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)
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 **MD IBADUDDIN SAFFAN (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 year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a**Course Title - (Course code)** work prescribed for the said degree.

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Designation   Assistant Professor
Department of CSE   Department of CSE
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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 saffanDB

switched to db saffanDB

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

>db.createCollection("Student");

{ "ok" : 1 }

>db.Student.insert({_id:1,name:"Saffan",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;