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
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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 **Md. Aman Taiyab (1BM19CS085),** 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 year2022. 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

1 MongoDB CRUD Operations

I. CREATE DATABASE IN MONGODB

>use amaanDB

switched to db amaanDB

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

>db.createCollection("Student");

{ "ok" : 1 }

>db.Student.insert({_id:1,name:"Amaan",grade:9});

WriteResult({ "nInserted" : 1 })

>db.Student.update({_id:6,name:"qwert"},{$set:{grade:4}},{upsert:true});

WriteResult({ "nMatched" : 0, "nUpserted" : 1, "nModified" : 0, "_id" : 6 })

>db.Student.find();

{ "_id" : 1, "name" : "Saffan", "grade" : 9 }

{ "_id" : 2, "name" : "Abc", "grade" : 10 }

{ "_id" : 3, "name" : "Mno", "grade" : 5 }

{ "_id" : 4, "name" : "Pqr", "grade" : 8 }

> show collections;

Student

III. Save Method

> db.Student.save({name:"zzz",_id:10,grade:8});

WriteResult({ "nMatched" : 0, "nUpserted" : 1, "nModified" : 0, "_id" : 10 })

IV. COUNT

> db.Student.count();

6

> db.Student.count({grade:9});

1

V FIND

> db.Student.find({grade:{$lt:5}},{name:1,grade:1,_id:0});

{ "grade" : 2, "name" : "qwert" }

> db.Student.find({name:{$in:["Saffan","Abc","Mno"]}},{name:1,grade:1,_id:0});

{ "name" : "Saffan", "grade" : 9 }

{ "name" : "Abc", "grade" : 10 }

{ "name" : "Mno", "grade" : 5 }

> db.Student.find({name:/^S/},{name:1,grade:1,_id:0});

{ "name" : "Saffan", "grade" : 9 }

> db.Student.find({name:/.b/},{name:1,grade:1,_id:0});

{ "name" : "Abc", "grade" : 10 }

> db.Student.find().sort({name:1});

{ "_id" : 2, "name" : "Abc", "grade" : 10 }

{ "_id" : 3, "name" : "Mno", "grade" : 5 }

{ "_id" : 4, "name" : "Pqr", "grade" : 8 }

{ "_id" : 1, "name" : "Saffan", "grade" : 9 }

{ "_id" : 7, "name" : "kkk", "grade" : 6 }

{ "_id" : 6, "grade" : 2, "name" : "qwert" }

> db.Student.find().sort({name:1,grade:-1});

{ "_id" : 2, "name" : "Abc", "grade" : 10 }

{ "_id" : 3, "name" : "Mno", "grade" : 5 }

{ "_id" : 4, "name" : "Pqr", "grade" : 8 }

{ "_id" : 1, "name" : "Saffan", "grade" : 9 }

{ "_id" : 7, "name" : "kkk", "grade" : 6 }

{ "_id" : 6, "grade" : 2, "name" : "qwert" }

> db.Student.find({grade:8}).limit(3);

{ "_id" : 4, "name" : "Pqr", "grade" : 8 }

{ "_id" : 10, "name" : "zzz", "grade" : 8 }

> db.Student.find().skip(2);

{ "_id" : 3, "name" : "Mno", "grade" : 5 }

{ "_id" : 4, "name" : "Pqr", "grade" : 8 }

{ "_id" : 6, "grade" : 2, "name" : "qwert" }

{ "_id" : 7, "name" : "kkk", "grade" : 6 }

{ "_id" : 10, "name" : "zzz", "grade" : 8 }

VI. AGGREGATE FUNCTIONS

> db.faculty.aggregate ({$match:{department:"mech"}}, {$group : {_id : "$designation", AverageSal :{$avg:"$salary"} } }, {$match:{AverageSal:{$gt:50000}}});

{ "_id" : " associate prof", "AverageSal" : 85000 }

{ "_id" : "assistant prof", "AverageSal" : 70000 }

VII. ARRAYS

> db.food.insert({_id:1,fruits:['apple','mango']});

WriteResult({ "nInserted" : 1 })

> db.food.find({fruits:['pineapple','mango','orange']});

{ "_id" : 3, "fruits" : ["pineapple", "mango", "orange"] }

> db.food.find({fruits:{$all:['pineapple']}});

{ "_id" : 2, "fruits" : ["pineapple", "mango", "grapes"] }

{ "_id" : 3, "fruits" : ["pineapple", "mango", "orange"] }

> db.food.update({_id:2},{$set:{'fruits.1':'apple'}});

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

> db.food.update({_id:2},{$push:{price:{grapes:80,mango:200,cherry:100}}});

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

2. MongoDB Operations

1) Faculty DB

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

```
>use Faculty
```

```
> db.createCollection("faculty")
```

ii) Insert required documents to the collection.

```
> db.faculty.insert({_id:1,name:"abc",designation:"assistant prof",department:"mech",age:31,salary:90000,specialization:['python','mysql','autocad']});
```

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.

```
> db.faculty.aggregate ( {$match:{department:"mech"}}, {$group : {_id : "$designation", AverageSal :{$avg:"$salary"} } }, {$match:{AverageSal:{$gt:50000}}});
```

```
{ "_id" : " associate prof", "AverageSal" : 85000 }
{ "_id" : "assistant prof", "AverageSal" : 70000 }
```

2) Consider a table “Product” with the following columns:

Product _id
ProductName
ManufacturingDate
Price
Quantity

Write MongoDB queries for the following:

```
> use Products switched to db Products
```

```
> db.createCollection("product");
```

```
{ "ok" : 1 }
```

>
db.product.insert({pid:1,pname:"keyboard",mdate:2001,price:1800,quantity:2})
;

WriteResult({ "nInserted" : 1 })

i)To display only the product name from all the documents of the product collection.

> db.product.find({},{pname:1,_id:0});

{ "pname" : "keyboard" }

{ "pname" : "mouse" }

{ "pname" : "motherboard" }

ii)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.

> db.product.find({pid:1},

{pid:1,_id:0,mdate:1,quantity:1});

{ "pid" : 1, "mdate" : 2001, "quantity" : 2 }

iii)To find those documents where the price is not set to 45000.

> db.product.find({price:{$ne:45000}},{pname:1,_id:0});

{ "pname" : "keyboard" }

{ "pname" : "mouse" }

{ "pname" : "motherboard" }

iv)To find those documents from the Product collection where the quantity is set to 30 and the product name is set to 'LEDTV'.

> db.product.find({$and:[{quantity:{$eq:30}},{pname:{$eq:"LED TV"}}]},{pname:1,_id:0})

{ "pname" : "LED TV" }

v)To find documents from the Product collection where the Product name ends in 'r'.

> db.product.find({pname:/d$/},{pname:1,quantity:1,_id:0})

{ "pname" : "keyboard", "quantity" : 2 }

{ "pname" : "motherboard", "quantity" : 150 }

3) Create a mongodb collection Hospital. Demonstrate the following by choosing fields of your choice.

> use Hospital switched to db Hospital

> db.createCollection("hospital");

{ "ok" : 1 }

> db.hospital.insert({_id:1,name:"xyz",diseases:["diabetes","high bp","fever"]});

WriteResult({ "nInserted" : 1 })

1. Insert three documents

> db.hospital.updateMany({},{$pull:{diseases:"fever"}});

{ "acknowledged" : true, "matchedCount" : 3, "modifiedCount" : 2 }

2. Use Arrays(Use Pull and Pop operation)

> db.hospital.updateOne({_id:1},{$pop:{diseases:-1}});

{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }

3. Use Index

> db.hospital.find({"diseases.2":"nausea"});

{ "_id" : 3, "name" : "mno", "diseases" : ["covid", "sarscov", "nausea"] }

4. Use Cursors

> db.hospital.find({}).count();

3

> db.hospital.find({}).limit(2);

{ "_id" : 1, "name" : "xyz", "diseases" : ["high bp"] } { "_id" : 2, "name" : "abc", "diseases" : ["typhoid", "cholera"] }

> db.hospital.find({}).size();

3

5. Updation

> db.hospital.update({_id:3},{$set:{'diseases.1':'sarscov'}});

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

3. Cassandra Lab 1

1. Create a key space by name Employee

```
cqlsh:saf> create keyspace Employee with
replication={'class':'SimpleStrategy','replication_factor':1}; cqlsh:saf> 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

```
cqlsh:employee> create table empInfo( emp_id int PRIMARY KEY, emp_name
text,desig text,dpj timestamp,salary int,dept_name text );
```

3. Insert the values into the table in batch

```
cqlsh:employee> insert into
empInfo(emp_id,emp_name,desig,dpj,salary,dept_name) values( 1, 'saffan',
'sde', '2022-05-05', 200000, 'cse' );
```

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

```
cqlsh:employee> update empInfo set emp_name='zzz',dept_name='ie'where
emp_id=2;
```

5. Sort the details of Employee records based on salary

```
.cqlsh:employee> select * from emp_Info where emp_id in (1,2,3) order by
salary;
```

6. 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:employee> alter table empInfo add project set
```

7. Update the altered table to add project names.

```
cqlsh:employee> update empInfo set project={'reactJs','Ml'} where emp_id=1;
```

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

```
cqlsh:employee> insert into
empInfo(emp_id,emp_name,desig,dpj,salary,dept_name) values( 5, 'wxy', 'sde',
'2022-02-05', 250000, 'cse' ) using ttl 30; cqlsh:employee> select ttl(emp_name)
from empInfo;
```

4. Cassandra Lab 2

1 Create a key space by name Library

CREATE keyspace library1 with replication={ 'class':'SimpleStrategy', 'replication_factor':1 };

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 lib.libinfo1 (s_id int, sname text, book text, bid int, doi timestamp, counter_val counter, PRIMARY KEY (s_id, sname, book, bid, doi));

3. Insert the values into the table in batch

update libinfo set counter_val=counter_val+1 where s_id=1 and sname='saf' and book='harry potter1' and bid=1 and doi='2022-05-05';

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

cqlsh:lib> update libinfo set counter_val=counter_val+1 where s_id=1 and sname='saf' and book='harry potter1'; cqlsh:lib> select * from libinfo;

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

cqlsh:lib> select counter_val from libinfo where s_id=1 and sname='saf' and book='harry potter1';

counter_val

2

6. Export the created column to a csv file

COPY libinfo(s_id,sname,book,bid,doi,counter_val) TO 'data1.csv' WITH HEADER = TRUE;

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

COPY libinfo(s_id,sname,book,bid,doi) FROM 'libdata.csv' WITH HEADER = TRUE;