

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT

on

BDA Lab record

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

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B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019
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Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “Big data Analytics lab” carried out by **Aisha Taffazul Chesti (1BM21CS010)**, 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 a **BDA lab record - (22CS6PEBDA)** work prescribed for the said degree.

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Index Sheet

Sl. No.	Experiment Title	Page No.
1.	Cassandra Lab Program 1 : Employee	4
2.	Cassandra Lab Program 2 : Library Database	7
3.	MongoDB - CRUD Demonstration	9
4.	Hadoop Installation	19
5.	Hadoop Commands	20
6.	Hadoop Program: Average Temperature	21
7.	Hadoop Program: Word Count	23
8.	Map Reduce program to sort the content in an alphabetic order	30

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

Lab 1

AIM: Perform the following DB operations using Cassandra.

1. Create a keyspace by name Employee

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

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

```
USE Employee;
```

```
CREATE TABLE Employee_Info (  
    Emp_Id int PRIMARY KEY,  
    Emp_Name text,  
    Designation text,  
    Date_of_Joining date,  
    Salary decimal,  
    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 (121, 'John Doe',  
    'Software Engineer', '2022-01-15', 60000,  
    'Engineering');
```

```
INSERT INTO Employee_Info (Emp_Id,  
    Emp_Name, Designation, Date_of_Joining,
```

```
Salary, Dept_Name) VALUES (122, 'Jane Smith',  
'Data Scientist', '2021-06-20', 75000, 'Data  
Science');
```

```
INSERT INTO Employee_Info (Emp_Id,  
Emp_Name, Designation, Date_of_Joining,  
Salary, Dept_Name) VALUES (123, 'Emily  
Davis', 'Project Manager', '2019-03-05', 85000,  
'Management');
```

```
APPLY BATCH;
```

- 4. Update Employee name and Department of Emp-Id 121**
- 5. Sort the details of Employee records based on salary**

```
UPDATE Employee_Info SET Emp_Name =  
'Johnathan Doe', Dept_Name = 'Product  
Development' WHERE Emp_Id = 121;
```

- 5. Sort the details of Employee records based on salary**

```
SELECT * FROM Employee_Info;
```

- 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.**

```
ALTER TABLE Employee_Info ADD Projects set<text>;
```

- 7. Update the altered table to add project names.**

```
UPDATE Employee_Info SET Projects = {'Project Alpha', 'Project  
Beta'} WHERE Emp_Id = 121;
```

```
UPDATE Employee_Info SET Projects = {'Project Gamma'}
WHERE Emp_Id = 122;
```

```
UPDATE Employee_Info SET Projects = {'Project Delta', 'Project
Epsilon'} WHERE Emp_Id = 123;
```

8. 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, Projects) VALUES (124,
'Michael Brown', 'System Analyst', '2020-09-11', 70000, 'IT', {'Project
Zeta'}) USING TTL 15;
```

```
aisha@AishasLaptop:~$ ls
40x  apache-cassandra-4.0.13  deb  main
aisha@AishasLaptop:~$ cd apache-cassandra-4.0.13
aisha@AishasLaptop:~/apache-cassandra-4.0.13$ bin/cqlsh
Connected to Test Cluster at 127.0.0.1:9042
[cqlsh 6.0.0 | Cassandra 4.0.13 | CQL spec 3.4.5 | Native protocol v5]
Use HELP for help.
cqlsh> create keyspace if not exists Employee with replication={{'class': 'SimpleStrategy', 'replication_factor': 1}};
cqlsh> create table if not exists Employee.Employee_Info(Emp_id int primary key, emp_name text, designation text, date_of_joining timestamp, salary
float, dept_name text);
cqlsh> begin batch
... insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining, salary, dept_name) values (121, 'aisha', 'Software engineer', '2024-0
8-07', 3600000, 'Engineering');
... insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining, salary, dept_name) values (122, 'fatima', 'prompt engineer', '202
4-11-07', 4600000, 'Engineering');
... insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining, salary, dept_name) values (123, 'shayan', 'civi; engineer', '2024
-11-07', 4600000, 'Engineering');
... apply batch;
InvalidRequest: Error from server: code=2200 [Invalid query] message="No keyspace has been specified. USE a keyspace, or explicitly specify keyspace
.tableName"
cqlsh> use Employee
... ;
cqlsh:employee> begin batch insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining, salary, dept_name) values (121, 'aisha', 'Softw
are engineer', '2024-08-07', 3600000, 'Engineering'); insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining, salary, dept_name) val
ues (122, 'fatima', 'prompt engineer', '2024-11-07', 4600000, 'Engineering'); insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining,
salary, dept_name) values (123, 'shayan', 'civi; engineer', '2024-11-07', 4600000, 'Engineering'); apply batch;
cqlsh:employee> update Employee_Info set emp_name= 'zainub', dept_name= 'software testing' where Emp_Id =121;
cqlsh:employee> select * from employee_info
... ;
```

emp_id	date_of_joining	dept_name	designation	emp_name	salary
123	2024-11-07	Engineering	civi; engineer	shayan	4.6e+06
122	2024-11-07	Engineering	prompt engineer	fatima	4.6e+06
121	2024-08-07	software testing	Software engineer	zainub	3.6e+06

(3 rows)
cqlsh:employee> |

```
(3 rows)
cqlsh:employee> alter table Employee
... _Info add projects set<text>;
Invalid syntax at char 1
^
_Info add projects set<text>;

cqlsh:employee> alter table Employee_Info add projects set<text>
... ;
cqlsh:employee> update Employee_Info SET projects ={'alpha', 'beta'} wher
e emp_id =121;
cqlsh:employee> update Employee_Info SET projects ={'gamma'} where emp_i
d =122;
cqlsh:employee> update Employee_Info SET projects ={'delta'} where emp_i
d =123;
cqlsh:employee> update Employee_Info SET projects ={'delta'} where emp_id =123;
cqlsh:employee> insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining, salary, dept_name, projects) values (124, 'ateeb', 'ece
engineer', '2024-09-07', 5600000, 'Engineering', 'zelta') using ttl 15;
InvalidRequest: Error from server: code=2200 [Invalid query] message="Invalid STRING constant (zelta) for "projects" of type set<text>"
cqlsh:employee> insert into Employee_Info(Emp_id, emp_name, designation, date_of_joining, salary, dept_name, projects) values (124, 'ateeb', 'ece engi
neer', '2024-09-07', 5600000, 'Engineering', {'zelta'}) using ttl 15;
cqlsh:employee> select * from employee_info
... ;
InvalidRequest: Error from server: code=2200 [Invalid query] message="table employee_info does not exist"
cqlsh:employee> select * from Employee_Info;
```

emp_id	date_of_joining	dept_name	designation	emp_name	projects	salary
123	2024-11-07	Engineering	civi; engineer	shayan	{'delta'}	4.6e+06
122	2024-11-07	Engineering	prompt engineer	fatima	{'gamma'}	4.6e+06
121	2024-08-07	software testing	Software engineer	zainub	{'alpha', 'beta'}	3.6e+06

cqlsh:employee>
cqlsh:employee>

LAB 2

AIM- Perform the following DB operations using Cassandra.

- 1.Create a keyspace by name 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**
- 3. Insert the values into the table in batch**
- 4. Display the details of the table created and increase the value of the counter**
- 5. Write a query to show that a student with id 112 has taken a book “BDA” 2 times.**
- 6. Export the created column to a csv file**
- 7. Import a given csv dataset from local file system into Cassandra column family**

```
cqlsh> CREATE KEYSPACE library5 WITH
REPLICATION={ 'class': 'SimpleStrategy', 'replication_factor':1 }; cqlsh> USE library5;

cqlsh:library0717> create table library_info17(stud_id int, counter_value counter, stud_name
text, book_name text, book_id int, date_of_issue timestamp, primary
key(stud_id,stud_name,book_name,book_id,date_of_issue));

cqlsh:library5> update library_info ... set counter_value=counter_value+1 ... where stud_id=112
and stud_name='shruti' and book_id=101 and book_name='os' and
date_of_issue='2023-07-09';

cqlsh:library5> update library_info ... set counter_value=counter_value+1 ... where stud_id=111
and stud_name='raj' and book_id=100 and book_name='ada' and date_of_issue='2022-04-07';

stud_id | stud_name | book_name | _of_issue | book_id | counter_value ----
-----+-----+-----+-----+-----+-----
--- 112 | aisha | OS | 2023-07-09 18:30:00.000000+0000 | 101 | 1
111 | shayan | ada | 2022-04-07 18:30:00.000000+0000 | 100 | 1

cqlsh:library0717> select counter_value as borrow_count ... from library_info17 ... where
stud_id=1;
```

```
cqlsh:library5> copy library5.library_info(stud_id, stud_name, book_name, book_id,  
date_of_issue, counter_value) to '/home/bmsce/cassandra/data.csv' WITH  
HEADER=TRUE;
```

```
cqlsh:library5> copy library5.library_info(stud_id, stud_name, book_name, book_id,  
date_of_issue, counter_value) from '/home/bmsce/cassandra/data.csv' WITH  
HEADER=TRUE;
```


LAB 3

AIM- MongoDB CRUD Documentation

```
C:\Users\bmsce>mongosh
"mongodb+srv://cluster1.kipkn5v.mongodb.net/DBMS_demo1" --apiVersion 1 --username aisha
```

Enter password: *****

Current Mongosh Log ID: 643a27cceb99a8175b2ff0e9

Connecting to:
mongodb+srv://<credentials>@cluster1.kipkn5v.mongodb.net/DBMS_demo1?appName=
mongosh+1.8.0

Using MongoDB: 6.0.5 (API Version 1)

Using Mongosh: 1.8.0

For mongosh info see: <https://docs.mongodb.com/mongosh-shell/>

To help improve our products, anonymous usage data is collected and sent to MongoDB periodically (<https://www.mongodb.com/legal/privacy-policy>).

You can opt-out by running the `disableTelemetry()` command.

```
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:1,
Age:21. Cont:9876, email:"antara.de9@gmail.com"});
```

Uncaught:

SyntaxError: Unexpected token, expected "," (1:38)

```
> 1 | db.Student.insert( {RollNo:1, Age:21. Cont:9876, email:"antara.de9@gmail.com"}); | ^
2 |
```

```
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:1,
Age:21, Cont:9876, email:
```

```
... db.Student.insert( {RollNo:1, Age:21, Cont:9876, email:"antara.de9@gmail.com"});
```

Uncaught:

SyntaxError: Unexpected token, expected "," (2:79)

```
1 | db.Student.insert( {RollNo:1, Age:21, Cont:9876, email:
```

```
> 2 | db.Student.insert( {RollNo:1, Age:21, Cont:9876, email:"antara.de9@gmail.com"}); | ^
```

```
3 |
```

```
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:1,
Age:21, Cont:9876, email:"antara.de9@gmail.com"});
```

DeprecationWarning: Collection.insert() is deprecated. Use insertOne, insertMany, or bulkWrite.

```
{
  acknowledged: true,
  insertedIds: { '0': ObjectId("643a2898ee0bdaa6ffbfd1dd") }
}
```

```
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:2,
Age:22, Cont:9976, email:"anuksha.de9@gmail.com"});
```

```
{
  acknowledged: true,
  insertedIds: { '0': ObjectId("643a28c8ee0bdaa6ffbfd1de") }
}
```

```
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:3,
Age:21, Cont:5576, email:
```

```
... "
```

Uncaught:

SyntaxError: Unterminated string constant. (2:0)

```
1 | db.Student.insert( {RollNo:3, Age:21, Cont:5576, email:
```

```
> 2 | "
```

```
| ^
```

```
3 |
```

```
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:3,
Age:21, Cont:5576, email: "anubhav.de9@gmail.com"});
```

```
{
  acknowledged: true,
  insertedIds: { '0': ObjectId("643a28f2ee0bdaa6ffbfd1df") }
}
```

```
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:4,
Age:20, Cont:4476, email:"pani.de9@gmail.com"});
```

```
{
  acknowledged: true,
```

```

    insertedIds: { '0': ObjectId("643a291eee0bdaa6ffbfd1e0") }
  }

Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert( {RollNo:10,
Age:23, Cont:2276, email:"rekha.de9@gmail.com"});

{
  acknowledged: true,
  insertedIds: { '0': ObjectId("643a293cee0bdaa6ffbfd1e1") }
}

Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.find() [
  {
    _id: ObjectId("643a2898ee0bdaa6ffbfd1dd"),
    RollNo: 1,
    Age: 21,
    Cont: 9876,
    email: 'antara.de9@gmail.com'
  },
  {
    _id: ObjectId("643a28c8ee0bdaa6ffbfd1de"),
    RollNo: 2,
    Age: 22,
    Cont: 9976,
    email: 'anuksha.de9@gmail.com'
  },
  {
    _id: ObjectId("643a28f2ee0bdaa6ffbfd1df"),
    RollNo: 3,
    Age: 21,
    Cont: 5576,
    email: 'anubhav.de9@gmail.com'
  },
  {
    _id: ObjectId("643a291eee0bdaa6ffbfd1e0"),
    RollNo: 4,
    Age: 20,
    Cont: 4476,

```

```

    email: 'pani.de9@gmail.com'
  },
  {
    _id: ObjectId("643a293cee0bdaa6ffbfd1e1"),
    RollNo: 10,
    Age: 23,
    Cont: 2276,
    email: 'rekha.de9@gmail.com'
  }
]

```

```

Atlas atlas-10724g-shard-0 [primary] DBMS_demo1>
db.Student.update({RollNo:10},{ $set:{email:"Abhinav@gmail.com"}})

```

DeprecationWarning: Collection.update() is deprecated. Use updateOne, updateMany, or bulkWrite.

```

{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}

```

```

Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.insert({RollNo:11,
Age:22, Name:"ABC",Cont:2276,email:"rea.de9@gmail.com"});

```

```

{
  acknowledged: true,
  insertedIds: { '0': ObjectId("643a29acee0bdaa6ffbfd1e2") }
}

```

```

Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.find() [

```

```

{
  _id: ObjectId("643a2898ee0bdaa6ffbfd1dd"),
  RollNo: 1,
  Age: 21,
  Cont: 9876,
  email: 'antara.de9@gmail.com'
},

```

```
{
  _id: ObjectId("643a28c8ee0bdaa6ffbfd1de"),
  RollNo: 2,
  Age: 22,
  Cont: 9976,
  email: 'anuksha.de9@gmail.com'
},
{
  _id: ObjectId("643a28f2ee0bdaa6ffbfd1df"),
  RollNo: 3,
  Age: 21,
  Cont: 5576,
  email: 'anubhav.de9@gmail.com'
},
{
  _id: ObjectId("643a291eee0bdaa6ffbfd1e0"),
  RollNo: 4,
  Age: 20,
  Cont: 4476,
  email: 'pani.de9@gmail.com'
},
{
  _id: ObjectId("643a293cee0bdaa6ffbfd1e1"),
  RollNo: 10,
  Age: 23,
  Cont: 2276,
  email: 'Abhinav@gmail.com'
},
{
  _id: ObjectId("643a29acee0bdaa6ffbfd1e2"),
  RollNo: 11,
  Age: 22,
  Name: 'ABC',
  Cont: 2276,
```

```

    email: 'rea.de9@gmail.com'
  }
]
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.update({RollNo:11,
Name:"ABC"},{$set:{Name:"FEM"}});
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.show()
TypeError: db.Student.show is not a function
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1> db.Student.find() [
  {
    _id: ObjectId("643a2898ee0bdaa6ffbfd1dd"),
    RollNo: 1,
    Age: 21,
    Cont: 9876,
    email: 'antara.de9@gmail.com'
  },
  {
    _id: ObjectId("643a28c8ee0bdaa6ffbfd1de"),
    RollNo: 2,
    Age: 22,
    Cont: 9976,
    email: 'anuksha.de9@gmai.com'
  },
  {
    _id: ObjectId("643a28f2ee0bdaa6ffbfd1df"),
    RollNo: 3,
    Age: 21,
    Cont: 5576,
    email: 'anubhav.de9@gmail.com'
  }
]

```

```
},  
{  
  _id: ObjectId("643a291eee0bdaa6ffbfd1e0"),  
  RollNo: 4,  
  Age: 20,  
  Cont: 4476,  
  email: 'pani.de9@gmail.com'  
},  
{  
  _id: ObjectId("643a293cee0bdaa6ffbfd1e1"),  
  RollNo: 10,  
  Age: 23,  
  Cont: 2276,  
  email: 'Abhinav@gmail.com'  
},  
{  
  _id: ObjectId("643a29acee0bdaa6ffbfd1e2"),  
  RollNo: 11,  
  Age: 22,  
  Name: 'FEM',  
  Cont: 2276,  
  email: 'rea.de9@gmail.com'  
}  
]  
Atlas atlas-10724g-shard-0 [primary] DBMS_demo1>
```

100%

$$w(\mathbf{w}) = \frac{1}{2} \|\mathbf{w}\|_2^2$$

„CIB“

```
# [primary] 0896_dms@> db.Student.update([{"RollNo":11, Name:"ABC"}, {"RollNo":12, Name:"DEF"}]);
```

```
R [primary] DMPS_demo> db.Student.Show()
# is not a function
R [primary] DMPS_demo> db.Student.Find()
```

$$(\text{div} \otimes \text{id})_* (\text{id} \otimes \text{id}^* \text{Id}^n)_{\mathcal{O}_X}.$$

13. 4×10^4

 $\alpha \text{Ker}(\phi) = \text{Ann}(\phi^{\#}) \cap \text{Ann}(\phi^{\#})^{\perp}$

ward, 1998

$$\{T_{\alpha\beta\gamma\delta\epsilon\zeta\eta\theta\iota\kappa\lambda\mu\nu\omega\pi\rho\sigma\tau\upsilon\phi\chi\psi\omega\pi\rho\sigma\tau\upsilon\phi\chi\psi}\}_{\alpha}$$

well.com

 $(\text{new}(\text{t}, \text{delete}(\text{f}, \text{old}(\text{t}, \text{left})))).r$

100

$$(\text{norm}(\text{data}(\text{find}(\text{LeS}^n)))_n$$

100%

```
R [primary] DBMS_descdb.ch.Student.insert((RollNo1, Age2), Contr9076, email:'anura.d@gmail.com');
T106.insert() is deprecated. Use insertDoc, insertMany, or bulkWrite.
```

es: 1.1.0 ("6.4.3a 2019 New Word + 4 Feb 2020")

```
1 [primary] OOPS_dev@1> db.Student.Insert( {RollNo:1, Age:21, Cmt:9999, email:'anusha.dev@gmail.com'});
```

```
act.Ld("c4.a2bc.b0wfdiaatffbfzde") }
```

```
1 [primary] UPS_dswal) db.Student.Insert( [RollNo:1, Age:21, Cmt:5579, email:
```

string constant. (2:0)

(allison, age:21, count:976, email:

```
1 [primary] DBMS_demos> db.Student.Insert( (RollNo:1, Age:21, Cont:5576, email: "another.d@qmail.com"));
```

```
set.Loc("6-13a20ff2e60d0e6d1f1b0ff5dff") >>
```

```
1 [primary] DBPS_demo1> db:Student.InsertC( @RollNo:=4, Age:=20, Covi:=4478, email: "paul.de78@gmail.com"):
```

```
mc.LLH("64.3a293ccc9b4e6b7f1b0f1d0")
```

```

# [primary] CWDG_demo1> db.studnet.insert( {rollno:20, Age:14, Cnt:1270, email:"reha.dev@gmail.com"})

```

act1d("648A273C099Bd3a26f7f6d7261"))

```

> [primary] DBMS_demo> db.Student.find()

```

 $\text{Mod}(\text{Mod}(T))$.

wt 3, 2000

$$(8e+0.3aw+4FbD^2+De^2),$$

1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 26

 $\Gamma(\text{int}(\text{Window}) \cap \text{Foot}(I) \cap P^*)$.www11.com
$$\text{len}(\text{std::data}(\text{find})).$$


```

All rights reserved.

ngodh@srv:/cluster1.kiptone.mongodb.net/DBS_demo$ --apiVersion 1 --username shvutic20
D68kafuJF3J812872ef9
ngodh@srv:/cluster1.kiptone.mongodb.net/DBS_demo$ appname=mongodv1.8.0
certificate is not yet valid

ngodh@srv:/cluster1.kiptone.mongodb.net/DBS_demo$ --apiVersion 1 --username shvutic20
da1Ac0u2ch0u220ff0c9e
ngodh@srv:/cluster1.kiptone.mongodb.net/DBS_demo$ appname=mongodv1.8.0
: authentication failed

ngodh@srv:/cluster1.kiptone.mongodb.net/DBS_demo$ --apiVersion 1 --username shvutic20
ba13ce0b0a8575a1f0a0
ngodh@srv:/cluster1.kiptone.mongodb.net/DBS_demo$ appname=mongodv1.8.0
v1.8 (API version 1)
v1.8

$ cd /etc/mongodb.com/mongodb-shell/

is, anonymous usage data is collected and sent to MongoDB personally (https://www.mongodb.com/legal/privacy-policy);
the disableTelemetry() command.

[primary] DBS_demo> db.student.insert( {RollNo:1, Age:22, Cont:9876, email:"artara.d@gmail.com"});
key, expected ":", (1:00)

RollNo:1, Age:22, Cont:9876, email:"artara.d@gmail.com");

[primary] DBS_demo> db.student.insert( {RollNo:1, Age:22, cont:9876, email:
RollNo:1, Age:22, Cont:9876, email:"artara.d@gmail.com"});
key, expected ":", (1:00)

RollNo:1, Age:22, Cont:9876, email:
RollNo:1, Age:22, Cont:9876, email:"artara.d@gmail.com");

[primary] DBS_demo> db.student.insert( {RollNo:1, Age:22, Cont:9876, email:"artara.d@gmail.com"});
ion.insert() is deprecated. Use insertOne, insertMany, or bulkWrite.

c1id("ba128ce0b0a8575a1f0a1d") }

[primary] DBS_demo> db.student.insert( {RollNo:2, Age:22, Cont:9876, email:"arukha.d@gmail.com"});

c1id("ba128ce0b0a8575a1f0a1d") }

[primary] DBS_demo> db.student.insert( {RollNo:3, Age:22, cont:9876, email:
string constant. (1:0)

```

```

all.com'

c1ee0b0a8575a1f0a1d"),

mail.com'

f1ee0b0a8575a1f0a1d"),

mail.com'

ba13ce0b0a8575a1f0a1d"),

l.com'

c1ee0b0a8575a1f0a1d"),

.com'

ac0e0b0a8575a1f0a1d"),

.com'

# [primary] DBS_demo>
x1n or Ctrl+Q or type .exit)
# [primary] DBS_demo> mongotop
rt is not defined
# [primary] DBS_demo>

```

```

    save()

    // save
    // save

    // (primary) ORM_dao<T> db.student.update(pollName, {sort: {poll: 'pollName'}})
    // Note: update() is deprecated, use updateOne, updateMany, or bulkWrite.

    // (primary) ORM_dao<T> db.student.insert(pollName, {age: 20, name: 'ABC', date: 2018, email: 'abc@gmail.com'})

    // (id) 'pollName'<pollName>
    // (primary) ORM_dao<T> db.student.find()

    // save
    // save

    // save
    // save

    // save
    // save

    // save
    // save

```

LAB 4

AIM- Screenshot of Hadoop Installed

```
C:\WINDOWS\system32>hadoop version
Hadoop 3.3.3
Source code repository https://github.com/apache/hadoop.git -r d37586cbda38c338d9fe481addda5a05fb516f71
Compiled by stevel on 2018-09-16:36Z
Compiled with protoc 3.7.1
From source with checksum eb96dd4a797b6989ae0cdb9db6efc6
This command was run using /C:/hadoop-3.3.3/share/hadoop/common/hadoop-common-3.3.3.jar

C:\WINDOWS\system32>
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>start-all.cmd
This script is Deprecated. Instead use start-dfs.cmd and start-yarn.cmd
starting yarn daemons

C:\WINDOWS\system32>jps
7072 DataNode
13492 Jps
15844 ResourceManager
16196 NameNode
1388 NodeManager
```

LAB 5

AIM- Execution of HDFS Commands for Interaction with Hadoop Environment

[illegible]

LAB 6

AIM- Implement WordCount Program on Hadoop framework

Mapper Code:

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

Reducer Code:

```
// Importing libraries
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;
import org.apache.hadoop.mapred.Reporter;
public class WCReducer extends MapReduceBase implements Reducer<Text,
IntWritable, Text, IntWritable> {
    // Reduce function
    public void reduce(Text key, Iterator<IntWritable> value,
OutputCollector<Text, IntWritable> output,
Reporter rep) throws IOException
    {
        int count = 0;
        // Counting the frequency of each words
        while (value.hasNext())
        {
            IntWritable i = value.next();
            count += i.get();
        }
        output.collect(key, new IntWritable(count));
    }
}
```

Driver Code: You have to copy paste this program into the WCDriver Java Class file.

```
// Importing libraries
import java.io.IOException;
import org.apache.hadoop.conf.Configured;
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.mapred.JobConf;
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.setOutputPath(conf, new Path(args[1]));
        conf.setMapperClass(WCMapper.class);
        conf.setReducerClass(WCReducer.class);
        conf.setMapOutputKeyClass(Text.class);
        conf.setMapOutputValueClass(IntWritable.class);
        conf.setOutputKeyClass(Text.class);
        conf.setOutputValueClass(IntWritable.class);
        JobClient.runJob(conf);
        return 0;
    }
    // Main Method
    public static void main(String args[]) throws Exception
    {
        int exitCode = ToolRunner.run(new WCDriver(), args);
        System.out.println(exitCode);
    }
}

```

LAB 7

AIM-Create a Map Reduce program to

a) Find average temperature for each year from the NCDC data

set. AverageDriver

```
package temp;

import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

public class AverageDriver {

    public static void main(String[] args) throws Exception {
        if (args.length != 2) {
            System.err.println("Please Enter the input and output
parameters"); System.exit(-1);
        }

        Job job = new Job();
        job.setJarByClass(AverageDriver.class);
        job.setJobName("Max temperature");
        FileInputFormat.addInputPath(job, new Path(args[0]));
        FileOutputFormat.setOutputPath(job, new Path(args[1]));
        job.setMapperClass(AverageMapper.class);
        job.setReducerClass(AverageReducer.class);23
        job.setOutputKeyClass(Text.class);
        job.setOutputValueClass(IntWritable.class);
        System.exit(job.waitForCompletion(true) ? 0 : 1);
    }
}
```

AverageMapper

```
package temp;

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.mapreduce.Mapper;

public class AverageMapper extends Mapper<LongWritable, Text, Text, IntWritable>
{
    public static final int MISSING = 9999;

    public void map(LongWritable key, Text value, Mapper<LongWritable, Text,
    Text, IntWritable>.Context context) throws IOException, InterruptedException {

        int temperature;

        String line = value.toString();
        String year = line.substring(15, 19);
        if (line.charAt(87) == '+') {
            temperature = Integer.parseInt(line.substring(88, 92));
        } else {
            temperature = Integer.parseInt(line.substring(87, 92));
        }

        String quality = line.substring(92, 93);
        if (temperature != 9999 && quality.matches("[01459]"))
            context.write(new Text(year), new IntWritable(temperature));
    }
}

```

AverageReducer

```

package temp;

import java.io.IOException;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;

import org.apache.hadoop.mapreduce.Reducer;

public class AverageReducer extends Reducer<Text, IntWritable, Text, IntWritable> {

    public void reduce(Text key, Iterable<IntWritable> values, Reducer<Text, IntWritable,
    Text, IntWritable>.Context context) throws IOException, InterruptedException {

        int max_temp = 0;
        int count = 0;

        for (IntWritable value : values) {

```



```

max_temp += value.get();

count++;

}

context.write(key, new IntWritable(max_temp / count));

}

}

```

```

C:\hadoop-3.3.0\sbin>hadoop jar C:\avgtemp.jar temp.AverageDriver /input_dir/temp.txt /avgtemp_outputdir
2021-05-15 14:52:50,635 INFO client.DefaultHadoopFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2021-05-15 14:52:51,005 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2021-05-15 14:52:51,111 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/Anusree/.staging/job_1621060230696_0005
2021-05-15 14:52:51,735 INFO input.FileInputFormat: Total input files to process : 1
2021-05-15 14:52:52,751 INFO mapreduce.JobSubmitter: number of splits:1
2021-05-15 14:52:53,073 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1621060230696_0005
2021-05-15 14:52:53,073 INFO mapreduce.JobSubmitter: Executing with tokens: []
2021-05-15 14:52:53,237 INFO conf.Configuration: resource-types.xml not found
2021-05-15 14:52:53,238 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2021-05-15 14:52:53,312 INFO impl.YarnClientImpl: Submitted application application_1621060230696_0005
2021-05-15 14:52:53,352 INFO mapreduce.Job: The url to track the job: http://LAPTOP-JG329ESD:8088/proxy/application_1621060230696_0005/
2021-05-15 14:52:53,353 INFO mapreduce.Job: Running job: job_1621060230696_0005
2021-05-15 14:53:06,640 INFO mapreduce.Job: Job job_1621060230696_0005 running in uber mode : false
2021-05-15 14:53:06,643 INFO mapreduce.Job: map 0% reduce 0%
2021-05-15 14:53:12,758 INFO mapreduce.Job: map 100% reduce 0%
2021-05-15 14:53:19,860 INFO mapreduce.Job: map 100% reduce 100%
2021-05-15 14:53:25,967 INFO mapreduce.Job: Job job_1621060230696_0005 completed successfully
2021-05-15 14:53:26,096 INFO mapreduce.Job: Counters: 54

File System Counters
  FILE: Number of bytes read=72210
  FILE: Number of bytes written=674341
  FILE: Number of read operations=0
  FILE: Number of large read operations=0
  FILE: Number of write operations=0
  HDFS: Number of bytes read=894860
  HDFS: Number of bytes written=8
  HDFS: Number of read operations=8
  HDFS: Number of large read operations=0
  HDFS: Number of write operations=2
  HDFS: Number of bytes read erasure-coded=0

Job Counters
  Launched map tasks=1
  Launched reduce tasks=1
  Data-local map tasks=1
  Total time spent by all maps in occupied slots (ms)=3782

```

```

C:\hadoop-3.3.0\sbin>hdfs dfs -ls /avgtemp_outputdir
Found 2 items
-rw-r--r-- 1 Anusree supergroup          0 2021-05-15 14:53 /avgtemp_outputdir/_SUCCESS
-rw-r--r-- 1 Anusree supergroup          8 2021-05-15 14:53 /avgtemp_outputdir/part-r-00000

C:\hadoop-3.3.0\sbin>hdfs dfs -cat /avgtemp_outputdir/part-r-00000
1901      46

C:\hadoop-3.3.0\sbin>

```

b) Find the mean max temperature for every month

MeanMaxDriver

```

package meanmax;

import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Job;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;

```

```

import org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;

public class MeanMaxDriver {
public static void main(String[] args) throws Exception {

if (args.length != 2) {

System.err.println("Please Enter the input and output parameters");

System.exit(-1);

}

Job job = new Job();

job.setJarByClass(MeanMaxDriver.class);

job.setJobName("Max temperature");

FileInputFormat.addInputPath(job, new Path(args[0]));

FileOutputFormat.setOutputPath(job, new Path(args[1]));

job.setMapperClass(MeanMaxMapper.class);

job.setReducerClass(MeanMaxReducer.class);

job.setOutputKeyClass(Text.class);

job.setOutputValueClass(IntWritable.class);

System.exit(job.waitForCompletion(true) ? 0 : 1);

}

}

```

```

C:\hadoop-3.3.0\sbin>hadoop jar C:\avgtemp.jar temp.AverageDriver /input_dir/temp.txt /avgtemp_outputdir
2021-05-15 14:52:50,635 INFO client.DefaultHadoopFollowerProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2021-05-15 14:52:51,005 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2021-05-15 14:52:51,111 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/Anusree/.staging/job_1621060230696_0005
2021-05-15 14:52:51,735 INFO input.FileInputFormat: Total input files to process : 1
2021-05-15 14:52:53,751 INFO mapreduce.JobSubmitter: number of splits:1
2021-05-15 14:52:53,073 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1621060230696_0005
2021-05-15 14:52:53,073 INFO mapreduce.JobSubmitter: Executing with tokens: []
2021-05-15 14:52:53,237 INFO conf.Configuration: resource-types.xml not found
2021-05-15 14:52:53,238 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2021-05-15 14:52:53,312 INFO impl.YarnClientImpl: Submitted application application_1621060230696_0005
2021-05-15 14:52:53,352 INFO mapreduce.Job: The url to track the job: http://LAPTOP-JG29ESD:8088/proxy/application_1621060230696_0005/
2021-05-15 14:52:53,353 INFO mapreduce.Job: Running job: job_1621060230696_0005
2021-05-15 14:53:06,640 INFO mapreduce.Job: Job job_1621060230696_0005 running in uber mode : false
2021-05-15 14:53:06,643 INFO mapreduce.Job: map 0% reduce 0%
2021-05-15 14:53:12,758 INFO mapreduce.Job: map 100% reduce 0%
2021-05-15 14:53:19,860 INFO mapreduce.Job: map 100% reduce 100%
2021-05-15 14:53:25,967 INFO mapreduce.Job: Job job_1621060230696_0005 completed successfully
2021-05-15 14:53:26,096 INFO mapreduce.Job: Counters: 54

File System Counters
  FILE: Number of bytes read=72210
  FILE: Number of bytes written=674341
  FILE: Number of read operations=0
  FILE: Number of large read operations=0
  FILE: Number of write operations=0
  HDFS: Number of bytes read=894860
  HDFS: Number of bytes written=8
  HDFS: Number of read operations=8
  HDFS: Number of large read operations=0
  HDFS: Number of write operations=2
  HDFS: Number of bytes read erasure-coded=0

Job Counters
  Launched map tasks=1
  Launched reduce tasks=1
  Data-local map tasks=1
  Total time spent by all maps in occupied slots (ms)=3782

```

```

C:\hadoop-3.3.0\sbin>hdfs dfs -ls /avgtemp_outputdir
Found 2 items
-rw-r--r-- 1 Anusree supergroup          0 2021-05-15 14:53 /avgtemp_outputdir/_SUCCESS
-rw-r--r-- 1 Anusree supergroup        8 2021-05-15 14:53 /avgtemp_outputdir/part-r-000000

C:\hadoop-3.3.0\sbin>hdfs dfs -cat /avgtemp_outputdir/part-r-000000
1901      46

C:\hadoop-3.3.0\sbin>

```

MeanMax Mapper

```
package meanmax;

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.mapreduce.Mapper;

public class MeanMaxMapper extends Mapper<LongWritable, Text, Text, IntWritable>
{ public static final int MISSING = 9999;

public void map(LongWritable key, Text value, Mapper<LongWritable, Text, Text,
IntWritable>.Context context) throws IOException, InterruptedException {
    int temperature;

    String line = value.toString();
    String month = line.substring(19, 21);
    if (line.charAt(87) == '+') {
        temperature = Integer.parseInt(line.substring(88, 92));
    } else {
        temperature = Integer.parseInt(line.substring(87, 92));
    }
    String quality = line.substring(92, 93);
    if (temperature != 9999 && quality.matches("[01459]"))
        context.write(new Text(month), new IntWritable(temperature));
    }
}
```

MeanMax Reducer

```
package meanmax;

import java.io.IOException;

import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;

public class MeanMaxReducer extends Reducer<Text, IntWritable, Text, IntWritable> {

public void reduce(Text key, Iterable<IntWritable> values, Reducer<Text, IntWritable,
```

Text, IntWritable>.Context context) throws IOException, InterruptedException {

int max_temp = 0;

int total_temp = 0;

int count = 0;

int days = 0;

for (IntWritable value : values) {

int temp = value.get();

if (temp > max_temp)

max_temp = temp;

count++;

if (count == 3) {

total_temp += max_temp;

max_temp = 0;

count = 0;

days++;

}

}

context.write(key, new IntWritable(total_temp / days));

}

}

```
C:\hadoop-3.3.0\bin>hadoop jar C:\ncarnax.jar ncarnax.MeanMaxDriver /input_dir/temp.txt /ncarnax_output
2021-05-21 20:28:05,250 INFO client.DefaultHadoopFallbackProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032.
2021-05-21 20:28:05,662 WARN mapreduce.JobResourceUploader: Hadoop command-line option parsing not performed. Implement the Tool interface and execute your application with ToolRunner to remedy this.
2021-05-21 20:28:05,916 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/ncarnax/.staging/job_1621688943095_0001
2021-05-21 20:28:06,426 INFO input.FileOutputFormat: Total input files to process : 1
2021-05-21 20:28:06,107 INFO mapreduce.JobSubmitter: number of splits:1
2021-05-21 20:28:09,741 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1621688943095_0001
2021-05-21 20:28:09,741 INFO mapreduce.JobSubmitter: Executing with tokens: []
2021-05-21 20:28:10,029 INFO conf.Configuration: resource-types.xml not found
2021-05-21 20:28:10,038 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2021-05-21 20:28:10,676 INFO impl.YarnClientImpl: Submitted application application_1621688943095_0001
2021-05-21 20:28:11,005 INFO mapreduce.Job: The url to track the job: http://LAPTOP-3G32HESD:8088/proxy/application_1621688943095_0001/
2021-05-21 20:28:11,006 INFO mapreduce.Job: Running job: job_1621688943095_0001
2021-05-21 20:28:25,385 INFO mapreduce.Job: Job job_1621688943095_0001 running in uber mode : false
2021-05-21 20:28:25,389 INFO mapreduce.Job:  map 0% reduce 0%
2021-05-21 20:28:40,664 INFO mapreduce.Job:  map 100% reduce 0%
2021-05-21 20:28:50,032 INFO mapreduce.Job:  map 100% reduce 100%
2021-05-21 20:28:50,965 INFO mapreduce.Job: Job job_1621688943095_0001 completed successfully
2021-05-21 20:28:59,178 INFO mapreduce.Job: Counter: 54
  File System Counters
    FILE: Number of bytes read=59082
    FILE: Number of bytes written=648091
    FILE: Number of read operations=0
    FILE: Number of large read operations=0
    FILE: Number of write operations=0
    HDFS: Number of bytes read=494860
    HDFS: Number of bytes written=74
    HDFS: Number of read operations=0
    HDFS: Number of large read operations=0
    HDFS: Number of write operations=2
    HDFS: Number of bytes read erasure-coded=0
  Job Counters
    Launched map tasks=1
    Launched reduce tasks=1
    Data-local map tasks=1
    Total time spent by all maps in occupied slots (ms)=8077
    Total time spent by all reduces in occupied slots (ms)=7511
    Total time spent by all map tasks (ms)=8077
    Total time spent by all reduce tasks (ms)=7511
    Total vcore-millisecsd taken by all map tasks=8077
    Total vcore-millisecsd taken by all reduce tasks=7511
    Total megabyte-millisecsd taken by all map tasks=4270648
    Total megabyte-millisecsd taken by all reduce tasks=3691264
```

```
C:\hadoop-3.3.0\sbin>hdfs dfs -cat /meanmax_output/*
```

```
01      4  
02      0  
03      7  
04     44  
05    100  
06    168  
07    219  
08    198  
09    141  
10    100  
11     19  
12      3
```

```
C:\hadoop-3.3.0\sbin>
```

LAB 8

AIM- 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.

alphabetic order listing only top 10 maximum occurrences of words.

//Driver Code

```
package wordCount;

import java.io.IOException;
import org.apache.hadoop.conf.Configured;
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.mapred.JobConf;
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.setOutputPath(conf, new Path(args[1]));
            conf.setMapperClass(WCMapper.class);
            conf.setReducerClass(WCReducer.class);
            conf.setMapOutputKeyClass(Text.class);
```

```

conf.setMapOutputValueClass(IntWritable.class);
conf.setOutputKeyClass(Text.class);
conf.setOutputValueClass(IntWritable.class);
JobClient.runJob(conf);
return 0;
}
// Main Method
public static void main(String args[]) throws Exception
{
int exitCode = ToolRunner.run(new WCDriver(), args);
System.out.println(exitCode);
}
}

```

//Mapper Code

```

package wordCount;30
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.MapReduceBase;
import org.apache.hadoop.mapred.Mapper;
import org.apache.hadoop.mapred.OutputCollector;
import org.apache.hadoop.mapred.Reporter;

public class WCMapper extends MapReduceBase implements Mapper<LongWritable,Text,
Text, IntWritable> {

// Map function
public void map(LongWritable key, Text value, OutputCollector<Text, IntWritable>
output, Reporter
rep) throws IOException
{
String line = value.toString();
// Splitting the line on spaces
for (String word : line.split(" "))

```

```

{
if (word.length() > 0)
{
output.collect(new Text(word), new IntWritable(1));
}
}
}
}
}

```

//Reducer Code

```

package wordCount;
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;
import org.apache.hadoop.mapred.Reporter;

public class WCReducer extends MapReduceBase implements Reducer<Text,IntWritable,
Text, IntWritable> {

// Reduce function

public void reduce(Text key, Iterator<IntWritable> value, OutputCollector<Text, IntWritable>
output,Reporter rep) throws IOException

{
int count = 0;

// Counting the frequency of each words

```

21

```

while (value.hasNext())
{
IntWritable i = value.next();
count += i.get();

```



```
}  
output.collect(key, new IntWritable(count));  
}  
}
```

//Hadoop Commands

hduser@bmsce-Precision-T1700:~\$ start-all.sh

This script is Deprecated. Instead use start-dfs.sh and start-yarn.sh

Starting namenodes on [localhost]

hduser@localhost's password:

localhost: namenode running as process 10473. Stop it first. hduser@localhost's password:

localhost: datanode running as process 10644. Stop it first. Starting secondary namenodes [0.0.0.0]

hduser@0.0.0.0's password:

0.0.0.0: secondarynamenode running as process 10857. Stop it first. starting yarn daemons

resourcemanager running as process 9796. Stop it first. hduser@localhost's password:

localhost: nodemanager running as process 10160. Stop it first.

hduser@bmsce-Precision-T1700:~\$ jps

10160 NodeManager

7441 org.eclipse.equinox.launcher_1.5.600.v20191014-2022.jar

9796 ResourceManager

12692 org.eclipse.equinox.launcher_1.5.600.v20191014-

2022.jar 10644 DataNode

10857 SecondaryNameNode

10473 NameNode

15100 Jps

hduser@bmsce-Precision-T1700:~\$ hadoop fs -ls /

Found 10 items33

drwxr-xr-x - hduser supergroup 0 2023-01-23 09:52 /gou drwxr-xr-

x - hduser supergroup 0 2023-01-23 10:33 /har drwxr-xr-x - hduser

supergroup 0 2023-04-14 10:50 /input drwxr-xr-x - hduser

supergroup 0 2023-05-23 09:58 /output1 drwxr-xr-x - hduser

supergroup 0 2023-01-23 15:57 /output2 drwxr-xr-x - hduser

supergroup 0 2023-01-15 10:27 /rgs drwxr-xr-x - hduser supergroup

0 2023-01-23 11:09 /stud drwxr-xr-x - hduser supergroup 0 2023-05-23 15:50 /testing drwxrwxr-x - hduser supergroup 0 2023-05-23 11:24 /tmp drwxr-xr-x - hduser supergroup 0 2023-05-01 16:03 /user hduser@bmsce-Precision-T1700:~\$ hadoop fs -mkdir /1bm20cs216 hduser@bmsce-Precision-T1700:~\$ hadoop fs -copyFromLocal /home/hduser/Desktop/sample.txt /1bm20cs216/test.txt hduser@bmsce-Precision-T1700:~\$ hdfs dfs -cat /1bm20cs216/test.txt

hi how are you

how is your job

how is your family

how is your brother

how is your sister

hduser@bmsce-Precision-T1700:~\$ hadoop jar /home/hduser/Documents/wordCount.jar wordCount.WCDriver /1bm20cs216/test.txt /1bm20cs216/output

File System Counters

FILE: Number of bytes read=8614

FILE: Number of bytes written=510599

FILE: Number of read operations=0

FILE: Number of large read operations=0

FILE: Number of write operations=0

HDFS: Number of bytes read=178

HDFS: Number of bytes written=69

HDFS: Number of read operations=13

HDFS: Number of large read operations=0

HDFS: Number of write operations=4

Map-Reduce Framework

Map input records=5

Map output records=20

Map output bytes=169

Map output materialized bytes=215

Input split bytes=87

Combine input records=0
Combine output records=0
Reduce input groups=10
Reduce shuffle bytes=215
Reduce input records=20
Reduce output records=10
Spilled Records=40
Shuffled Maps =1
Failed Shuffles=0
Merged Map outputs=1
GC time elapsed (ms)=1
CPU time spent (ms)=0
Physical memory (bytes) snapshot=0
Virtual memory (bytes) snapshot=0
Total committed heap usage (bytes)=47185920038
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=89
File Output Format Counters
Bytes Written=69
0

hduser@bmsce-Precision-T1700:~\$ hdfs dfs -cat /1bm20cs216/output/part-00000

are 1

brother 1

family 1

hi 1

how 5

is 4

job 1

sister 1

you 1

your

4

(_+_);

reducedata.collect;

```
C:\hadoop-3.3.0\sbin>jps
11072 DataNode
20528 Jps
5620 ResourceManager
15532 NodeManager
6140 NameNode

C:\hadoop-3.3.0\sbin>hdfs dfs -mkdir /input_dir

C:\hadoop-3.3.0\sbin>hdfs dfs -ls /
Found 1 items
drwxr-xr-x  - Anusree supergroup          0 2021-05-08 19:46 /input_dir

C:\hadoop-3.3.0\sbin>hdfs dfs -copyFromLocal C:\input.txt /input_dir

C:\hadoop-3.3.0\sbin>hdfs dfs -ls /input_dir
Found 1 items
-rw-r--r--  1 Anusree supergroup        36 2021-05-08 19:48 /input_dir/input.txt

C:\hadoop-3.3.0\sbin>hdfs dfs -cat /input_dir/input.txt
hello
world
hello
hadoop
bye
```

```
C:\hadoop-3.3.0\sbin>hadoop jar C:\sort.jar samples.TopN /input_dir/input.txt /output_dir
2021-05-08 19:54:54,582 INFO client.DefaultHAWAIFailoverProxyProvider: Connecting to ResourceManager at /0.0.0.0:8032
2021-05-08 19:54:55,291 INFO mapreduce.JobResourceUploader: Disabling Erasure Coding for path: /tmp/hadoop-yarn/staging/Anusree/staging/job_1620483374279_0001
2021-05-08 19:54:55,821 INFO input.FileInputFormat: Total input files to process : 1
2021-05-08 19:54:56,261 INFO mapreduce.JobSubmitter: number of splits:1
2021-05-08 19:54:56,352 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_1620483374279_0001
2021-05-08 19:54:56,352 INFO mapreduce.JobSubmitter: Executing with tokens: []
2021-05-08 19:54:56,843 INFO conf.Configuration: resource-types.xml not found
2021-05-08 19:54:56,843 INFO resource.ResourceUtils: Unable to find 'resource-types.xml'.
2021-05-08 19:54:57,387 INFO impl.YarnClientImpl: Submitted application application_1620483374279_0001
2021-05-08 19:54:57,507 INFO mapreduce.Job: The url to track the job: http://140700-36329550-8088/proxy/application_1620483374279_0001/
2021-05-08 19:54:57,508 INFO mapreduce.Job: Running job: job_1620483374279_0001
2021-05-08 19:55:13,792 INFO mapreduce.Job: Job job_1620483374279_0001 running in uber mode : false
2021-05-08 19:55:13,794 INFO mapreduce.Job:  map 0% reduce 0%
2021-05-08 19:55:20,020 INFO mapreduce.Job:  map 100% reduce 0%
2021-05-08 19:55:27,116 INFO mapreduce.Job:  map 100% reduce 100%
2021-05-08 19:55:33,199 INFO mapreduce.Job: Job job_1620483374279_0001 completed successfully
2021-05-08 19:55:33,334 INFO mapreduce.Job: Counters: 54
  File System Counters
    FILE: Number of bytes read=65
    FILE: Number of bytes written=530397
    FILE: Number of read operations=0
    FILE: Number of large read operations=0
    FILE: Number of write operations=0
    HDFS: Number of bytes read=142
    HDFS: Number of bytes written=31
    HDFS: Number of read operations=8
    HDFS: Number of large read operations=0
    HDFS: Number of write operations=2
    HDFS: Number of bytes read erasure-coded=0
```