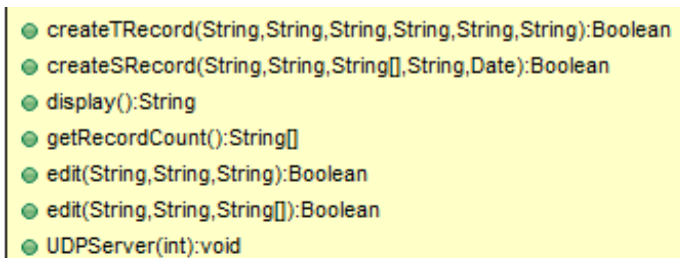
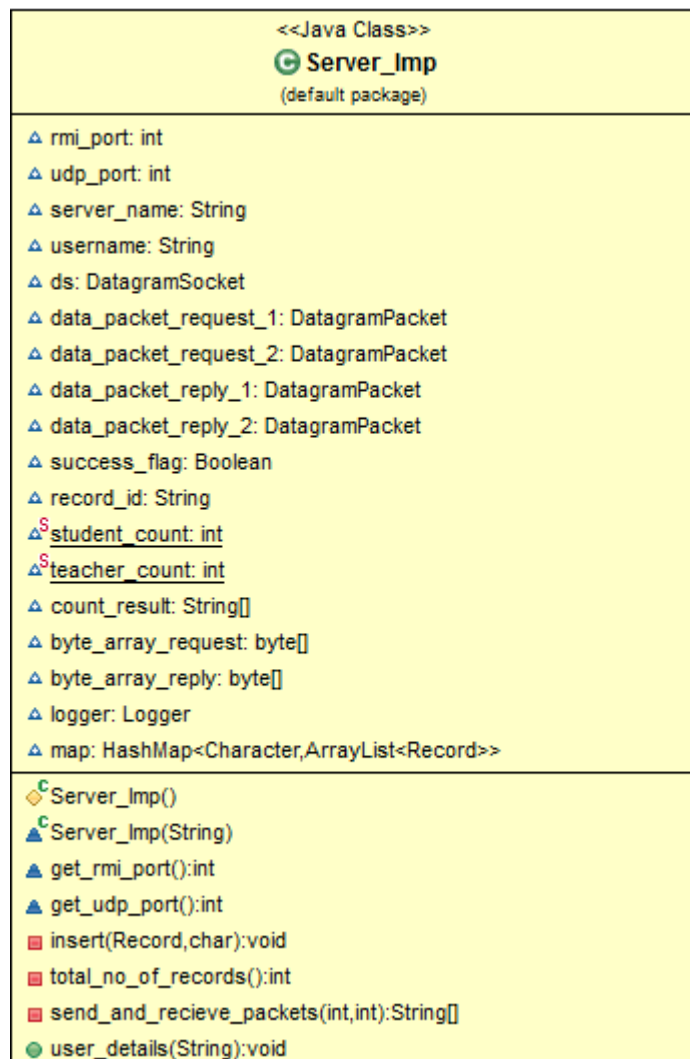
All the functions performed by every client are stored in different text files saved as their username.

Implementation:



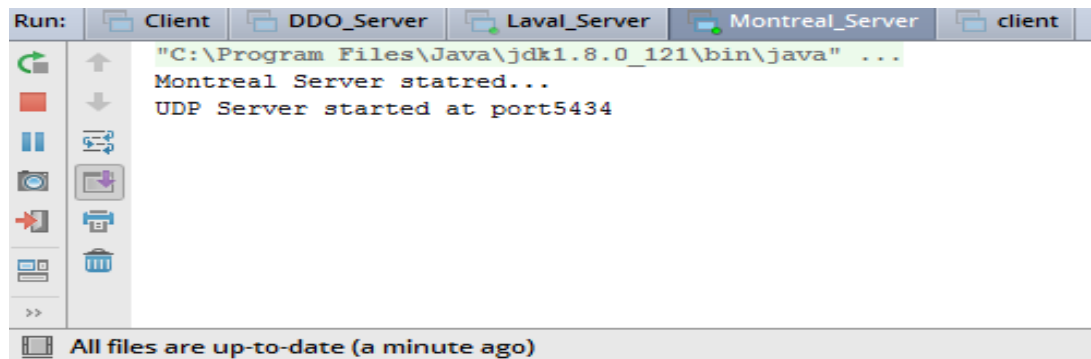
Class Diagrams:-



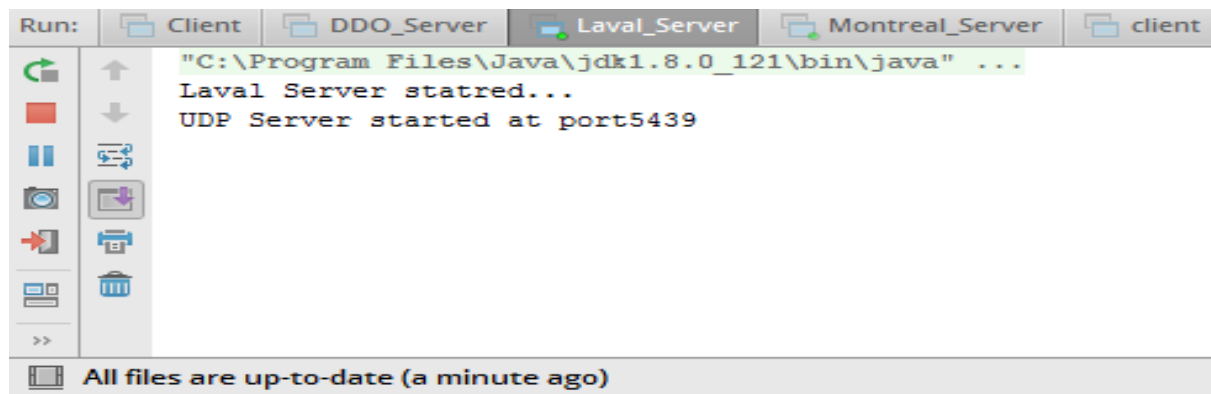


TEST CASES AND OUTPUT SCREENS:-

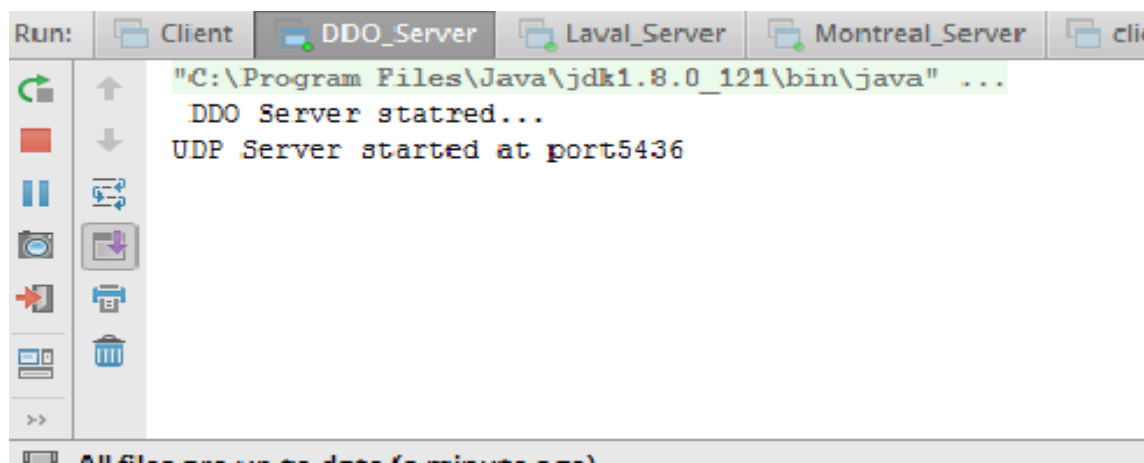
All servers are started one by one:-



```
Run: Client DDO_Server Laval_Server Montreal_Server client
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...
Montreal Server statred...
UDP Server started at port5434
All files are up-to-date (a minute ago)
```



```
Run: Client DDO_Server Laval_Server Montreal_Server client
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...
Laval Server statred...
UDP Server started at port5439
All files are up-to-date (a minute ago)
```




```
Run: Client DDO_Server Laval_Server Montreal_Server cli
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...
DDO Server statred...
UDP Server started at port5436
All files are up-to-date (a minute ago)
```

Manager Login (MTL00001) and Student Record Creation

```
"C:\Program Files\Java\jdk1.8.0_121\bin\java" ...
Enter your username:
MTL00001
Enter your password:
password1
LOGIN SUCCESSFULL
Choose your option:
 1.Create student record.
 2.Create teacher record.
 3.Edit the record
 4.Get record count
 5.Display records
 6.Exit
Enter your choice:1
Enter the Student first name:
firstname1
Enter the Student last name:
lastname1
Enter the courses registered:
course1
Enter the Student status:
course2
Student record created with fieldsfirstname1 lastname1 [course1] course2
Choose your option:
 1.Create student record.
 2.Create teacher record.
 3.Edit the record
 4.Get record count
 5.Display records
 6.Exit
Enter your choice:5
[1]SR00001 firstname1 lastname1 course2 [course1] Mon Jun 05 00:05:52 EDT 2017
```

Log file Creation of Manger (MTL00001)

 MTL00001 - Notepad

File Edit Format View Help

Jun 05, 2017 12:05:04 AM assignment1.Client_Thread login

INFO: User MTL00001logged in

Jun 05, 2017 12:05:52 AM assignment1.Operations_to_be_performed do_the_following

INFO: Student record created with fieldsfirstname1 lastname1 [course1] course2

Jun 05, 2017 12:06:12 AM assignment1.Operations_to_be_performed do_the_following

INFO: Display function performed

Staus of of student changed-

```
5.Display records
6.Exit
Enter your choice:5
[1]SR00001 firstname1 lastname1 active [Maths, Physics] Mon Jun 05 16:32:19 EDT 2017
SR00002 firstname2 lastname2 active [Chemistry, Biology, Maths] Mon Jun 05 16:32:53 EDT 2017

Choose your option:
1.Create student record.
2.Create teacher record.
3.Edit the record
4.Get record count
5.Display records
6.Exit
Enter your choice:3
Enter the Record id[SR/TR0000N]
SR00001
Enter the field name to edit:[courses_Registered,status]
status
Enter the status value:[active/deactive]
deactive
Status edited
Choose your option:
1.Create student record.
2.Create teacher record.
3.Edit the record
4.Get record count
5.Display records
6.Exit
Enter your choice:5
[1]SR00001 firstname1 lastname1 deactive [Maths, Physics] Mon Jun 05 16:33:17 EDT 2017
SR00002 firstname2 lastname2 active [Chemistry, Biology, Maths] Mon Jun 05 16:32:53 EDT 2017
```

Courses of Stundent Changed:

```
5.Display records
6.Exit
Enter your choice:5
[1]SR00001 firstname1 lastname1 active [Maths, physics] Mon Jun 05 16:15:07 EDT 2017
SR00002 firstname2 lastname2 active [Maths] Mon Jun 05 16:15:32 EDT 2017

Choose your option:
1.Create student record.
2.Create teacher record.
3.Edit the record
4.Get record count
5.Display records
6.Exit
Enter your choice:3
Enter the Record id[SR/TR0000N]
SR00001
Enter the field name to edit:[courses_Registered,status]
courses_Registered
Enter the courses :
Chemistry Physics Biology
Edit operation failed
Choose your option:
1.Create student record.
2.Create teacher record.
3.Edit the record
4.Get record count
5.Display records
6.Exit
Enter your choice:5
[1]SR00001 firstname1 lastname1 active [Chemistry, Physics, Biology] Mon Jun 05 16:15:07 EDT 2017
SR00002 firstname2 lastname2 active [Maths] Mon Jun 05 16:15:32 EDT 2017
```

Teacher Address Changed:

```
[T]TR00002 T-firstname2 T-lastname2 #506 Toronto +1 345 234 5674 Laval
[l]SR00001 firstname1 lastname1 deactive [Maths, Physics] Mon Jun 05 16:33:17 EDT 2017
SR00002 firstname2 lastname2 active [Chemistry, Biology, Maths] Mon Jun 05 16:32:53 EDT 2017
TR00001 T-firstname1 lastname1 #123 Vancouver +1 514 234 3454 Montreal
```

Choose your option:

- 1.Create student record.
- 2.Create teacher record.
- 3.Edit the record
- 4.Get record count
- 5.Display records
- 6.Exit

Enter your choice:3

Enter the Record id[SR/TR0000N]

TR00001

Enter the field name to edit:[address,phone,location]

address

Enter the field's value:

#607 Ottawa

Teacher record edited

Choose your option:

- 1.Create student record.
- 2.Create teacher record.
- 3.Edit the record
- 4.Get record count
- 5.Display records
- 6.Exit

Enter your choice:5

```
[T]TR00002 T-firstname2 T-lastname2 #506 Toronto +1 345 234 5674 Laval
```

```
[l]SR00001 firstname1 lastname1 deactive [Maths, Physics] Mon Jun 05 16:33:17 EDT 2017
```

```
SR00002 firstname2 lastname2 active [Chemistry, Biology, Maths] Mon Jun 05 16:32:53 EDT 2017
```

```
TR00001 T-firstname1 lastname1 #607 Ottawa +1 514 234 3454 Montreal
```

Teachers Location change Failed(Because of wrong Location):

3.Edit the record

4.Get record count

5.Display records

6.Exit

Enter your choice:3

Enter the Record id[SR/TR0000N]

TR00001

Enter the field name to edit:[address,phone,location]

location

Enter the field's value:

Trt

Edit operation failed

Choose your option:

Server's Log File:(Montreal Server):

```
Montreallog - Notepad
File Edit Format View Help
INFO: Student record created byMTL00002
Jun 05, 2017 10:34:25 AM Server_Imp createTRecord
INFO: Teacher record created by MTL00002
Jun 05, 2017 10:34:25 AM Server_Imp createTRecord
INFO: Teacher record created by MTL00002
Jun 05, 2017 10:34:25 AM Server_Imp createTRecord
INFO: Teacher record created by MTL00002
Jun 05, 2017 11:56:47 AM Server_Imp createSRecord
INFO: Student record created byMTL00001
Jun 05, 2017 11:56:47 AM Server_Imp createSRecord
INFO: Student record created byMTL00001
Jun 05, 2017 11:56:47 AM Server_Imp createSRecord
INFO: Student record created byMTL00001
Jun 05, 2017 11:56:47 AM Server_Imp createTRecord
INFO: Teacher record created by MTL00001
```

Running multiple Threads :(Without Synchronization):
SR00019 record id not created .

```

[1]SR00001 firstname1 lastname1 deactive [maths, physics, eco, geo] Mon Jun 05 13:38:59 EDT 2017
TR00001 t_firstname1 lastname1 addreeeeeeeeee 11111111111111111111 montreal
SR00002 firstname lastname active [maths, physics] Mon Jun 05 13:28:44 EDT 2017
SR00003 f 1 active [maths, physics] Mon Jun 05 13:37:11 EDT 2017
TR00002 f 1 address1 456 mtl
SR00004 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:22:42 EDT 2017
SR00005 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:22:42 EDT 2017
SR00006 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:22:42 EDT 2017
SR00007 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:22:42 EDT 2017
SR00008 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:22:42 EDT 2017
SR00009 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:22:42 EDT 2017
SR00010 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:22:42 EDT 2017
TR00003 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
TR00004 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
SR00011 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:22:42 EDT 2017
TR00005 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
SR00012 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:22:42 EDT 2017
TR00007 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
SR00013 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:22:42 EDT 2017
TR00010 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
SR00014 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:23:57 EDT 2017
SR00015 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:23:57 EDT 2017
SR00016 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:23:57 EDT 2017
SR00017 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:23:57 EDT 2017
TR00013 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
TR00014 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
SR00018 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:23:57 EDT 2017
SR00020 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:23:57 EDT 2017
SR00021 first_name2 last_name2 active [course1, course2, course3] Mon Jun 05 14:23:57 EDT 2017
TR00017 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
TR00018 t-first_name1 last_name1 #12 ,Vancouver +1 514 333 2435 Mtl
SR00022 first_name1 last_name1 active [course1, course2] Mon Jun 05 14:23:57 EDT 2017

```

This problem is resolved by using synchronized block for record id and edit function.

Get Record Count

DDO00001 runs the get record count option and record count of three servers is printrd:-

```

Choose your option:
1.Create student record.
2.Create teacher record.
3.Edit the record
4.Get record count
5.Display records
6.Exit
Enter your choice:4
DDO 1 MTL:2 LVL:2

```