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LAB REPORT
on
Big Data Analytics (23CS6PCBDA)

Submitted by:

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**Under the Guidance of
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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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**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 PRAJWAL K K (**1BM22CS199**), 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 2024. The Lab report has been approved as it satisfies the academic requirements in respect of **Big Data Analytics – (23CS6PCBDA)** work prescribed for the said degree.

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Github Link: [PRAJWALKK007/BDA LAB](#)

Course Outcomes

CO1: Apply the concepts of NoSQL, Hadoop, Spark for a given task

CO2: Analyse data analytic techniques for a given problem.

CO3: Conduct experiments using data analytics mechanisms for a given problem.

Program 1

MongoDB- CRUD Operations Demonstration (Practice and Self Study)

- Created a database named **myDB** and verified its existence.
- Created and dropped collections like **Student** and **Students**.
- Inserted student data into collections.
- Performed **upsert** to insert or update a student record.
- Used to find queries with various filters: by name, grade, hobbies, regex, etc.
- Retrieved specific fields while suppressing **_id**.
- Counted total documents and documents with specific criteria.
- Sorted records in ascending and descending order.
- Imported data from a CSV file and exported data to a CSV file.
- Used **save()** to insert or replace documents.
- Added, removed, and set fields to **null** in documents.
- Retrieved limited records and skipped initial entries.
- Created a **food** collection with arrays and queried arrays by value, index, size, etc.
- Updated specific elements in an array.
- Practiced query optimizations using **\$in**, **\$all**, **\$ne**, **\$regex**, **\$slice**, and more.

Observation:

papergrid
Date 01/03/25

I Create Database in MongoDB

① use my DB;
Output:
Switched to db my DB

② show db;
Output:
admin
config
local
mydb

II Create, Read, update, Delete

① db.createCollection("student");
O/P
{ok:1}

② db.student.drop();
O/P
true

③ db.student.insert({id: 1, studName: "middle",
grade: "VII", hobbies: "Internet Surfing"});
O/P
db.students.find()
{
 id: 1
 StudentName: "Mickey Mouse";
 Grade: "VII";
 Hobbies: "Internet Surfing";
 _id: 1
}
{
 id: 1
 StudentName: "Mickey Mouse";
 Grade: "VII";
 Hobbies: "Internet Surfing";
 _id: 1
}

Grade : VII;
Hobbies : 'Internet Surfing'
}
}

④ Update:

```
db.student.update({id: 3, Student-Name:  
    "Aryan David", Grade :"VII",  
    {set:{Hobbies:"Skating"}}, {update:true})
```

O/P

```
[  
    acknowledge: true,  
    inserted: id:3,  
    modifiedCount:0,  
    updatedCount:1  
]
```

db.student.find()

O/P

```
{  
    [
```

Hobbies: 'Internet Surfing'

```
]  
[
```

~~-id:3,~~

~~Grade:VII~~

~~Stud-Name :"Aryan David";~~

~~Hobbies : 'string';~~

```
}
```

Code with Output:

```
hadoop@bnsccece-HP-Elite-Tower-600-G9-Desktop-PC:~$ mongosh
Current Mongosh Log ID: 6833f9c9126af1945c47586f
Connecting to:      mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.0.1
Using MongoDB:     7.0.2
Using Mongosh:     2.0.1
mongosh 2.5.1 is available for download: https://www.mongodb.com/try/download/shell
For mongosh info see: https://docs.mongodb.com/mongodb-shell/

-----
The server generated these startup warnings when booting
2025-05-26T10:46:48.806+05:30: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine. See http://dochub.mongodb.org/core/prodnotes-filesystem
2025-05-26T10:46:50.937+05:30: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
-----

test> use MyDB
switched to db MyDB
MyDB> db
MyDB> show dbs
admin          40.00 KiB
config         72.00 KiB
local          80.00 KiB
myNewDatabase  72.00 KiB
MyDB> db.createCollection("Student");
{ ok: 1 }
MyDB> db.Student.insert({_id:1,Name:"Preeti",Grade:"V",Hobbies:"Dancing"},{_id:2,Name:"Prajwal",Grade:"V",Hobbies:"Drawing"});
DeprecationWarning: Collection.insert() is deprecated. Use insertOne, insertMany, or bulkWrite.
{ acknowledged: true, insertedIds: { '0': 1 } }
MyDB> db.find();
TypeError: db.find is not a function
MyDB> db.Student.find();
[ { _id: 1, Name: 'Preeti', Grade: 'V', Hobbies: 'Dancing' } ]
MyDB> db.Student.insertMany({_id:2,Name:"Rachana",Grade:"V",Hobbies:"Painting"},{_id:3,Name:"Prajwal",Grade:"V",Hobbies:"Drawing"});
MongoInvalidArgumentError: Argument "docs" must be an array of documents
MyDB> db.Student.insertMany([{_id:2,Name:"Rachana",Grade:"V",Hobbies:"Painting"},{_id:3,Name:"Prajwal",Grade:"V",Hobbies:"Drawing"}]);
{ acknowledged: true, insertedIds: { '0': 2, '1': 3 } }
MyDB> db.Student.update({{_id:2,Name:"Rachana",Grade:"V"},{$set:{Hobbies:"Singing"}}, {upsert:true}});
DeprecationWarning: Collection.update() is deprecated. Use updateOne, updateMany, or bulkWrite.
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
MyDB> db.Student.find();
[
  { _id: 1, Name: 'Preeti', Grade: 'V', Hobbies: 'Dancing' },
  { _id: 2, Name: 'Rachana', Grade: 'V', Hobbies: 'Singing' },
  { _id: 3, Name: 'Prajwal', Grade: 'V', Hobbies: 'Drawing' }
]
```

```
[ { _id: 1, fruits: [ 'grapes', 'banana', 'apple' ] },
  { _id: 2,
    fruits: [ 'grapes', 'mango', 'cherry' ],
    price: [ { grapes: 80, mango: 100, cherry: 200 } ]
  },
  { _id: 3, fruits: [ 'banana', 'mango' ] }
]
MyDB> db.food.find().pretty();
[
  { _id: 1, fruits: [ 'grapes', 'banana', 'apple' ] },
  { _id: 2,
    fruits: [ 'grapes', 'mango', 'cherry' ],
    price: [ { grapes: 80, mango: 100, cherry: 200 } ]
  },
  { _id: 3, fruits: [ 'banana', 'mango' ] }
]
MyDB> db.createCollection("customer");
{ ok: 1 }
MyDB> var val=[{custid:1,accbal:100,acctype:"A"},{custid:1,accbal:100,acctype:"B"},{custid:2,accbal:200,acctype:"B"}];
Uncaught:
SyntaxError: Unexpected token, expected "," (1:144)
> 1 | var val=[{custid:1,accbal:100,acctype:"A"},{custid:1,accbal:100,acctype:"B"},{custid:2,accbal:200,acctype:"B"}];
|   ^
z |
MyDB> var val=[{custid:1,accbal:100,acctype:"A"},{custid:1,accbal:100,acctype:"B"},{custid:2,accbal:200,acctype:"B"}];
MyDB> db.customer.insert(val);
{
  acknowledged: true,
  insertedIds: [
    '0' : ObjectId("683405cb126af1945c47587e"),
    '1' : ObjectId("683405cb126af1945c47587f"),
    '2' : ObjectId("683405cb126af1945c475872"),
    '3' : ObjectId("683405cb126af1945c475873")
  ]
}
MyDB> db.customer.aggregate({$group:{_id:'$custid',totalbal:{$sum:'$accbal'}}});
[ { _id: 1, totalbal: 200 }, { _id: 2, totalbal: 400 } ]
MyDB> db.customers.aggregate( { $match:{AcctType:"S"}},{$group : { _id : "$custID",TotAccBal :
Uncaught:
SyntaxError: Unexpected character '''. (1:43)
> z | db.Customers.aggregate ( {$match:{AcctType:"S"}},{$group : { _id : "$custID",TotAccBal :
```

```

[ { _id: 1, fruits: [ 'grapes', 'banana', 'apple' ] },
  {
    _id: 2,
    fruits: [ 'grapes', 'mango', 'cherry' ],
    price: [ { grapes: 80, mango: 100, cherry: 200 } ]
  },
  { _id: 3, fruits: [ 'banana', 'mango' ] }
]
MyDB> db.food.find().pretty();
[
  { _id: 1, fruits: [ 'grapes', 'banana', 'apple' ] },
  {
    _id: 2,
    fruits: [ 'grapes', 'mango', 'cherry' ],
    price: [ { grapes: 80, mango: 100, cherry: 200 } ]
  },
  { _id: 3, fruits: [ 'banana', 'mango' ] }
]
MyDB> db.createCollection("customer");
{ ok: 1 }
MyDB> var val=[{custid:1,accbal:100,acctype:"A"},{custid:1,accbal:100,acctype:"B"},{custid:2,accbal:200,acctype:"B"}];
Uncaught:
SyntaxError: Unexpected token, expected "," (1:144)

> 1 | var val=[{custid:1,accbal:100,acctype:"A"},{custid:1,accbal:100,acctype:"B"},{custid:2,accbal:200,acctype:"B"}];
|   ^
2 |

MyDB> var val=[{custid:1,accbal:100,acctype:"A"},{custid:1,accbal:100,acctype:"B"},{custid:2,accbal:200,acctype:"B"}];

MyDB> db.customer.insert(val);
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId("683405cb126af1945c475870"),
    '1': ObjectId("683405cb126af1945c475871"),
    '2': ObjectId("683405cb126af1945c475872"),
    '3': ObjectId("683405cb126af1945c475873")
  }
}
MyDB> db.customer.aggregate({$group:{_id:'$custid',totalbal:{$sum:'$accbal'}}});
[ { _id: 1, totalbal: 200 }, { _id: 2, totalbal: 400 } ]
MyDB> db.Customers.aggregate ( {$match:{AcctType:"S"}},{$group : { _id : "$custID",TotAccBal :
Uncaught:
SyntaxError: Unexpected character '''. (1:43)

> 1 | db.Customers.aggregate ( {$match:{AcctType:"S"}},{$group : { _id : "$custID",TotAccBal :

MyDB> db.customer.aggregate({$match:{acctype:"A"}},{$group:{_id:"$custid",totalbal:{$sum:'$accbal'}}});
[ { _id: 1, totalbal: 100 }, { _id: 2, totalbal: 200 } ]
MyDB> db.customer.aggregate({$match:{acctype:"A"}},{$group:{_id:"$custid",totalbal:{$sum:'$accbal'}}},{$mat$rn

MyDB> db.customer.aggregate({$match:{acctype:"A"}},{$group:{_id:"$custid",totalbal:{$sum:'$accbal'}}},{$match

MyDB> db.customer.aggregate({$match:{acctype:"A"}},{$group:{_id:"$custid",totalbal:{$sum:'$accbal'}}},{$match
[ { _id: 2, totalbal: 200 } ]
MyDB> S

```

Program 2

Perform the following DB operations using Cassandra.

a) Create a keyspace by name Employee

b) Create a column family by name

Employee-Info with attributes Emp_Id Primary Key, Emp_Name, Designation, Date_of_Joining, Salary, Dept_Name

c) Insert the values into the table in batch

d) Update Employee name and Department of Emp-Id 121

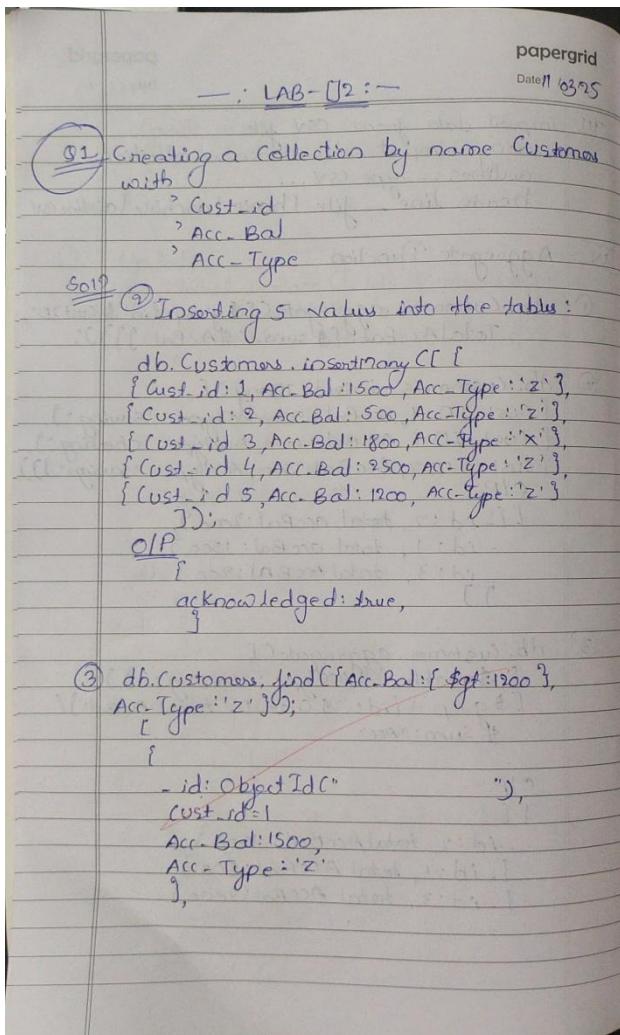
e) Sort the details of Employee records based on salary

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

g) Update the altered table to add project names.

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

Observation:



```
{
  - id: ObjectId("5c10997e17e1110001000000"),
  cust_id: 4,
  Acc_Bal: 2500,
  Acc_Type: "z"
}
```

④ db. customers.aggregate [

```
$group: [
  _id: "$cust_id",
  min_balance: { $min: "$Acc_Bal" },
  max_balance: { $max: "$Acc_Bal" }
]);

```

OP [

```
{
  - id: 1, min_balance: 1500, max_balance: 1500,
  - id: 2, min_balance: 500, max_balance: 500,
  - id: 3, min_balance: , max_balance: ,
  - id: 4, min_balance: , max_balance: ,
  - id: 5, min_balance: , max_balance: ,
}
```

(82)

~~use ecommerce~~

→ switched to db ecommerce init, created db

db.createCollection("products")

db.products.insertMany([

papergrid
Date: / /

```
{  
    product_id: "P001",  
    name: "Laptop",  
    category: "Electronics",  
    price: 999.99,  
    quantity: 50,  
    description: "High-end gaming laptop"  
},  
  
{  
    product_id: "P002",  
    name: "Headphones",  
    category: "Electronics",  
    price: 199.99,  
    quantity: 100,  
    description: "Noise-cancelling headphones"  
}  
  
OP  
{  
    acknowledged: true  
}  
  
db.createCollection("users")  
→ ok: 1  
  
db.users.insertOne({  
    username: "John.doe",  
    password: "hashedpassword123",  
    email: "john.doe@example.com",  
})
```

Code with Output:

```
...
cqlsh> CREATE KEYSPACE Student WITH REPLICATION= {'class':'SimpleStrategy','replication_factor':1};
cqlsh> describe keyspaces;
'keyspaces' not found in keyspaces
cqlsh> describe keyspaces;

student    system      system_distributed  system_traces  system_virtual_schema
students   system_auth  system_schema       system_views

cqlsh> use students;
cqlsh:students> create table st_info(rollno int primary key,name text,doj timestamp,percent double);
cqlsh:students> describe tables;

library_book  st_info  students_info  userlogin

cqlsh:students> describe table<st_info>;
Improper describe command.
cqlsh:students> describe table st_info;

CREATE TABLE students.st_info (
    rollno int PRIMARY KEY,
    doj timestamp,
    name text,
    percent double
) WITH additional_write_policy = '99p'
    AND bloom_filter_fp_chance = 0.01
    AND caching = {'keys': 'ALL', 'rows_per_partition': 'NONE'}
    AND cdc = false
    AND comment = ''
    AND compaction = {'class': 'org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy', 'max_threshold': '32', 'min_threshold': '4'}
    AND compression = {'chunk_length_in_kb': '16', 'class': 'org.apache.cassandra.io.compress.LZ4Compressor'}
    AND memtable = 'default'
    AND crc_check_chance = 1.0
    AND default_time_to_live = 0
    AND extensions = {}
    AND gc_grace_seconds = 864000
    AND max_index_interval = 2048
    AND memtable_flush_period_in_ms = 0
    AND min_index_interval = 128
    AND read_repair = 'BLOCKING'
    AND speculative_retry = '99p';
cqlsh:students> begin batch
... insert into st_info(rollno,name,doj,percent)
```

```
cqlsh:students> select * from st_info;
+-----+-----+-----+
| rollno | doj | name | percent |
+-----+-----+-----+
| 1 | 2010-02-28 18:30:00.000000+0000 | preeti | 90 |
| 2 | 2010-03-19 18:30:00.000000+0000 | prajwal | 89 |
| 4 | 2010-04-22 18:30:00.000000+0000 | rachana | 90 |
+-----+-----+-----+
(3 rows)
cqlsh:students> select * from st_info where rollno in(1,2);
+-----+-----+-----+
| rollno | doj | name | percent |
+-----+-----+-----+
| 1 | 2010-02-28 18:30:00.000000+0000 | preeti | 90 |
| 2 | 2010-03-19 18:30:00.000000+0000 | prajwal | 89 |
+-----+-----+-----+
(2 rows)
cqlsh:students> select * from st_info where name='preeti';
SyntaxException: line 1:42 no viable alternative at input ';' (...* from st_info where name=["preet]i";)
cqlsh:students> create index on st_info(name);
cqlsh:students> select * from st_info where name="preeti";
SyntaxException: line 1:42 no viable alternative at input ';' (...* from st_info where name=["preet]i";)
cqlsh:students> select * from st_info where name='preeti';
+-----+-----+-----+
| rollno | doj | name | percent |
+-----+-----+-----+
| 1 | 2010-02-28 18:30:00.000000+0000 | preeti | 90 |
+-----+-----+-----+
(1 rows)
cqlsh:students> select rollno,name,percent from st_info limit 2;
+-----+-----+-----+
| rollno | name | percent |
+-----+-----+-----+
| 1 | preeti | 90 |
| 2 | prajwal | 89 |
+-----+-----+-----+
(2 rows)
cqlsh:students> slect rollno as usn from st_info;
SyntaxException: line 1:0 no viable alternative at input 'slect' ([slect]...)
cqlsh:students> select rollno as usn from st_info;
+-----+
| usn |
+-----+
| 1 |
+-----+
```

```
+-----+
| usn |
+-----+
| 1 |
| 2 |
| 4 |
+-----+
(3 rows)
cqlsh:students> create table library(c_val counter,book_name varchar,stud_name varchar,primary key(book_name,stud_name));
cqlsh:students> update library set c_val=c_val+1 where book_name='BDA' and stud_name='preeti';
cqlsh:students> create table userlogin(id int primary key,pass text);
AlreadyExists: Table 'students.userlogin' already exists
cqlsh:students> create table login(id int primary key,pass text);
cqlsh:students> insert into login(id,pass) values(1,'infy')using ttl 30;
cqlsh:students> select ttl(pass) from login where id=1;
+-----+
| ttl(pass) |
+-----+
| 3 |
+-----+
```

Program 3

Perform the following DB operations using Cassandra.

- a) Create a keyspace by name Library
- b) 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
- c) Insert the values into the table in batch
- d) Display the details of the table created and increase the value of the counter
- e) Write a query to show that a student with id 112 has taken a book "BDA" 2 times.
- f) Export the created column to a csv file
- g) Import a given csv dataset from local file system into Cassandra column family

Observation:

—: LAB-04 :—

papergrid Date: / /

A Working with Cassandra :-

01 Create Keyspace:-
→ CREATE KEYSPACE Students WITH REPLICATION =
{'class': 'SimpleStrategy', 'replication_factor': 3};

02 Describe the existing Keyspaces:
→ DESCRIBE KEYSPACES;
#Output:
System-Schema system-auth system-distributed
System-traces students

03 Use the Keyspace "Students":
→ USE Students;

A To Create table (column family) by name Student-Info:
→ CREATE TABLE Students-Info (Roll-No int PRIMARY KEY,
StudName text,
DateOfJoining timestamp,
last_exam_Percent double
);

A Insert:
→ BEGIN BATCH
INSERT INTO Students-Info (Roll-No, StudName,
DateOfJoining, last_exam_Percent)
VALUES (1, 'Asha', '2012-03-12', 79.9)
INSERT INTO Students-Info (Roll-No, StudName,
DateOfJoining, last_exam_Percent)
VALUES (1, 'Khan', '2012-03-12', 89.9)

```
INSERT INTO _____
VALUES(1,'Tarun','2012-03-12',78.9)
```

```
INSERT INTO _____
VALUES(1,'Samantha','2012-03-12',90.9)
```

```
INSERT INTO _____
VALUES(1,'Smitha','2012-03-12',67.9)
```

```
INSERT INTO _____
VALUES(1,'Rohan','2012-03-12',56.9)
```

```
APPLY BATCH;
```

~~15~~ SELECT * FROM Students-Info;

<u>roll-no</u>	<u>date-of-joining</u>	<u>last-exam-percent</u>	<u>student-name</u>
5	2012-03-11	67.9	Smitha
1	2012-03-11	79.9	Ashu
2	2012-03-11	89.9	Kiran
4	2012-03-11	90.9	Samantha
6	2012-03-11	56.9	Rohan
3	2012-03-11	78.9	Tarun

~~16~~ SELECT * FROM Students-Info WHERE
Roll-No IN(1,2,3);

<u>roll-no</u>	<u>date-of-joining</u>	<u>last-exam-percent</u>	<u>student-name</u>
1	2012-03-11	79.9	Ashu
2	2012-03-11	89.9	Kiran
3	2012-03-11	78.9	Tarun

Code with Output:

```
hadoop@bmseccse-HP-Elite-Tower-600-G9-Desktop-PC:~$ cqlsh
Connected to Test Cluster at 127.0.0.1:9042
[cqlsh 6.1.0 | Cassandra 4.1.8 | CQL spec 3.4.6 | Native protocol v5]
Use HELP for help.
cqlsh> create keyspace library with replication={'class':'Simplestrategy','replication_factor':1};
ConfigurationException: Unable to find replication strategy class 'org.apache.cassandra.locator.Simplestrategy'
cqlsh> create keyspace library with replication={'class':'Simplestrategy','replication_factor':1};exit
ConfigurationException: Unable to find replication strategy class 'org.apache.cassandra.locator.Simplestrategy'
hadoop@bmseccse-HP-Elite-Tower-600-G9-Desktop-PC:~$ cqlsh
Connected to Test Cluster at 127.0.0.1:9042
[cqlsh 6.1.0 | Cassandra 4.1.8 | CQL spec 3.4.6 | Native protocol v5]
Use HELP for help.
cqlsh> create keyspace library with replication={'class':'SimpleStrategy','replication_factor':1};exit
hadoop@bmseccse-HP-Elite-Tower-600-G9-Desktop-PC:~$ cqlsh
Connected to Test Cluster at 127.0.0.1:9042
[cqlsh 6.1.0 | Cassandra 4.1.8 | CQL spec 3.4.6 | Native protocol v5]
Use HELP for help.
cqlsh> create keyspace library with replication={'class':'SimpleStrategy','replication_factor':1};
AlreadyExists: Keyspace 'library' already exists
cqlsh> exit
hadoop@bmseccse-HP-Elite-Tower-600-G9-Desktop-PC:~$ cqlsh
Connected to Test Cluster at 127.0.0.1:9042
[cqlsh 6.1.0 | Cassandra 4.1.8 | CQL spec 3.4.6 | Native protocol v5]
Use HELP for help.
cqlsh> create keyspace libraries with replication={'class':'SimpleStrategy','replication_factor':1};
cqlsh> keyspaces
...
cqlsh> describe keyspaces;

libraries    students      system_distributed   system_views
library      system       system_schema        system_virtual_schema
student     system_auth  system_traces

cqlsh> use libraries;
cqlsh:libraries> create table l_info(sid int primary key, c_val counter, sname varchar,bname varchar,bid int,doi timestamp);
InvalidRequest: Error from server: code=2200 [Invalid query] message="Cannot mix counter and non counter columns in the same table"
cqlsh:libraries> create table l_info(sid int primary key, sname varchar,bname varchar,bid int,doi timestamp);
cqlsh:libraries> create table count(sid int primary key,c_val counter);
cqlsh:libraries> begin batch
... insert into l_info(sid,sname,bname,bid,doi)
... values(112,'alice','bda',1,'2020-03-03')
... insert into l_info(sid,sname,bname,bid,doi)
... values(113,'preeti','cn',2,'2020-03-04')
... apply batch;
cqlsh:libraries> update l_info
```

```
```
cqlsh:libraries> select * from l_info;

 sid | bid | bname | doi
-----+-----+-----+-----+-----+-----+-----+
 113 | 2 | cn | 2020-03-03 18:30:00.000000+0000 | preeti
 112 | 1 | bda | 2020-03-02 18:30:00.000000+0000 | alice

(2 rows)
cqlsh:libraries> select * from count;

 sid | c_val
-----+-----
 112 | 1

(1 rows)
cqlsh:libraries> □
```

## Program 4

**Execution of HDFS Commands for interaction with Hadoop Environment. (Minimum 10 commands to be executed)**

**Observation:**

*-: LAB-05 :-*

So Task 1:- Create a Keyspace by the name "library"

→ CREATE KEYSPACE Library  
... WITH replication = ?  
... 'class': 'SimpleStrategy',  
... 'replication\_factor': 1  
... ;

⇒ Table Created.

USE Library ;

Task 2:- Creating 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 C

Stud\_Id int,  
stud\_Name text,  
Book\_Name text,  
Book\_Id text,  
Date\_of\_issue date,  
PRIMARY KEY (stud\_Id, Book\_Id)  
;

# Counter Table to track book count:

→ CREATE TABLE Book-Counter ( Stud-ID int, Book-Name text, Counter-value counter, PRIMARY KEY (Stud-ID, Book-Name) );

Task 3:- Inserting the values into the table in batch.

→ BEGIN BATCH

INSERT INTO Library-Info (Stud-ID, Stud-Name, Book-Name, Book-ID, Date-of-issue) values (112, 'John Doe', 'BDA', 'BK101', '2025-04-01');

INSERT INTO ——————  
values (113, 'Alice Smith', 'AL', 'BK102', '2025-04-02');

INSERT INTO ——————  
values (114, 'Bob Lee', 'A1', 'BK103', '2025-04-03');

~~INSERT INTO ——————  
values (115, 'Charlie Brown', 'BDA', 'BK101',  
'2025-04-04');~~

INSERT INTO ——————  
values (116, 'Daisy Ray', 'DS', 'BK104', '2025-04-05');

APPLY BATCH;

## Code with Output:

```
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ start-all.sh
WARNING: Attempting to start all Apache Hadoop daemons as hadoop in 10 seconds.
WARNING: This is not a recommended production deployment configuration.
WARNING: Use CTRL-C to abort.
Starting namenodes on [localhost]
Starting datanodes
Starting secondary namenodes [bmscecse-HP-Elite-Tower-600-G9-Desktop-PC]
Starting resourcemanager
Starting nodemanagers
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -mkdir /bda_hadoop
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -ls /
Found 4 items
drwxr-xr-x - hadoop supergroup 0 2025-04-15 15:07 /abc
drwxr-xr-x - hadoop supergroup 0 2025-05-26 14:13 /bda_hadoop
drwxr-xr-x - hadoop supergroup 0 2025-05-22 16:32 /pqr
drwxr-xr-x - hadoop supergroup 0 2025-05-20 16:36 /rgs
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -put /home/hadoop/sample.txt /bda_hadoop/file.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/sample.txt /bda_hadoop/local.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -cat /bda_hadoop/file.txt
hi how are you
how is your job
how is your family
how is your brother
how is your sister
eof
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -get /bda_hadoop/file.txt /home/hadoop/sample.txt
get: '/home/hadoop/sample.txt': File exists
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -get /bda_hadoop/file.txt /home/hadoop/get.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop fs -getfacl /bda_hadoop/
file: /bda_hadoop
owner: hadoop
group: supergroup
user::rwx
group::r-x
other::r-x

hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -copyToLocal /bda_hadoop/file.txt /home/hadoop/tolocal.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop fs -cp /bda_hadoop /abc
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop fs -ls /abc
Found 3 items
drwxr-xr-x - hadoop supergroup 0 2025-05-26 14:28 /abc/bda_hadoop
-rw-r--r-- 1 hadoop supergroup 55 2025-04-15 15:05 /abc/file.txt
-rw-r--r-- 1 hadoop supergroup 55 2025-04-15 15:07 /abc/file_cp_.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$
```

## Program 5

### Implement Wordcount program on Hadoop framework

#### Observation:

papergrid  
Date: / /

Task 4: Displaying the details of the table created and increase the values of the counts.

→ UPDATE Book-Counter SET CounterValue = CounterValue + 1 WHERE Stud-ID = 112 AND Book-Name = 'BDA';

UPDATE \_\_\_\_\_ WHERE Stud-ID = 113 AND Book-Name = 'ML';

UPDATE \_\_\_\_\_ WHERE Stud-ID = 114 AND Book-Name = 'AI';

UPDATE \_\_\_\_\_ WHERE Stud-ID = 115 AND Book-Name = 'BDA';

UPDATE \_\_\_\_\_ WHERE Stud-ID = 116 AND Book-Name = 'DS';

Task 5: Write a query to show that a student with Id 112 has taken a book 'BDA' 2 times.

→ SELECT \* FROM Book-Counter WHERE Stud-ID = 112 AND Book-Name = 'BDA';

⇒

| <u>stud-id</u> | <u>book-name</u> | <u>counter-value</u> |
|----------------|------------------|----------------------|
| 112            | BDA              | 2                    |

Task6:- Export the created column to a  
CSV file

sqlsh -e "COPY library.library\_info TO  
'library\_info-export.csv' WITH HEADER  
= TRUE;"

Final Table:

→ SELECT \* FROM library\_info;

| <u>stud-id</u> | <u>book-id</u> | <u>book-name</u> | <u>date-of-iss</u> |
|----------------|----------------|------------------|--------------------|
| 114            | BK103          | A1               | 2025-04-03         |

| <u>stud-name</u> | <u>book-id</u> | <u>book-name</u> | <u>date-of-iss</u> |
|------------------|----------------|------------------|--------------------|
| Bob Lee          | BK103          | A1               | 2025-04-03         |

Ans of 8/4/25

## Code with Output:

```
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ start-all.sh
WARNING: Attempting to start all Apache Hadoop daemons as hadoop in 10 seconds.
WARNING: This is not a recommended production deployment configuration.
WARNING: Use CTRL-C to abort.
Starting namenodes on [localhost]
localhost: namenode is running as process 12082. Stop it first and ensure /tmp/hadoop-hadoop-namenode.pid file is empty before retry.
Starting datanodes
localhost: datanode is running as process 12255. Stop it first and ensure /tmp/hadoop-hadoop-datanode.pid file is empty before retry.
Starting secondary namenodes [bmscecse-HP-Elite-Tower-600-G9-Desktop-PC]
bmscecse-HP-Elite-Tower-600-G9-Desktop-PC: secondarynamenode is running as process 12557. Stop it first and ensure /tmp/hadoop-hadoop-secondarnamenode.pid file is empty before retry.
Starting resourcemanager
resourcemanager is running as process 12845. Stop it first and ensure /tmp/hadoop-hadoop-resourcemanager.pid file is empty before retry.
Starting nodemanagers
localhost: nodemanager is running as process 13014. Stop it first and ensure /tmp/hadoop-hadoop-nodemanager.pid file is empty before retry.
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ jps
12082 NameNode
13014 NodeManager
15100 org.eclipse.equinox.launcher_1.6.1000.v20250227-1734.jar
17036 Jps
12845 ResourceManager
12557 SecondaryNameNode
12255 DataNode
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/sample.txt /bda_hadoop/input.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop jar /home/hadoop/Desktop/hdpwordcount.jar WCDriver /bda_hadoop/input.txt /bda_hadoop/output
Exception in thread "main" java.lang.ClassNotFoundException: WCDriver
 at java.base/java.net.URLClassLoader.findClass(URLClassLoader.java:476)
 at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:594)
 at java.base/java.lang.ClassLoader.loadClass(ClassLoader.java:527)
 at java.base/java.lang.Class.forName0(Native Method)
 at java.base/java.lang.Class.forName(Class.java:398)
 at org.apache.hadoop.util.RunJar.run(RunJar.java:321)
 at org.apache.hadoop.util.RunJar.main(RunJar.java:241)
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop jar /home/hadoop/Desktop/hdpwordcount.jar hdpwordcount.WCDriver /bda_hadoop/input.txt /bda_hadoop/output
2025-05-26 14:40:01,404 INFO impl.MetricsConfig: Loaded properties from hadoop-metrics2.properties
2025-05-26 14:40:01,440 INFO impl.MetricsSystemImpl: Scheduled Metric snapshot period at 10 second(s).
2025-05-26 14:40:01,440 INFO impl.MetricsSystemImpl: JobTracker metrics system started
2025-05-26 14:40:01,446 WARN impl.MetricsSystemImpl: JobTracker metrics system already initialized!
2025-05-26 14:40:01,501 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-05-26 14:40:01,545 INFO mapred.FileInputFormat: Total input files to process : 1
2025-05-26 14:40:01,567 INFO mapreduce.JobSubmitter: number of splits:1
2025-05-26 14:40:01,624 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local276129153_0001
2025-05-26 14:40:01,624 INFO mapreduce.JobSubmitter: Executing with tokens: []
2025-05-26 14:40:01,677 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
2025-05-26 14:40:01,679 INFO mapred.LocalJobRunner: OutputCommitter set in config null
2025-05-26 14:40:01,679 INFO mapreduce.Job: Running job: job_local276129153_0001
2025-05-26 14:40:01,680 INFO mapred.LocalJobRunner: OutputCommitter is org.apache.hadoop.mapred.FileOutputCommitter
2025-05-26 14:40:01,682 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-26 14:40:01,682 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ign
hdpwordcount
```

```
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -ls /bda_hadoop/output
Found 2 items
-rw-r--r-- 1 hadoop supergroup 0 2025-05-26 14:40 /bda_hadoop/output/_SUCCESS
-rw-r--r-- 1 hadoop supergroup 75 2025-05-26 14:40 /bda_hadoop/output/part-00000
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -cat /bda_hadoop/output/part-00000
are 1
brother 1
eof 1
family 1
hi 1
how 5
is 4
job 1
sister 1
you 1
your 4
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$
```

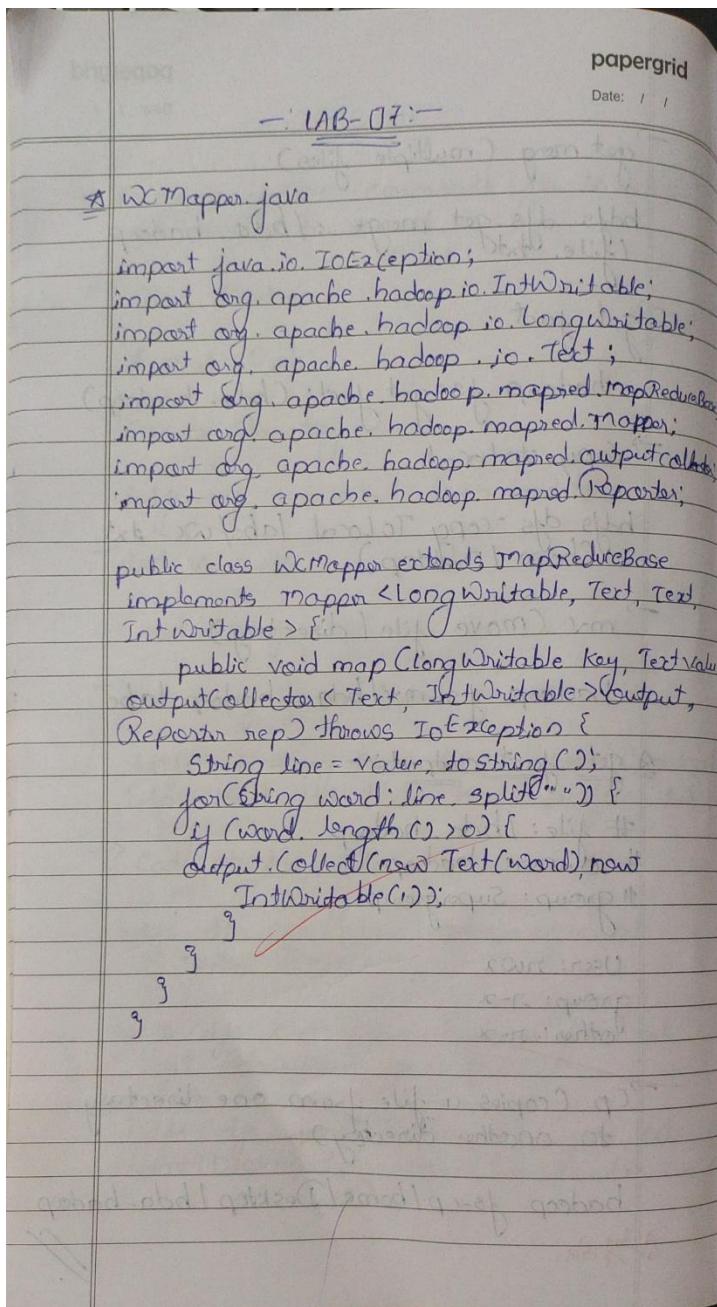
## Program 6

From the following link extract the weather data

<https://github.com/tomwhite/hadoop-book/tree/master/input/ncdc/all>

- a) Create a MapReduce program to find average temperature for each year from the NCDC data set.
- b) find the mean max temperature for every month

Observation:



### WCReducer.java

```
import java.io.IOException;
import java.util.Iterator;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.MapReduceBase;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reducer;

public class WCReducer extends MapReduceBase
implements Reducer<Text, Int> {
 public void Reduce(Text key, Iterator<IntWritable>
values, OutputCollector
int count=0;
while (value, Next ())
{
 IntWritable i = value.next ();
 count += i.get ();
}
output.collect (key, new IntWritable (count));
}
```

3

### WC Driver.java

```
import java.io.IOException;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.FileInputFormat;
```

```
import org.apache.hadoop.mapred.FileOutputFormat;
import org.apache.hadoop.mapred.JobClient;
import org.apache.hadoop.util.Tool;
import org.apache.hadoop.util.ToolRunner;
```

```
public class WcDriver extends Configured
implements Tool {
 public int run(String args[]) throws
IOException {
 if (args.length < 2) {
 System.out.println("Please give valid
inputs");
 return -1;
 }
 jobConf(conf = new JobConf(WcDriver.class));
 FileInputFormat.setInputPaths(conf,
new Path(args[0]));
 FileOutputFormat.setOutputPaths(conf,
new Path(args[1]));
 conf.setMapperClass(WcMapper.class);
 conf.setReducerClass(WcReducer.class);
 conf.setMapOutputKeyClass(Text.class);
 JobClient.runJob(conf);
 return 0;
 }
}
```

```
public static void main(String args[])
throws Exception {
 int exitCode = ToolRunner.run(new WcDriver,
args);
 System.out.println(exitCode);
}
```

## Code with Output:

### a) `Average temperature

```
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ jps
12082 NameNode
17908 Jps
13014 NodeManager
15100 org.eclipse.equinox.launcher_1.6.1000.v20250227-1734.jar
12845 ResourceManager
12557 SecondaryNameNode
12255 DataNode
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/Downloads/1901 /bda_hadoop/avinput.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop jar /home/hadoop/Desktop/WeatherAverage.jar WeatherAverage.AVDriver /bda_h
adoop/avinput.txt /bda_hadoop/avoutput
2025-05-26 14:49:09,290 INFO impl.MetricsConfig: Loaded properties from hadoop-metrics2.properties
2025-05-26 14:49:09,327 INFO impl.MetricsSystemImpl: Scheduled Metric snapshot period at 10 second(s).
2025-05-26 14:49:09,327 INFO impl.MetricsSystemImpl: JobTracker metrics system started
2025-05-26 14:49:09,380 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-05-26 14:49:09,427 INFO input.FileInputFormat: Total input files to process : 1
2025-05-26 14:49:09,452 INFO mapreduce.JobSubmitter: number of splits:1
2025-05-26 14:49:09,510 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local1313646497_0001
2025-05-26 14:49:09,510 INFO mapreduce.JobSubmitter: Executing with tokens: []
2025-05-26 14:49:09,566 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
2025-05-26 14:49:09,566 INFO mapreduce.Job: Running job: job_local1313646497_0001
2025-05-26 14:49:09,567 INFO mapred.LocalJobRunner: OutputCommitter set in config null
2025-05-26 14:49:09,570 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitte
rFactory
2025-05-26 14:49:09,571 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-26 14:49:09,571 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory: f
alse, ignore cleanup failures: false
2025-05-26 14:49:09,571 INFO mapred.LocalJobRunner: OutputCommitter is org.apache.hadoop.mapreduce.lib.output.FileOutputCommitter
2025-05-26 14:49:09,620 INFO mapred.LocalJobRunner: Waiting for map tasks
2025-05-26 14:49:09,620 INFO mapred.LocalJobRunner: Starting task: attempt_local1313646497_0001_m_000000_0
2025-05-26 14:49:09,629 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitte
rFactory
2025-05-26 14:49:09,629 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-26 14:49:09,629 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory: f
alse, ignore cleanup failures: false
2025-05-26 14:49:09,635 INFO mapred.Task: Using ResourceCalculatorProcessTree : []
2025-05-26 14:49:09,637 INFO mapred.MapTask: Processing split: hdfs://localhost:9000/bda_hadoop/avinput.txt:0+888190
2025-05-26 14:49:09,666 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
2025-05-26 14:49:09,666 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
2025-05-26 14:49:09,666 INFO mapred.MapTask: soft limit at 83886080
2025-05-26 14:49:09,666 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
2025-05-26 14:49:09,666 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
2025-05-26 14:49:09,668 INFO mapred.MapTask: Map output collector class = org.apache.hadoop.mapred.MapTask$MapOutputBuffer
2025-05-26 14:49:09,730 INFO mapred.LocalJobRunner:
2025-05-26 14:49:09,731 INFO mapred.MapTask: Starting flush of map output
2025-05-26 14:49:09,731 INFO mapred.MapTask: Spilling map output
2025-05-26 14:49:09,731 INFO mapred.MapTask: bufstart = 0; bufend = 59076; bufvoid = 104857600
2025-05-26 14:49:09,731 INFO mapred.MapTask: kvstart = 26214396(104857584); kvend = 26188144(104752576); length = 26253/6553600
2025-05-26 14:49:09,739 INFO mapred.MapTask: Finished spill 0
2025-05-26 14:49:09,743 INFO mapred.Task: Task:attempt_local1313646497_0001_m_000000_0 is done. And is in the process of committing
2025-05-26 14:49:09,745 INFO mapred.LocalJobRunner: map
```

```
Merged Map Outputs=1
GC time elapsed (ms)=0
Total committed heap usage (bytes)=1052770304
Shuffle Errors
BAD_ID=0
CONNECTION=0
IO_ERROR=0
WRONG_LENGTH=0
WRONG_MAP=0
WRONG_REDUCE=0
File Input Format Counters
Bytes Read=888190
File Output Format Counters
Bytes Written=8
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC: $ hdfs dfs -ls /bda_hadoop/avoutput
Found 2 items
-rw-r--r-- 1 hadoop supergroup 0 2025-05-26 14:49 /bda_hadoop/avoutput/_SUCCESS
-rw-r--r-- 1 hadoop supergroup 8 2025-05-26 14:49 /bda_hadoop/avoutput/part-r-00000
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC: $ hdfs dfs -cat /bda_hadoop/avoutput/part-r-00000
1901 46
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC: $
```

## b) Maximum temperature

```
hadoop@bmscecsse-HP-Elite-Tower-600-G9-Desktop-PC:~$ jps
18721 Jps
12082 NameNode
13014 NodeManager
15100 org.eclipse.equinox.launcher_1.6.1000.v20250227-1734.jar
12845 ResourceManager
12557 SecondaryNameNode
12255 DataNode
hadoop@bmscecsse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/Downloads/1901 /bda_hadoop/minput.txt
hadoop@bmscecsse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop jar /home/hadoop/Desktop/meanTemp.jar Mean.MNDriver /bda_hadoop/minput.txt /bda_hadoop/moutput
2025-05-26 14:54:41,993 INFO impl.MetricsConfig: Loaded properties from hadoop-metrics2.properties
2025-05-26 14:54:42,029 INFO impl.MetricSystemImpl: Scheduled Metric snapshot period at 10 second(s).
2025-05-26 14:54:42,029 INFO impl.MetricSystemImpl: JobTracker metrics system started
2025-05-26 14:54:42,083 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-05-26 14:54:42,131 INFO input.FileInputFormat: Total input files to process : 1
2025-05-26 14:54:42,158 INFO mapreduce.JobSubmitter: number of splits:1
2025-05-26 14:54:42,216 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local862196817_0001
2025-05-26 14:54:42,216 INFO mapreduce.JobSubmitter: Executing with tokens: []
2025-05-26 14:54:42,272 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
2025-05-26 14:54:42,273 INFO mapreduce.Job: Running job: job_local862196817_0001
2025-05-26 14:54:42,273 INFO mapred.LocalJobRunner: OutputCommitter set in config null
2025-05-26 14:54:42,276 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-26 14:54:42,277 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-26 14:54:42,277 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-26 14:54:42,277 INFO mapred.LocalJobRunner: OutputCommitter is org.apache.hadoop.mapreduce.lib.output.FileOutputCommitter
2025-05-26 14:54:42,319 INFO mapred.LocalJobRunner: Waiting for map tasks
2025-05-26 14:54:42,319 INFO mapred.LocalJobRunner: Starting task: attempt_local862196817_0001_m_000000_0
2025-05-26 14:54:42,328 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-26 14:54:42,329 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-26 14:54:42,329 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-26 14:54:42,335 INFO mapred.Task: Using ResourceCalculatorProcessTree : []
2025-05-26 14:54:42,336 INFO mapred.MapTask: Processing split: hdfs://localhost:9000/bda_hadoop/minput.txt:0+888190
2025-05-26 14:54:42,366 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
2025-05-26 14:54:42,366 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
2025-05-26 14:54:42,366 INFO mapred.MapTask: soft limit at 83886080
2025-05-26 14:54:42,366 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
2025-05-26 14:54:42,366 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
2025-05-26 14:54:42,368 INFO mapred.MapTask: Map output collector class = org.apache.hadoop.mapred.MapTask$MapOutputBuffer
2025-05-26 14:54:42,428 INFO mapred.LocalJobRunner:
2025-05-26 14:54:42,428 INFO mapred.MapTask: Starting flush of map output
2025-05-26 14:54:42,429 INFO mapred.MapTask: Spilling map output
2025-05-26 14:54:42,429 INFO mapred.MapTask: bufstart = 0; bufend = 45948; bufvoid = 104857600
```

```
BAD_ID=0
CONNECTION=0
IO_ERROR=0
WRONG_LENGTH=0
WRONG_MAP=0
WRONG_REDUCE=0
File Input Format Counters
 Bytes Read=888190
File Output Format Counters
 Bytes Written=81
hadoop@bmscecsse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -ls /bda_hadoop/moutput
Found 2 items
-rw-r--r-- 1 hadoop supergroup 0 2025-05-26 14:54 /bda_hadoop/moutput/_SUCCESS
-rw-r--r-- 1 hadoop supergroup 81 2025-05-26 14:54 /bda_hadoop/moutput/part-r-00000
hadoop@bmscecsse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -cat /bda_hadoop/moutput/part-r-00000
01 -13
02 -66
03 -15
04 43
05 100
06 168
07 219
08 198
09 141
10 100
11 1
12 -61
hadoop@bmscecsse-HP-Elite-Tower-600-G9-Desktop-PC:~$
```

## Program 7

For a given Text file, Create a Map Reduce program to sort the content in an alphabetic order listing only top 10 maximum occurrences of words.

Observation:

papergrid  
Date: / /

- LAB-07 -

```
WMapper.java
import java.io.IOException;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.Mapper;
import org.apache.hadoop.mapred.MapReduceBase;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reporter;
```

```
public class WMapper extends MapReduceBase
implements Mapper<LongWritable, Text, Text,
IntWritable> {
 public void map(LongWritable key, Text value,
 OutputCollector<Text, IntWritable> output,
 Reporter reporter) throws IOException {
 String line = value.toString();
 for(String word : line.split(" ")){
 if(word.length() > 0){
 output.collect(new Text(word), new
 IntWritable(1));
 }
 }
 }
}

// Cart created
// -> input
// -> output
```

final void combSort(int[] arr){}

array should be sorted before method

### WCReducer.java

```
import java.io.IOException;
import java.util.Iterator;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.MapReduceBase;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reducer;
```

public class WCReducer extends MapReduceBase  
implements Reducer<Text, Int> {  
 public void Reduce(Text key, Iterator<IntWritable>  
values, OutputCollector  
int count=0;  
 while (value, Next ())  
 {  
 IntWritable i = value.next();  
 Count += i.get();  
 }  
 output.collect(key, new IntWritable (Count));  
}

### WC Driver.java

```
import java.io.IOException;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.FileInputFormat;
```

## Code with Output:

```
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ jps
12082 NameNode
19238 Jps
13014 NodeManager
15100 org.eclipse.equinox.launcher_1.6.1000.v20250227-1734.jar
12845 ResourceManager
12557 SecondaryNameNode
12255 DataNode
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/Desktop/TopN.txt /bda_hadoop/tinput.txt
copyFromLocal: '/bda_hadoop/tinput.txt': No such file or directory: 'hdfs://localhost:9000/bda_hadoop/tinput.txt'
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -copyFromLocal /home/hadoop/Desktop/TopN.txt /bda_hadoop/tinput.txt
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hadoop jar /home/hadoop/Desktop/TopN.jar TopN.TNDriver /bda_hadoop/tinput.txt /bda_hadoop/toutput
2025-05-26 14:59:03,334 INFO impl.MetricsConfig: Loaded properties from hadoop-metrics2.properties
2025-05-26 14:59:03,372 INFO impl.MetricsSystemImpl: Scheduled Metric snapshot period at 10 second(s).
2025-05-26 14:59:03,372 INFO impl.MetricsSystemImpl: JobTracker metrics system started
2025-05-26 14:59:03,426 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. I implement the Tool interface and execute your application with ToolRunner to remedy this.
2025-05-26 14:59:03,472 INFO input.FileInputFormat: Total input files to process : 1
2025-05-26 14:59:03,497 INFO mapreduce.JobSubmitter: number of splits:1
2025-05-26 14:59:03,554 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local1824101299_0001
2025-05-26 14:59:03,554 INFO mapreduce.JobSubmitter: Executing with tokens: []
2025-05-26 14:59:03,609 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
2025-05-26 14:59:03,610 INFO mapreduce.Job: Running job: job_local1824101299_0001
2025-05-26 14:59:03,610 INFO mapred.LocalJobRunner: OutputCommitter set in config null
2025-05-26 14:59:03,614 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-26 14:59:03,614 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-26 14:59:03,614 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-26 14:59:03,614 INFO mapred.LocalJobRunner: OutputCommitter is org.apache.hadoop.mapreduce.lib.output.FileOutputCommitter
2025-05-26 14:59:03,654 INFO mapred.LocalJobRunner: Waiting for map tasks
2025-05-26 14:59:03,655 INFO mapred.LocalJobRunner: Starting task: attempt_local1824101299_0001_m_000000_0
2025-05-26 14:59:03,664 INFO output.PathOutputCommitterFactory: No output committer factory defined, defaulting to FileOutputCommitterFactory
2025-05-26 14:59:03,664 INFO output.FileOutputCommitter: File Output Committer Algorithm version is 2
2025-05-26 14:59:03,664 INFO output.FileOutputCommitter: FileOutputCommitter skip cleanup _temporary folders under output directory:false, ignore cleanup failures: false
2025-05-26 14:59:03,670 INFO mapred.Task: Using ResourceCalculatorProcessTree : []
2025-05-26 14:59:03,672 INFO mapred.MapTask: Processing split: hdfs://localhost:9000/bda_hadoop/tinput.txt:0+95
2025-05-26 14:59:03,701 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
2025-05-26 14:59:03,701 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
2025-05-26 14:59:03,701 INFO mapred.MapTask: soft limit at 83886080
2025-05-26 14:59:03,701 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
2025-05-26 14:59:03,701 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
2025-05-26 14:59:03,702 INFO mapred.MapTask: Map output collector class = org.apache.hadoop.mapred.MapTask$MapOutputBuffer
2025-05-26 14:59:03,738 INFO mapred.LocalJobRunner:
2025-05-26 14:59:03,739 INFO mapred.MapTask: Starting flush of map output
```

```

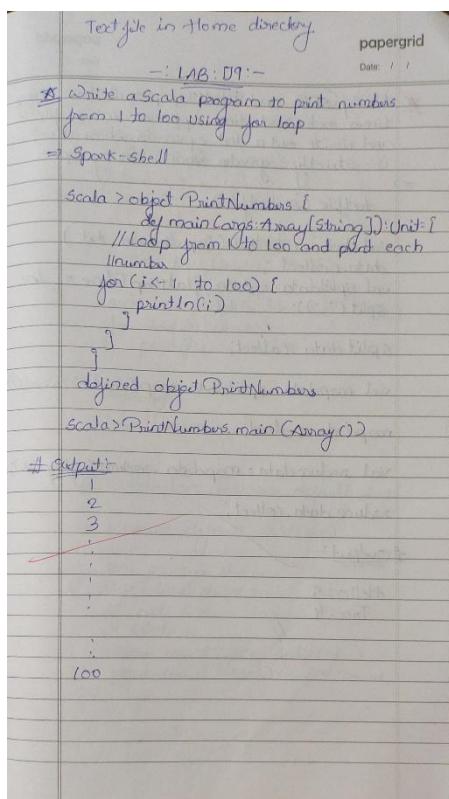
File System Counters
 FILE: Number of bytes read=10682
 FILE: Number of bytes written=1291808
 FILE: Number of read operations=0
 FILE: Number of large read operations=0
 FILE: Number of write operations=0
 HDFS: Number of bytes read=190
 HDFS: Number of bytes written=40
 HDFS: Number of read operations=15
 HDFS: Number of large read operations=0
 HDFS: Number of write operations=4
 HDFS: Number of bytes read erasure-coded=0
Map-Reduce Framework
 Map input records=3
 Map output records=15
 Map output bytes=154
 Map output materialized bytes=190
 Input split bytes=108
 Combine input records=0
 Combine output records=0
 Reduce input groups=5
 Reduce shuffle bytes=190
 Reduce input records=15
 Reduce output records=5
 Spilled Records=30
 Shuffled Maps =1
 Failed Shuffles=0
 Merged Map outputs=1
 GC time elapsed (ms)=0
 Total committed heap usage (bytes)=1052770304
Shuffle Errors
 BAD_ID=0
 CONNECTION=0
 IO_ERROR=0
 WRONG_LENGTH=0
 WRONG_MAP=0
 WRONG_REDUCE=0
File Input Format Counters
 Bytes Read=95
File Output Format Counters
 Bytes Written=40
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -ls /bda_hadoop/toutput
Found 2 items
-rw-r--r-- 1 hadoop supergroup 0 2025-05-26 14:59 /bda_hadoop/toutput/_SUCCESS
-rw-r--r-- 1 hadoop supergroup 40 2025-05-26 14:59 /bda_hadoop/toutput/part-r-00000
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$ hdfs dfs -cat /bda_hadoop/toutput/part-r-00000
banana 5
apple 4
fruit 3
mango 2
kiwi 1
hadoop@bmscecse-HP-Elite-Tower-600-G9-Desktop-PC:~$

```

## Program 8

**Write a Scala program to print numbers from 1 to 100 using for loop.**

## **Observation:**

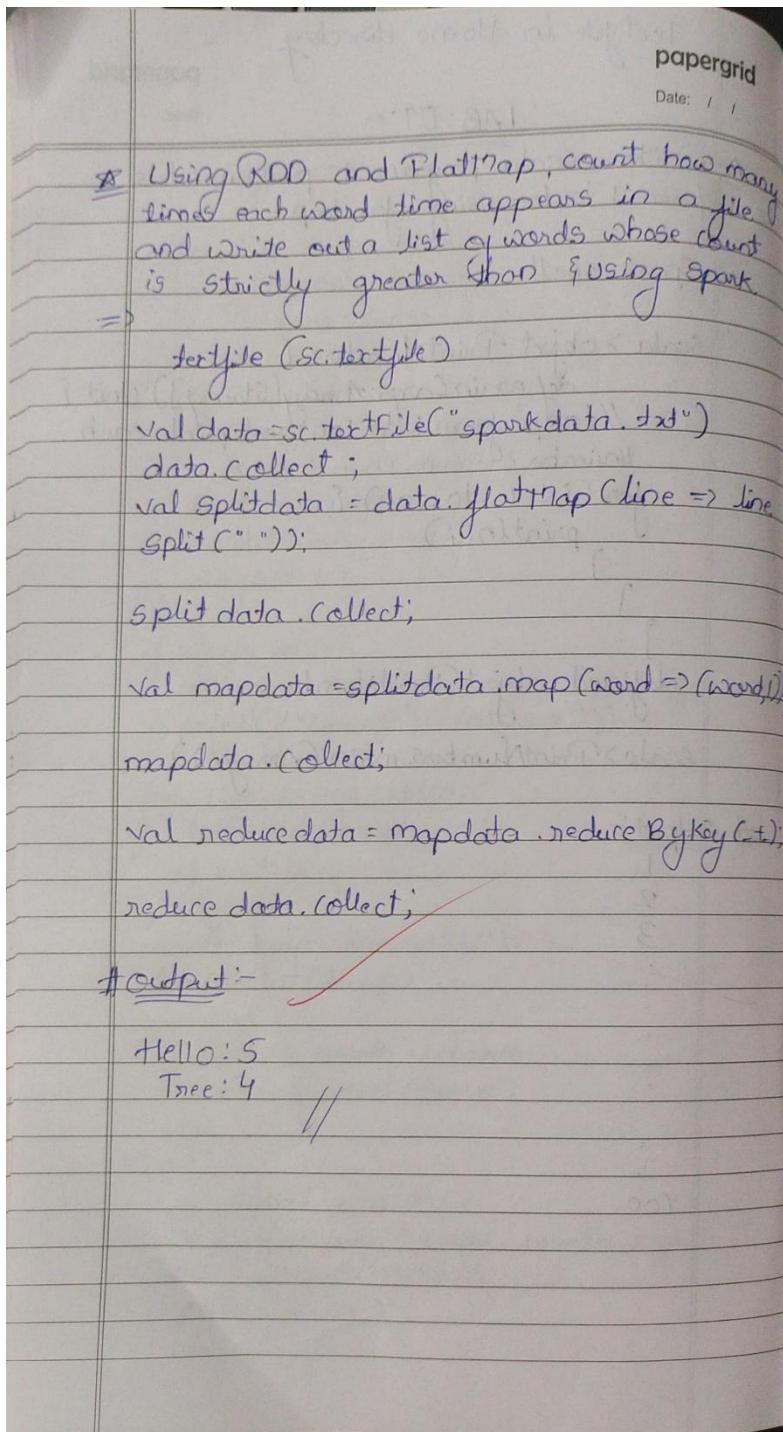


## Code with Output:

## Program 9

Using RDD and FlatMap count how many times each word appears in a file and write out a list of words whose count is strictly greater than 4 using Spark

Observation:



## Code with Output:

## Program 10

**Write a simple streaming program in Spark to receive text data streams on a particular port, perform basic text cleaning (like white space removal, stop words removal, lemmatization, etc.), and print the cleaned text on the screen. (Open Ended Question).**

## **Observation:**

papergrid

Date: / /

- CAB: U8:-

## 8) Meanmax Using Python:-

→ `Meanmax-mapper.py`

```
import sys
```

For line in sys.stdin:

```
 line = line.strip()
```

```
 if len(line) < 93:
```

```
 continue
```

```
 month = line[19:21]
```

```
 if line[87] == '+':
```

```
 temperature = int(line[88:92])
```

```
 else:
```

```
 temperature = int(line[87:92])
```

```
 quality = line[92:93]
```

```
 if temperature != MISSING and quality in
```

```
('0', '1', '4', '5', '9').
```

```
 print(j + month + temperature + quality)
```

→ `Meanmax-reducer.py`

```
import sys
```

```
current_month = None
```

```
temp = []
```

```
def emit_average(month, temp_list):
```

```
 max_temp =
```

```
 total = 0
```

```
 count = 0
```

days = 0

for t in temp-list:  
if t > max-temp:  
max-temp = t  
count += 1

if count == 3:  
total += max-temp.  
max-temp = 0  
count = 0  
days += 1

if days > 0:  
average = total / days  
print(f"month {month} | {average}")

for line in sys.stdin:  
line = line.strip()  
if not line:  
continue

month, temp = line.split(',')  
temp = int(temp)

if current-month == month:  
temp.append(temp)

else:

if current-month:  
emit-average(current-month, temps)  
current-month = month  
temps = [temp]