VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

BIG DATA ANALYTICS (20CS6PEBDA)

Submitted by

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in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
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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 **ROHAN SIWACH (1BM19CS132),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a**Big Data Analytics - (20CS6PEBDA)**work prescribed for the said degree.

Nameof the Lab-Incharge	**Mrs Rajeshwini**
Designation	Professor
Department of CSE	Department of CSE
BMSCE, Bengaluru	BMSCE, Bengaluru

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Course Outcome

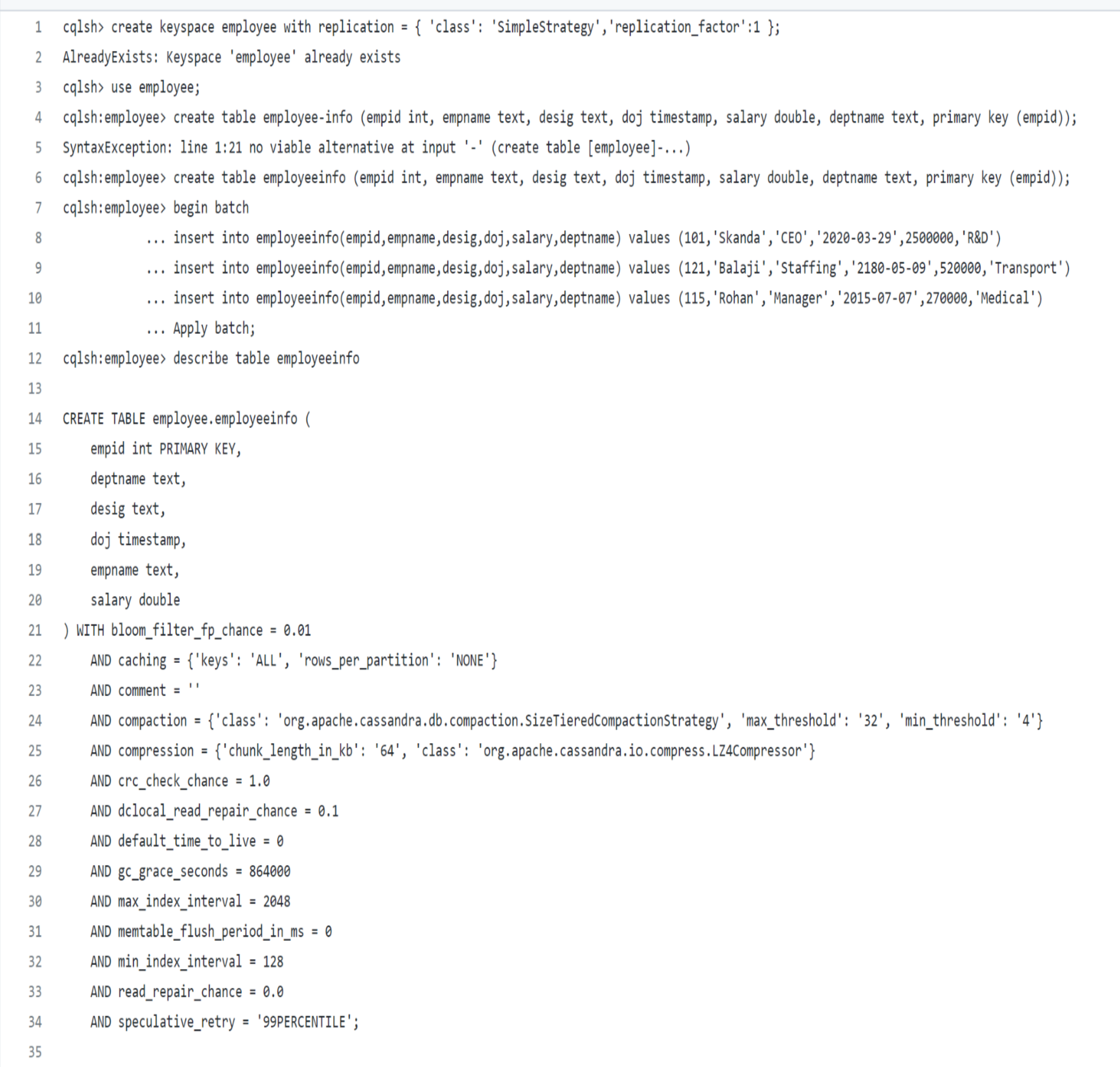
CO1	Apply the concept of NoSQL, Hadoop or Spark for a given task
CO2	Analyze the Big Data and obtain insight using data analytics mechanisms.
CO3	Design and implement Big data applications by applying NoSQL, Hadoop or Spark

Program 1 Mongo DB CRUD Demonstration

```
>db.createCollection("Student");
{ "ok" : 1 }

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

>db.Student.find();
{ "_id" : 1, "name" : "Saffan", "grade" : 9 }
{ "_id" : 2, "name" : "Abc", "grade" : 10 }
{ "_id" : 3, "name" : "Mno", "grade" : 5 }
{ "_id" : 4, "name" : "Pqr", "grade" : 8 }

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

> show collections;
Student

#HERE upsert=> update else insert if doesn't exist
>
db.Student.update({_id:6,name:"qwert"},{$set:{grade:4}},{upsert:true});
WriteResult({ "nMatched" : 0, "nUpserted" : 1, "nModified" : 0, "_id" : 6
})

> db.Student.update({_id:2},{$set:{age:21}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })


> db.Student.save({name:"zzz",_id:10,grade:8});
WriteResult({ "nMatched" : 0, "nUpserted" : 1, "nModified" : 0, "_id" : 10
})



> db.Student.update({_id:2},{$unset:{age:21}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
```

```
 > db.Student.update({_id:2},{$unset:{age:21}});
 WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })

 > db.Student.find({},{name:1,grade:1,_id:0});
 { "name" : "Saffan", "grade" : 9 }
 { "name" : "Abc", "grade" : 10 }
 { "name" : "Mno", "grade" : 5 }
 { "name" : "Pqr", "grade" : 8 }
 { "grade" : 4, "name" : "qwert" }


 > db.Student.find({grade:{$lt:5}},{name:1,grade:1,_id:0});
 { "grade" : 2, "name" : "qwert" }

 >
 db.Student.find({name:{$in:["Saffan","Abc","Mno"]}},{name:1,grade:1,_id
 :0});
 { "name" : "Saffan", "grade" : 9 }
 { "name" : "Abc", "grade" : 10 }
 { "name" : "Mno", "grade" : 5 }

 > db.Student.find({name:/^S/},{name:1,grade:1,_id:0});
 { "name" : "Saffan", "grade" : 9 }

 > db.Student.find({name:/.b/},{name:1,grade:1,_id:0});
 { "name" : "Abc", "grade" : 10 }

 > db.Student.count();
 6

 > db.Student.count({grade:9});
 1

 > db.Student.find().sort({name:1});
 { "_id" : 2, "name" : "Abc", "grade" : 10 }
 { "_id" : 3, "name" : "Mno", "grade" : 5 }
 { "_id" : 4, "name" : "Pqr", "grade" : 8 }
 { "_id" : 1, "name" : "Saffan", "grade" : 9 }
 { "_id" : 7, "name" : "kkk", "grade" : 6 }
 { "_id" : 6, "grade" : 2, "name" : "qwert" }


 > db.Student.find().sort({name:1,grade:-1});
 { "_id" : 2, "name" : "Abc", "grade" : 10 }
 { "_id" : 3, "name" : "Mno", "grade" : 5 }
 { "_id" : 4, "name" : "Pqr", "grade" : 8 }
 { "_id" : 1, "name" : "Saffan", "grade" : 9 }
 { "_id" : 7, "name" : "kkk", "grade" : 6 }
 { "_id" : 6, "grade" : 2, "name" : "qwert" }

 > db.Student.find({grade:8}).limit(3);
 { "_id" : 4, "name" : "Pqr", "grade" : 8 }
 { "_id" : 10, "name" : "zzz", "grade" : 8 }


 > db.Student.find().skip(2);
 { "_id" : 3, "name" : "Mno", "grade" : 5 }
 { "_id" : 4, "name" : "Pqr", "grade" : 8 }
 { "_id" : 6, "grade" : 2, "name" : "qwert" }
 { "_id" : 7, "name" : "kkk", "grade" : 6 }
 { "_id" : 10, "name" : "zzz", "grade" : 8 }

 ---------------------------------------------
 > db.food.insert({_id:1,fruits:['apple','mango']})
 WriteResult({ "nInserted" : 1 })


> db.food.update({_id:2},{$set:{'fruits.1':'apple'}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })

>
db.food.update({_id:2},{$push:{price:{grapes:80,mango:200,cherry:100}}}
);
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
```

Program 2 Employee DB - Cassendra



```
cqlsh> create keyspace employee with replication = { 'class': 'SimpleStrategy','replication_factor':1 };
AlreadyExists: Keyspace 'employee' already exists
cqlsh> use employee;
cqlsh:employee> create table employee-info (empid int, empname text, desig text, doj timestamp, salary double, deptname text, primary key (empid));
SyntaxException: line 1:21 no viable alternative at input '-' (create table [employee]-...)
cqlsh:employee> create table employeeinfo (empid int, empname text, desig text, doj timestamp, salary double, deptname text, primary key (empid));
cqlsh:employee> begin batch
            ... insert into employeeinfo(empid,empname,desig,doj,salary,deptname) values (101,'Skanda','CEO','2020-03-29',2500000,'R&D')
            ... insert into employeeinfo(empid,empname,desig,doj,salary,deptname) values (121,'Balaji','Staffing','2180-05-09',520000,'Transport')
            ... insert into employeeinfo(empid,empname,desig,doj,salary,deptname) values (115,'Rohan','Manager','2015-07-07',270000,'Medical')
            ... Apply batch;
cqlsh:employee> describe table employeeinfo

CREATE TABLE employee.employeeinfo (
    empid int PRIMARY KEY,
    deptname text,
    desig text,
    doj timestamp,
    empname text,
    salary double
) WITH bloom_filter_fp_chance = 0.01
    AND caching = {'keys': 'ALL', 'rows_per_partition': 'NONE'}
    AND comment = ''
    AND compaction = {'class': 'org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy', 'max_threshold': '32', 'min_threshold': '4'}
    AND compression = {'chunk_length_in_kb': '64', 'class': 'org.apache.cassandra.io.compress.LZ4Compressor'}
    AND crc_check_chance = 1.0
    AND dclocal_read_repair_chance = 0.1
    AND default_time_to_live = 0
    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_chance = 0.0
    AND speculative_retry = '99PERCENTILE';

```

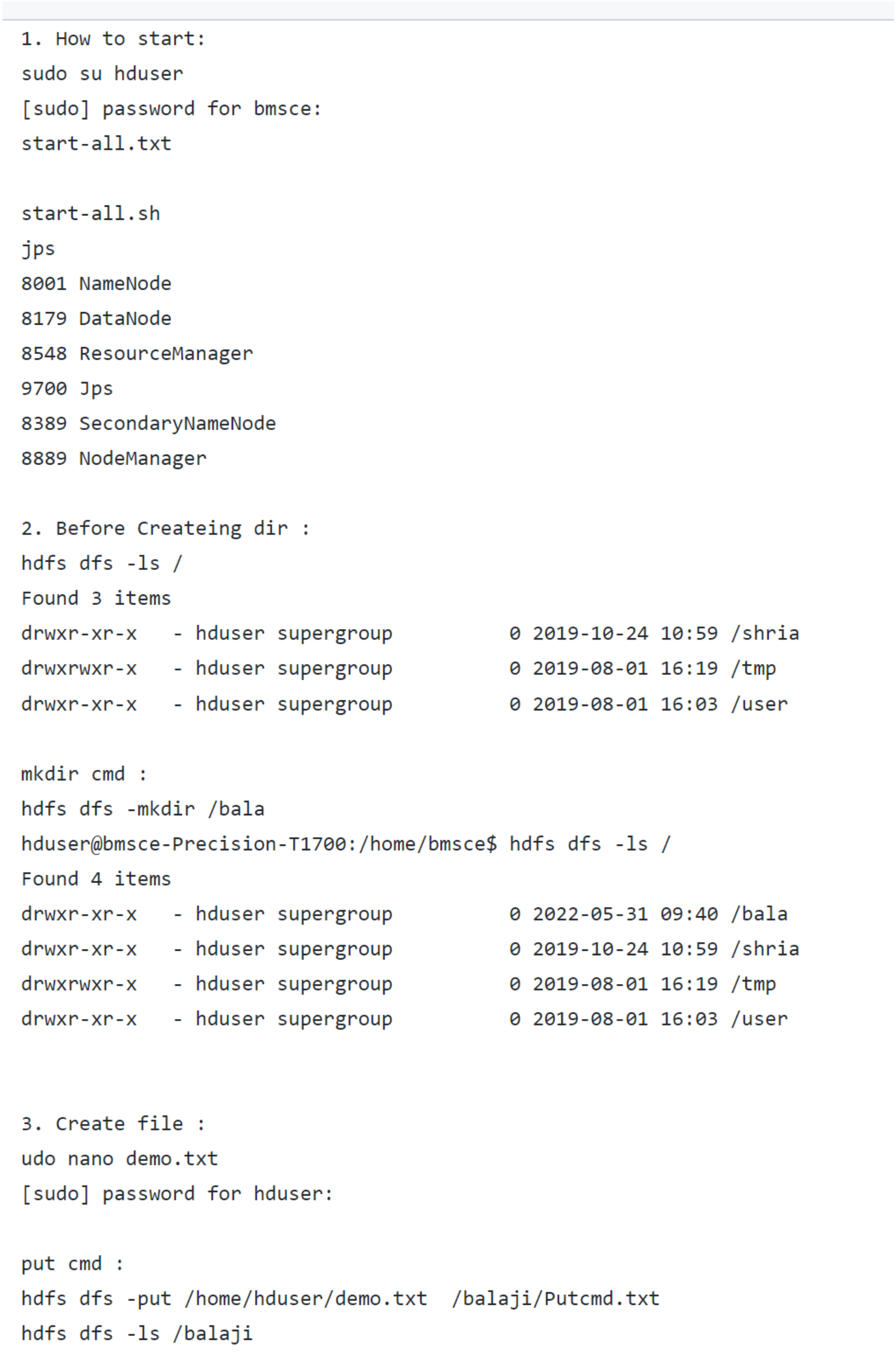
```
cqlsh:employee> select * from employeeinfo
            ... ;

 empid | deptname  | desig    | doj                             | empname | salary
-------+-----------+----------+---------------------------------+---------+---------
   121 | Transport | Staffing | 2180-05-08 18:30:00.000000+0000 |  Balaji | 5.2e+05
   115 |   Medical |  Manager | 2015-07-06 18:30:00.000000+0000 |   Rohan | 2.7e+05
   101 |       R&D |      CEO | 2020-03-28 18:30:00.000000+0000 |  Skanda | 2.5e+06

```

```
cqlsh:employee> alter table employeeinfo add projects text;
cqlsh:employee> select * from employeeinfo ;

 empid | deptname  | desig    | doj                             | empname | projects | salary
-------+-----------+----------+---------------------------------+---------+----------+---------
   121 | Transport | Staffing | 2180-05-08 18:30:00.000000+0000 |  Balaji |     null | 5.2e+05
   115 |   Medical |  Manager | 2015-07-06 18:30:00.000000+0000 |   Rohan |     null | 2.7e+05
   101 |       R&D |      CEO | 2020-03-28 18:30:00.000000+0000 |  Skanda |     null | 2.5e+06

(3 rows)
cqlsh:employee> update employeeinfo set projects='Cassandra' where empid = 101
            ... ;
cqlsh:employee> update employeeinfo set projects='Andriod' where empid = 121 ;
cqlsh:employee> update employeeinfo set projects='DevOps' where empid = 115 ;
cqlsh:employee> select * from employeeinfo ;

 empid | deptname  | desig    | doj                             | empname | projects  | salary
-------+-----------+----------+---------------------------------+---------+-----------+---------
   121 | Transport | Staffing | 2180-05-08 18:30:00.000000+0000 |  Balaji |   Andriod | 5.2e+05
   115 |   Medical |  Manager | 2015-07-06 18:30:00.000000+0000 |   Rohan |    DevOps | 2.7e+05
   101 |       R&D |      CEO | 2020-03-28 18:30:00.000000+0000 |  Skanda | Cassandra | 2.5e+06
```

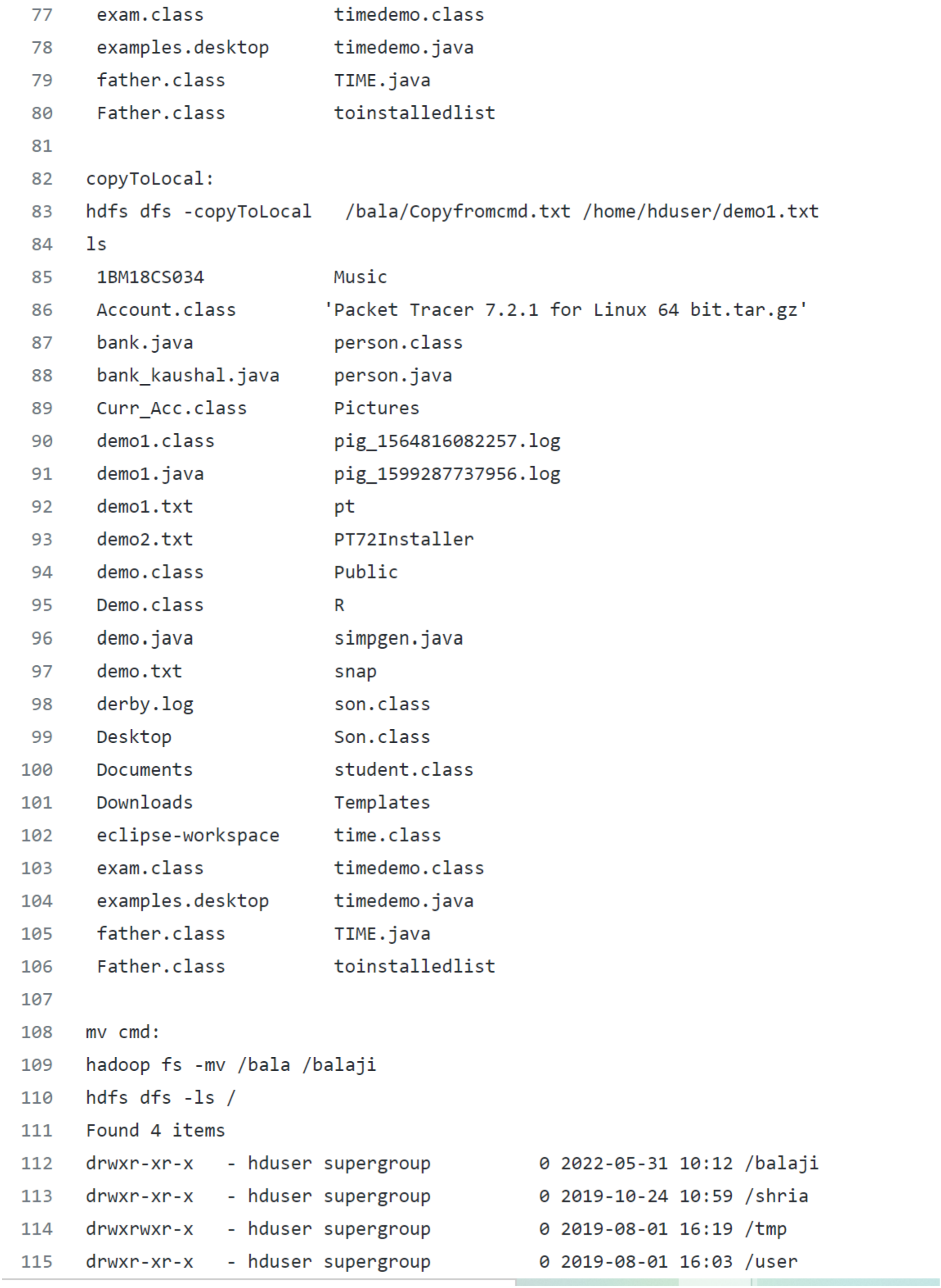
Program 3 : Library DB - Cassandra

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

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

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

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

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

 counter_val

 -------------

2

 6) COPY libinfo(s_id,sname,book,bid,doi,counter_val) TO 'data1.csv' WITH HEADER = TRUE; 7) COPY libinfo(s_id,sname,book,bid,doi) FROM 'libdata.csv' WITH HEADER = TRUE;
```

Program 4 : HADOOP



```
1. How to start:
sudo su hduser
[sudo] password for bmsce:
start-all.txt

start-all.sh
jps
8001 NameNode
8179 DataNode
8548 ResourceManager
9700 Jps
8389 SecondaryNameNode
8889 NodeManager

2. Before Createing dir :
hdfs dfs -ls /
Found 3 items
drwxr-xr-x   - hduser supergroup          0 2019-10-24 10:59 /shria
drwxrwxr-x   - hduser supergroup          0 2019-08-01 16:19 /tmp
drwxr-xr-x   - hduser supergroup          0 2019-08-01 16:03 /user

mkdir cmd :
hdfs dfs -mkdir /bala
hduser@bmsce-Precision-T1700:/home/bmsce$ hdfs dfs -ls /
Found 4 items
drwxr-xr-x   - hduser supergroup          0 2022-05-31 09:40 /bala
drwxr-xr-x   - hduser supergroup          0 2019-10-24 10:59 /shria
drwxrwxr-x   - hduser supergroup          0 2019-08-01 16:19 /tmp
drwxr-xr-x   - hduser supergroup          0 2019-08-01 16:03 /user


3. Create file :
udo nano demo.txt
[sudo] password for hduser:

put cmd :
hdfs dfs -put /home/hduser/demo.txt  /balaji/Putcmd.txt
hdfs dfs -ls /balaji
hdfs dfs -ls /balaji
Found 4 items
-rw-r--r--   1 hduser supergroup         21 2022-05-31 10:11 /balaji/CopyFromcmd.txt
-rw-r--r--   1 hduser supergroup         21 2022-05-31 10:12 /balaji/Copyfromcmd.txt
-rw-r--r--   1 hduser supergroup         21 2022-05-31 10:03 /balaji/Putcmd.txt
-rw-r--r--   1 hduser supergroup          0 2022-05-31 09:47 /balaji/hello.txt


copyFromLocal:
hdfs dfs -copyFromLocal /home/hduser/demo.txt  /balaji/Copyfromcmd.txt
hdfs dfs -ls /balaji
Found 4 items
-rw-r--r--   1 hduser supergroup         21 2022-05-31 10:11 /balaji/CopyFromcmd.txt
-rw-r--r--   1 hduser supergroup         21 2022-05-31 10:12 /balaji/Copyfromcmd.txt
-rw-r--r--   1 hduser supergroup         21 2022-05-31 10:03 /balaji/Putcmd.txt
-rw-r--r--   1 hduser supergroup          0 2022-05-31 09:47 /balaji/hello.txt


get :
hdfs dfs -get   /bala/Copyfromcmd.txt /home/hduser/demo2.txt
ls
 1BM18CS034            Music
 Account.class        'Packet Tracer 7.2.1 for Linux 64 bit.tar.gz'
 bank.java             person.class
 bank_kaushal.java     person.java
 Curr_Acc.class        Pictures
 demo1.class           pig_1564816082257.log
 demo1.java            pig_1599287737956.log
 demo1.txt             pt
 demo2.txt             PT72Installer
 demo.class            Public
 Demo.class            R
 demo.java             simpgen.java
 demo.txt              snap
 derby.log             son.class
 Desktop               Son.class
 Documents             student.class
 Downloads             Templates
 eclipse-workspace     time.class
```



```
 exam.class             timedemo.class
 examples.desktop       timedemo.java
 father.class           TIME.java
 Father.class           toinstalledlist

copyToLocal:
hdfs dfs -copyToLocal   /bala/Copyfromcmd.txt /home/hduser/demo1.txt
ls
 1BM18CS034             Music
 Account.class         'Packet Tracer 7.2.1 for Linux 64 bit.tar.gz'
 bank.java              person.class
 bank_kaushal.java      person.java
 Curr_Acc.class         Pictures
 demo1.class            pig_1564816082257.log
 demo1.java             pig_1599287737956.log
 demo1.txt              pt
 demo2.txt              PT72Installer
 demo.class             Public
 Demo.class             R
 demo.java              simpgen.java
 demo.txt               snap
 derby.log              son.class
 Desktop                Son.class
 Documents              student.class
 Downloads              Templates
 eclipse-workspace      time.class
 exam.class             timedemo.class
 examples.desktop       timedemo.java
 father.class           TIME.java
 Father.class           toinstalledlist

mv cmd:
hadoop fs -mv /bala /balaji
hdfs dfs -ls /
Found 4 items
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:12 /balaji
drwxr-xr-x   - hduser supergroup          0 2019-10-24 10:59 /shria
drwxrwxr-x   - hduser supergroup          0 2019-08-01 16:19 /tmp
drwxr-xr-x   - hduser supergroup          0 2019-08-01 16:03 /user
```

```
cp cmd:
hadoop fs -cp /balaji /sam
hdfs dfs -ls /
Found 5 items
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:12 /balaji
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:34 /sam
drwxr-xr-x   - hduser supergroup          0 2019-10-24 10:59 /shria
drwxrwxr-x   - hduser supergroup          0 2019-08-01 16:19 /tmp
drwxr-xr-x   - hduser supergroup          0 2019-08-01 16:03 /user
```