

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT

on

BIG DATA ANALYTICS (20CS6PEBDA)

Submitted by

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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)

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Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “**BIG DATA ANALYTICS**” carried out by **Akash Shrivastava(IBM19CS231)**, who is a 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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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

Program 1: Employee Database using Cassandra

1. Create a keyspace by name Employee

```
CREATE KEYSPACE employee WITH REPLICATION={ 'class' : 'SimpleStrategy',  
'replication_factor' : 1 };
```

```
USE employee;
```

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

```
create table employee_info(emp_id int PRIMARY KEY, emp_name text, designation  
text, date_of_joining timestamp, salary double, dept_name text);
```

3. Insert the values into the table in batch

```
BEGIN BATCH
```

```
INSERT INTO
```

```
employee_info(emp_id,emp_name,designation,date_of_joining,salary,dept_name)  
VALUES(100,'TANYA','MANAGER','2020-09-11',30000,'TESTING')
```

```
... INSERT INTO
```

```
employee_info(emp_id,emp_name,designation,date_of_joining,salary,dept_name)  
VALUES(111,'SRIRAM','ASSOCIATE','2020-06-22',25000,'DEVELOPING')
```

```
... INSERT INTO
```

```
employee_info(emp_id,emp_name,designation,date_of_joining,salary,dept_name)  
VALUES(121,'SHIVA','MANAGER','2020-03-30',35000,'HR')
```

```
... APPLY BATCH;
```

```
SELECT * FROM employee_info;
```

4. Update Employee name and Department of Emp-Id 121

```
UPDATE employee_info SET emp_name = 'SHAAN' WHERE emp_id = 121; SELECT  
* FROM employee_info;
```

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

```
ALTER TABLE employee_info ADD projects text;
```

6. Update the altered table to add project names.

```
UPDATE employee_info SET projects = 'chat app' WHERE emp_id = 111;
```

```
UPDATE employee_info SET projects = 'campusx' WHERE emp_id = 121;
```

```
UPDATE employee_info SET projects = 'canteen app' WHERE emp_id = 100;
```

```
SELECT * FROM employee_info;
```

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

```
INSERT INTO
```

```
employee_info(emp_id,emp_name,designation,date_of_joining,salary,dept_name)
```

```
VALUES(110,'SAM','ASSOCIATE','2020-01-11',33000,'TESTING') USING TTL 15;
```

```
SELECT TTL(emp_name) from employee_info WHERE emp_id = 110; SELECT *  
FROM employee_info;
```

Program 2: Library Database using Cassandra

1. Create a keyspace by name Library

```
CREATE KEYSPACE library WITH REPLICATION={ 'class': 'SimpleStrategy',  
'replication_factor' : 1 };
```

```
USE 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

```
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));
```

3. Insert the values into the table in batch

```
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; 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;
```

```
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;
```

```
SELECT * FROM library_info;
```

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

```
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;
```

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

times. SELECT * FROM library_info WHERE stud_id = 112; **6. Export the created column to a csv file**

```
COPY Library_Info(Stud_Id,Stud_Name,Book_Name,Book_Id,Date_Of_Issue,Counter_val ue)  
TO 'e:\libraryInfo.csv';
```

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

```
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));
```

```
COPY library_info2(stud_id,stud_name,book_name,book_id,date_of_issue,counter_value)
FROM 'e:\libraryInfo.csv';
```

Program 3 : Student MongoDB Program

```
> use mySTUD;
switched to dbmySTUD
> db.getCollectionNames()

[ ]
> db.createCollection("Student");
{ "ok" : 1 }
> db.getCollectionNames()

[ "Student" ]
> db.Student.insert({_id: 1, Name:"John", USN: "1B22CS001",Semester: 6,Dept_name: "CSE",
CGPA:9.6, Hobbies : ["Reading","Gardening"]})
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:4,Name:"Arthur", USN: "1B22CS041",Semester:
6,Dept_name: "CSE", CGPA: 8.6, Hobbies : ["Novel Reading"]})
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id: 3, Name:"Horris", USN: "1B22EE021",Semester: 5,Dept_name:
"EEE", CGPA: 9.3, Hobbies : ["eSports"]})
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id: 7, Name:"Hritik", USN: "1B22CS014",Semester: 5,Dept_name:
"CSE", CGPA: 8.7, Hobbies : ["Reading"]})
WriteResult({ "nInserted" : 1 })
> db.Student.find().pretty()
{
  "_id" : 1,
  "Name" : "John",
  "USN" : "1B22CS001",
  "Semester" : 6,
  "Dept_name" : "CSE",
  "CGPA" : 9.6,
  "Hobbies" : [
```



```
        "Reading",
        "Gardening"
    ]
}
{
    "_id" : 4,
    "Name" : "Arthur",
    "USN" : "1B22CS041",
    "Semester" : 6,
    "Dept_name" : "CSE",
    "CGPA" : 8.6,
    "Hobbies" : [
        "Novel Reading"
    ]
}
{
    "_id" : 3,
    "Name" : "Horris",
    "USN" : "1B22EE021",
    "Semester" : 5,
    "Dept_name" : "EEE",
    "CGPA" : 9.3,
    "Hobbies" : [
        "eSports"
    ]
}
{
    "_id" : 7,
```

```
    "Name" : "Hritik",
    "USN" : "1B22CS014",
    "Semester" : 5,
    "Dept_name" : "CSE",
    "CGPA" : 8.7,
    "Hobbies" : [
        "Reading"
    ]
}
```

```
> db.Student.update({_id: 3, Name:"Horris", USN: "1B22EE021",Semester:
5,Dept_name: "EEE", CGPA:9.3},{ $set:{Hobbies:"Skating"}},{upset:true});
```

```
> db.Student.find().pretty()
```

```
{
  "_id" : 1,
  "Name" : "John",
  "USN" : "1B22CS001",
  "Semester" : 6,
  "Dept_name" : "CSE",
  "CGPA" : 9.6,
  "Hobbies" : [
    "Reading",
    "Gardening"
  ]
}
{
  "_id" : 4,
  "Name" : "Arthur",
```

```
    "USN" : "1B22CS041",
    "Semester" : 6,
    "Dept_name" : "CSE",
    "CGPA" : 8.6,
    "Hobbies" : [
        "Novel Reading"
    ]
}
{
    "_id" : 3,
    "Name" : "Horris",
    "USN" : "1B22EE021",
    "Semester" : 5,
    "Dept_name" : "EEE",
    "CGPA" : 9.3,
    "Hobbies" : "Skating"
}
{
    "_id" : 7,
    "Name" : "Hritik",
    "USN" : "1B22CS014",
    "Semester" : 5,
    "Dept_name" : "CSE",
    "CGPA" : 8.7,
    "Hobbies" : [
        "Reading"
    ]
}
```

```
> db.Student.find({}, {StudName:1,Semester:1,_id:0}); {
```

```
"Semester" : 6 }
```

```
{ "Semester" : 6 }
```

```
{ "Semester" : 5 }
```

```
{ "Semester" : 5 }
```

```
> db.Student.find({}, {Name:1,Semester:1,_id:0});
```

```
{ "Name" : "John", "Semester" : 6 }
```

```
{ "Name" : "Arthur", "Semester" : 6 }
```

```
{ "Name" : "Horris", "Semester" : 5 }
```

```
{ "Name" : "Hritik", "Semester" : 5 }
```

```
> db.Student.find({Semester:{ $eq:5 }}).pretty();
```

```
{
```

```
  "_id" : 3,
```

```
  "Name" : "Horris",
```

```
  "USN" : "1B22EE021",
```

```
  "Semester" : 5,
```

```
  "Dept_name" : "EEE",
```

```
  "CGPA" : 9.3,
```

```
  "Hobbies" : "Skating"
```

```
}
```

```
{
```

```
  "_id" : 7,
```

```
  "Name" : "Hritik",
```

```
  "USN" : "1B22CS014",
```

```
  "Semester" : 5,
```

```
  "Dept_name" : "CSE",
```

```
  "CGPA" : 8.7,
```

```
        "Hobbies" : [
            "Reading"
        ]
    }
> db.Student.count();
4
> db.Student.find().sort({Name:-1}).pretty();
{
  "_id" : 1,
  "Name" : "John",
  "USN" : "1B22CS001",
  "Semester" : 6,
  "Dept_name" : "CSE",
  "CGPA" : 9.6,
  "Hobbies" : [
    "Reading",
    "Gardening"
  ]
}
{
  "_id" : 7,
  "Name" : "Hritik",
  "USN" : "1B22CS014",
  "Semester" : 5,
  "Dept_name" : "CSE",
  "CGPA" : 8.7,
  "Hobbies" : [
    "Reading"
```

```

    ]
  }
  {
    "_id" : 3,
    "Name" : "Horris",
    "USN" : "1B22EE021",
    "Semester" : 5,
    "Dept_name" : "EEE",
    "CGPA" : 9.3,
    "Hobbies" : "Skating"
  }
  {
    "_id" : 4,
    "Name" : "Arthur",
    "USN" : "1B22CS041",
    "Semester" : 6,
    "Dept_name" : "CSE",
    "CGPA" : 8.6,
    "Hobbies" : [
      "Novel Reading"
    ]
  }
}

```

```

(base) bmsce@bmsce-Precision-T1700:~$ mongoexport --host localhost --db mySTUD
--collection Student --type=csv --fields="_id,Name,USN,Semester,Dept_name,CGPA,Hobbies" --
out/home/bmsce/Desktop/output.csv

```

```

2022-05-06T12:13:37.350+0530    connected to: localhost

```

```

2022-05-06T12:13:37.351+0530    exported 4 records

```

```

(base) bmsce@bmsce-Precision-T1700:~$ mongo

```

MongoDB shell version v3.6.8

connecting to: mongodb://127.0.0.1:27017

Implicit session: session { "id" : UUID("aab8226-3ced-43d4-97fb-b0d55827849c") }

MongoDB server version: 3.6.8

Server has startup warnings:

2022-05-06T11:28:08.073+0530 I STORAGE [initandlisten]

2022-05-06T11:28:08.073+0530 I STORAGE [initandlisten] ** WARNING: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine

2022-05-06T11:28:08.073+0530 I STORAGE [initandlisten] ** See

<http://dochub.mongodb.org/core/prodnotes-filesystem> 2022-05-

06T11:28:13.281+0530 I CONTROL [initandlisten]

2022-05-06T11:28:13.281+0530 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.

2022-05-06T11:28:13.281+0530 I CONTROL [initandlisten] ** Read and write access to data and configuration is unrestricted.

2022-05-06T11:28:13.281+0530 I CONTROL [initandlisten]

> use mySTUD;

switched to db mySTUD

> db.Student.update({_id:4},{ \$set:{Location:"Network"}})

2022-05-06T12:16:35.289+0530 E QUERY [thread1] SyntaxError: illegal character @ (shell):1:42

> db.Student.update({_id:4},{ \$set:{Location:"Network"}})

WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })

> db.Student.find().pretty()

```
{
  "_id" : 1,
  "Name" : "John",
  "USN" : "1B22CS001",
  "Semester" : 6,
  "Dept_name" : "CSE",
```

```
"CGPA" : 9.6,
"Hobbies" : [
    "Reading",
    "Gardening"
]
}
{
    "_id" : 4,
    "Name" : "Arthur",
    "USN" : "1B22CS041",
    "Semester" : 6,
    "Dept_name" : "CSE",
    "CGPA" : 8.6,
    "Hobbies" : [
        "Novel Reading"
    ],
    "Location" : "Network"
}
{
    "_id" : 3,
    "Name" : "Horris",
    "USN" : "1B22EE021",
    "Semester" : 5,
    "Dept_name" : "EEE",
    "CGPA" : 9.3,
    "Hobbies" : "Skating"
}
{
```



```

    "_id" : 7,
    "Name" : "Hritik",
    "USN" : "1B22CS014",
    "Semester" : 5,
    "Dept_name" : "CSE",
    "CGPA" : 8.7,
    "Hobbies" : [
        "Reading"
    ]
}
> db.Student.find().sort({ Name:1 }).pretty();
{
  "_id" : 4,
  "Name" : "Arthur",
  "USN" : "1B22CS041",
  "Semester" : 6,
  "Dept_name" : "CSE",
  "CGPA" : 8.6,
  "Hobbies" : [
    "Novel Reading"
  ],
  "Location" : "Network"
}
{
  "_id" : 3,
  "Name" : "Horris",
  "USN" : "1B22EE021",
  "Semester" : 5,

```

```
    "Dept_name" : "EEE",
    "CGPA" : 9.3,
    "Hobbies" : "Skating"
  }
  {
    "_id" : 7,
    "Name" : "Hritik",
    "USN" : "1B22CS014",
    "Semester" : 5,
    "Dept_name" : "CSE",
    "CGPA" : 8.7,
    "Hobbies" : [
      "Reading"
    ]
  }
  {
    "_id" : 1,
    "Name" : "John",
    "USN" : "1B22CS001",
    "Semester" : 6,
    "Dept_name" : "CSE",
    "CGPA" : 9.6,
    "Hobbies" : [
      "Reading",
      "Gardening"
    ]
  }
}
```