VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

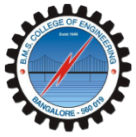
LAB REPORT
on

BIG DATA ANALYTICS
(20CS6PEBDA)

Submitted by

NIHARIKA B S (1BM19CS100)

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
May-2022 to July-2022

B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "**BIG DATA ANALYTICS**" carried out by **NIHARIKA B S(1BM19CS100),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a **BIG DATA ANALYTICS - (20CS6PEBDA)**work prescribed for the said degree.

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Index Sheet

Course Outcome

CO1	Apply the concept of NoSQL, Hadoop or Spark for a given task
CO2	Analyze the Big Data and obtain insight using data analytics mechanisms.
CO3	Design and implement Big data applications by applying NoSQL, Hadoop or Spark

Week-1

1. CREATE DATABASE IN MONGODB.

```
bmsce@bmsce-Precision-T1700:~$ mongo
MongoDB shell version v3.6.8
connecting to: mongodb://127.0.0.1:27017
Implicit session: session { "id" : UUID("567e15b6-00ef-48ad-8af9-604f6e8de048") }
MongoDB server version: 3.6.8
Server has startup warnings:
2022-04-13T19:39:21.099+0530 I STORAGE  [initandlisten]
2022-04-13T19:39:21.099+0530 I STORAGE  [initandlisten] ** WARNING: Using the XFS filesystem is stron
gly recommended with the WiredTiger storage engine
2022-04-13T19:39:21.099+0530 I STORAGE  [initandlisten] **          See http://dochub.mongodb.org/cor
e/prodnotes-filesystem
2022-04-13T19:39:24.590+0530 I CONTROL  [initandlisten]
2022-04-13T19:39:24.590+0530 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for
 the database.
2022-04-13T19:39:24.590+0530 I CONTROL  [initandlisten] **          Read and write access to data and
 configuration is unrestricted.
2022-04-13T19:39:24.590+0530 I CONTROL  [initandlisten]
>
> use Niharika_db
switched to db Niharika_db
```

2. CRUD (CREATE, READ, UPDATE, DELETE) OPERATIONS

To create a collection by the name “Student”. Let us take a look at the collection list prior to the creation of the new collection “Student”.

```
> db.createCollection("Student");
{ "ok" : 1 }
```

Create a collection by the name “Students” and store the following data in it.

```
> db.Student.insert({_id:1,StudName:"MichelleJacintha",Grade:"VII",Hobbies:"InternetSurfing"});
WriteResult({ "nInserted" : 1 })
```

```
> db.Student.insert({_id:2,StudName:"MikeHassan",Grade:"VII",Hobbies:"Swimming"});
WriteResult({ "nInserted" : 1 })
> db.Student.update({_id:3,StudName:"AryanDavid",Grade:"VII"},{$set:{Hobbies:"Skating"}},{upsert:true});
WriteResult({ "nMatched" : 0, "nUpserted" : 1, "nModified" : 0, "_id" : 3 })
> db.Student.insert({_id:4,StudName:"DuaLipa",Grade:"VII",Hobbies:"Singing"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:5,StudName:"RajeshBharadwaj",Grade:"VII",Hobbies:"Badminton"});
WriteResult({ "nInserted" : 1 })
```

FIND METHOD

A. To search for documents from the “Students” collection based on certain search criteria.

```
> db.Student.find({StudName:"DuaLipa"});
{ "_id" : 4, "StudName" : "DuaLipa", "Grade" : "VII", "Hobbies" : "Singing" }
```

B. To display only the StudName and Grade from all the documents of the Students collection. The identifier_id should be suppressed and NOT displayed.

```
> db.Student.find({},{StudName:1,Grade:1,_id:0});
{ "StudName" : "MichelleJacintha", "Grade" : "VII" }
{ "StudName" : "MikeHassan", "Grade" : "VII" }
{ "Grade" : "VII", "StudName" : "AryanDavid" }
{ "StudName" : "DuaLipa", "Grade" : "VII" }
{ "StudName" : "RajeshBharadwaj", "Grade" : "VII" }
```

C. To find those documents where the Grade is set to 'VII' D. To find those documents from the Students collection where the Hobbies is set to either 'singing' or is set to 'Skating'.

```
> db.Student.find({Grade:{$eq:'VII'}}).pretty();
{
        "_id" : 1,
        "StudName" : "MichelleJacintha",
        "Grade" : "VII",
        "Hobbies" : "InternetSurfing"
}
{
        "_id" : 2,
        "StudName" : "MikeHassan",
        "Grade" : "VII",
        "Hobbies" : "Swimming"
}
{
        "_id" : 3,
        "Grade" : "VII",
        "StudName" : "AryanDavid",
        "Hobbies" : "Skating"
}
{
        "_id" : 4,
        "StudName" : "DuaLipa",
        "Grade" : "VII",
        "Hobbies" : "Singing"
}
{
        "_id" : 5,
        "StudName" : "RajeshBharadwaj",
        "Grade" : "VII",
        "Hobbies" : "Badminton"
}
```

```
> db.Student.find({Hobbies :{ $in: ['Singing','Skating']}}).pretty ();
{
        "_id" : 3,
        "Grade" : "VII",
        "StudName" : "AryanDavid",
        "Hobbies" : "Skating"
}
{
        "_id" : 4,
        "StudName" : "DuaLipa",
        "Grade" : "VII",
        "Hobbies" : "Singing"
}
```

E. To find documents from the Students collection where the StudName begins with “R”.

```
> db.Student.find({StudName:/^R/}).pretty();
{
        "_id" : 5,
        "StudName" : "RajeshBharadwaj",
        "Grade" : "VII",
        "Hobbies" : "Badminton"
```

F. To find documents from the Students collection where the StudNamehas an “a” in any position.
G. To find the number of documents in the Students collection.

```
> db.Student.count();
5
```

H. To sort the documents from the Students collection in the descending order of StudName.

```
> db.Student.find().sort({StudName:-1}).pretty();
{
        "_id" : 5,
        "StudName" : "RajeshBharadwaj",
        "Grade" : "VII",
        "Hobbies" : "Badminton"
}
{
        "_id" : 2,
        "StudName" : "MikeHassan",
        "Grade" : "VII",
        "Hobbies" : "Swimming"
}
{
        "_id" : 1,
        "StudName" : "MichelleJacintha",
        "Grade" : "VII",
        "Hobbies" : "InternetSurfing"
}
{
        "_id" : 4,
        "StudName" : "DuaLipa",
        "Grade" : "VII",
        "Hobbies" : "Singing"
}
{
        "_id" : 3,
        "Grade" : "VII",
        "StudName" : "AryanDavid",
        "Hobbies" : "Skating"
}
```

3.Save Method :

Save() method will insert a new document, if the document with the _id does not exist. If it exists it will replace the exisiting document.

```
> db.Student.save({StudName:"Vamsi", Grade:"VI"})
WriteResult({ "nInserted" : 1 })
```

Add a new field to existing Document:

```
> db.Student.update({_id:4},{$set:{Location: "Network"}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.find({});
{ "_id" : 1, "StudName" : "MichelleJacintha", "Grade" : "VII", "Hobbies" : "InternetSurfing" }
{ "_id" : 2, "StudName" : "MikeHassan", "Grade" : "VII", "Hobbies" : "Swimming" }
{ "_id" : 3, "Grade" : "VII", "StudName" : "AryanDavid", "Hobbies" : "Skating" }
{ "_id" : 4, "StudName" : "DuaLipa", "Grade" : "VII", "Hobbies" : "Singing", "Location" : "Network" }
{ "_id" : 5, "StudName" : "RajeshBharadwaj", "Grade" : "VII", "Hobbies" : "Badminton" }
{ "_id" : ObjectId("62569a60a083074f5c1a00a8"), "StudName" : "Vamsi", "Grade" : "VI" }
```

Remove the field in an existing Document

```
> db.Student.update({_id:4},{$unset:{Location:"Network"}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.find({});
{ "_id" : 1, "StudName" : "MichelleJacintha", "Grade" : "VII", "Hobbies" : "InternetSurfing" }
{ "_id" : 2, "StudName" : "MikeHassan", "Grade" : "VII", "Hobbies" : "Swimming" }
{ "_id" : 3, "Grade" : "VII", "StudName" : "AryanDavid", "Hobbies" : "Skating" }
{ "_id" : 4, "StudName" : "DuaLipa", "Grade" : "VII", "Hobbies" : "Singing" }
{ "_id" : 5, "StudName" : "RajeshBharadwaj", "Grade" : "VII", "Hobbies" : "Badminton" }
{ "_id" : ObjectId("62569a60a083074f5c1a00a8"), "StudName" : "Vamsi", "Grade" : "VI" }
```

Finding Document based on search criteria suppressing few fields

```
> db.Student.find({_id:1},{StudName:1,Grade:1,_id:0});
{ "StudName" : "MichelleJacintha", "Grade" : "VII" }
```

To find those documents where the Grade is not set to 'VII'

```
> db.Student.find({Grade:{$ne:'VII'}}).pretty();
{
        "_id" : ObjectId("62569a60a083074f5c1a00a8"),
        "StudName" : "Vamsi",
        "Grade" : "VI"
}
```

To find documents from the Students collection where the StudName ends with n. to set a particular field value to NULL

```
> db.Student.find({StudName:/n$/}).pretty();
{
        "_id" : 2,
        "StudName" : "MikeHassan",
        "Grade" : "VII",
        "Hobbies" : "Swimming"
}
```

```
> db.Student.update({_id:3},{$set:{Hobbies:null}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.find({});
{ "_id" : 1, "StudName" : "MichelleJacintha", "Grade" : "VII", "Hobbies" : "InternetSurfing" }
{ "_id" : 2, "StudName" : "MikeHassan", "Grade" : "VII", "Hobbies" : "Swimming" }
{ "_id" : 3, "Grade" : "VII", "StudName" : "AryanDavid", "Hobbies" : null }
{ "_id" : 4, "StudName" : "DuaLipa", "Grade" : "VII", "Hobbies" : "Singing" }
{ "_id" : 5, "StudName" : "RajeshBharadwaj", "Grade" : "VII", "Hobbies" : "Badminton" }
{ "_id" : ObjectId("62569a60a083074f5c1a00a8"), "StudName" : "Vamsi", "Grade" : "VI" }
>
```

Count the number of documents in Student Collections

```
> db.Student.count()
6
```

Count the number of documents in Student Collections

with grade :VII

```
> db.Student.count({Grade:"VII"})
5
```

food database using mongodb

Create a collection by name “food” and add to each document add a “fruits”

array

```
> db.food.insert( { _id:1, fruits:['grapes','mango','apple'] } )
WriteResult({ "nInserted" : 1 })
> db.food.insert( { _id:2, fruits:['grapes','mango','cherry'] } )
WriteResult({ "nInserted" : 1 })
> db.food.insert( { _id:3, fruits:['banana','mango'] } )
WriteResult({ "nInserted" : 1 })
```

To find those documents from the “food” collection which has the “fruits array” constitute of “grapes”, “mango” and “apple”.

```
> db.food.find ( {fruits: ['grapes','mango','apple'] } ).pretty();
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
```

To find all the documets from the food collection which have elements mango and grapes in the array “fruits”

```
> db.food.find({fruits:{$all:["mango","grapes"]}})
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ] }
```

updateonArray:
using particular id replace the element present in the1st index position of

the fruits array with apple

```
> db.food.update({_id:3},{$set:{'fruits.1':'apple'}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.food.find({});
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ] }
{ "_id" : 3, "fruits" : [ "banana", "apple" ] }
>
```

Week-2

1) Using MongoDB

i) Create a database for Students and Create a Student Collection (_id,Name, USN, Semester, Dept_Name, CGPA, Hobbies(Set)).

ii) Insert required documents to the collection.

iii) First Filter on “Dept_Name:CSE” and then group it on “Semester” and compute the Average CPGA for that semester and filter those documents where the “Avg_CPGA” is greater than 7.5.

iv) Command used to export MongoDB JSON documents from “Student” Collection into the “Students” database into a CSV file “Output.txt”.

```
bmsce@bmsce-Precision-T1700:~$ mongo
MongoDB shell version v3.6.8
connecting to: mongodb://127.0.0.1:27017
Implicit session: session { "id" : UUID("4419b91e-5b22-4f43-a52c-ac48a0bf73a6") }
MongoDB server version: 3.6.8
Server has startup warnings:
2022-04-20T19:31:53.425+0530 I STORAGE  [initandlisten]
2022-04-20T19:31:53.426+0530 I STORAGE  [initandlisten] ** WARNING: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine
2022-04-20T19:31:53.426+0530 I STORAGE  [initandlisten] **          See http://dochub.mongodb.org/core/prodnotes-filesystem
2022-04-20T19:31:58.891+0530 I CONTROL  [initandlisten]
2022-04-20T19:31:58.891+0530 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2022-04-20T19:31:58.891+0530 I CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
2022-04-20T19:31:58.891+0530 I CONTROL  [initandlisten]
> use Niharika_db
switched to db Niharika_db
```

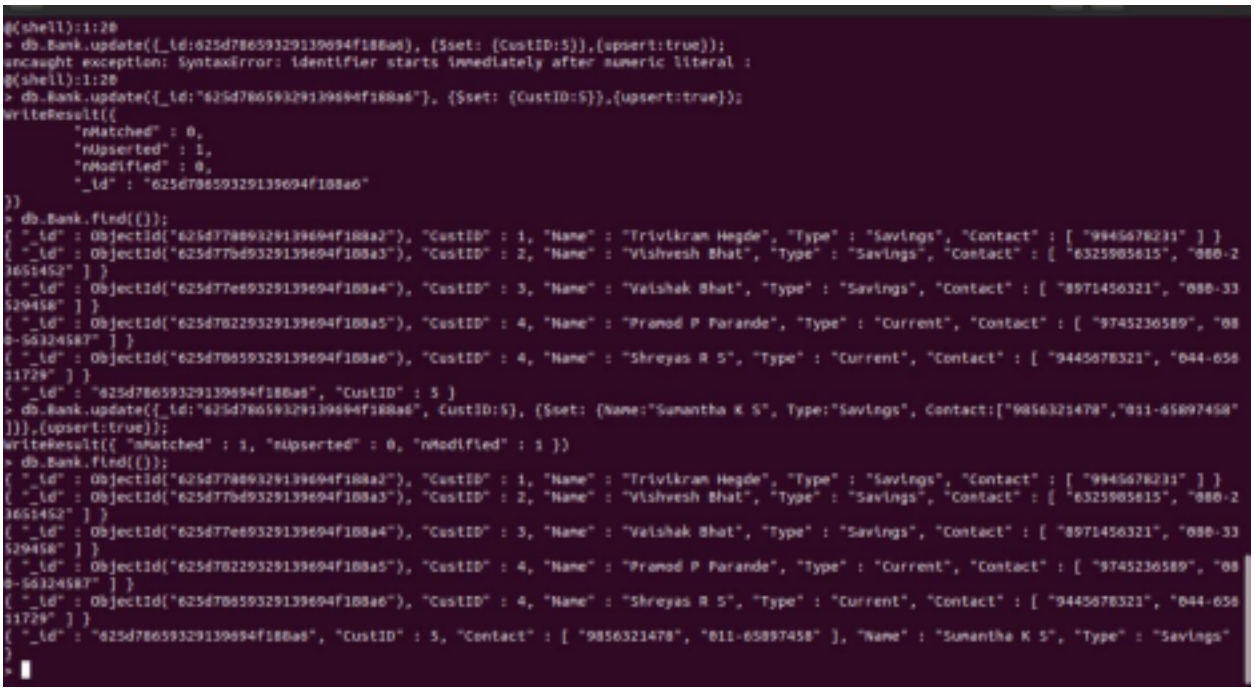
```
> db.Student.insert({_id:1,Name:"Aravind",USN:"1BM19CS001",Sem:6,Dept_name:"CSE",CGPA:"9.6",Hobbies:"Badminton"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:2,Name:"Aman",USN:"1BM19EC002",Sem:7,Dept_name:"ECE",CGPA:"9.1",Hobbies:"Swimming"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:3,Name:"Latha",USN:"1BM19CS003",Sem:6,Dept_name:"CSE",CGPA:"8.1",Hobbies:"Reading"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:4,Name:"Sam",USN:"1BM19CS004",Sem:6,Dept_name:"CSE",CGPA:"6.5",Hobbies:"Cycling"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:5,Name:"Suman",USN:"1BM19CS005",Sem:5,Dept_name:"CSE",CGPA:"7.6",Hobbies:"Cycling"});
WriteResult({ "nInserted" : 1 })
```

```
> db.Student.update({_id:1},{$set:{CGPA:9.6}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:2},{$set:{CGPA:9.1}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:3},{$set:{CGPA:8.1}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:4},{$set:{CGPA:6.5}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:5},{$set:{CGPA:8.6}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.aggregate({$match:{Dept_name:"CSE"}},{$group:{_id:"$Sem",AvgCGPA:{$avg:"$CGPA"}}},{$match:{AvgCGPA:{$gt:7.5}}});
{ "_id" : 5, "AvgCGPA" : 8.6 }
{ "_id" : 6, "AvgCGPA" : 7.800000000000001 }
```

```
bmsce@bmsce-Precision-T1700:~$ mongoexport --host localhost --db Niharika_db --collection Student --csv --out /home/bmsce/Desktop/output.txt --fields "_id","Name","USN","Sem","Dept-name","CGPA","Hobbies"
2022-04-20T15:04:30.836+0530    csv flag is deprecated; please use --type=csv instead
2022-04-20T15:04:30.836+0530    connected to: localhost
2022-04-20T15:04:30.838+0530    exported 5 records
```

2)Create a mongodb collection Bank. Demonstrate the following by choosing fields of your choice. 1. Insert three documents

2. Use Arrays(Use Pull and Pop operation)
3. Use Index
4. Use Cursors
5. Updation



1) Using MongoDB,

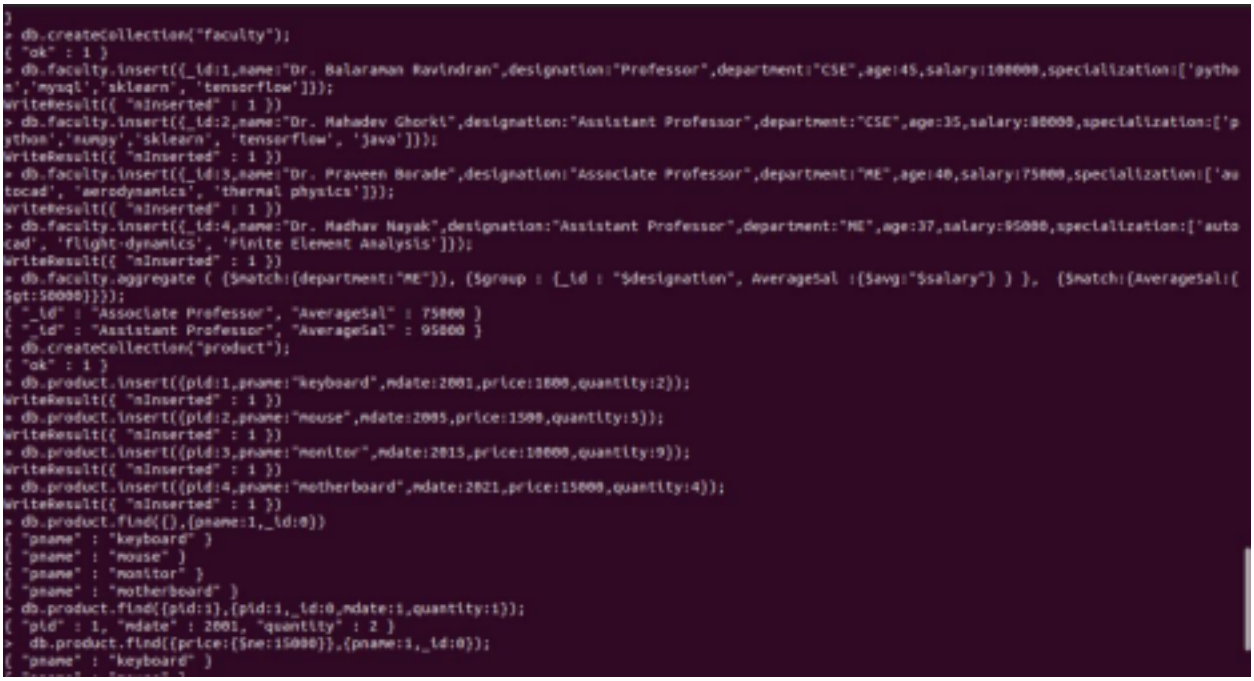
i) Create a database for Faculty and Create a Faculty Collection(Faculty_id, Name, Designation ,Department, Age, Salary, Specialization(Set)).

ii) Insert required documents to the collection.

iii) First Filter on “Dept_Name:MECH” and then group it on “Designation” and compute the Average Salary for that Designation and filter those documents where the “Avg_Sal” is greater than 650000.

iv) Demonstrate usage of import and export commands

Write MongoDB queries for the following:
1)To display only the product name from all the documents of the product collection.
2)To display only the Product ID, ExpiryDate as well as the quantity from the document of the product collection where the _id column is 1.
3)To find those documents where the price is not set to 15000.
4)To find those documents from the Product collection where the quantity is set to 9 and the product name is set to 'monitor'.
5)To find documents from the Product collection where the Product name ends in 'd'.



3)Create a mongodb collection Hospital. Demonstrate the following by choosing fields of your choice. 1. Insert three documents
2. Use Arrays(Use Pull and Pop operation)
3. Use Index
4. Use Cursors
5. Updation

Week-3

Program 1. Perform the following DB operations using Cassandra.

Create a key space by name Employee

```
cqlsh> CREATE KEYSPACE Employeee WITH replication={'class':'SimpleStrategy','replication_factor':1};
```

```
cqlsh> describe Employeee;

CREATE KEYSPACE employeee WITH replication = {'class': 'SimpleStrategy', 'replication_factor': '1'}  AND durable_writes = true;
```

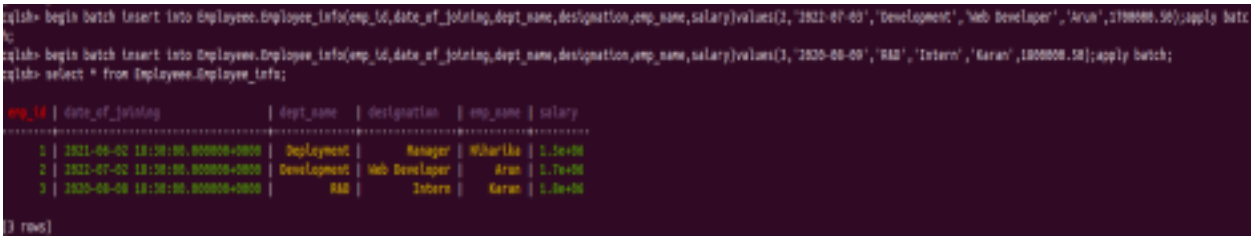
Create a column family by name Employee-Info with attributes Emp_Id Primary Key, Emp_Name, Designation, Date_of_Joining, Salary, Dept_Name

```
cqlsh> create table Employeeee.Employee_info(Emp_id int Primary Key,Emp_name text,Designation text,Date_of_joining timestamp,Salary double,Dept_name text);
```

```
cqlsh> select * from Employeee.Employee_info;

 emp_id | date_of_joining | dept_name | designation | emp_name | salary
--------+-----------------+-----------+-------------+----------+--------

(0 rows)
```

Insert the values into the table in batch

```
cqlsh> begin batch insert into Employeee.Employee_info(emp_id,date_of_joining,dept_name,designation,emp_name,salary)values(1,'2021-06-03','Deployment','Manager','Nikharika',1500000.50);apply batch;
cqlsh> select * from Employeee.Employee_info;

 emp_id | date_of_joining                 | dept_name | designation | emp_name | salary
--------+---------------------------------+-----------+-------------+----------+---------
      1 | 2021-06-02 18:30:00.000000+0000 | Deployment |     Manager | Nikharika | 1.5e+06
```



Update Employee name and Department of Emp-Id 121

```
cqlsh> update Employeee.Employee_info SET emp_name='Kushl',dept_name='Testing' where emp_id=3;
cqlsh> select * from Employeee.Employee_info;

 emp_id | date_of_joining                 | dept_name   | designation    | emp_name | salary
--------+---------------------------------+-------------+----------------+----------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |        Manager | Niharika | 1.5e+06
      2 | 2022-07-02 18:30:00.000000+0000 | Development | Web Developer |     Arun | 1.7e+06
      3 | 2020-08-08 18:30:00.000000+0000 |     Testing |         Intern |    Kushi | 1.8e+06

(3 rows)
```

Alter the schema of the table Employee_Info to add a column Projects which stores a set of Projects done by the corresponding Employee.

```
cqlsh> alter table Employeee.Employee_info add Projects set<text>;
cqlsh> select * from Employeee.Employee_info;

 emp_id | date_of_joining                 | dept_name   | designation    | emp_name | projects | salary
--------+---------------------------------+-------------+----------------+----------+----------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |        Manager | Niharika |     null | 1.5e+06
      2 | 2022-07-02 18:30:00.000000+0000 | Development | Web Developer |     Arun |     null | 1.7e+06
      3 | 2020-08-08 18:30:00.000000+0000 |     Testing |         Intern |    Kushi |     null | 1.8e+06

(3 rows)
```

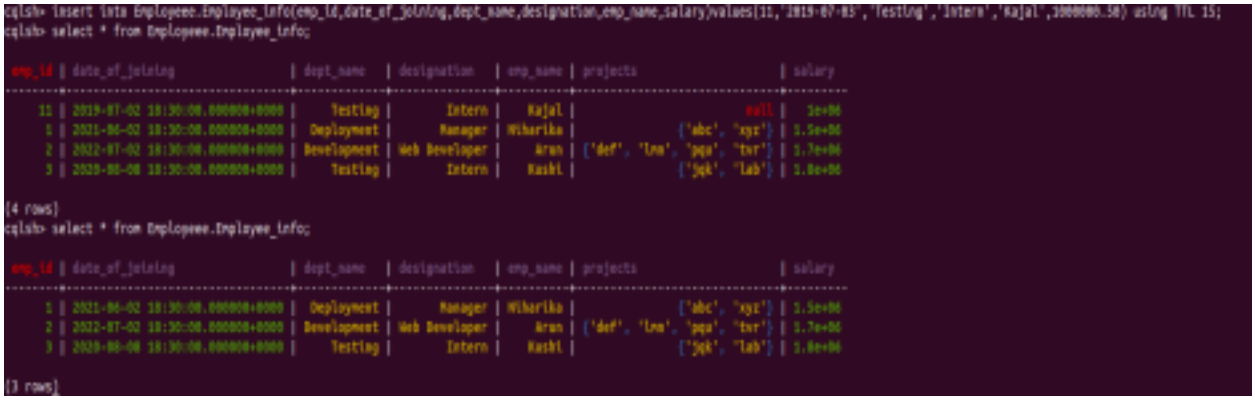
Update the altered table to add project names.

```
cqlsh> update Employeee.Employee_info set projects=projects+{'abc','xyz'} where emp_id=1;
cqlsh> select * from Employeee.Employee_info;

 emp_id | date_of_joining                 | dept_name   | designation    | emp_name | projects       | salary
--------+---------------------------------+-------------+----------------+----------+----------------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |        Manager | Niharika | {'abc', 'xyz'} | 1.5e+06
      2 | 2022-07-02 18:30:00.000000+0000 | Development | Web Developer |     Arun |           null | 1.7e+06
      3 | 2020-08-08 18:30:00.000000+0000 |     Testing |         Intern |    Kushi |           null | 1.8e+06

(3 rows)
```

```
cqlsh> update Employeee.Employee_info set projects=projects+{'lmn','def'} where emp_id=2;
cqlsh> update Employeee.Employee_info set projects=projects+{'pqu','tvr'} where emp_id=2;
cqlsh> select * from Employeee.Employee_info;

 emp_id | date_of_joining                 | dept_name   | designation    | emp_name | projects                          | salary
--------+---------------------------------+-------------+----------------+----------+-----------------------------------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |        Manager | Niharika |                {'abc', 'xyz'} | 1.5e+06
      2 | 2022-07-02 18:30:00.000000+0000 | Development | Web Developer |     Arun | {'def', 'lmn', 'pqu', 'tvr'} | 1.7e+06
      3 | 2020-08-08 18:30:00.000000+0000 |     Testing |         Intern |    Kushi |                              null | 1.8e+06

(3 rows)
```

```
cqlsh> update Employeee.Employee_info set projects=projects+{'lab','jqk'} where emp_id=3;
cqlsh> select * from Employeee.Employee_info;

 emp_id | date_of_joining                 | dept_name   | designation    | emp_name | projects                                | salary
--------+---------------------------------+-------------+----------------+----------+-----------------------------------------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |        Manager | Niharika |                      {'abc', 'xyz'} | 1.5e+06
      2 | 2022-07-02 18:30:00.000000+0000 | Development | Web Developer |     Arun | {'def', 'lmn', 'pqu', 'tvr'} | 1.7e+06
      3 | 2020-08-08 18:30:00.000000+0000 |     Testing |         Intern |    Kushi |                      {'jqk', 'lab'} | 1.8e+06

(3 rows)
```

Create a TTL of 15 seconds to display the values of Employees.



Week-4

Perform the following DB operations using Cassandra:

1 Create a key space by name Library

```
cqlsh> CREATE KEYSPACE LIBRARY WITH replication = {'class':'SimpleStrategy','replication_factor':3};
cqlsh> Use LIBRARY;
cqlsh:library>
```

2. Create a column family by name Library-Info with attributes Stud_Id Primary Key, Counter_value of type Counter,Stud_Name, Book-Name, Book-Id, Date_of_issue.

```
cqlsh:library> create table library_info(stud_id int, counter_value Counter, stud_name text,book_name text, date_of_issue timestamp, book_id int, PRIMARY KEY(stud_id,stud_name,book_name,date_of
_issue,book_id));
```

```
cqlsh:library> select * from library.library_info;

 stud_id | stud_name | book_name | date_of_issue | book_id | counter_value
---------+-----------+-----------+---------------+---------+---------------

(0 rows)
```

3. Insert the values into the table in batch

```
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id = 111 and stud_name = 'SAM' and book_name = 'ML' and date_of_issue = '2020-10-11'and book_id = 200;
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id = 112 and stud_name = 'SHAAN' and book_name = 'BDA' and date_of_issue = '2020-09-21'and book_id = 300;
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id = 113 and stud_name = 'AYMAN' and book_name = 'OOMD' and date_of_issue = '2020-04-01'and book_id = 400;
```

```
cqlsh:library> select * from library.library_info;

 stud_id | stud_name | book_name | date_of_issue                   | book_id | counter_value
---------+-----------+-----------+---------------------------------+---------+---------------
     111 |       SAM |        ML | 2020-10-10 18:30:00.000000+0000 |     200 |             1
     113 |     AYMAN |      OOMD | 2020-03-31 18:30:00.000000+0000 |     400 |             1
     112 |     SHAAN |       BDA | 2020-09-20 18:30:00.000000+0000 |     300 |             1

(3 rows)
```

4. Display the details of the table created and increase the value of the counter

```
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id = 112 and stud_name = 'SHAAN' and book_name = 'BDA' and date_of_issue = '2020-09-21'and book_id = 300;
```

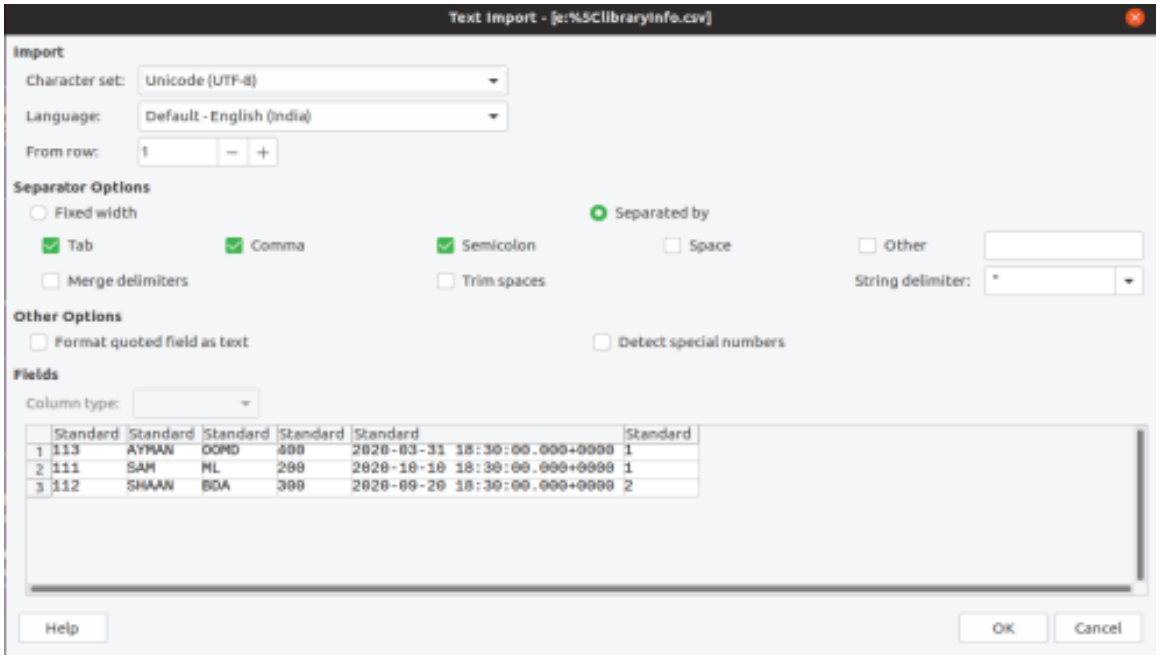
```
cqlsh:library> select * from library.library_info;

 stud_id | stud_name | book_name | date_of_issue                   | book_id | counter_value
---------+-----------+-----------+---------------------------------+---------+---------------
     111 |       SAM |        ML | 2020-10-10 18:30:00.000000+0000 |     200 |             1
     113 |     AYMAN |      OOMD | 2020-03-31 18:30:00.000000+0000 |     400 |             1
     112 |     SHAAN |       BDA | 2020-09-20 18:30:00.000000+0000 |     300 |             2

(3 rows)
```

5. Write a query to show that a student with id 112 has taken a book “BDA” 2 times.

```
cqlsh:library> SELECT * FROM library_info WHERE stud_id = 112;

 stud_id | stud_name | book_name | date_of_issue                   | book_id | counter_value
---------+-----------+-----------+---------------------------------+---------+---------------
     112 |     SHAAN |       BDA | 2020-09-20 18:30:00.000000+0000 |     300 |             2

(1 rows)
```

6. Export the created column to a csv file

```
cqlsh:library> COPY Library_Info(Stud_Id,Stud_Name,Book_Name,Book_Id,Date_Of_Issue,Counter_value) TO 'e:\libraryInfo.csv';
Using 11 child processes

Starting copy of library.library_info with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Processed: 3 rows; Rate:      17 rows/s; Avg. rate:      17 rows/s
3 rows exported to 1 files in 0.204 seconds.
```



7. Import a given csv dataset from local file system into Cassandra column family

```
cqlsh:library> create table library_info2(stud_id int, counter_value Counter, stud_name text,book_name text, date_of_issue timestamp, book_id int, PRIMARY KEY(stud_id,stud_name,book_name,date_of_issue,
book_id));
```

```
cqlsh:library> SELECT * FROM library_info2;

 stud_id | stud_name | book_name | date_of_issue | book_id | counter_value
---------+-----------+-----------+---------------+---------+---------------

(0 rows)
```

```
cqlsh:library> COPY library_info2(stud_id,stud_name,book_name,book_id,date_of_issue,counter_value) FROM 'e:\libraryInfo.csv';
Using 11 child processes

Starting copy of library.library_info2 with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Processed: 3 rows; Rate:       5 rows/s; Avg. rate:       7 rows/s
3 rows imported from 1 files in 0.416 seconds (0 skipped).
```

```
cqlsh:library> SELECT * FROM library_info2;

 stud_id | stud_name | book_name | date_of_issue                   | book_id | counter_value
---------+-----------+-----------+---------------------------------+---------+---------------
     111 |       SAM |        ML | 2020-10-10 18:30:00.000000+0000 |     200 |             1
     113 |     AYMAN |      OOMD | 2020-03-31 18:30:00.000000+0000 |     400 |             1
     112 |     SHAAN |       BDA | 2020-09-20 18:30:00.000000+0000 |     300 |             2

(3 rows)
```