VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

BIG DATA ANALYTICS
(20CS6PEBDA)

Submitted by

MITHUN R K
(1BM19CS087)

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

B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
May-2022 to July-2022

B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "**BIG DATA ANALYTICS**" was carried out by **MITHUN R K(1BM19CS087),** who is bona fide 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 the course **BIG DATA ANALYTICS (20CS6PEBDA)** work prescribed for the said degree.

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Designation	Assistant Professor
Department of CSE	Department of CSE
BMSCE, Bengaluru	BMSCE, Bengaluru

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Index Sheet

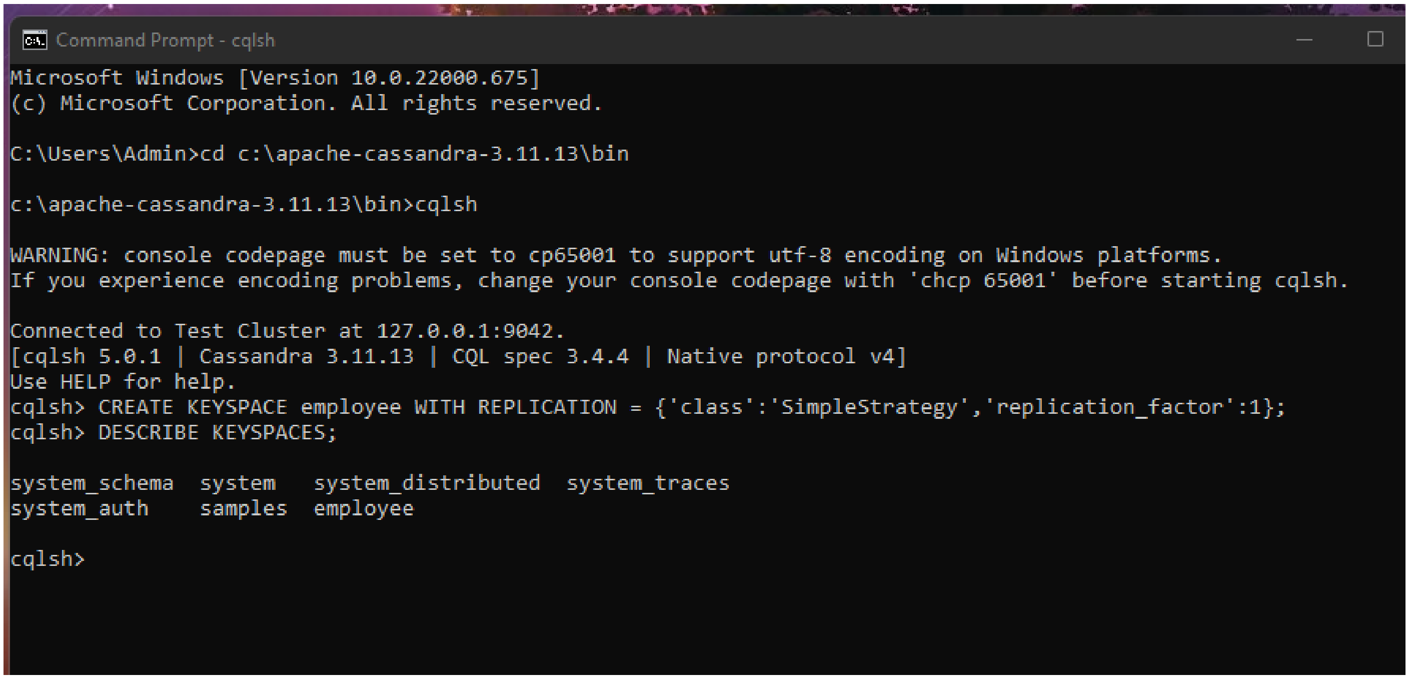
Course Outcome

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

Cassandra Lab Program 1: -

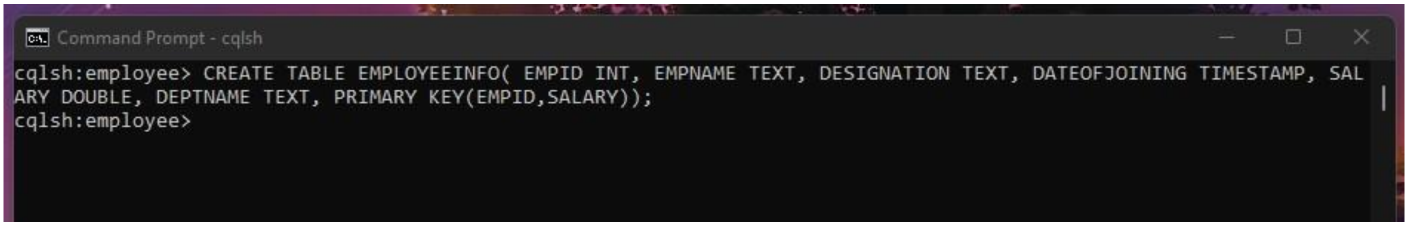
Perform the following DB operations using Cassandra.

1. Create a key space by name Employee

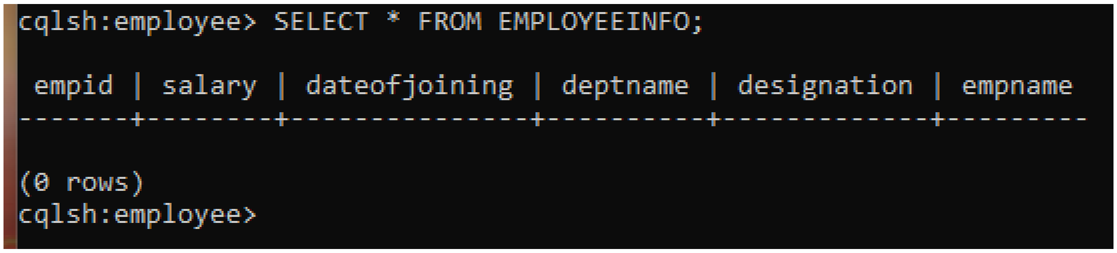


```
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Admin>cd c:\apache-cassandra-3.11.13\bin

c:\apache-cassandra-3.11.13\bin>cqlsh

WARNING: console codepage must be set to cp65001 to support utf-8 encoding on Windows platforms.
If you experience encoding problems, change your console codepage with 'chcp 65001' before starting cqlsh.

Connected to Test Cluster at 127.0.0.1:9042.
[cqlsh 5.0.1 | Cassandra 3.11.13 | CQL spec 3.4.4 | Native protocol v4]
Use HELP for help.
cqlsh> CREATE KEYSPACE employee WITH REPLICATION = {'class':'SimpleStrategy','replication_factor':1};
cqlsh> DESCRIBE KEYSPACES;

system_schema  system   system_distributed  system_traces
system_auth    samples  employee

cqlsh>
```

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

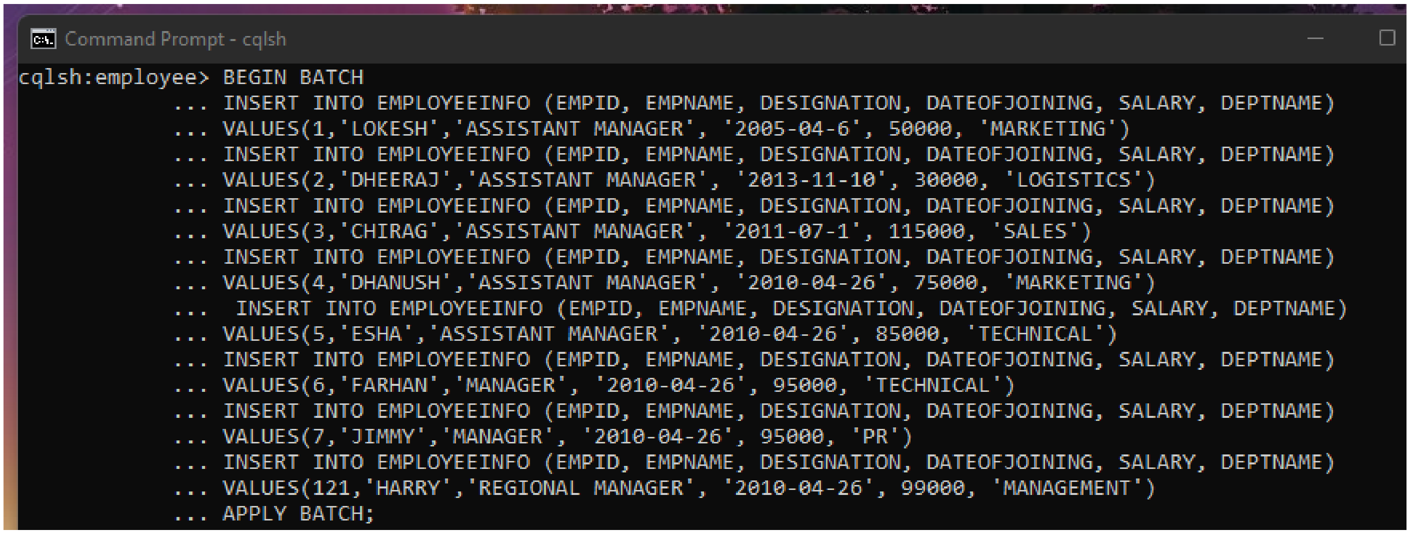


```
cqlsh:employee> CREATE TABLE EMPLOYEEINFO( EMPID INT, EMPNAME TEXT, DESIGNATION TEXT, DATEOFJOINING TIMESTAMP, SAL
ARY DOUBLE, DEPTNAME TEXT, PRIMARY KEY(EMPID,SALARY));
cqlsh:employee>
```

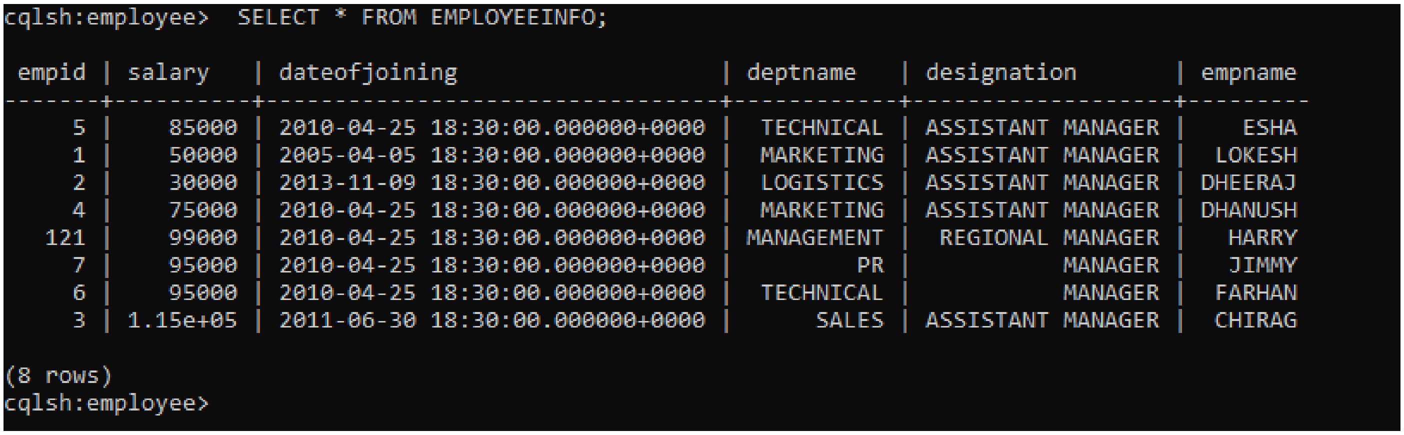


```
cqlsh:employee> SELECT * FROM EMPLOYEEINFO;

 empid | salary | dateofjoining | deptname | designation | empname
-------+--------+---------------+----------+-------------+---------

(0 rows)
cqlsh:employee>
```

3. Insert the values into the table in batch

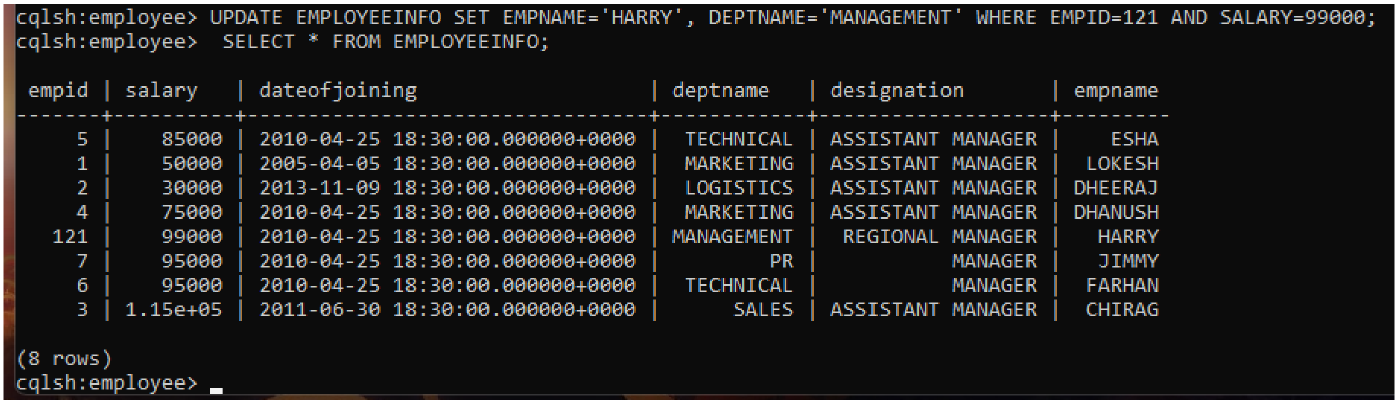


```
cqlsh:employee> BEGIN BATCH
            ... INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(1,'LOKESH','ASSISTANT MANAGER', '2005-04-6', 50000, 'MARKETING')
            ... INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(2,'DHEERAJ','ASSISTANT MANAGER', '2013-11-10', 30000, 'LOGISTICS')
            ... INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(3,'CHIRAG','ASSISTANT MANAGER', '2011-07-1', 115000, 'SALES')
            ... INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(4,'DHANUSH','ASSISTANT MANAGER', '2010-04-26', 75000, 'MARKETING')
            ...  INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(5,'ESHA','ASSISTANT MANAGER', '2010-04-26', 85000, 'TECHNICAL')
            ... INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(6,'FARHAN','MANAGER', '2010-04-26', 95000, 'TECHNICAL')
            ... INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(7,'JIMMY','MANAGER', '2010-04-26', 95000, 'PR')
            ... INSERT INTO EMPLOYEEINFO (EMPID, EMPNAME, DESIGNATION, DATEOFJOINING, SALARY, DEPTNAME)
            ... VALUES(121,'HARRY','REGIONAL MANAGER', '2010-04-26', 99000, 'MANAGEMENT')
            ... APPLY BATCH;
```



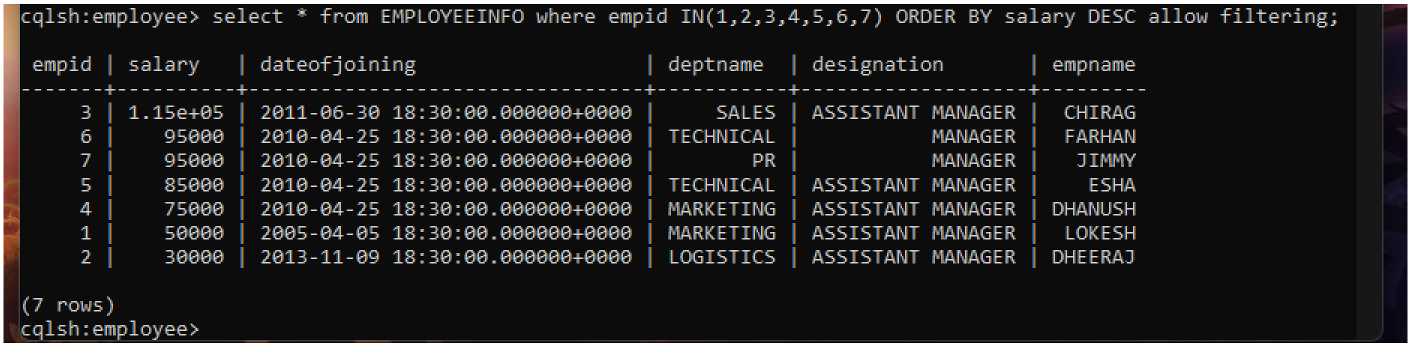
```
cqlsh:employee>  SELECT * FROM EMPLOYEEINFO;

 empid | salary   | dateofjoining                   | deptname   | designation       | empname
-------+----------+---------------------------------+------------+-------------------+---------
     5 |    85000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL | ASSISTANT MANAGER |    ESHA
     1 |    50000 | 2005-04-05 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER |  LOKESH
     2 |    30000 | 2013-11-09 18:30:00.000000+0000 |  LOGISTICS | ASSISTANT MANAGER | DHEERAJ
     4 |    75000 | 2010-04-25 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER | DHANUSH
   121 |    99000 | 2010-04-25 18:30:00.000000+0000 | MANAGEMENT |  REGIONAL MANAGER |   HARRY
     7 |    95000 | 2010-04-25 18:30:00.000000+0000 |         PR |           MANAGER |   JIMMY
     6 |    95000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL |           MANAGER |  FARHAN
     3 | 1.15e+05 | 2011-06-30 18:30:00.000000+0000 |      SALES | ASSISTANT MANAGER |  CHIRAG

(8 rows)
cqlsh:employee>
```

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



```
cqlsh:employee> UPDATE EMPLOYEEINFO SET EMPNAME='HARRY', DEPTNAME='MANAGEMENT' WHERE EMPID=121 AND SALARY=99000;
cqlsh:employee>  SELECT * FROM EMPLOYEEINFO;

 empid | salary   | dateofjoining                   | deptname   | designation       | empname
-------+----------+---------------------------------+------------+-------------------+---------
     5 |    85000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL | ASSISTANT MANAGER |    ESHA
     1 |    50000 | 2005-04-05 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER |  LOKESH
     2 |    30000 | 2013-11-09 18:30:00.000000+0000 |  LOGISTICS | ASSISTANT MANAGER | DHEERAJ
     4 |    75000 | 2010-04-25 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER | DHANUSH
   121 |    99000 | 2010-04-25 18:30:00.000000+0000 | MANAGEMENT |  REGIONAL MANAGER |   HARRY
     7 |    95000 | 2010-04-25 18:30:00.000000+0000 |         PR |           MANAGER |   JIMMY
     6 |    95000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL |           MANAGER |  FARHAN
     3 | 1.15e+05 | 2011-06-30 18:30:00.000000+0000 |      SALES | ASSISTANT MANAGER |  CHIRAG

(8 rows)
cqlsh:employee> _
```

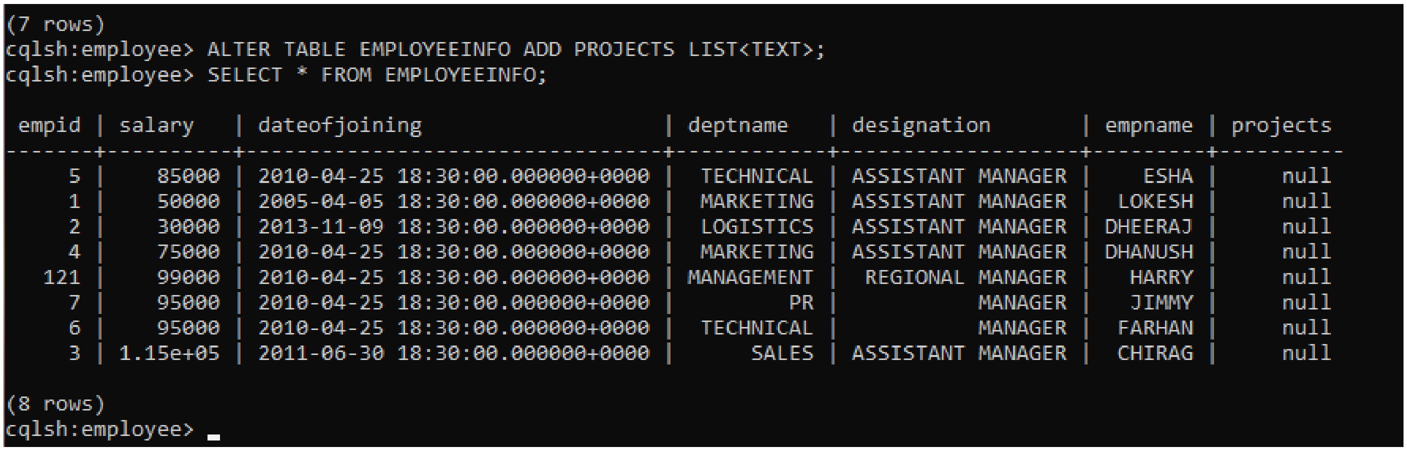
5. Sort the details of Employee records based on salary (Note:- cql>PAGING OFF)



```
cqlsh:employee> select * from EMPLOYEEINFO where empid IN(1,2,3,4,5,6,7) ORDER BY salary DESC allow filtering;

 empid | salary   | dateofjoining                   | deptname  | designation       | empname
-------+----------+---------------------------------+-----------+-------------------+---------
     3 | 1.15e+05 | 2011-06-30 18:30:00.000000+0000 |     SALES | ASSISTANT MANAGER |  CHIRAG
     6 |    95000 | 2010-04-25 18:30:00.000000+0000 | TECHNICAL |           MANAGER |  FARHAN
     7 |    95000 | 2010-04-25 18:30:00.000000+0000 |        PR |           MANAGER |   JIMMY
     5 |    85000 | 2010-04-25 18:30:00.000000+0000 | TECHNICAL | ASSISTANT MANAGER |    ESHA
     4 |    75000 | 2010-04-25 18:30:00.000000+0000 | MARKETING | ASSISTANT MANAGER | DHANUSH
     1 |    50000 | 2005-04-05 18:30:00.000000+0000 | MARKETING | ASSISTANT MANAGER |  LOKESH
     2 |    30000 | 2013-11-09 18:30:00.000000+0000 | LOGISTICS | ASSISTANT MANAGER | DHEERAJ

(7 rows)
cqlsh:employee>
```

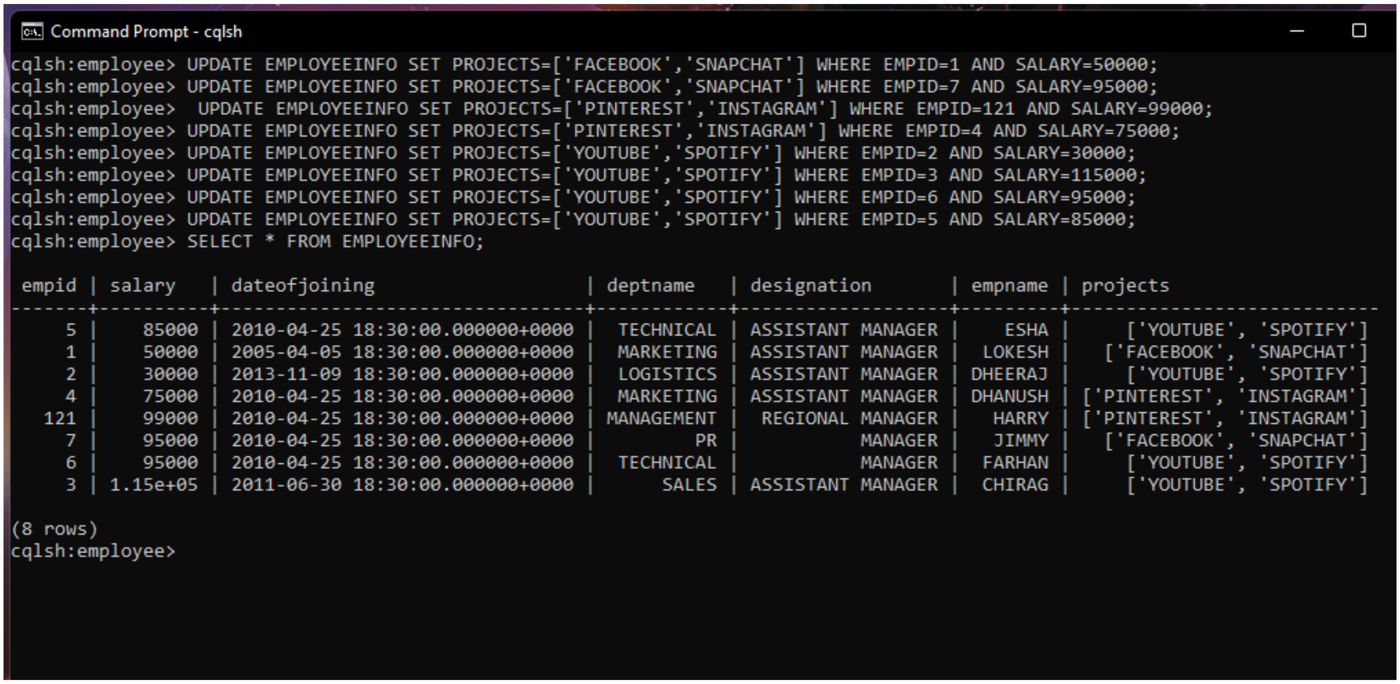
6. Alter the schema of the table Employee_Info to add a column Projects which stores a set

of Projects done by the corresponding Employee.



```
(7 rows)
cqlsh:employee> ALTER TABLE EMPLOYEEINFO ADD PROJECTS LIST<TEXT>;
cqlsh:employee> SELECT * FROM EMPLOYEEINFO;

 empid | salary   | dateofjoining                   | deptname   | designation       | empname | projects
-------+----------+---------------------------------+------------+-------------------+---------+----------
     5 |    85000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL | ASSISTANT MANAGER |    ESHA |     null
     1 |    50000 | 2005-04-05 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER |  LOKESH |     null
     2 |    30000 | 2013-11-09 18:30:00.000000+0000 |  LOGISTICS | ASSISTANT MANAGER | DHEERAJ |     null
     4 |    75000 | 2010-04-25 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER | DHANUSH |     null
   121 |    99000 | 2010-04-25 18:30:00.000000+0000 | MANAGEMENT |  REGIONAL MANAGER |   HARRY |     null
     7 |    95000 | 2010-04-25 18:30:00.000000+0000 |         PR |           MANAGER |   JIMMY |     null
     6 |    95000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL |           MANAGER |  FARHAN |     null
     3 | 1.15e+05 | 2011-06-30 18:30:00.000000+0000 |      SALES | ASSISTANT MANAGER |  CHIRAG |     null

(8 rows)
cqlsh:employee> _
```

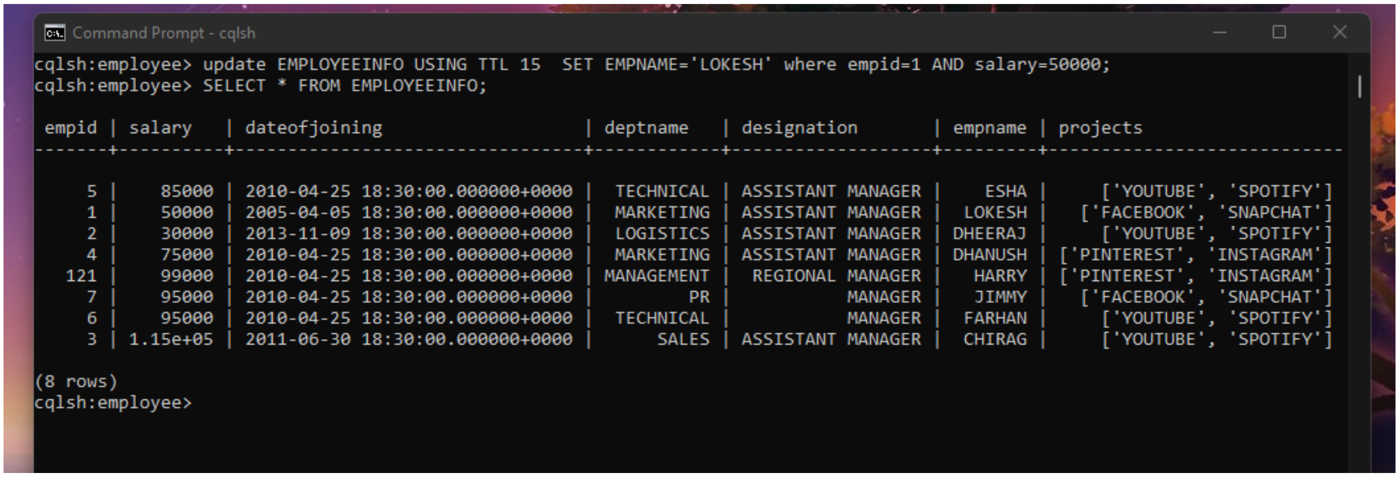
7. Update the altered table to add project names.



```
cqlsh:employee> UPDATE EMPLOYEEINFO SET PROJECTS=['FACEBOOK','SNAPCHAT'] WHERE EMPID=1 AND SALARY=50000;
cqlsh:employee> UPDATE EMPLOYEEINFO SET PROJECTS=['FACEBOOK','SNAPCHAT'] WHERE EMPID=7 AND SALARY=95000;
cqlsh:employee>  UPDATE EMPLOYEEINFO SET PROJECTS=['PINTEREST','INSTAGRAM'] WHERE EMPID=121 AND SALARY=99000;
cqlsh:employee> UPDATE EMPLOYEEINFO SET PROJECTS=['PINTEREST','INSTAGRAM'] WHERE EMPID=4 AND SALARY=75000;
cqlsh:employee> UPDATE EMPLOYEEINFO SET PROJECTS=['YOUTUBE','SPOTIFY'] WHERE EMPID=2 AND SALARY=30000;
cqlsh:employee> UPDATE EMPLOYEEINFO SET PROJECTS=['YOUTUBE','SPOTIFY'] WHERE EMPID=3 AND SALARY=115000;
cqlsh:employee> UPDATE EMPLOYEEINFO SET PROJECTS=['YOUTUBE','SPOTIFY'] WHERE EMPID=6 AND SALARY=95000;
cqlsh:employee> UPDATE EMPLOYEEINFO SET PROJECTS=['YOUTUBE','SPOTIFY'] WHERE EMPID=5 AND SALARY=85000;
cqlsh:employee> SELECT * FROM EMPLOYEEINFO;

 empid | salary   | dateofjoining                   | deptname   | designation       | empname | projects
-------+----------+---------------------------------+------------+-------------------+---------+---------------------------
     5 |    85000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL | ASSISTANT MANAGER |    ESHA |     ['YOUTUBE', 'SPOTIFY']
     1 |    50000 | 2005-04-05 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER |  LOKESH |   ['FACEBOOK', 'SNAPCHAT']
     2 |    30000 | 2013-11-09 18:30:00.000000+0000 |  LOGISTICS | ASSISTANT MANAGER | DHEERAJ |     ['YOUTUBE', 'SPOTIFY']
     4 |    75000 | 2010-04-25 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER | DHANUSH | ['PINTEREST', 'INSTAGRAM']
   121 |    99000 | 2010-04-25 18:30:00.000000+0000 | MANAGEMENT |  REGIONAL MANAGER |   HARRY | ['PINTEREST', 'INSTAGRAM']
     7 |    95000 | 2010-04-25 18:30:00.000000+0000 |         PR |           MANAGER |   JIMMY |   ['FACEBOOK', 'SNAPCHAT']
     6 |    95000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL |           MANAGER |  FARHAN |     ['YOUTUBE', 'SPOTIFY']
     3 | 1.15e+05 | 2011-06-30 18:30:00.000000+0000 |      SALES | ASSISTANT MANAGER |  CHIRAG |     ['YOUTUBE', 'SPOTIFY']

(8 rows)
cqlsh:employee>
```

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

//BEFORE 15 seconds

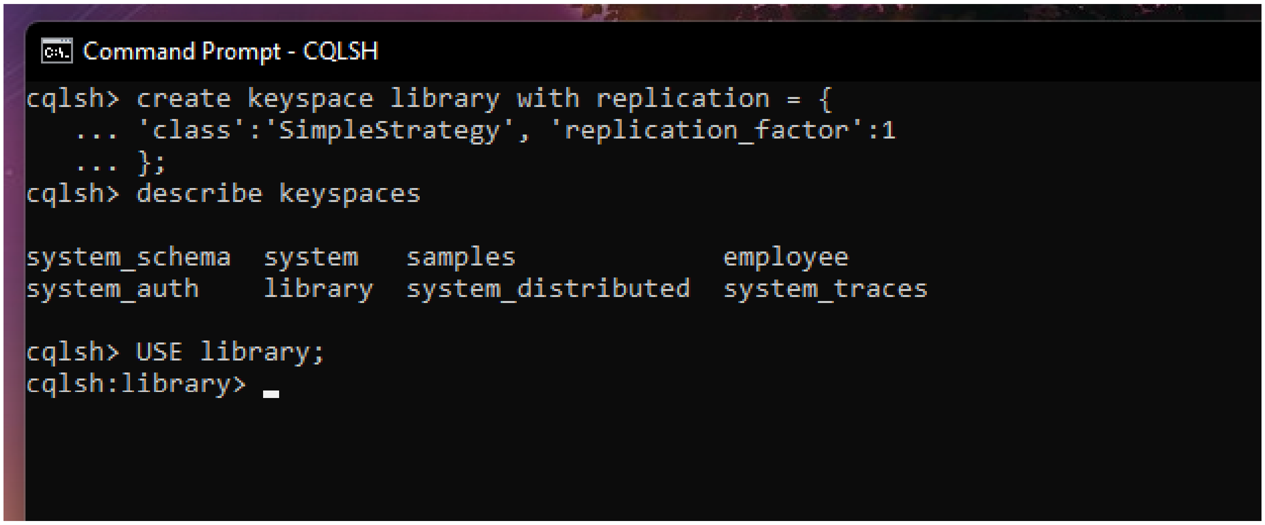


```
cqlsh:employee> update EMPLOYEEINFO USING TTL 15  SET EMPNAME='LOKESH' where empid=1 AND salary=50000;
cqlsh:employee> SELECT * FROM EMPLOYEEINFO;

 empid | salary   | dateofjoining                   | deptname   | designation       | empname | projects
-------+----------+---------------------------------+------------+-------------------+---------+----------------------------

     5 |    85000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL | ASSISTANT MANAGER |    ESHA |     ['YOUTUBE', 'SPOTIFY']
     1 |    50000 | 2005-04-05 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER |  LOKESH |   ['FACEBOOK', 'SNAPCHAT']
     2 |    30000 | 2013-11-09 18:30:00.000000+0000 |  LOGISTICS | ASSISTANT MANAGER | DHEERAJ |     ['YOUTUBE', 'SPOTIFY']
     4 |    75000 | 2010-04-25 18:30:00.000000+0000 |  MARKETING | ASSISTANT MANAGER | DHANUSH | ['PINTEREST', 'INSTAGRAM']
   121 |    99000 | 2010-04-25 18:30:00.000000+0000 | MANAGEMENT |  REGIONAL MANAGER |   HARRY | ['PINTEREST', 'INSTAGRAM']
     7 |    95000 | 2010-04-25 18:30:00.000000+0000 |         PR |           MANAGER |   JIMMY |   ['FACEBOOK', 'SNAPCHAT']
     6 |    95000 | 2010-04-25 18:30:00.000000+0000 |  TECHNICAL |           MANAGER |  FARHAN |     ['YOUTUBE', 'SPOTIFY']
     3 | 1.15e+05 | 2011-06-30 18:30:00.000000+0000 |      SALES | ASSISTANT MANAGER |  CHIRAG |     ['YOUTUBE', 'SPOTIFY']

(8 rows)
cqlsh:employee>
```

Cassandra Lab Program 2: -

Perform the following DB operations using Cassandra.

1.Create a key space by name Library

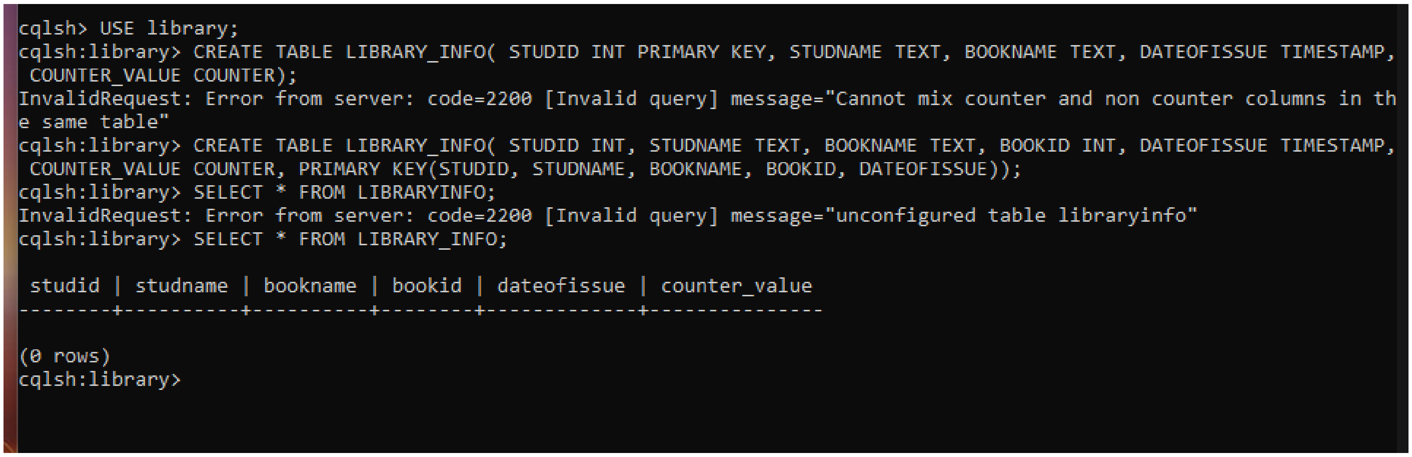


```
cqlsh> create keyspace library with replication = {
   ... 'class':'SimpleStrategy', 'replication_factor':1
   ... };
cqlsh> describe keyspaces

system_schema  system   samples             employee
system_auth    library  system_distributed  system_traces

cqlsh> USE library;
cqlsh:library>
```

2. Create a column family by name Library-Info with attributes Stud_Id Primary Key,

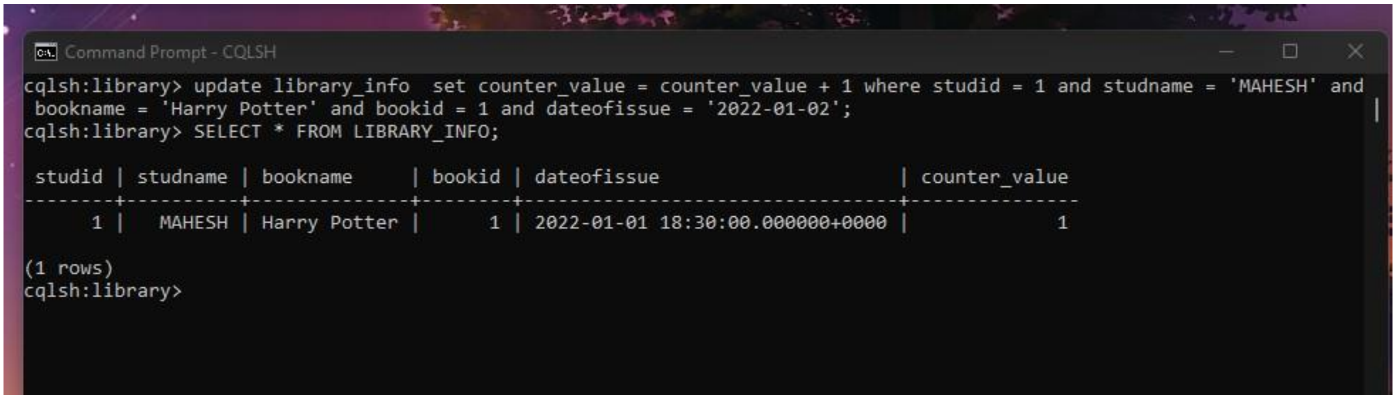
Counter_value of type Counter,

Stud_Name, Book-Name, Book-Id, Date_of_issue

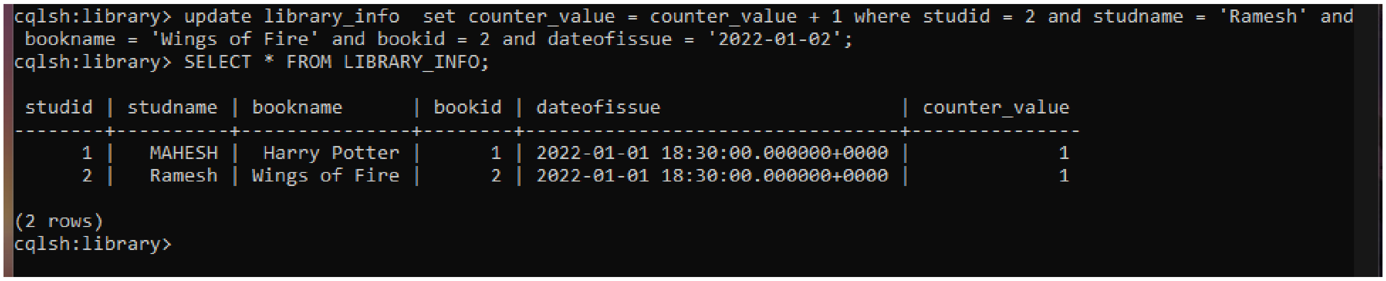


```
cqlsh> USE library;
cqlsh:library> CREATE TABLE LIBRARY_INFO( STUDID INT PRIMARY KEY, STUDNAME TEXT, BOOKNAME TEXT, DATEOFISSUE TIMESTAMP,
 COUNTER_VALUE COUNTER);
InvalidRequest: Error from server: code=2200 [Invalid query] message="Cannot mix counter and non counter columns in th
e same table"
cqlsh:library> CREATE TABLE LIBRARY_INFO( STUDID INT, STUDNAME TEXT, BOOKNAME TEXT, BOOKID INT, DATEOFISSUE TIMESTAMP,
 COUNTER_VALUE COUNTER, PRIMARY KEY(STUDID, STUDNAME, BOOKNAME, BOOKID, DATEOFISSUE));
cqlsh:library> SELECT * FROM LIBRARYINFO;
InvalidRequest: Error from server: code=2200 [Invalid query] message="unconfigured table libraryinfo"
cqlsh:library> SELECT * FROM LIBRARY_INFO;

 studid | studname | bookname | bookid | dateofissue | counter_value
--------+----------+----------+--------+-------------+---------------

(0 rows)
cqlsh:library>
```

3.Insert the values into the table in batch

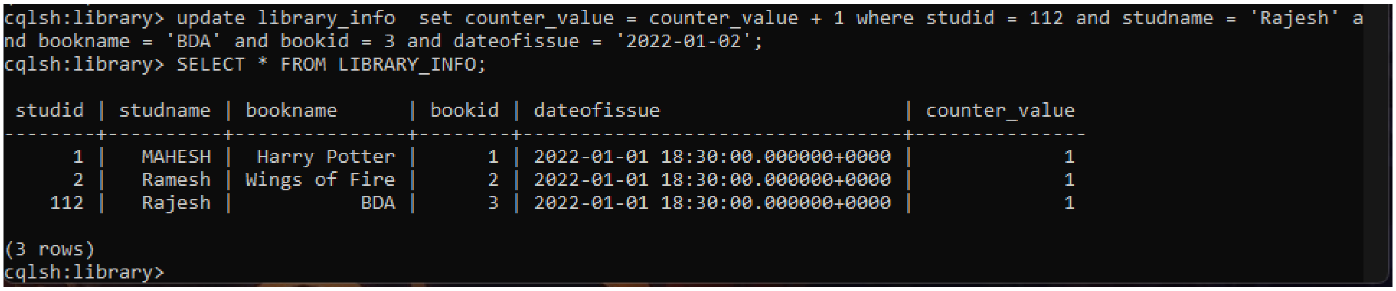


```
cqlsh:library> update library_info  set counter_value = counter_value + 1 where studid = 1 and studname = 'MAHESH' and
 bookname = 'Harry Potter' and bookid = 1 and dateofissue = '2022-01-02';
cqlsh:library> SELECT * FROM LIBRARY_INFO;

 studid | studname | bookname     | bookid | dateofissue                     | counter_value
--------+----------+--------------+--------+---------------------------------+---------------
      1 |   MAHESH | Harry Potter |      1 | 2022-01-01 18:30:00.000000+0000 |             1

(1 rows)
cqlsh:library>
```

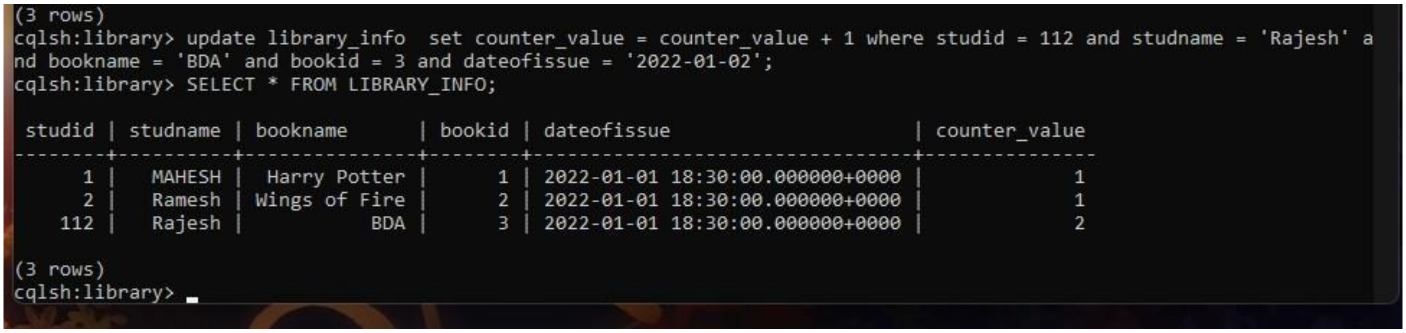


```
cqlsh:library> update library_info  set counter_value = counter_value + 1 where studid = 2 and studname = 'Ramesh' and
 bookname = 'Wings of Fire' and bookid = 2 and dateofissue = '2022-01-02';
cqlsh:library> SELECT * FROM LIBRARY_INFO;

 studid | studname | bookname      | bookid | dateofissue                     | counter_value
--------+----------+---------------+--------+---------------------------------+---------------
      1 |   MAHESH |  Harry Potter |      1 | 2022-01-01 18:30:00.000000+0000 |             1
      2 |   Ramesh | Wings of Fire |      2 | 2022-01-01 18:30:00.000000+0000 |             1

(2 rows)
cqlsh:library>
```

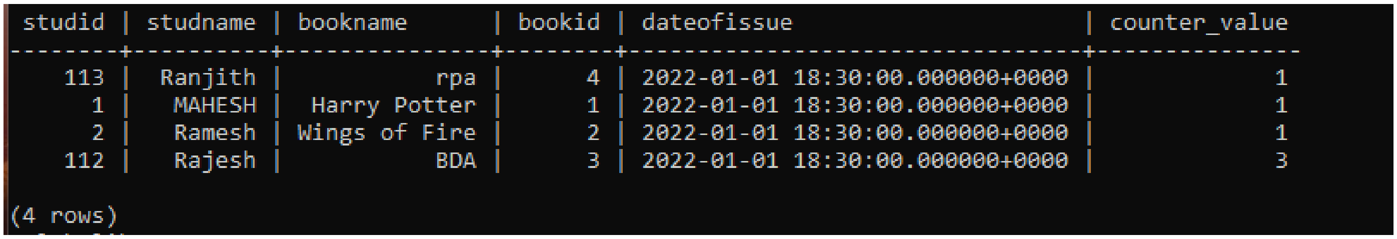
4. Display the details of the table created and increase the value of the counter



```
cqlsh:library> update library_info  set counter_value = counter_value + 1 where studid = 112 and studname = 'Rajesh' a
nd bookname = 'BDA' and bookid = 3 and dateofissue = '2022-01-02';
cqlsh:library> SELECT * FROM LIBRARY_INFO;

 studid | studname | bookname      | bookid | dateofissue                     | counter_value
--------+----------+---------------+--------+---------------------------------+---------------
      1 |   MAHESH |  Harry Potter |      1 | 2022-01-01 18:30:00.000000+0000 |             1
      2 |   Ramesh | Wings of Fire |      2 | 2022-01-01 18:30:00.000000+0000 |             1
    112 |   Rajesh |           BDA |      3 | 2022-01-01 18:30:00.000000+0000 |             1

(3 rows)
cqlsh:library>
```

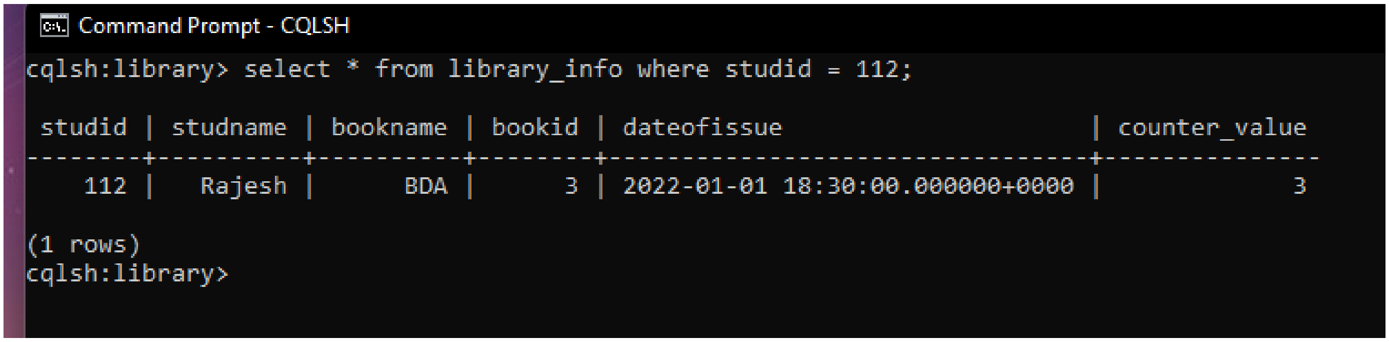


```
(3 rows)
cqlsh:library> update library_info  set counter_value = counter_value + 1 where studid = 112 and studname = 'Rajesh' a
nd bookname = 'BDA' and bookid = 3 and dateofissue = '2022-01-02';
cqlsh:library> SELECT * FROM LIBRARY_INFO;

 studid | studname | bookname      | bookid | dateofissue                     | counter_value
--------+----------+---------------+--------+---------------------------------+---------------
      1 |   MAHESH |  Harry Potter |      1 | 2022-01-01 18:30:00.000000+0000 |             1
      2 |   Ramesh | Wings of Fire |      2 | 2022-01-01 18:30:00.000000+0000 |             1
    112 |   Rajesh |           BDA |      3 | 2022-01-01 18:30:00.000000+0000 |             2

(3 rows)
cqlsh:library> _
```



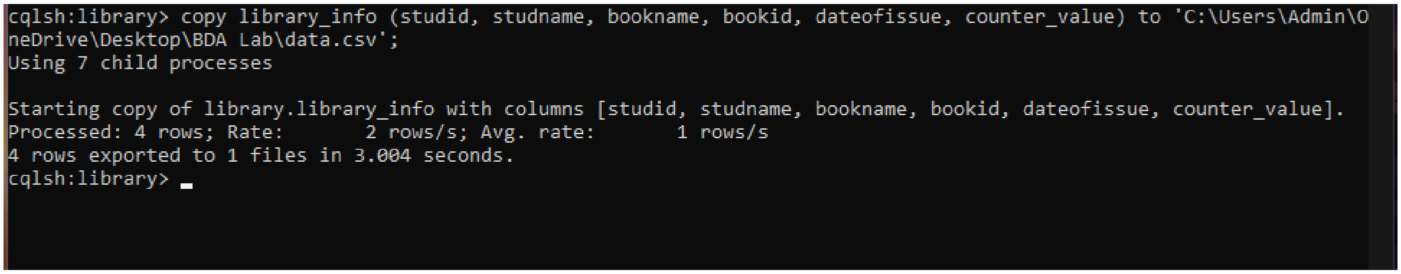
```
 studid | studname | bookname      | bookid | dateofissue                     | counter_value
--------+----------+---------------+--------+---------------------------------+---------------
    113 |  Ranjith |           rpa |      4 | 2022-01-01 18:30:00.000000+0000 |             1
      1 |   MAHESH |  Harry Potter |      1 | 2022-01-01 18:30:00.000000+0000 |             1
      2 |   Ramesh | Wings of Fire |      2 | 2022-01-01 18:30:00.000000+0000 |             1
    112 |   Rajesh |           BDA |      3 | 2022-01-01 18:30:00.000000+0000 |             3

(4 rows)
```

5. Write a query to show that a student with id 112 has taken a book “BDA” 3 times.

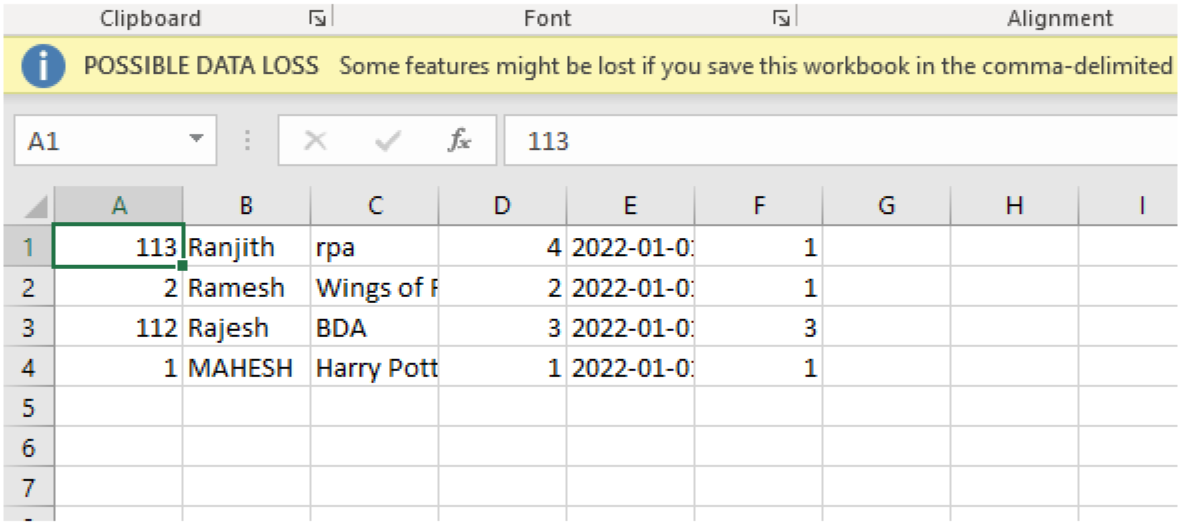


```
cqlsh:library> select * from library_info where studid = 112;

 studid | studname | bookname | bookid | dateofissue                     | counter_value
--------+----------+----------+--------+---------------------------------+---------------
    112 |   Rajesh |      BDA |      3 | 2022-01-01 18:30:00.000000+0000 |             3

(1 rows)
cqlsh:library>
```

6. Export the created column to a csv file



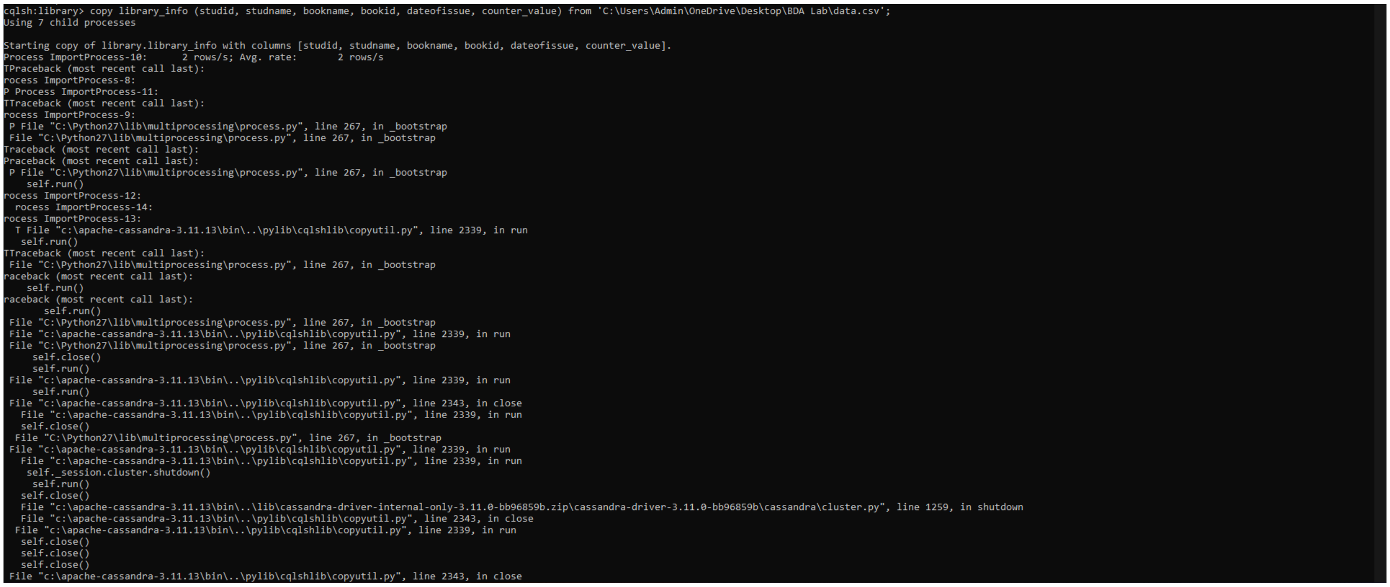
```
cqlsh:library> copy library_info (studid, studname, bookname, bookid, dateofissue, counter_value) to 'C:\Users\Admin\O
neDrive\Desktop\BDA Lab\data.csv';
Using 7 child processes

Starting copy of library.library_info with columns [studid, studname, bookname, bookid, dateofissue, counter_value].
Processed: 4 rows; Rate:       2 rows/s; Avg. rate:       1 rows/s
4 rows exported to 1 files in 3.004 seconds.
cqlsh:library> _
```



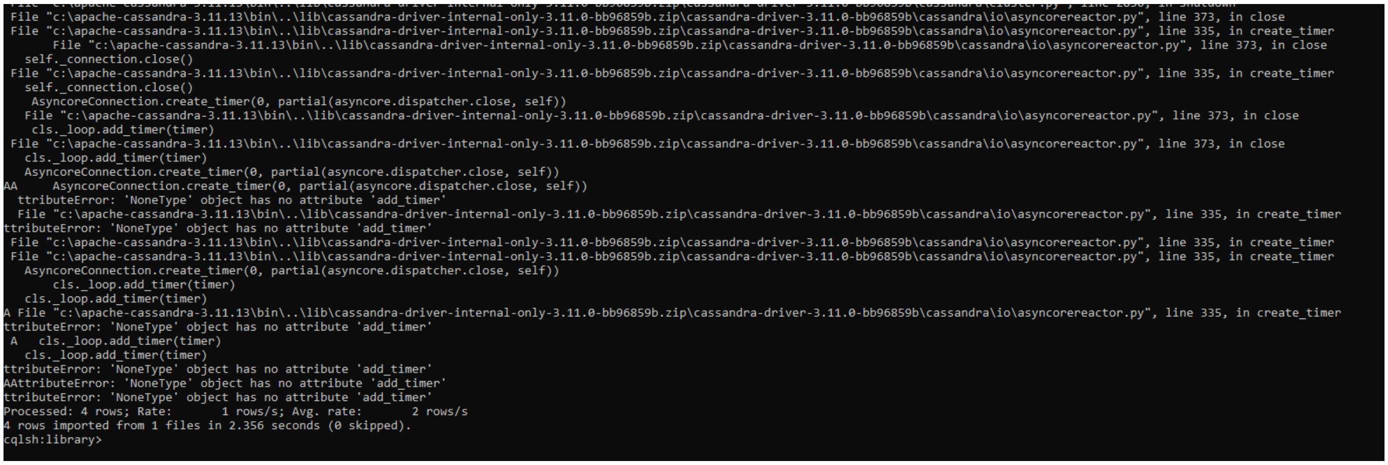
POSSIBLE DATA LOSS Some features might be lost if you save this workbook in the comma-delimited

	A	B	C	D	E	F	G	H	I
1	113	Ranjith	rpa	4	2022-01-0	1			
2	2	Ramesh	Wings of F	2	2022-01-0	1			
3	112	Rajesh	BDA	3	2022-01-0	3			
4	1	MAHESH	Harry Pott	1	2022-01-0	1			
5									
6									
7									

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



```
cqlsh:library> copy library_info (studid, studname, bookname, bookid, dateofissue, counter_value) from 'C:\Users\Admin\OneDrive\Desktop\BDA Lab\data.csv';
Using 7 child processes

Starting copy of library.library_info with columns [studid, studname, bookname, bookid, dateofissue, counter_value].
Process ImportProcess-10:      2 rows/s; Avg. rate:       2 rows/s
TPraceback (most recent call last):
rocess ImportProcess-8:
P Process ImportProcess-11:
TTraceback (most recent call last):
rocess ImportProcess-9:
 P File "C:\Python27\lib\multiprocessing\process.py", line 267, in _bootstrap
 File "C:\Python27\lib\multiprocessing\process.py", line 267, in _bootstrap
Traceback (most recent call last):
Praceback (most recent call last):
 P File "C:\Python27\lib\multiprocessing\process.py", line 267, in _bootstrap
    self.run()
rocess ImportProcess-12:
  rocess ImportProcess-14:
rocess ImportProcess-13:
  T File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2339, in run
   self.run()
TTraceback (most recent call last):
 File "C:\Python27\lib\multiprocessing\process.py", line 267, in _bootstrap
raceback (most recent call last):
    self.run()
raceback (most recent call last):
       self.run()
 File "C:\Python27\lib\multiprocessing\process.py", line 267, in _bootstrap
 File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2339, in run
 File "C:\Python27\lib\multiprocessing\process.py", line 267, in _bootstrap
     self.close()
     self.run()
 File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2339, in run
     self.run()
 File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2343, in close
   File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2339, in run
   self.close()
  File "C:\Python27\lib\multiprocessing\process.py", line 267, in _bootstrap
 File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2339, in run
   File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2339, in run
    self._session.cluster.shutdown()
     self.run()
   self.close()
   File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\cluster.py", line 1259, in shutdown
   File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2343, in close
  File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2339, in run
   self.close()
   self.close()
   self.close()
 File "c:\apache-cassandra-3.11.13\bin\..\pylib\cqlshlib\copyutil.py", line 2343, in close
```



```
 File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\cluster.py", line 2850, in shutdown
 File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 373, in close
 File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 335, in create_timer
       File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 373, in close
   self._connection.close()
 File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 335, in create_timer
   self._connection.close()
    AsyncoreConnection.create_timer(0, partial(asyncore.dispatcher.close, self))
   File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 373, in close
    cls._loop.add_timer(timer)
 File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 373, in close
   cls._loop.add_timer(timer)
   AsyncoreConnection.create_timer(0, partial(asyncore.dispatcher.close, self))
AA     AsyncoreConnection.create_timer(0, partial(asyncore.dispatcher.close, self))
  ttributeError: 'NoneType' object has no attribute 'add_timer'
  File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 335, in create_timer
ttributeError: 'NoneType' object has no attribute 'add_timer'
 File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 335, in create_timer
 File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 335, in create_timer
   AsyncoreConnection.create_timer(0, partial(asyncore.dispatcher.close, self))
       cls._loop.add_timer(timer)
   cls._loop.add_timer(timer)
A File "c:\apache-cassandra-3.11.13\bin\..\lib\cassandra-driver-internal-only-3.11.0-bb96859b.zip\cassandra-driver-3.11.0-bb96859b\cassandra\io\asyncorereactor.py", line 335, in create_timer
ttributeError: 'NoneType' object has no attribute 'add_timer'
 A   cls._loop.add_timer(timer)
   cls._loop.add_timer(timer)
ttributeError: 'NoneType' object has no attribute 'add_timer'
AAttributeError: 'NoneType' object has no attribute 'add_timer'
ttributeError: 'NoneType' object has no attribute 'add_timer'
Processed: 4 rows; Rate:       1 rows/s; Avg. rate:       2 rows/s
4 rows imported from 1 files in 2.356 seconds (0 skipped).
cqlsh:library>
```

MongoDB Lab Program 1 (CRUD Demonstration): -

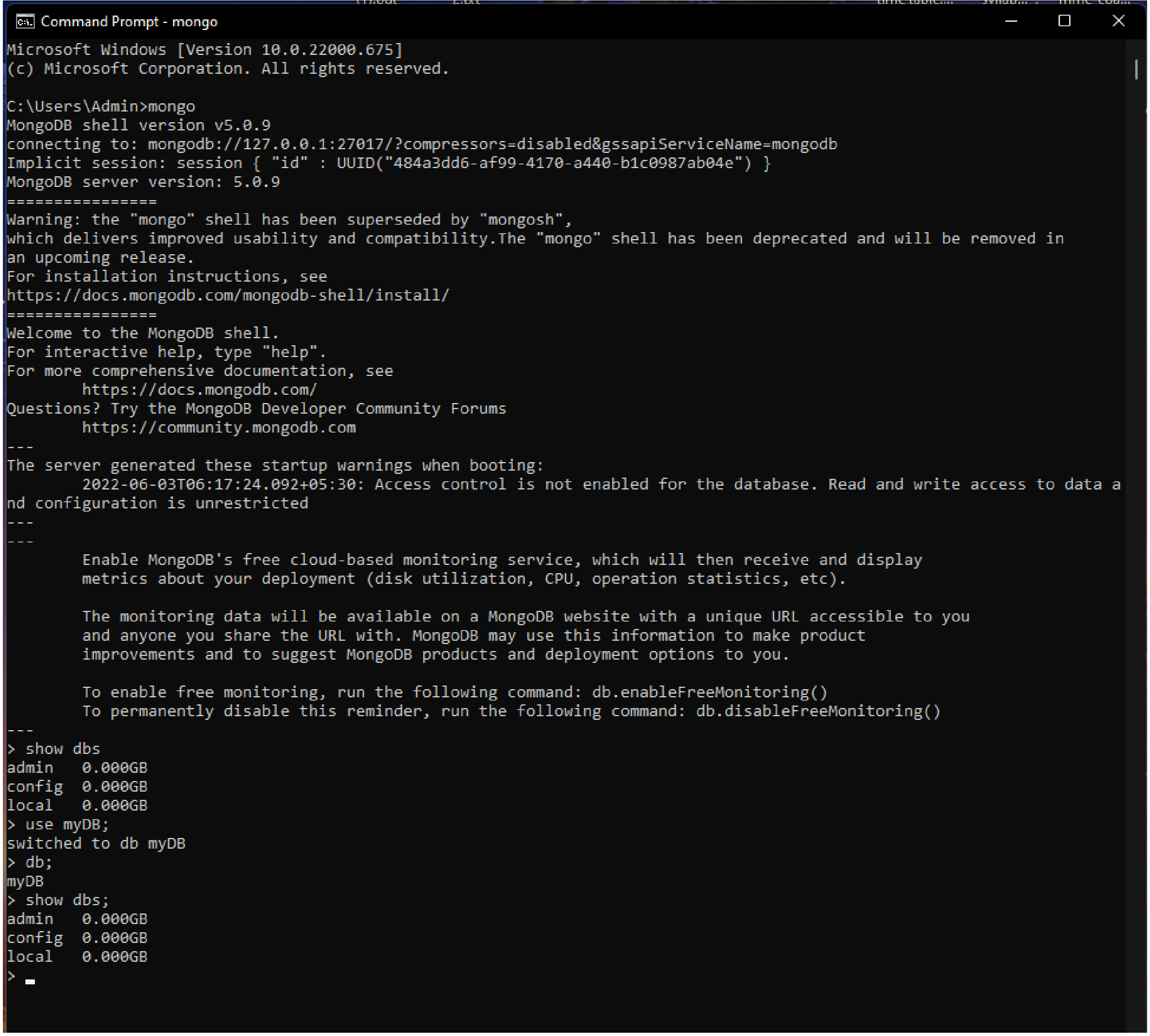
Execute the queries and upload a document with output.

I. CREATE DATABASE IN MONGODB.

use myDB;

db; (Confirm the existence of your database)

show dbs; (To list all databases)



```
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Admin>mongo
MongoDB shell version v5.0.9
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("484a3dd6-af99-4170-a440-b1c0987ab04e") }
MongoDB server version: 5.0.9
================
Warning: the "mongo" shell has been superseded by "mongosh",
which delivers improved usability and compatibility.The "mongo" shell has been deprecated and will be removed in
an upcoming release.
For installation instructions, see
https://docs.mongodb.com/mongodb-shell/install/
================
Welcome to the MongoDB shell.
For interactive help, type "help".
For more comprehensive documentation, see
        https://docs.mongodb.com/
Questions? Try the MongoDB Developer Community Forums
        https://community.mongodb.com
---
The server generated these startup warnings when booting:
        2022-06-03T06:17:24.092+05:30: Access control is not enabled for the database. Read and write access to data a
nd configuration is unrestricted
---
---
        Enable MongoDB's free cloud-based monitoring service, which will then receive and display
        metrics about your deployment (disk utilization, CPU, operation statistics, etc).

        The monitoring data will be available on a MongoDB website with a unique URL accessible to you
        and anyone you share the URL with. MongoDB may use this information to make product
        improvements and to suggest MongoDB products and deployment options to you.

        To enable free monitoring, run the following command: db.enableFreeMonitoring()
        To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---
> show dbs
admin   0.000GB
config  0.000GB
local   0.000GB
> use myDB;
switched to db myDB
> db;
myDB
> show dbs;
admin   0.000GB
config  0.000GB
local   0.000GB
> _
```

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

1. To create a collection by the name “Student”. Let us take a look at the collection list

prior to the creation of the new collection “Student”.

db.createCollection(“Student”); =&gt; sql equivalent CREATE TABLE STUDENT(…);

2. To drop a collection by the name “Student”.

db.Student.drop();

3. Create a collection by the name “Students” and store the following data in it.

db.Student.insert({_id:1,StudName:&quot;MichelleJacintha&quot;,Grade:&quot;VII&quot;,Hobbies:&quot;Int
ernetS

urfing&quot;});

4. Insert the document for “AryanDavid” in to the Students collection only if it does not

already exist in the collection. However, if it is already present in the collection, then

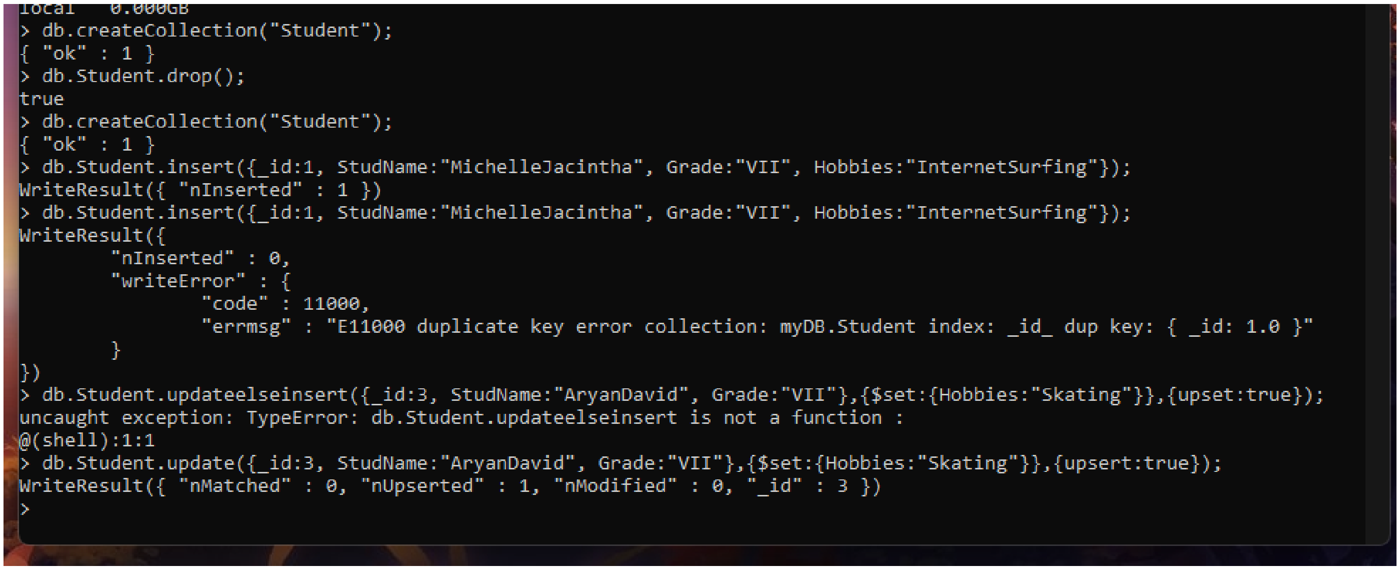
update the document with new values. (Update his Hobbies from “Skating” to “Chess”.

) Use “Update else insert” (if there is an existing document, it will attempt to update it,

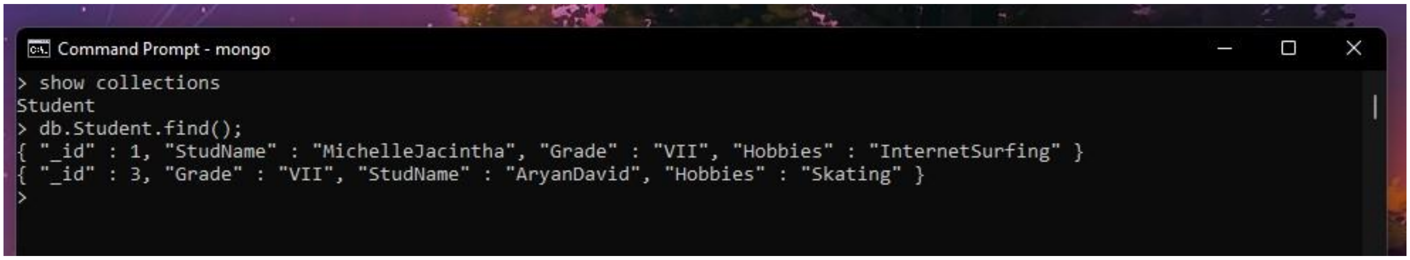
if there is no existing document then it will insert it).

db.Student.update({_id:3,StudName:&quot;AryanDavid&quot;,Grade:&quot;VII&quot;},{$set:{Hobbies:&quo
t;Skatin

g&quot;}},{upsert:true});



```
local   0.000GB
> db.createCollection("Student");
{ "ok" : 1 }
> db.Student.drop();
true
> db.createCollection("Student");
{ "ok" : 1 }
> db.Student.insert({_id:1, StudName:"MichelleJacintha", Grade:"VII", Hobbies:"InternetSurfing"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:1, StudName:"MichelleJacintha", Grade:"VII", Hobbies:"InternetSurfing"});
WriteResult({
        "nInserted" : 0,
        "writeError" : {
                "code" : 11000,
                "errmsg" : "E11000 duplicate key error collection: myDB.Student index: _id_ dup key: { _id: 1.0 }"
        }
})
> db.Student.updateelseinsert({_id:3, StudName:"AryanDavid", Grade:"VII"},{$set:{Hobbies:"Skating"}},{upset:true});
uncaught exception: TypeError: db.Student.updateelseinsert is not a function :
@(shell):1:1
> db.Student.update({_id:3, StudName:"AryanDavid", Grade:"VII"},{$set:{Hobbies:"Skating"}},{upsert:true});
WriteResult({ "nMatched" : 0, "nUpserted" : 1, "nModified" : 0, "_id" : 3 })
>
```



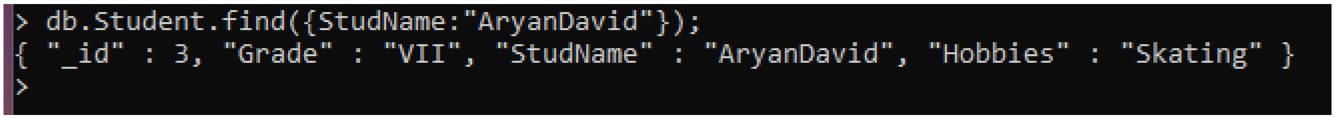
```
> show collections
Student
> db.Student.find();
{ "_id" : 1, "StudName" : "MichelleJacintha", "Grade" : "VII", "Hobbies" : "InternetSurfing" }
{ "_id" : 3, "Grade" : "VII", "StudName" : "AryanDavid", "Hobbies" : "Skating" }
>
```

5. FIND METHOD

A. To search for documents from the “Students” collection based on certain search criteria.

db.Student.find({StudName:&quot;Aryan David&quot;});

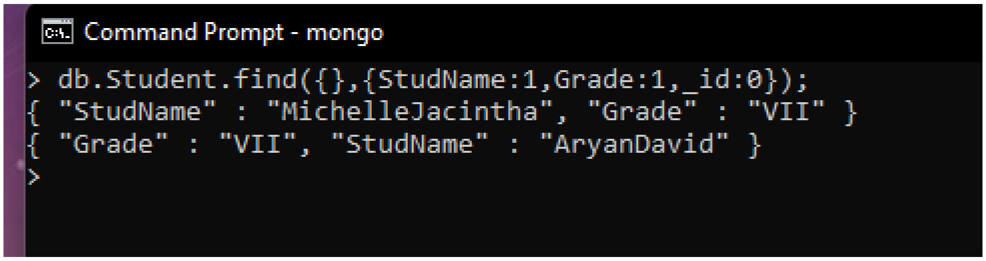
({cond..},{columns.. column:1, columnname:0})



```
> db.Student.find({StudName:"AryanDavid"});
{ "_id" : 3, "Grade" : "VII", "StudName" : "AryanDavid", "Hobbies" : "Skating" }
>
```

B. To display only the StudName and Grade from all the documents of the Students collection. The identifier_id should be suppressed and NOT displayed.

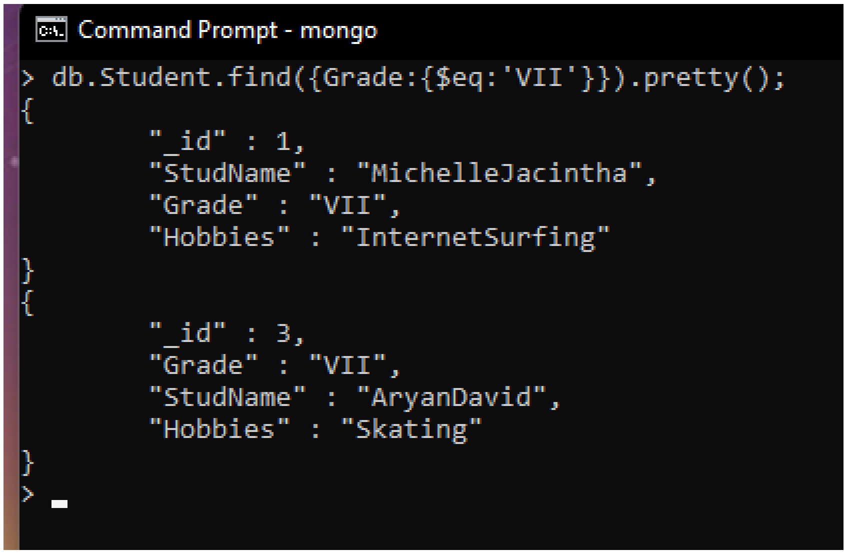
db.Student.find({},{StudName:1,Grade:1,_id:0});



```
> db.Student.find({},{StudName:1,Grade:1,_id:0});
{ "StudName" : "MichelleJacintha", "Grade" : "VII" }
{ "Grade" : "VII", "StudName" : "AryanDavid" }
>
```

C. To find those documents where the Grade is set to ‘VII’

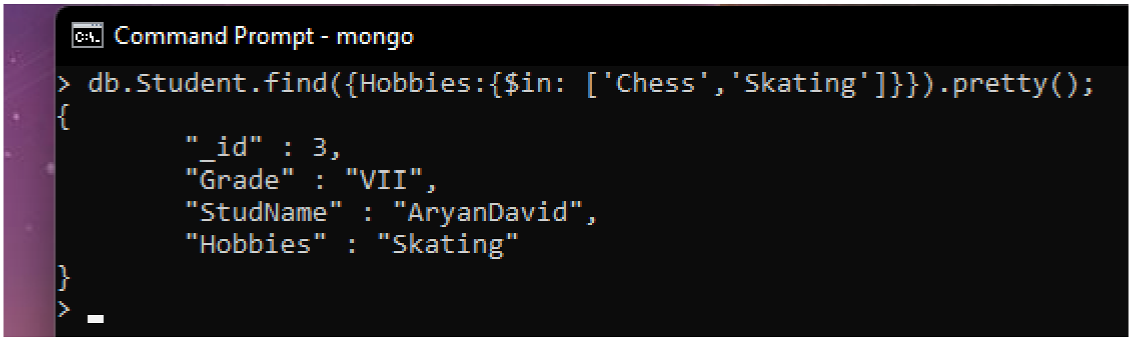
db.Student.find({Grade:{$eq:&#39;VII&#39;}}).pretty();



```
> db.Student.find({Grade:{$eq:'VII'}}).pretty();
{
        "_id" : 1,
        "StudName" : "MichelleJacintha",
        "Grade" : "VII",
        "Hobbies" : "InternetSurfing"
}
{
        "_id" : 3,
        "Grade" : "VII",
        "StudName" : "AryanDavid",
        "Hobbies" : "Skating"
}
>
```

D. To find those documents from the Students collection where the Hobbies is set to either ‘Chess’ or is set to ‘Skating’.

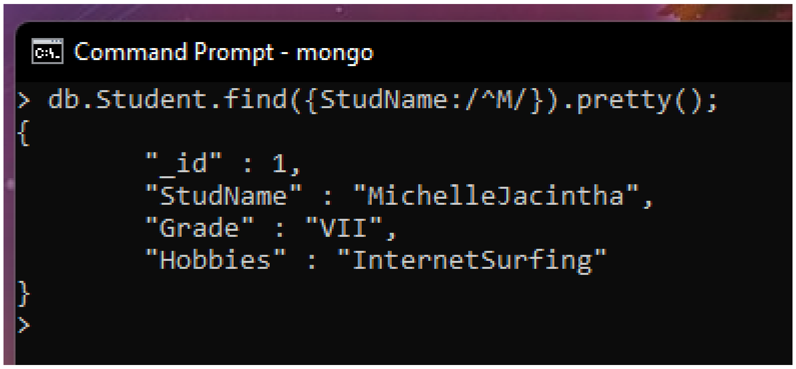
db.Student.find({Hobbies :{ $in: [&#39;Chess&#39;,&#39;Skating&#39;]}}).pretty ();



```
> db.Student.find({Hobbies:{$in: ['Chess','Skating']}}).pretty();
{
        "_id" : 3,
        "Grade" : "VII",
        "StudName" : "AryanDavid",
        "Hobbies" : "Skating"
}
>
```

E. To find documents from the Students collection where the StudName begins with “M”.

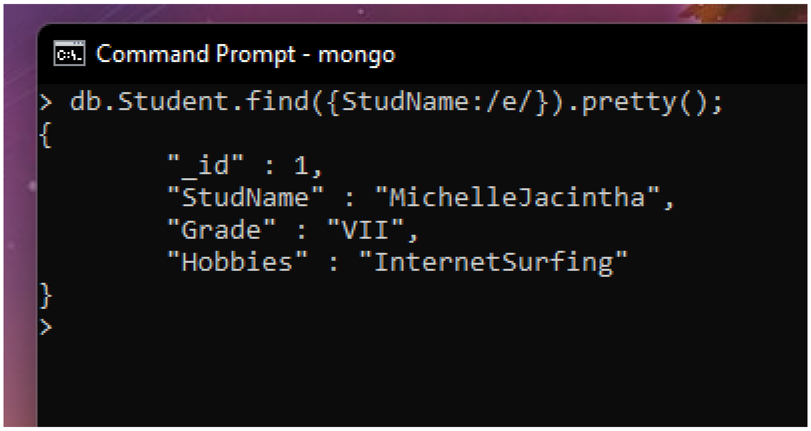
db.Student.find({StudName:/^M/}).pretty();



```
> db.Student.find({StudName:/^M/}).pretty();
{
        "_id" : 1,
        "StudName" : "MichelleJacintha",
        "Grade" : "VII",
        "Hobbies" : "InternetSurfing"
}
>
```

F. To find documents from the Students collection where the StudNamehas an “e” in any position.

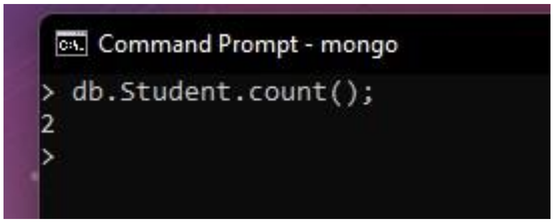
db.Student.find({StudName:/e/}).pretty();



```
> db.Student.find({StudName:/e/}).pretty();
{
        "_id" : 1,
        "StudName" : "MichelleJacintha",
        "Grade" : "VII",
        "Hobbies" : "InternetSurfing"
}
>
```

G. To find the number of documents in the Students collection.

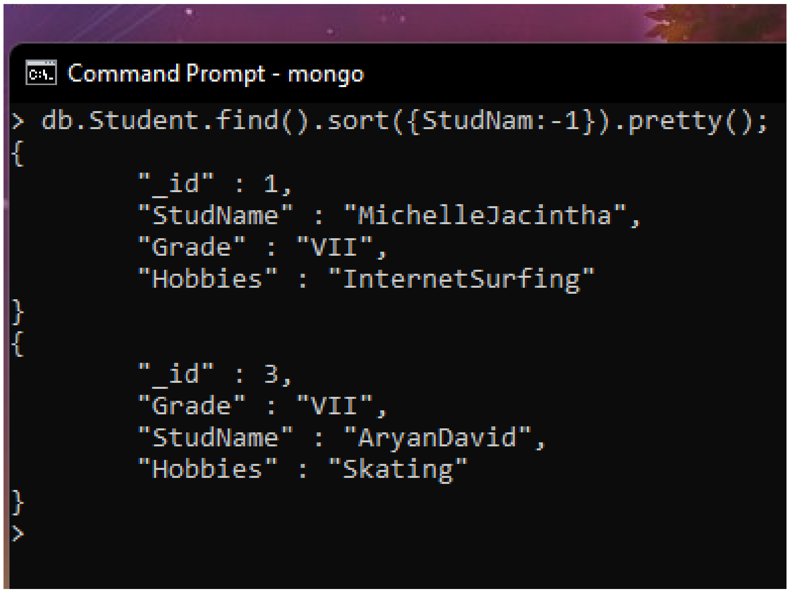
db.Student.count();



```
> db.Student.count();
2
>
```

H. To sort the documents from the Students collection in the descending order of StudName.

db.Student.find().sort({StudName:-1}).pretty();

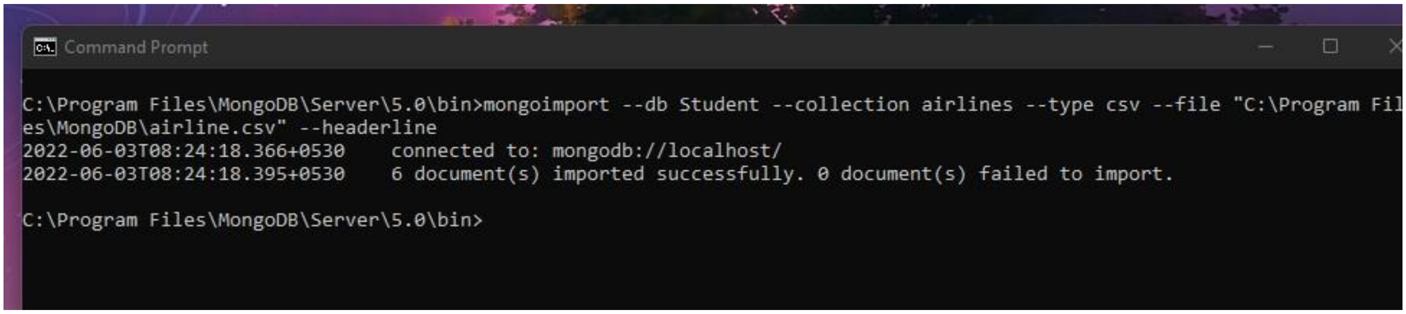


```
> db.Student.find().sort({StudNam:-1}).pretty();
{
        "_id" : 1,
        "StudName" : "MichelleJacintha",
        "Grade" : "VII",
        "Hobbies" : "InternetSurfing"
}
{
        "_id" : 3,
        "Grade" : "VII",
        "StudName" : "AryanDavid",
        "Hobbies" : "Skating"
}
>
```

III. Import data from a CSV file

Given a CSV file “sample.txt” in the D:drive, import the file into the MongoDB collection, “SampleJSON”. The collection is in the database “test”.

mongoimport --db Student --collection airlines --type csv –headerline --file /home/hduser/Desktop/airline.csv

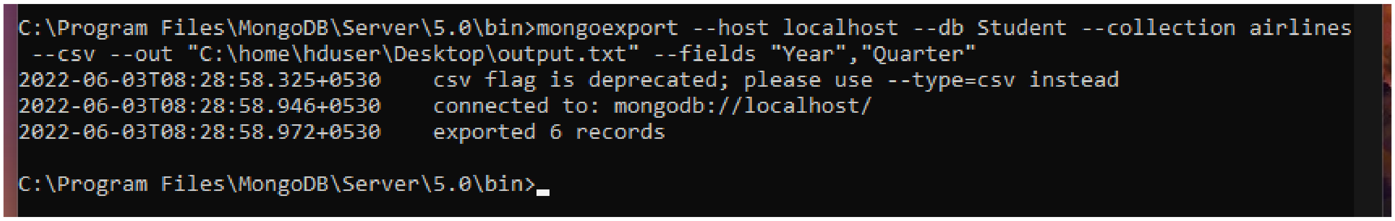


```
C:\Program Files\MongoDB\Server\5.0\bin>mongoimport --db Student --collection airlines --type csv --file "C:\Program Fil
es\MongoDB\airline.csv" --headerline
2022-06-03T08:24:18.366+0530    connected to: mongodb://localhost/
2022-06-03T08:24:18.395+0530    6 document(s) imported successfully. 0 document(s) failed to import.

C:\Program Files\MongoDB\Server\5.0\bin>
```

IV. Export data to a CSV file

This command used at the command prompt exports MongoDB JSON documents from “Customers” collection in the “test” database into a CSV file “Output.txt” in the D:drive.

mongoexport --host localhost --db Student --collection airlines --csv --out /home/hduser/Desktop/output.txt –fields “Year”,”Quarter”

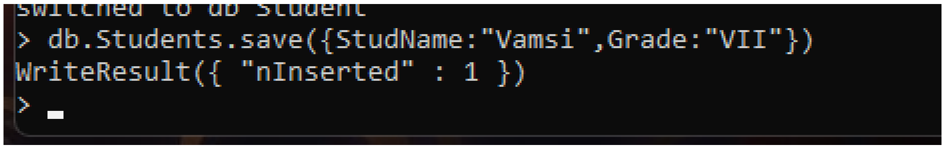


```
C:\Program Files\MongoDB\Server\5.0\bin>mongoexport --host localhost --db Student --collection airlines
 --csv --out "C:\home\hduser\Desktop\output.txt" --fields "Year","Quarter"
2022-06-03T08:28:58.325+0530    csv flag is deprecated; please use --type=csv instead
2022-06-03T08:28:58.946+0530    connected to: mongodb://localhost/
2022-06-03T08:28:58.972+0530    exported 6 records

C:\Program Files\MongoDB\Server\5.0\bin>
```

V. Save Method :

Save() method will insert a new document, if the document with the _id does not exist. If it exists it will replace the exisiting document.

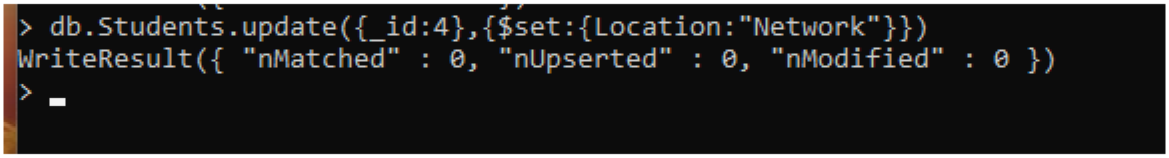
db.Students.save({StudName:”Vamsi”, Grade:”VI”})



```
switched to db student
> db.Students.save({StudName:"Vamsi",Grade:"VII"})
WriteResult({ "nInserted" : 1 })
> 
```

VI. Add a new field to existing Document:

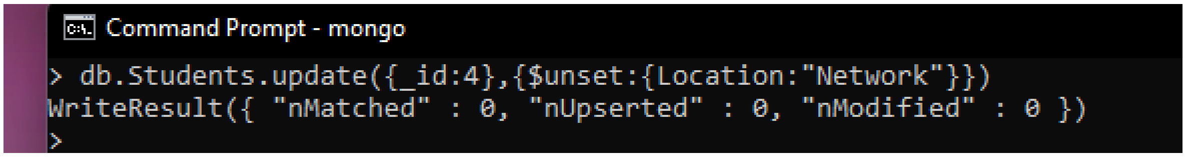
db.Students.update({_id:4},{$set:{Location:”Network”}})



```
> db.Students.update({_id:4},{$set:{Location:"Network"}})
WriteResult({ "nMatched" : 0, "nUpserted" : 0, "nModified" : 0 })
> 
```

VII. Remove the field in an existing Document

db.Students.update({_id:4},{$unset:{Location:”Network”}})



```
> db.Students.update({_id:4},{$unset:{Location:"Network"}})
WriteResult({ "nMatched" : 0, "nUpserted" : 0, "nModified" : 0 })
>
```

VIII. Finding Document based on search criteria suppressing few fields

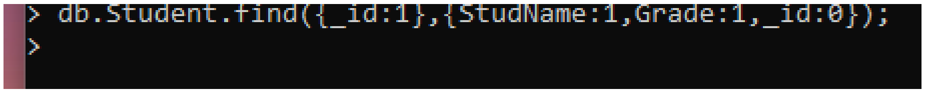
db.Student.find({_id:1},{StudName:1,Grade:1,_id:0});

To find those documents where the Grade is not set to ‘VII’

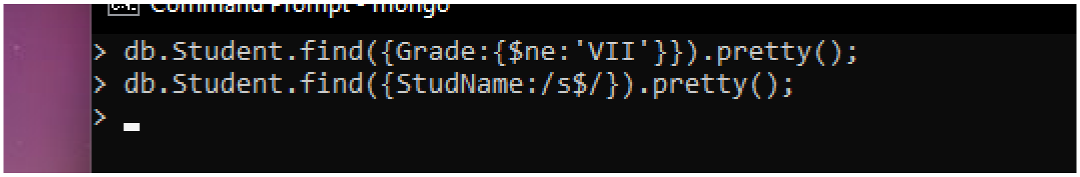
db.Student.find({Grade:{$ne:&#39;VII&#39;}}).pretty();

To find documents from the Students collection where the StudName ends with s.

db.Student.find({StudName:/s$/}).pretty();

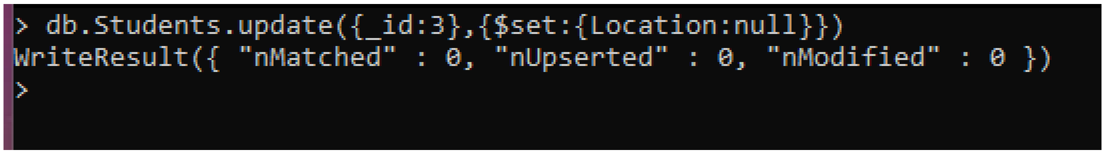


```
> db.Student.find({_id:1},{StudName:1,Grade:1,_id:0});
>
```



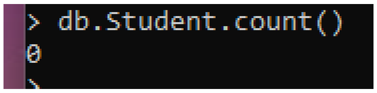
```
> db.Student.find({Grade:{$ne:'VII'}}).pretty();
> db.Student.find({StudName:/s$/}).pretty();
> 
```

IX. to set a particular field value to NULL



```
> db.Students.update({_id:3},{$set:{Location:null}})
WriteResult({ "nMatched" : 0, "nUpserted" : 0, "nModified" : 0 })
>
```

X Count the number of documents in Student Collections



```
> db.Student.count()
0
>
```

XI. Count the number of documents in Student Collections with grade :VII

db.Students.count({Grade:”VII”})

retrieve first 3 documents

db.Students.find({Grade:”VII”}).limit(3).pretty();

Sort the document in Ascending order

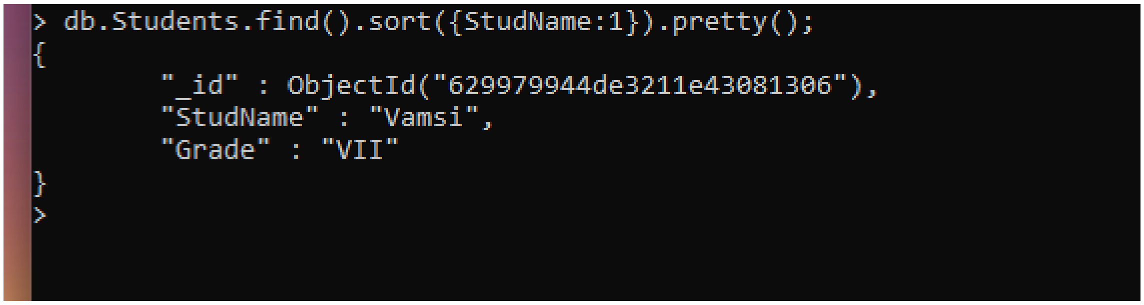
db.Students.find().sort({StudName:1}).pretty();

Note:

for desending order : db.Students.find().sort({StudName:-1}).pretty();

to Skip the 1 st two documents from the Students Collections

db.Students.find().skip(2).pretty()



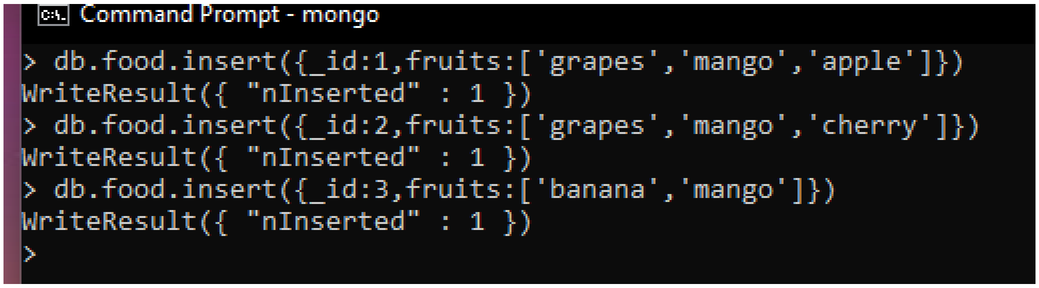
```
> db.Students.find().sort({StudName:1}).pretty();
{
        "_id" : ObjectId("629979944de3211e43081306"),
        "StudName" : "Vamsi",
        "Grade" : "VII"
}
>
```

XII. Create a collection by name “food” and add to each document add a “fruits” array

db.food.insert({ _id:1, fruits:[&#39;grapes&#39;,&#39;mango&#39;,&#39;apple&#39;] })

db.food.insert({ _id:2, fruits:[&#39;grapes&#39;,&#39;mango&#39;,&#39;cherry&#39;] })

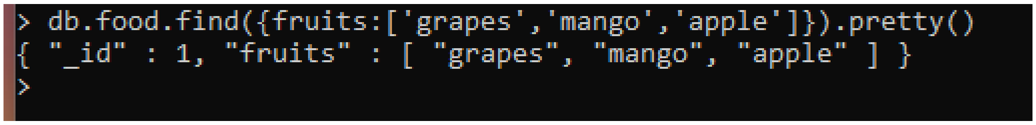
db.food.insert({ _id:3, fruits:[&#39;banana&#39;,&#39;mango&#39;] })



```
> db.food.insert({_id:1,fruits:['grapes','mango','apple']})
WriteResult({ "nInserted" : 1 })
> db.food.insert({_id:2,fruits:['grapes','mango','cherry']})
WriteResult({ "nInserted" : 1 })
> db.food.insert({_id:3,fruits:['banana','mango']})
WriteResult({ "nInserted" : 1 })
>
```

To find those documents from the “food” collection which has the “fruits array” constitute of “grapes”, “mango” and “apple”.

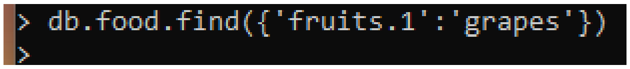
db.food.find ({fruits: [&#39;grapes&#39;,&#39;mango&#39;,&#39;apple&#39;] }). pretty().



```
> db.food.find({fruits:['grapes','mango','apple']}).pretty()
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
>
```

To find in “fruits” array having “mango” in the first index position.

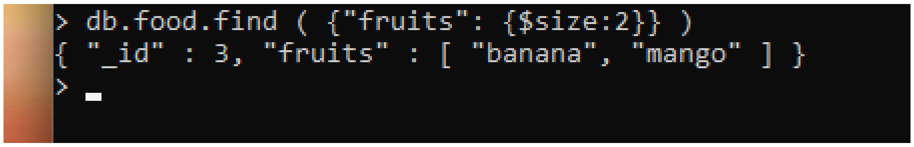
db.food.find ({&#39;fruits.1&#39;:&#39;grapes&#39;})



```
> db.food.find({'fruits.1':'grapes'})
>
```

To find those documents from the “food” collection where the size of the array is two.

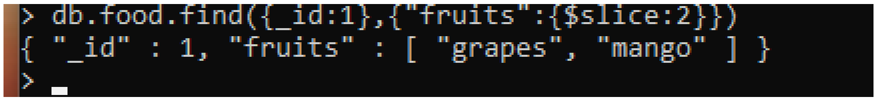
db.food.find ({“fruits”: {$size:2}})



```
> db.food.find ( {"fruits": {$size:2}} )
{ "_id" : 3, "fruits" : [ "banana", "mango" ] }
> _
```

To find the document with a particular id and display the first two elements from the array “fruits”

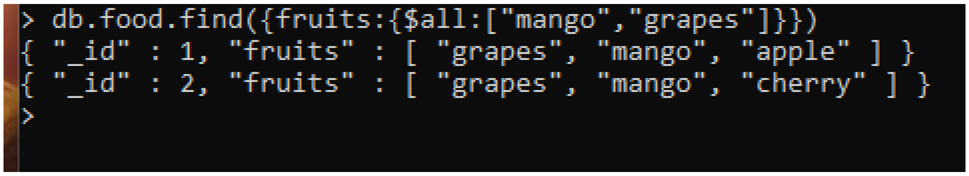
db.food.find({_id:1},{“fruits”:{$slice:2}})



```
> db.food.find({_id:1},{"fruits":{$slice:2}})
{ "_id" : 1, "fruits" : [ "grapes", "mango" ] }
> _
```

To find all the documets from the food collection which have elements mango and grapes in the array “fruits”

db.food.find({fruits:{$all:[“mango”,”grapes”]}})



```
> db.food.find({fruits:{$all:["mango","grapes"]}})
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ] }
>
```

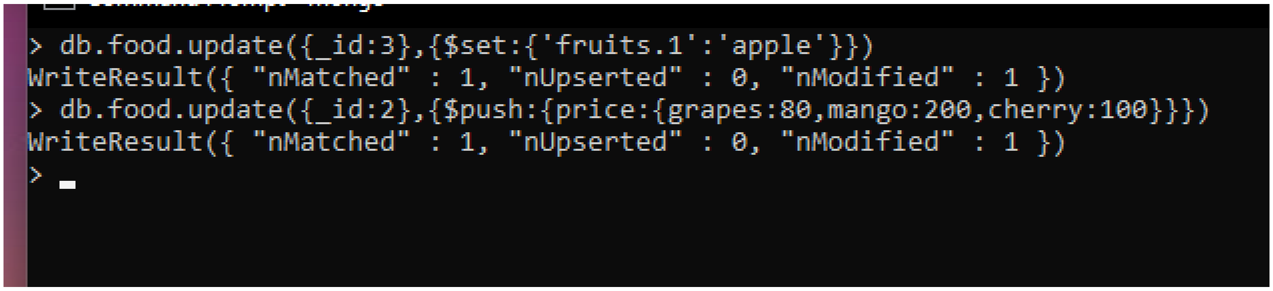
update on Array:

using particular id replace the element present in the 1 st index position of the fruits array with apple

db.food.update({_id:3},{$set:{&#39;fruits.1&#39;:&#39;apple&#39;}})

insert new key value pairs in the fruits array

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



```
> db.food.update({_id:3},{$set:{'fruits.1':'apple'}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.food.update({_id:2},{$push:{price:{grapes:80,mango:200,cherry:100}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> _
```

Note: perform query operations using - pop, addToSet, pullAll and pull

XII. Aggregate Function :

Create a collection Customers with fields custID, AcctBal, AcctType.

Now group on “custID” and compute the sum of “AccBal”.

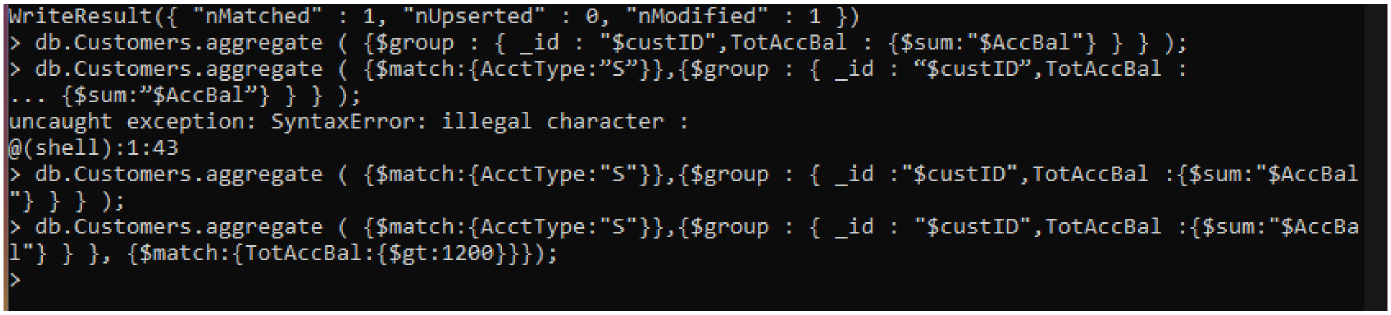
db.Customers.aggregate ({$group : { _id : “$custID”,TotAccBal : {$sum:”$AccBal”} } });

match on AcctType:”S” then group on “CustID” and compute the sum of “AccBal”.

db.Customers.aggregate ({$match:{AcctType:”S”}},{$group : { _id : “$custID”,TotAccBal : {$sum:”$AccBal”} } });

match on AcctType:”S” then group on “CustID” and compute the sum of “AccBal” and total balance greater than 1200.

db.Customers.aggregate ({$match:{AcctType:”S”}},{$group : { _id : “$custID”,TotAccBal : {$sum:”$AccBal”} } }, {$match:{TotAccBal:{$gt:1200}}});



```
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Customers.aggregate ( {$group : { _id : "$custID",TotAccBal : {$sum:"$AccBal"} } } );
> db.Customers.aggregate ( {$match:{AcctType:”S”}},{$group : { _id : “$custID”,TotAccBal :
... {$sum:”$AccBal”} } } );
uncaught exception: SyntaxError: illegal character :
@(shell):1:43
> db.Customers.aggregate ( {$match:{AcctType:"S"}},{$group : { _id :"$custID",TotAccBal :{$sum:"$AccBal
"} } } );
> db.Customers.aggregate ( {$match:{AcctType:"S"}},{$group : { _id : "$custID",TotAccBal :{$sum:"$AccBa
l"} } }, {$match:{TotAccBal:{$gt:1200}}});
>
```

MongoDB Lab Program 2 (CRUD Demonstration): -

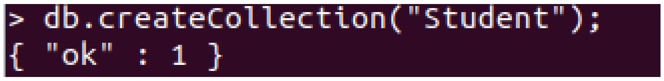
1) Using MongoDB

i) Create a database for Students and Create a Student Collection (_id,Name, USN, Semester, Dept_Name, CGPA, Hobbies(Set)).
ii) Insert required documents to the collection.

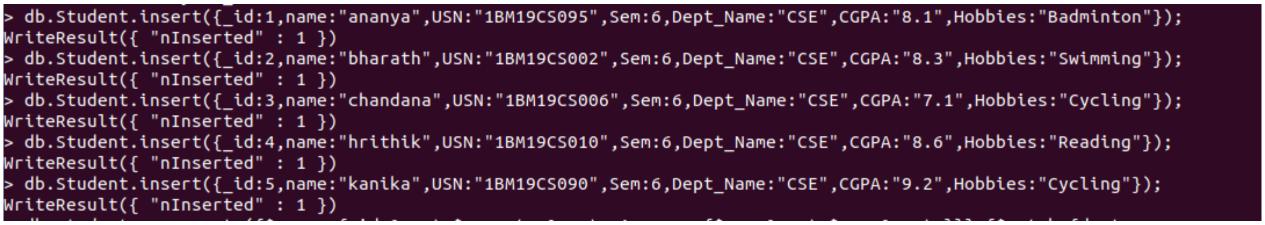
iii) First Filter on “Dept_Name:CSE” and then group it on “Semester” and

compute the Average CPGA for that semester and flter those documents where the “Avg_CPGA” is greater than 7.5.

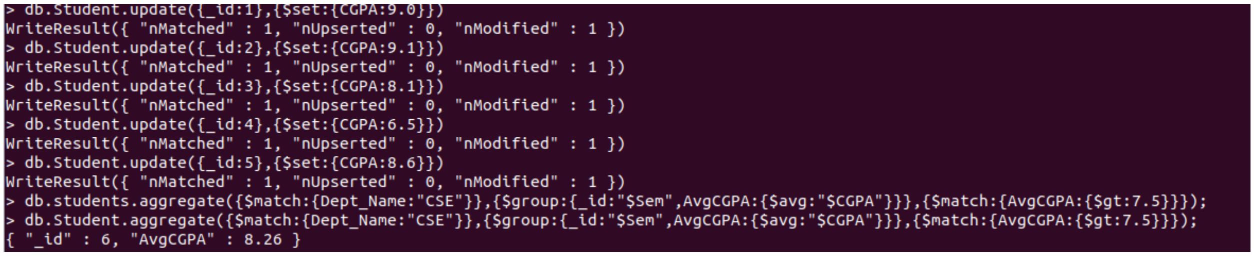
iv) Command used to export MongoDB JSON documents from “Student” Collection into the “Students” database into a CSV fle “Output.txt”.



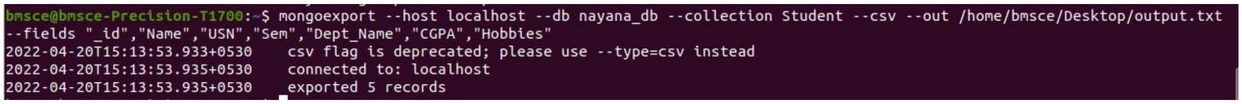
```
> db.createCollection("Student");
{ "ok" : 1 }
```



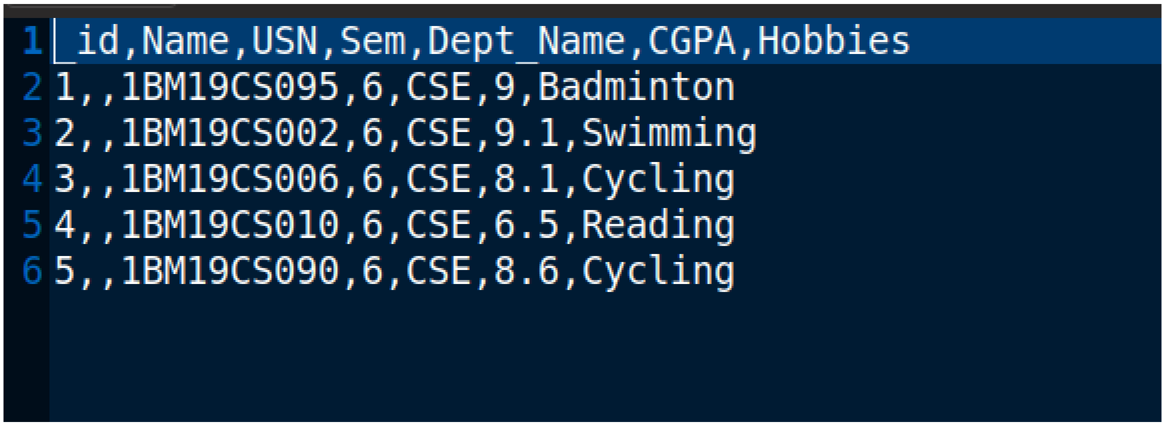
```
> db.Student.insert({_id:1,name:"ananya",USN:"1BM19CS095",Sem:6,Dept_Name:"CSE",CGPA:"8.1",Hobbies:"Badminton"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:2,name:"bharath",USN:"1BM19CS002",Sem:6,Dept_Name:"CSE",CGPA:"8.3",Hobbies:"Swimming"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:3,name:"chandana",USN:"1BM19CS006",Sem:6,Dept_Name:"CSE",CGPA:"7.1",Hobbies:"Cycling"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:4,name:"hrithik",USN:"1BM19CS010",Sem:6,Dept_Name:"CSE",CGPA:"8.6",Hobbies:"Reading"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:5,name:"kanika",USN:"1BM19CS090",Sem:6,Dept_Name:"CSE",CGPA:"9.2",Hobbies:"Cycling"});
WriteResult({ "nInserted" : 1 })
```



```
> db.Student.update({_id:1},{$set:{CGPA:9.0}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:2},{$set:{CGPA:9.1}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:3},{$set:{CGPA:8.1}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:4},{$set:{CGPA:6.5}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.update({_id:5},{$set:{CGPA:8.6}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.students.aggregate({$match:{Dept_Name:"CSE"}},{$group:{_id:"$Sem",AvgCGPA:{$avg:"$CGPA"}}},{$match:{AvgCGPA:{$gt:7.5}}});
> db.Student.aggregate({$match:{Dept_Name:"CSE"}},{$group:{_id:"$Sem",AvgCGPA:{$avg:"$CGPA"}}},{$match:{AvgCGPA:{$gt:7.5}}});
{ "_id" : 6, "AvgCGPA" : 8.26 }
```



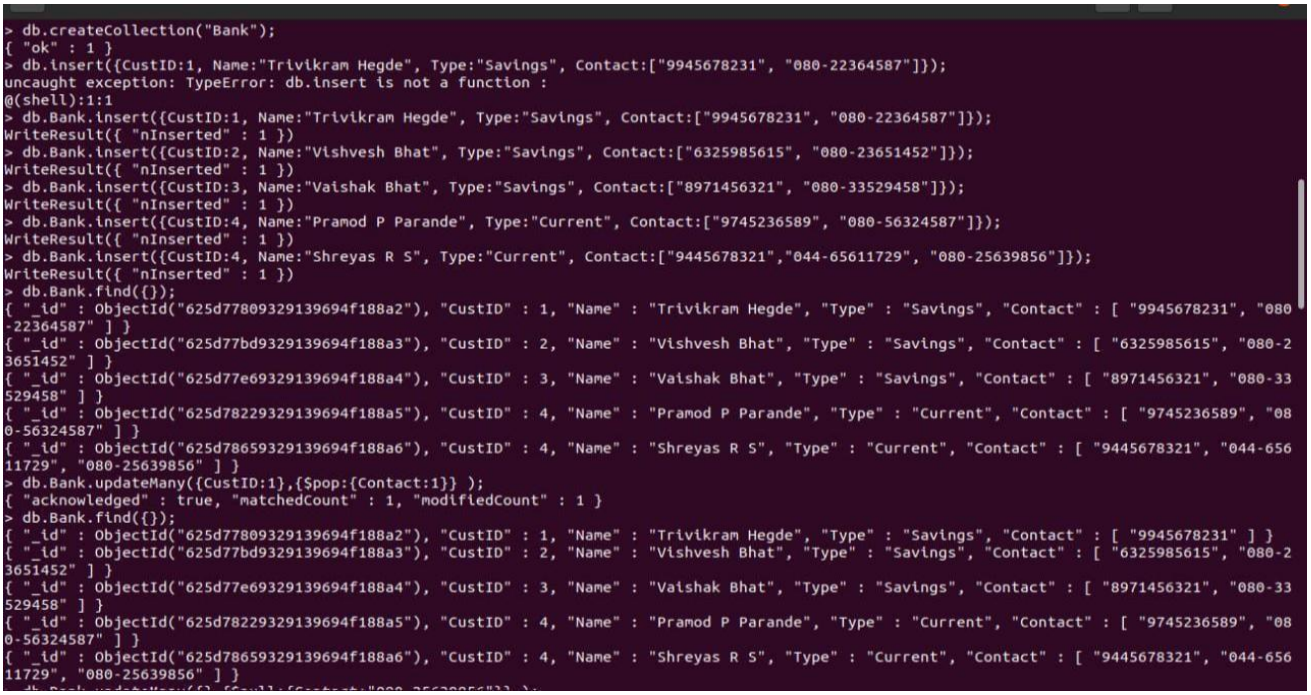
```
bmsce@bmsce-Precision-T1700:~$ mongoexport --host localhost --db nayana_db --collection Student --csv --out /home/bmsce/Desktop/output.txt
--fields "_id","Name","USN","Sem","Dept_Name","CGPA","Hobbies"
2022-04-20T15:13:53.933+0530    csv flag is deprecated; please use --type=csv instead
2022-04-20T15:13:53.935+0530    connected to: localhost
2022-04-20T15:13:53.935+0530    exported 5 records
```



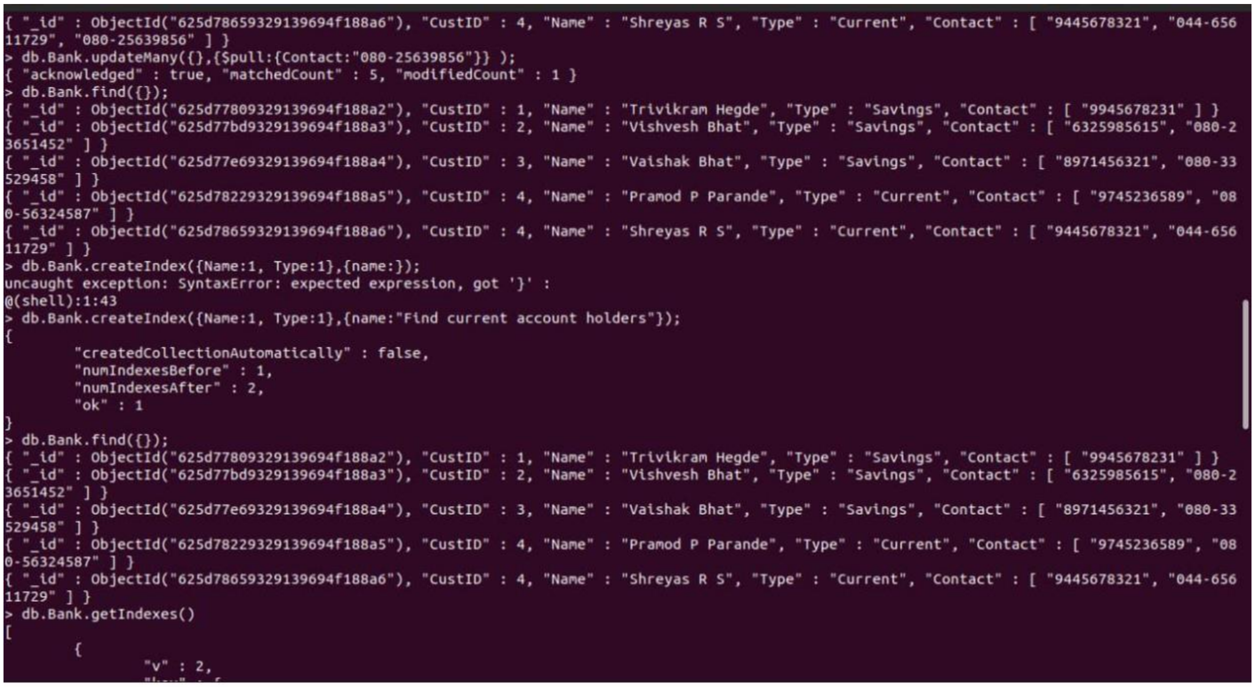
```
_id,Name,USN,Sem,Dept_Name,CGPA,Hobbies
1,,1BM19CS095,6,CSE,9,Badminton
2,,1BM19CS002,6,CSE,9.1,Swimming
3,,1BM19CS006,6,CSE,8.1,Cycling
4,,1BM19CS010,6,CSE,6.5,Reading
5,,1BM19CS090,6,CSE,8.6,Cycling
```

2)Create a mongodb collection Bank. Demonstrate the following by choosing felds of your choice.

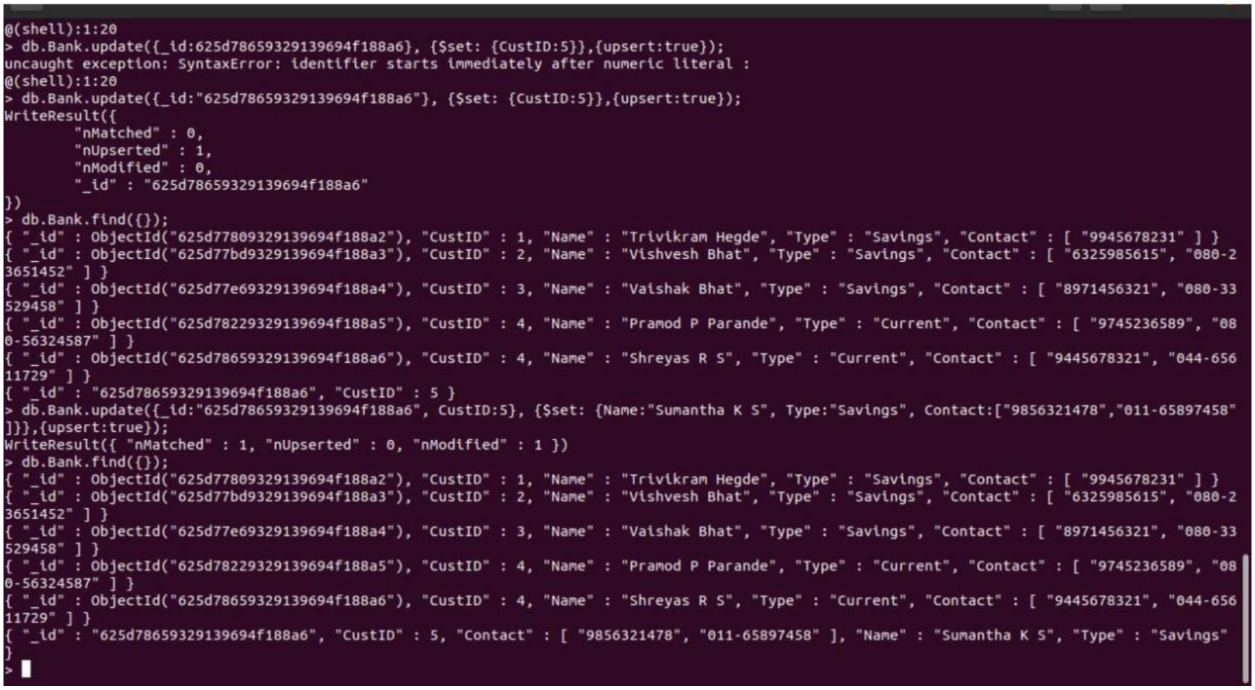
1. Insert three documents
2. Use Arrays(Use Pull and Pop operation)
3. Use Index
4. Use Cursors
5. Updation



```
> db.createCollection("Bank");
{ "ok" : 1 }
> db.insert({CustID:1, Name:"Trivikram Hegde", Type:"Savings", Contact:["9945678231", "080-22364587"]});
uncaught exception: TypeError: db.insert is not a function :
@(shell):1:1
> db.Bank.insert({CustID:1, Name:"Trivikram Hegde", Type:"Savings", Contact:["9945678231", "080-22364587"]});
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({CustID:2, Name:"Vishvesh Bhat", Type:"Savings", Contact:["6325985615", "080-23651452"]});
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({CustID:3, Name:"Vaishak Bhat", Type:"Savings", Contact:["8971456321", "080-33529458"]});
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({CustID:4, Name:"Pramod P Parande", Type:"Current", Contact:["9745236589", "080-56324587"]});
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({CustID:4, Name:"Shreyas R S", Type:"Current", Contact:["9445678321","044-65611729", "080-25639856"]});
WriteResult({ "nInserted" : 1 })
> db.Bank.find({});
{ "_id" : ObjectId("625d77809329139694f188a2"), "CustID" : 1, "Name" : "Trivikram Hegde", "Type" : "Savings", "Contact" : [ "9945678231", "080
-22364587" ] }
{ "_id" : ObjectId("625d77bd9329139694f188a3"), "CustID" : 2, "Name" : "Vishvesh Bhat", "Type" : "Savings", "Contact" : [ "6325985615", "080-2
3651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33
529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pramod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "08
0-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-656
11729", "080-25639856" ] }
> db.Bank.updateMany({CustID:1},{$pop:{Contact:1}} );
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
> db.Bank.find({});
{ "_id" : ObjectId("625d77809329139694f188a2"), "CustID" : 1, "Name" : "Trivikram Hegde", "Type" : "Savings", "Contact" : [ "9945678231" ] }
{ "_id" : ObjectId("625d77bd9329139694f188a3"), "CustID" : 2, "Name" : "Vishvesh Bhat", "Type" : "Savings", "Contact" : [ "6325985615", "080-2
3651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33
529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pramod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "08
0-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-656
11729", "080-25639856" ] }
> db.Bank.updateMany({},{$pull:{Contact:"080-25639856"}} );
```



```
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-656
11729", "080-25639856" ] }
> db.Bank.updateMany({},{$pull:{Contact:"080-25639856"}} );
{ "acknowledged" : true, "matchedCount" : 5, "modifiedCount" : 1 }
> db.Bank.find({});
{ "_id" : ObjectId("625d77809329139694f188a2"), "CustID" : 1, "Name" : "Trivikram Hegde", "Type" : "Savings", "Contact" : [ "9945678231" ] }
{ "_id" : ObjectId("625d77bd9329139694f188a3"), "CustID" : 2, "Name" : "Vishvesh Bhat", "Type" : "Savings", "Contact" : [ "6325985615", "080-2
3651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33
529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pramod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "08
0-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-656
11729" ] }
> db.Bank.createIndex({Name:1, Type:1},{name:});
uncaught exception: SyntaxError: expected expression, got '}' :
@(shell):1:43
> db.Bank.createIndex({Name:1, Type:1},{name:"Find current account holders"});
{
        "createdCollectionAutomatically" : false,
        "numIndexesBefore" : 1,
        "numIndexesAfter" : 2,
        "ok" : 1
}
> db.Bank.find({});
{ "_id" : ObjectId("625d77809329139694f188a2"), "CustID" : 1, "Name" : "Trivikram Hegde", "Type" : "Savings", "Contact" : [ "9945678231" ] }
{ "_id" : ObjectId("625d77bd9329139694f188a3"), "CustID" : 2, "Name" : "Vishvesh Bhat", "Type" : "Savings", "Contact" : [ "6325985615", "080-2
3651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33
529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pramod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "08
0-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-656
11729" ] }
> db.Bank.getIndexes()
[
        {
                "v" : 2,
```



```
@(shell):1:20
> db.Bank.update({_id:625d78659329139694f188a6}, {$set: {CustID:5}},{upsert:true});
uncaught exception: SyntaxError: identifier starts immediately after numeric literal :
@(shell):1:20
> db.Bank.update({_id:"625d78659329139694f188a6"}, {$set: {CustID:5}},{upsert:true});
WriteResult({
        "nMatched" : 0,
        "nUpserted" : 1,
        "nModified" : 0,
        "_id" : "625d78659329139694f188a6"
})
> db.Bank.find({});
{ "_id" : ObjectId("625d77809329139694f188a2"), "CustID" : 1, "Name" : "Trivikram Hegde", "Type" : "Savings", "Contact" : [ "9945678231" ] }
{ "_id" : ObjectId("625d77bd9329139694f188a3"), "CustID" : 2, "Name" : "Vishvesh Bhat", "Type" : "Savings", "Contact" : [ "6325985615", "080-2
3651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33
529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pramod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "08
0-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-656
11729" ] }
{ "_id" : "625d78659329139694f188a6", "CustID" : 5 }
> db.Bank.update({_id:"625d78659329139694f188a6", CustID:5}, {$set: {Name:"Sumantha K S", Type:"Savings", Contact:["9856321478","011-65897458"
]}},{upsert:true});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find({});
{ "_id" : ObjectId("625d77809329139694f188a2"), "CustID" : 1, "Name" : "Trivikram Hegde", "Type" : "Savings", "Contact" : [ "9945678231" ] }
{ "_id" : ObjectId("625d77bd9329139694f188a3"), "CustID" : 2, "Name" : "Vishvesh Bhat", "Type" : "Savings", "Contact" : [ "6325985615", "080-2
3651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33
529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pramod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "08
0-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-656
11729" ] }
{ "_id" : "625d78659329139694f188a6", "CustID" : 5, "Contact" : [ "9856321478", "011-65897458" ], "Name" : "Sumantha K S", "Type" : "Savings"
}
> 
```

1) Using MongoDB,

i) Create a database for Faculty and Create a Faculty Collection(Faculty_id, Name, Designation ,Department, Age, Salary, Specialization(Set)).
ii) Insert required documents to the collection.

iii) First Filter on “Dept_Name:MECH” and then group it on “Designation” and

compute the Average Salary for that Designation and flter those documents where the “Avg_Sal” is greater than 650000. iv) Demonstrate usage of import and export commands

Write MongoDB queries for the following:

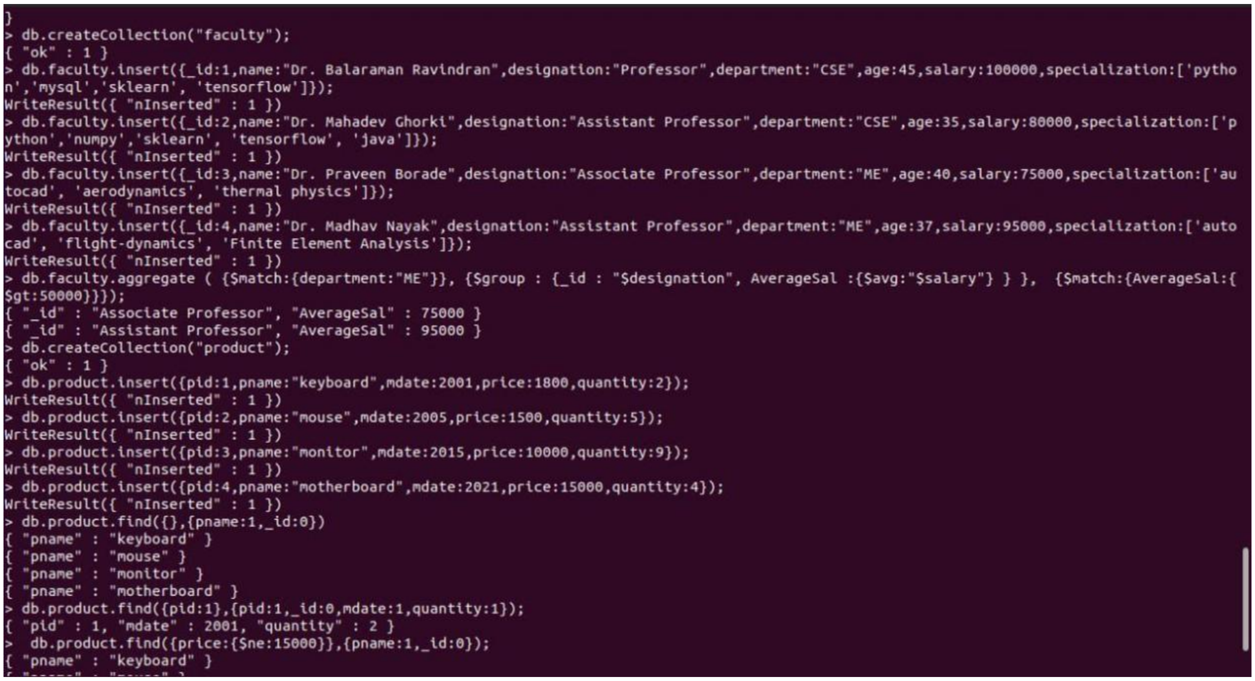
1) To display only the product name from all the documents of the product collection.

2) To display only the Product ID, ExpiryDate as well as the quantity from the document of the product collection where the _id column is 1.

3) To fnd those documents where the price is not set to 15000.

4) To fnd those documents from the Product collection where the quantity is set to 9 and the product name is set to ‘monitor’.

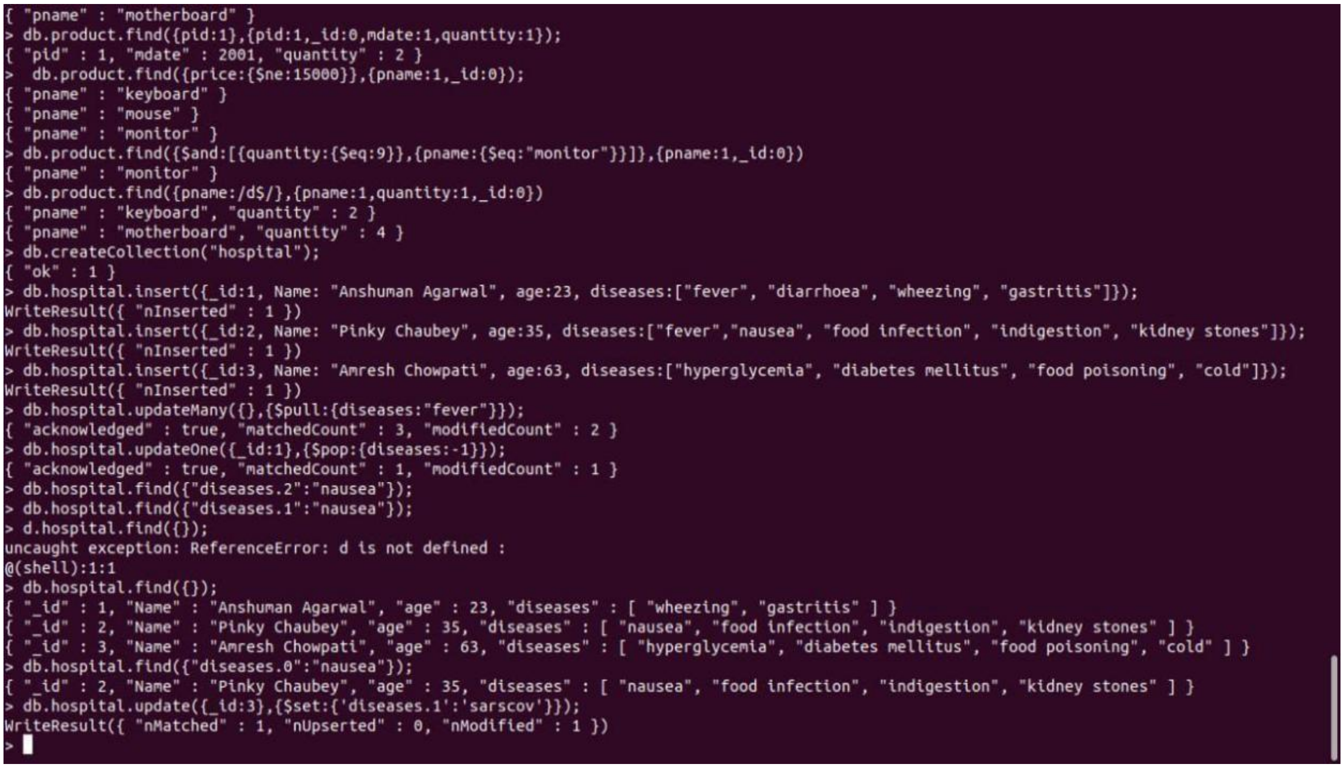
5) To fnd documents from the Product collection where the Product name ends in ‘d’.



```
}
> db.createCollection("faculty");
{ "ok" : 1 }
> db.faculty.insert({_id:1,name:"Dr. Balaraman Ravindran",designation:"Professor",department:"CSE",age:45,salary:100000,specialization:['pytho
n','mysql','sklearn', 'tensorflow']});
WriteResult({ "nInserted" : 1 })
> db.faculty.insert({_id:2,name:"Dr. Mahadev Ghorki",designation:"Assistant Professor",department:"CSE",age:35,salary:80000,specialization:['p
ython','numpy','sklearn', 'tensorflow', 'java']});
WriteResult({ "nInserted" : 1 })
> db.faculty.insert({_id:3,name:"Dr. Praveen Borade",designation:"Associate Professor",department:"ME",age:40,salary:75000,specialization:['au
tocad', 'aerodynamics', 'thermal physics']});
WriteResult({ "nInserted" : 1 })
> db.faculty.insert({_id:4,name:"Dr. Madhav Nayak",designation:"Assistant Professor",department:"ME",age:37,salary:95000,specialization:['auto
cad', 'flight-dynamics', 'Finite Element Analysis']});
WriteResult({ "nInserted" : 1 })
> db.faculty.aggregate ( {$match:{department:"ME"}}, {$group : {_id : "$designation", AverageSal :{$avg:"$salary"} } },  {$match:{AverageSal:{
$gt:50000}}});
{ "_id" : "Associate Professor", "AverageSal" : 75000 }
{ "_id" : "Assistant Professor", "AverageSal" : 95000 }
> db.createCollection("product");
{ "ok" : 1 }
> db.product.insert({pid:1,pname:"keyboard",mdate:2001,price:1800,quantity:2});
WriteResult({ "nInserted" : 1 })
> db.product.insert({pid:2,pname:"mouse",mdate:2005,price:1500,quantity:5});
WriteResult({ "nInserted" : 1 })
> db.product.insert({pid:3,pname:"monitor",mdate:2015,price:10000,quantity:9});
WriteResult({ "nInserted" : 1 })
> db.product.insert({pid:4,pname:"motherboard",mdate:2021,price:15000,quantity:4});
WriteResult({ "nInserted" : 1 })
> db.product.find({},{pname:1,_id:0})
{ "pname" : "keyboard" }
{ "pname" : "mouse" }
{ "pname" : "monitor" }
{ "pname" : "motherboard" }
> db.product.find({pid:1},{pid:1,_id:0,mdate:1,quantity:1});
{ "pid" : 1, "mdate" : 2001, "quantity" : 2 }
>  db.product.find({price:{$ne:15000}},{pname:1,_id:0});
{ "pname" : "keyboard" }
```

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

1. Insert three documents
2. Use Arrays(Use Pull and Pop operation)
3. Use Index
4. Use Cursors
5. Updation



```
{ "pname" : "motherboard" }
> db.product.find({pid:1},{pid:1,_id:0,mdate:1,quantity:1});
{ "pid" : 1, "mdate" : 2001, "quantity" : 2 }
>  db.product.find({price:{$ne:15000}},{pname:1,_id:0});
{ "pname" : "keyboard" }
{ "pname" : "mouse" }
{ "pname" : "monitor" }
> db.product.find({$and:[{quantity:{$eq:9}},{pname:{$eq:"monitor"}}]},{pname:1,_id:0})
{ "pname" : "monitor" }
> db.product.find({pname:/d$/},{pname:1,quantity:1,_id:0})
{ "pname" : "keyboard", "quantity" : 2 }
{ "pname" : "motherboard", "quantity" : 4 }
> db.createCollection("hospital");
{ "ok" : 1 }
> db.hospital.insert({_id:1, Name: "Anshuman Agarwal", age:23, diseases:["fever", "diarrhoea", "wheezing", "gastritis"]});
WriteResult({ "nInserted" : 1 })
> db.hospital.insert({_id:2, Name: "Pinky Chaubey", age:35, diseases:["fever","nausea", "food infection", "indigestion", "kidney stones"]});
WriteResult({ "nInserted" : 1 })
> db.hospital.insert({_id:3, Name: "Amresh Chowpati", age:63, diseases:["hyperglycemia", "diabetes mellitus", "food poisoning", "cold"]});
WriteResult({ "nInserted" : 1 })
> db.hospital.updateMany({},{$pull:{diseases:"fever"}});
{ "acknowledged" : true, "matchedCount" : 3, "modifiedCount" : 2 }
> db.hospital.updateOne({_id:1},{$pop:{diseases:-1}});
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
> db.hospital.find({"diseases.2":"nausea"});
> db.hospital.find({"diseases.1":"nausea"});
> d.hospital.find({});
uncaught exception: ReferenceError: d is not defined :
@(shell):1:1
> db.hospital.find({});
{ "_id" : 1, "Name" : "Anshuman Agarwal", "age" : 23, "diseases" : [ "wheezing", "gastritis" ] }
{ "_id" : 2, "Name" : "Pinky Chaubey", "age" : 35, "diseases" : [ "nausea", "food infection", "indigestion", "kidney stones" ] }
{ "_id" : 3, "Name" : "Amresh Chowpati", "age" : 63, "diseases" : [ "hyperglycemia", "diabetes mellitus", "food poisoning", "cold" ] }
> db.hospital.find({"diseases.0":"nausea"});
{ "_id" : 2, "Name" : "Pinky Chaubey", "age" : 35, "diseases" : [ "nausea", "food infection", "indigestion", "kidney stones" ] }
> db.hospital.update({_id:3},{$set:{'diseases.1':'sarscov'}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> 
```

Hadoop Commands

```
hdusersbmsce-OptiPlus-3000:-$ sudo su hduser
[sudo] password for hduser:

hdusersbmsce-OptiPlus-3000: $ start-all.sh
This script is Deprecated. Instead use start-dfs.sh and start-yarn.sh
22/06/06 14:43:45 WARN util.NativeCodeLoader: Unable to load native-hadoop
Library for your platform... using builtin-java classes where applicable
Starting namenodes on [localhost]
localhost: nanenade running as process 3396. Stop it first.
localhost: datanode running as process 3564, Stop it first.
starting secondary nanenodes [0.0.0.0)
0.0.0.0: secondarynamenode running as process 3773. Stop it first.
022/06/06 14:43:47 WARN uttt.NativeCodeLoader: Unable to load native-hadoop
library for your
starting yarn daemons
resource process 3932. Stop it first.
Localhost: running as process 4255. stop it first.
6003 Jps
3932 ResourceManager
3773 SecondaryNameNode
4255 NodeManager
hdusersbmsce-OptiPlus-3060:-$ hdfs dfs -mkdir /khushil
hdusersbmsce-OptiPlus-3060: $ hdfs dfs -ls /
22/06/06 14:45:30 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
Found 19 itens
drwxr-xr-x hduser supergroup
02022-06-06 11:44 /AAA
drwxr-xr-x -hduser supergroup
2022-06-03 12:17 /Army
drwxr-xr-x hduser supergroup
02022-06-06 11:40 /Avnit
drwxr-xr-x -hduser supergroup
02022-05-31 10:44 /88
drwxr-xr-x -hduser supergroup
02022-06-01 15:03 /Cath
drwxr-xr-x -hduser supergroup
drwxr-xr-x hduser supergroup
drwxr-xr-x -hduser supergroup
drwxr-xr-x -hduser supergroup
drwxr-xr-x -hduser supergroup
drwxr-xr-x -hduser supergroup
drwxr-xr-x -hduser supergroup
drwxr-xr-x -hduser supergroup
drwxr-xr-x -hduser supergroup
drwxr-xr-x - hduser supergroup
drwxr-xr-x -hduser supergroup
82022-06-04 10:06 /FFF
02022-06-06 14:40 /Kmrv
02022-06-06 14:44 /Khushil
02022-06-01 15:03 /Neha
02022-06-04 09:54 /WC.txt
0 2022-06-04 09:54 /welcone.txt
02022-06-06 11:36 /abc
62022-06-03 12:13 /akash
0 2022-06-03 15:12 /darshan
```

```
0 2022-06-04 09:31 /ghh
8 2022-06-06 11:45 /hello
drwxr-xr-x -hduser supergroup
62022-06-04 09:35 /rahul
drwxr-xr-x -hduser supergroup
02022-06-03 12:11 /shre
drwxr-xr-x .hduser supergroup
02022-06-03 12:41 /shreshtha
hdusersbmsce-OptiPlus-3060:-$ hdfs dfs put /home/hduser/Desktop/6b.txt
/Khushil/WC.txt
22/05/06 14:46:40 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using butltin-java classes where applicable
hduserabesce-OptiPlex-3060:-$ hdfs dfs cat /Khushil/WC.txt
22/06/06 14:47:00 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
hello fron of
hdusersbmsce-OptiPlus-3040:-$ hdfs dfs-get /Khushil/WC.txt
/home/hduser/Downloads/newic.txt
22/05/06 14:51:43 WARN util.NativeCodeLoader: Unable to load nattve-hadoop
library for your platform... using builtin-java classes where applicable
hdusersbmsce-OptiPlus-3066:-$ cd Downloads
hdusersbmsce-OptiPlus-3060:-/Downloads$ cat newwMC.Ext
hello from 6E
hdusersbmsce-OptiPlus-3060:-$ hdfs dfs -1s /Khushil/
22/06/06 14:54:04 WARN util.NativeCodeLoader: Unable to load native-hadoop
Library for your platform... using builtin java classes where applicable
Found 2 itens
-rw-r--r-- 1 hduser supergroup
23 2822-06-06 14:46 /Khushil/MC.txt
1 hduser supergroup
23 2022-06-06 14:58 /Khushil/newwc.txt
hdusersbmsce-OptiPlus-3060:-5 hdfs drs -getmerge /Khushil/wc.txt
/Khushil/newwc.txt /bone/hduser/Desktop/newmerge.txt
22/06/06 14:55:18 NARN util.NativeCodeLoader: Unable to load nattve-hadoop
library for your platform... using butitin-Java classes where applicable
hduserabesce-OptiPlex-3060:~$ cd Desktop
hduser@besce-OptiPlex-3060:-/Desktops cat newmerge.txt
hello from 68
D
B
hello from 68
D
B
hdusersbmsce-OptiPlus-3060:-/Desktops hadoop fs getfacl /Khushil/
22/06/06 14:56:24 WARN util.NativeCodeLoader: Unable to load native hadoop
library for your platform... using builtin java classes where applicable
# file: /Khushil
# owner: hduser
# group: supergroup
user::rwx
group::r-x
other::r-x
hdusersbmsce-OptiPlus-3060:-/Desktop5 hdfs dfs copyToLocal /Khushil/HC.txt
/home/hduser/Desktop
22/05/06 14:58:09 WARN util.NativeCodeLoader: Unable to load native-hadoop
Library for your platform... using butltin-java classes where applicable
hdusersbmsce-OptiPlus-3000:-/Desktop5 cat MC.txt
hello fron 68
```

```
hdusersbmsce-OptiPlus-3060:-/Desktops hdfs dfs -cat /Khushil/MC.txt
22/06/06 14:58:59 WARN util.NativeCodeLoader: Unable to load native-hadoop
Library for your platform... ustng bulltin-Java classes where applicable
hello from GB
B
hdusersbmsce-OptiPlus-3060:-/Desktop5 hadoop fs - /Khushil /FFF 22/06/06
14:59:46 WARN util.NativeCodeLoader: Unable to load native-hadoop Library for
your platform... using builtin-java classes where applicable hduseransce-
OptiPlex-3060:-/Desktops hadoop fs-Ls /FFF 22/05/06 15:00:00 WARN
util.NativeCodeLoader: Unable to load native-hadoop library for your
platform... using butltin-java classes where applicable Found 2 itens drwxr-
xr-x -hduser supergroup TWEE 1 hduser supergroup 02022-05-06 14:50
/FFF/Khushil 17 2022-05-04 10:06 /FFF/MC.txt
hdusersbmsce-OptiPlus-3060:-/Desktops hadoop fs cp /FFF/ /LLL
22/06/06 15:09:34 WARN util.NativeCodeLoader: Unable to load native hadoop
library for your platform... using butltin-java classes where applicable
hdusersbmsce-OptiPlus-3060:-/Desktops hadoop fs -Ls /LLL
22/06/06 15:10:07 WARN util.NativeCodeLoader: Unable to load native-hadoop
library for your platform... using builtin-java classes where applicable
Found 2 1tens
drwxr-xr-x -hduser supergroup
hdusersbmsce-OptiPlus-3000:-/Desktops
02022-06-06 15:09 /LLL/KHUSHIL
17 2022-00-00 15:09 /LLL/MC.txt
```

Hadoop Programs

1) Word Count

WCMapper Java Class file.

```
// Importing libraries
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));
            }    }     } }
```

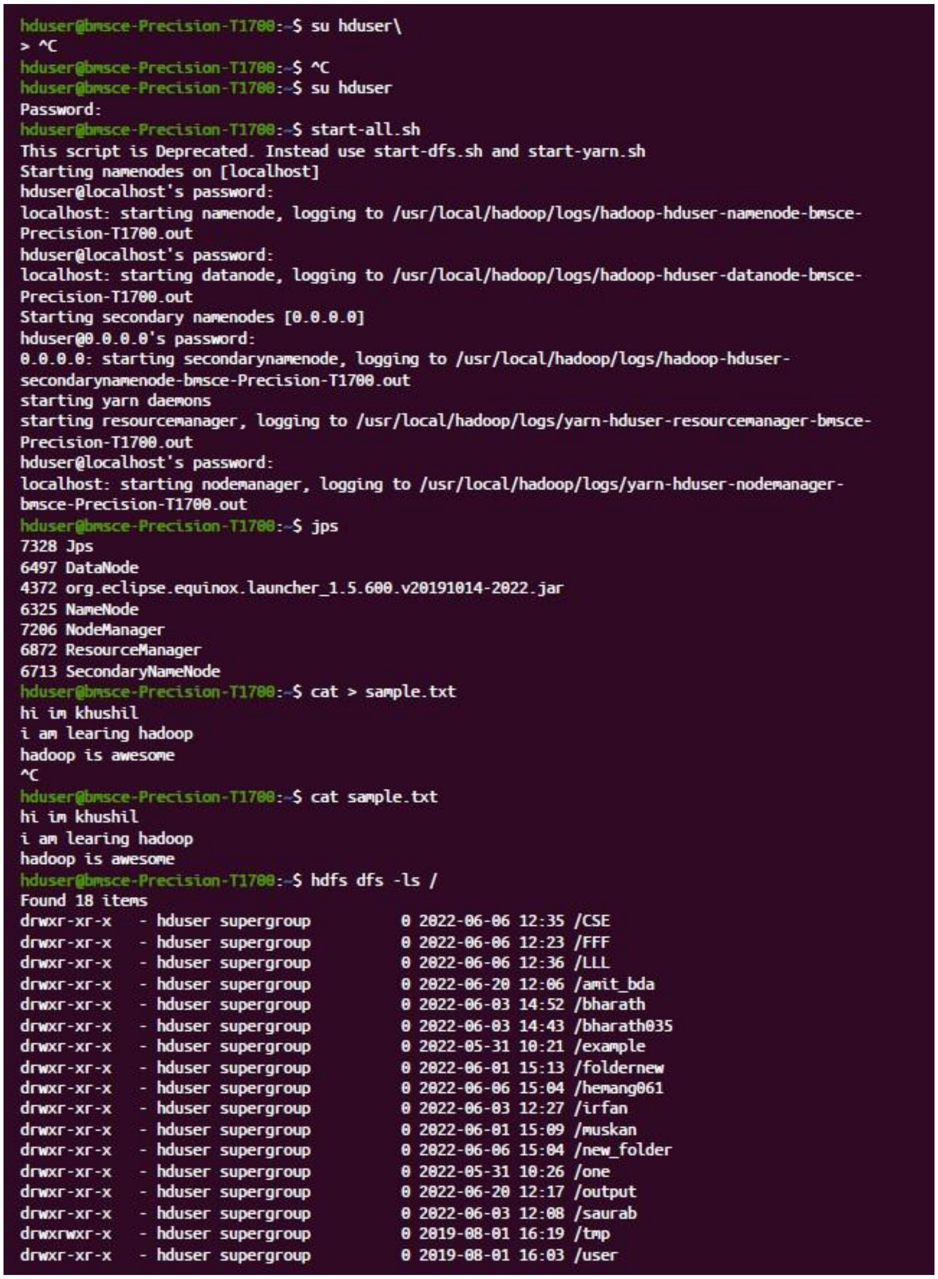
Reducer Code

```
// 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));
    }
}
```

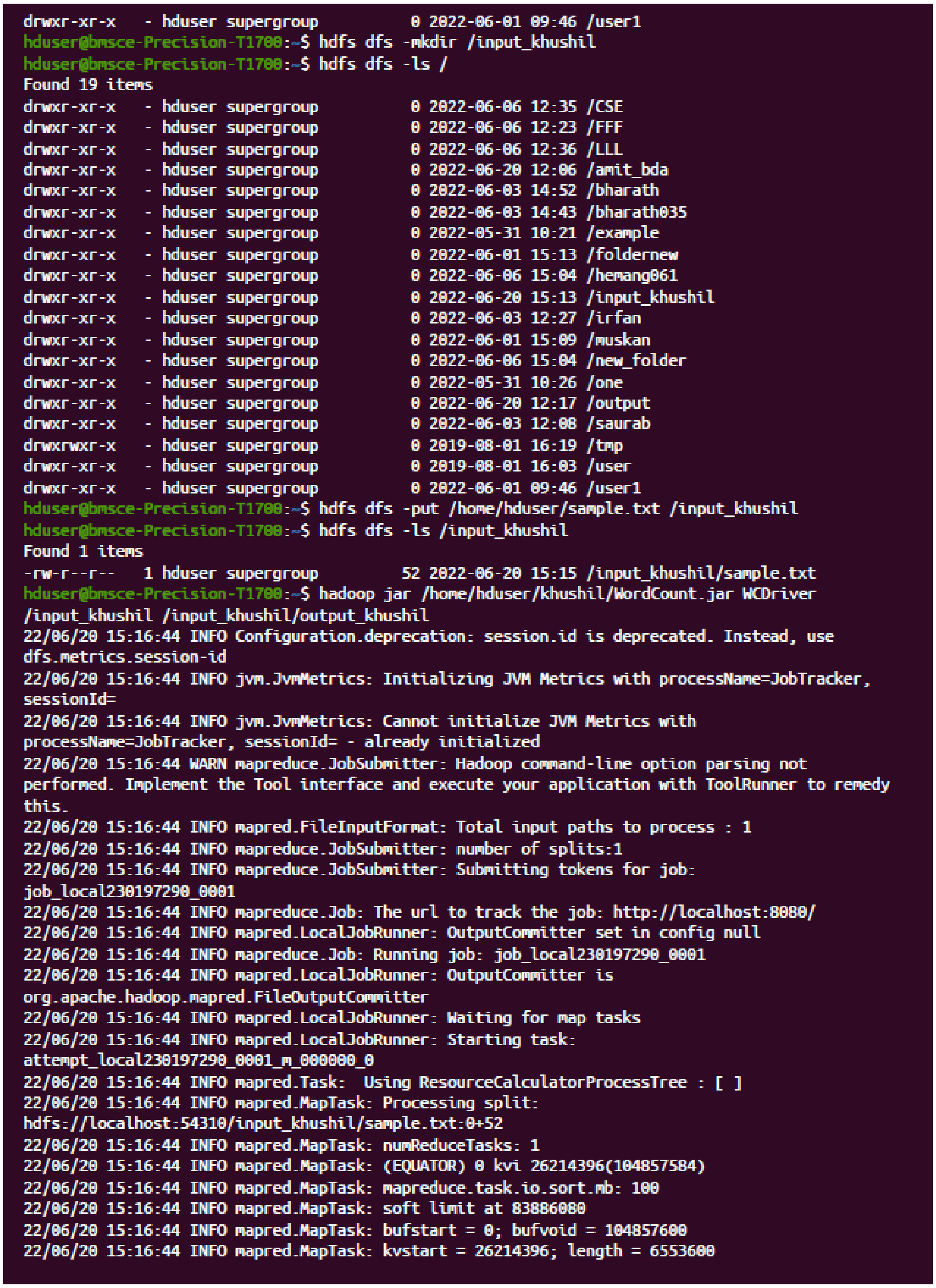
Driver Code:

```
// 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);
    }
}
```

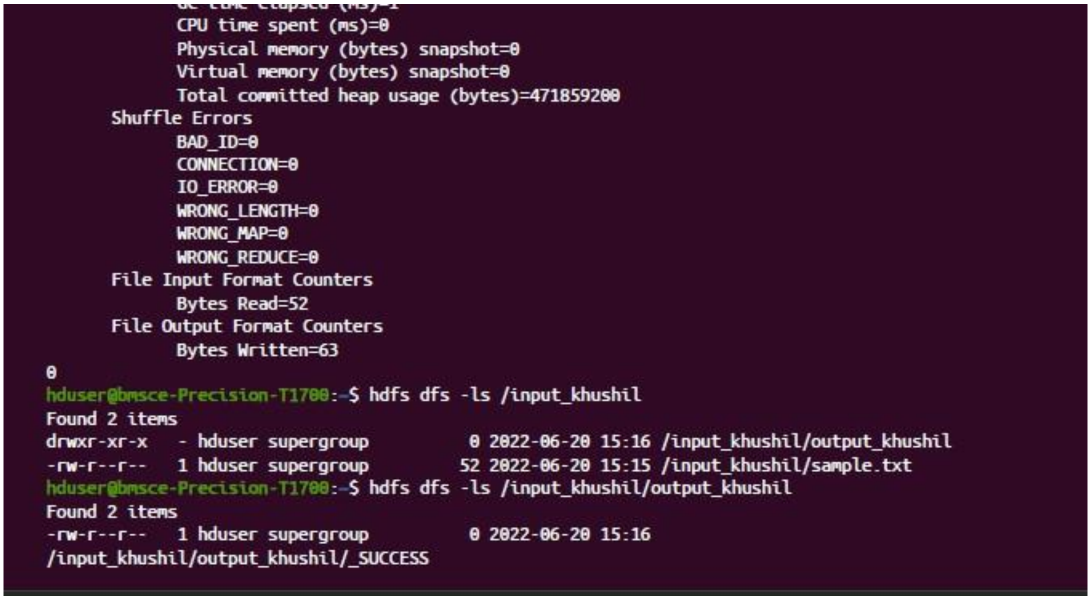
Output :



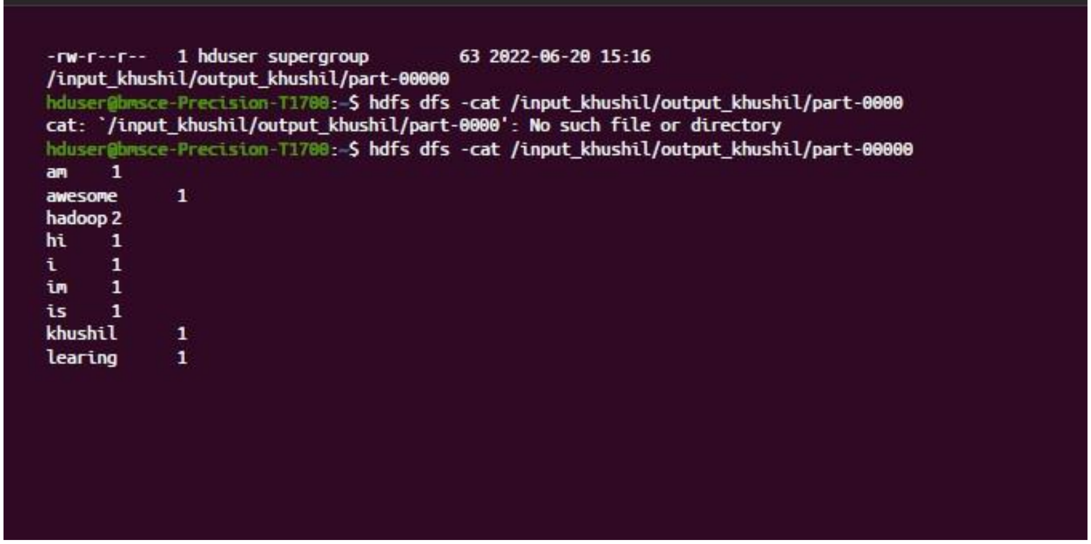
```
hduser@bmsce-Precision-T1700:~$ su hduser\
> ^C
hduser@bmsce-Precision-T1700:~$ ^C
hduser@bmsce-Precision-T1700:~$ su hduser
Password:
hduser@bmsce-Precision-T1700:~$ start-all.sh
This script is Deprecated. Instead use start-dfs.sh and start-yarn.sh
Starting namenodes on [localhost]
hduser@localhost's password:
localhost: starting namenode, logging to /usr/local/hadoop/logs/hadoop-hduser-namenode-bmsce-
Precision-T1700.out
hduser@localhost's password:
localhost: starting datanode, logging to /usr/local/hadoop/logs/hadoop-hduser-datanode-bmsce-
Precision-T1700.out
Starting secondary namenodes [0.0.0.0]
hduser@0.0.0.0's password:
0.0.0.0: starting secondarynamenode, logging to /usr/local/hadoop/logs/hadoop-hduser-
secondarynamenode-bmsce-Precision-T1700.out
starting yarn daemons
starting resourcemanager, logging to /usr/local/hadoop/logs/yarn-hduser-resourcemanager-bmsce-
Precision-T1700.out
hduser@localhost's password:
localhost: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-hduser-nodemanager-
bmsce-Precision-T1700.out
hduser@bmsce-Precision-T1700:~$ jps
7328 Jps
6497 DataNode
4372 org.eclipse.equinox.launcher_1.5.600.v20191014-2022.jar
6325 NameNode
7206 NodeManager
6872 ResourceManager
6713 SecondaryNameNode
hduser@bmsce-Precision-T1700:~$ cat > sample.txt
hi im khushil
i am learing hadoop
hadoop is awesome
^C
hduser@bmsce-Precision-T1700:~$ cat sample.txt
hi im khushil
i am learing hadoop
hadoop is awesome
hduser@bmsce-Precision-T1700:~$ hdfs dfs -ls /
Found 18 items
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:35 /CSE
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:23 /FFF
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:36 /LLL
drwxr-xr-x   - hduser supergroup          0 2022-06-20 12:06 /amit_bda
drwxr-xr-x   - hduser supergroup          0 2022-06-03 14:52 /bharath
drwxr-xr-x   - hduser supergroup          0 2022-06-03 14:43 /bharath035
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:21 /example
drwxr-xr-x   - hduser supergroup          0 2022-06-01 15:13 /foldernew
drwxr-xr-x   - hduser supergroup          0 2022-06-06 15:04 /hemang061
drwxr-xr-x   - hduser supergroup          0 2022-06-03 12:27 /irfan
drwxr-xr-x   - hduser supergroup          0 2022-06-01 15:09 /muskan
drwxr-xr-x   - hduser supergroup          0 2022-06-06 15:04 /new_folder
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:26 /one
drwxr-xr-x   - hduser supergroup          0 2022-06-20 12:17 /output
drwxr-xr-x   - hduser supergroup          0 2022-06-03 12:08 /saurab
drwxrwxr-x   - hduser supergroup          0 2019-08-01 16:19 /tmp
drwxr-xr-x   - hduser supergroup          0 2019-08-01 16:03 /user
```



```
drwxr-xr-x   - hduser supergroup          0 2022-06-01 09:46 /user1
hduser@bmsce-Precision-T1700:~$ hdfs dfs -mkdir /input_khushil
hduser@bmsce-Precision-T1700:~$ hdfs dfs -ls /
Found 19 items
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:35 /CSE
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:23 /FFF
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:36 /LLL
drwxr-xr-x   - hduser supergroup          0 2022-06-20 12:06 /amit_bda
drwxr-xr-x   - hduser supergroup          0 2022-06-03 14:52 /bharath
drwxr-xr-x   - hduser supergroup          0 2022-06-03 14:43 /bharath035
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:21 /example
drwxr-xr-x   - hduser supergroup          0 2022-06-01 15:13 /foldernew
drwxr-xr-x   - hduser supergroup          0 2022-06-06 15:04 /hemang061
drwxr-xr-x   - hduser supergroup          0 2022-06-20 15:13 /input_khushil
drwxr-xr-x   - hduser supergroup          0 2022-06-03 12:27 /irfan
drwxr-xr-x   - hduser supergroup          0 2022-06-01 15:09 /muskan
drwxr-xr-x   - hduser supergroup          0 2022-06-06 15:04 /new_folder
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:26 /one
drwxr-xr-x   - hduser supergroup          0 2022-06-20 12:17 /output
drwxr-xr-x   - hduser supergroup          0 2022-06-03 12:08 /saurab
drwxrwxr-x   - hduser supergroup          0 2019-08-01 16:19 /tmp
drwxr-xr-x   - hduser supergroup          0 2019-08-01 16:03 /user
drwxr-xr-x   - hduser supergroup          0 2022-06-01 09:46 /user1
hduser@bmsce-Precision-T1700:~$ hdfs dfs -put /home/hduser/sample.txt /input_khushil
hduser@bmsce-Precision-T1700:~$ hdfs dfs -ls /input_khushil
Found 1 items
-rw-r--r--   1 hduser supergroup         52 2022-06-20 15:15 /input_khushil/sample.txt
hduser@bmsce-Precision-T1700:~$ hadoop jar /home/hduser/khushil/WordCount.jar WCDriver
/input_khushil /input_khushil/output_khushil
22/06/20 15:16:44 INFO Configuration.deprecation: session.id is deprecated. Instead, use
dfs.metrics.session-id
22/06/20 15:16:44 INFO jvm.JvmMetrics: Initializing JVM Metrics with processName=JobTracker,
sessionId=
22/06/20 15:16:44 INFO jvm.JvmMetrics: Cannot initialize JVM Metrics with
processName=JobTracker, sessionId= - already initialized
22/06/20 15:16:44 WARN mapreduce.JobSubmitter: Hadoop command-line option parsing not
performed. Implement the Tool interface and execute your application with ToolRunner to remedy
this.
22/06/20 15:16:44 INFO mapred.FileInputFormat: Total input paths to process : 1
22/06/20 15:16:44 INFO mapreduce.JobSubmitter: number of splits:1
22/06/20 15:16:44 INFO mapreduce.JobSubmitter: Submitting tokens for job:
job_local230197290_0001
22/06/20 15:16:44 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
22/06/20 15:16:44 INFO mapred.LocalJobRunner: OutputCommitter set in config null
22/06/20 15:16:44 INFO mapreduce.Job: Running job: job_local230197290_0001
22/06/20 15:16:44 INFO mapred.LocalJobRunner: OutputCommitter is
org.apache.hadoop.mapred.FileOutputCommitter
22/06/20 15:16:44 INFO mapred.LocalJobRunner: Waiting for map tasks
22/06/20 15:16:44 INFO mapred.LocalJobRunner: Starting task:
attempt_local230197290_0001_m_000000_0
22/06/20 15:16:44 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
22/06/20 15:16:44 INFO mapred.MapTask: Processing split:
hdfs://localhost:54310/input_khushil/sample.txt:0+52
22/06/20 15:16:44 INFO mapred.MapTask: numReduceTasks: 1
22/06/20 15:16:44 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
22/06/20 15:16:44 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
22/06/20 15:16:44 INFO mapred.MapTask: soft limit at 83886080
22/06/20 15:16:44 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
22/06/20 15:16:44 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
```



```
                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)=471859200
        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=52
        File Output Format Counters
                Bytes Written=63
0
hduser@bmsce-Precision-T1700:~$ hdfs dfs -ls /input_khushil
Found 2 items
drwxr-xr-x   - hduser supergroup          0 2022-06-20 15:16 /input_khushil/output_khushil
-rw-r--r--   1 hduser supergroup         52 2022-06-20 15:15 /input_khushil/sample.txt
hduser@bmsce-Precision-T1700:~$ hdfs dfs -ls /input_khushil/output_khushil
Found 2 items
-rw-r--r--   1 hduser supergroup          0 2022-06-20 15:16
/input_khushil/output_khushil/_SUCCESS
```



```
-rw-r--r--   1 hduser supergroup         63 2022-06-20 15:16
/input_khushil/output_khushil/part-00000
hduser@bmsce-Precision-T1700:~$ hdfs dfs -cat /input_khushil/output_khushil/part-0000
cat: `/input_khushil/output_khushil/part-0000': No such file or directory
hduser@bmsce-Precision-T1700:~$ hdfs dfs -cat /input_khushil/output_khushil/part-00000
am      1
awesome 1
hadoop  2
hi      1
i       1
im      1
is      1
khushil 1
learing 1
```

2) Top N

Driver-TopN.class

```
package samples.topn;

import java.io.IOException;
import java.util.StringTokenizer;
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.mapreduce.Job;
import org.apache.hadoop.mapreduce.Mapper;
import org.apache.hadoop.mapreduce.lib.input.FileInputFormat;
import
org.apache.hadoop.mapreduce.lib.output.FileOutputFormat;
import org.apache.hadoop.util.GenericOptionsParser;

public class TopN {
  public static void main(String[] args) throws Exception {
    Configuration conf = new Configuration();
    String[] otherArgs = (new GenericOptionsParser(conf,
args)).getRemainingArgs();
    if (otherArgs.length != 2) {
      System.err.println("Usage: TopN <in> <out>");
      System.exit(2);
    }
    Job job = Job.getInstance(conf);
    job.setJobName("Top N");
    job.setJarByClass(TopN.class);
    job.setMapperClass(TopNMapper.class);
    job.setReducerClass(TopNReducer.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);
    FileInputFormat.addInputPath(job, new Path(otherArgs[0]));
    FileOutputFormat.setOutputPath(job, new
Path(otherArgs[1]));
    System.exit(job.waitForCompletion(true) ? 0 : 1);
  }

  public static class TopNMapper extends Mapper<Object, Text,
Text, IntWritable> {
  private static final IntWritable one = new IntWritable(1);

  private Text word = new Text();

  private String tokens = "[_|$#<>\\^=\\[\\]\\*/\\\\,;,.\\-
:()?!\"']";

  public void map(Object key, Text value, Mapper<Object,
Text, Text, IntWritable>.Context context) throws IOException,
InterruptedException {
   String cleanLine =
value.toString().toLowerCase().replaceAll(this.tokens, " ");
   StringTokenizer itr = new StringTokenizer(cleanLine);
   while (itr.hasMoreTokens()) {
    this.word.set(itr.nextToken().trim());
    context.write(this.word, one);
   }
  }
 }
}
```

TopNCombiner.class

```
package samples.topn;

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

public class TopNCombiner 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 sum = 0;
  for (IntWritable val : values)
   sum += val.get();
  context.write(key, new IntWritable(sum));
 }
}
```

TopNMapper.class

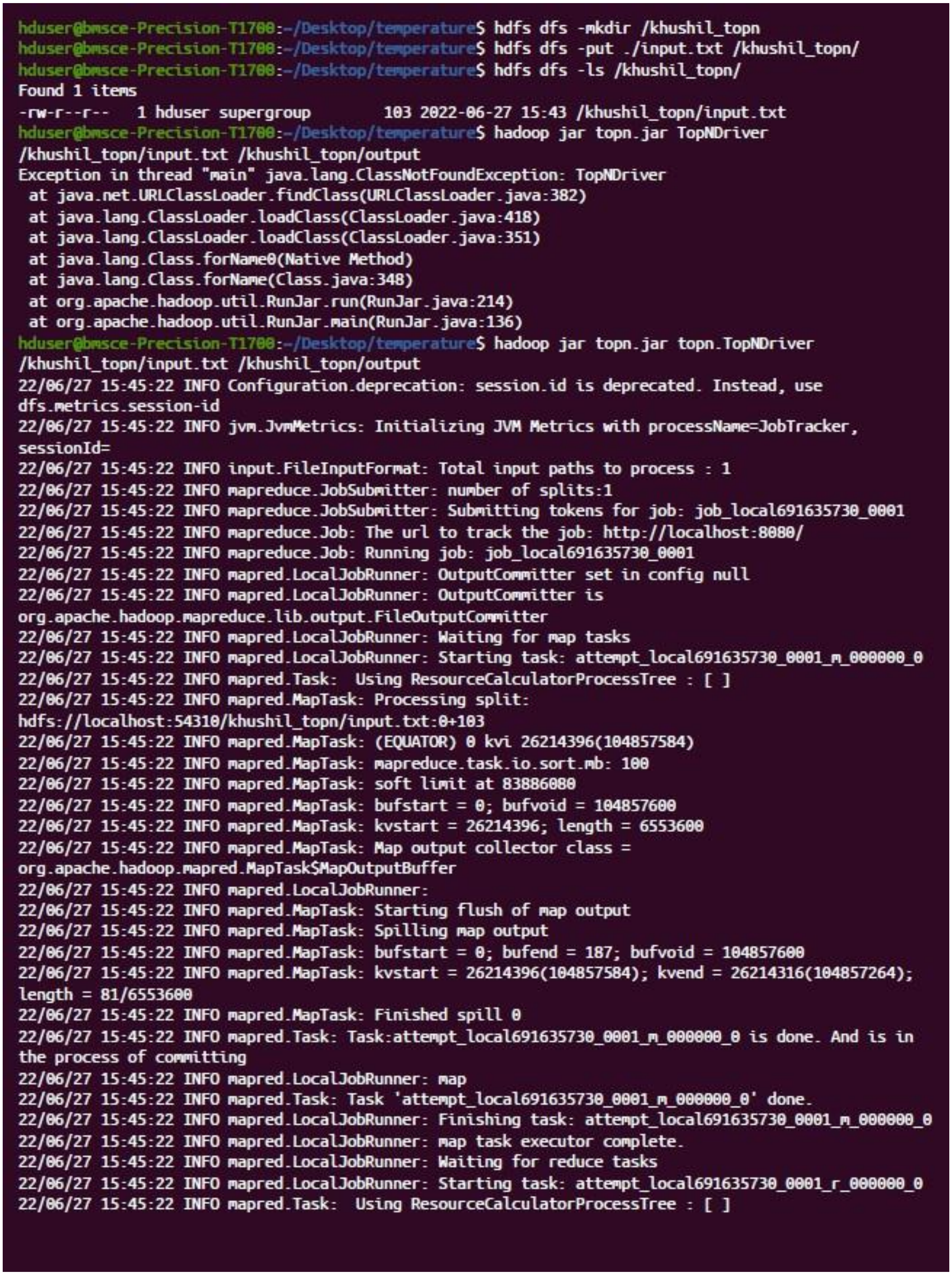
```
package samples.topn;

import java.io.IOException;
import java.util.StringTokenizer;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Mapper;

public class TopNMapper extends Mapper<Object, Text, Text,
IntWritable> {
  private static final IntWritable one = new IntWritable(1);

  private Text word = new Text();

  private String tokens = "[_|$#<>\\^=\\[\\]\\*/\\\\,;,.\\-
:()?!\"']";

  public vo```\\id map(Object key, Text value, Mapper<Object,
Text, Text, IntWritable>.Context context) throws IOException,
InterruptedException {
    String cleanLine =
value.toString().toLowerCase().replaceAll(this.tokens, " ");
    StringTokenizer itr = new StringTokenizer(cleanLine);
    while (itr.hasMoreTokens()) {
      this.word.set(itr.nextToken().trim());
      context.write(this.word, one);
    }
  }
}
```

TopNReducer.class

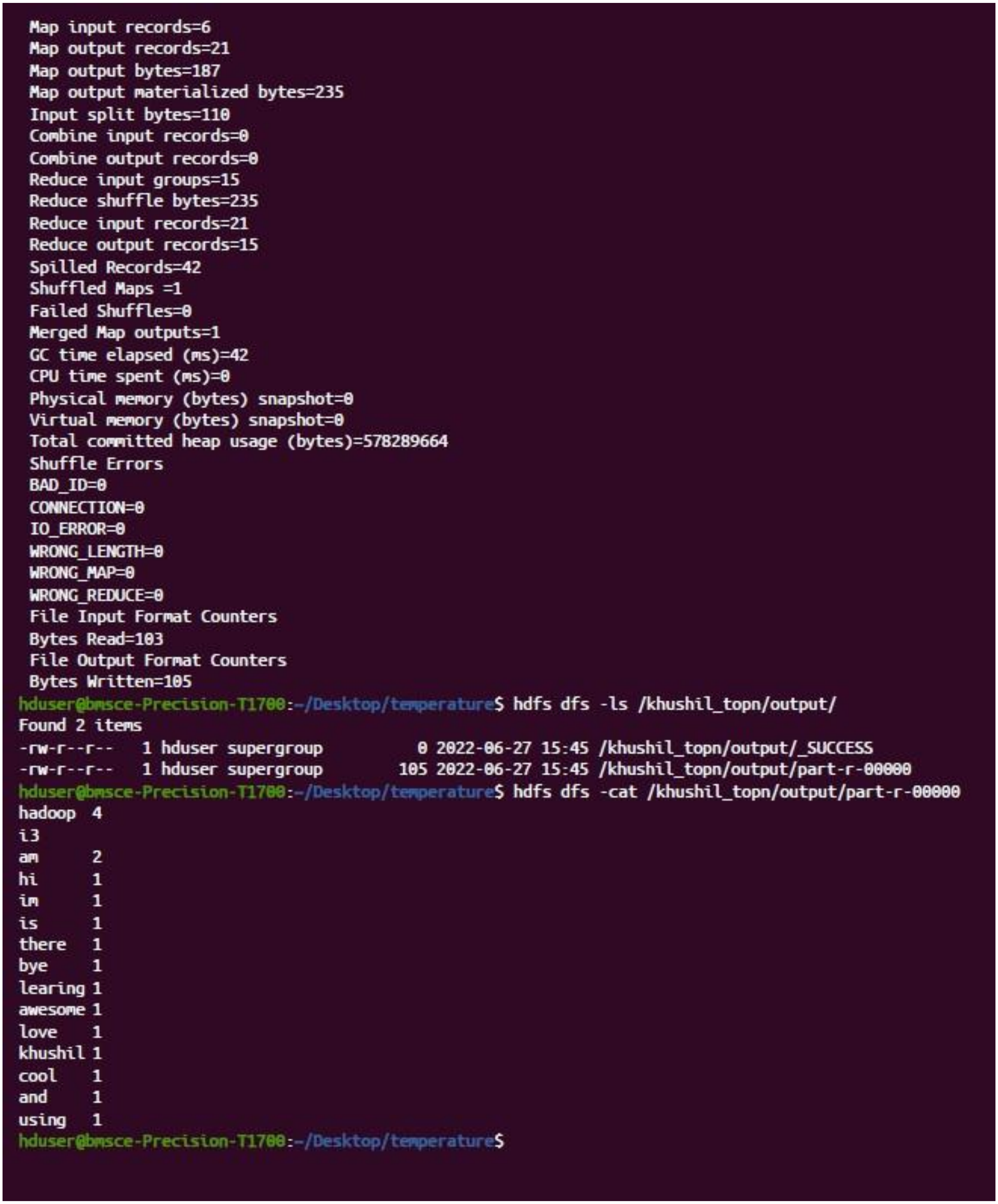
```
package samples.topn;

import java.io.IOException;
import java.util.HashMap;
```

```
import java.util.Map;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapreduce.Reducer;
import utils.MiscUtils;

public class TopNReducer extends Reducer<Text, IntWritable,
Text, IntWritable> {
  private Map<Text, IntWritable> countMap = new HashMap<>();

  public void reduce(Text key, Iterable<IntWritable> values,
Reducer<Text, IntWritable, Text, IntWritable>.Context context)
throws IOException, InterruptedException {
    int sum = 0;
    for (IntWritable val : values)
      sum += val.get();
    this.countMap.put(new Text(key), new IntWritable(sum));
  }

  protected void cleanup(Reducer<Text, IntWritable, Text,
IntWritable>.Context context) throws IOException,
InterruptedException {
    Map<Text, IntWritable> sortedMap =
MiscUtils.sortByValues(this.countMap);
    int counter = 0;
    for (Text key : sortedMap.keySet()) {
      if (counter++ == 20)
        break;
      context.write(key, sortedMap.get(key));
    }
  }
}
```

Output:



```
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -mkdir /khushil_topn
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -put ./input.txt /khushil_topn/
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -ls /khushil_topn/
Found 1 items
-rw-r--r--   1 hduser supergroup        103 2022-06-27 15:43 /khushil_topn/input.txt
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hadoop jar topn.jar TopNDriver
/khushil_topn/input.txt /khushil_topn/output
Exception in thread "main" java.lang.ClassNotFoundException: TopNDriver
 at java.net.URLClassLoader.findClass(URLClassLoader.java:382)
 at java.lang.ClassLoader.loadClass(ClassLoader.java:418)
 at java.lang.ClassLoader.loadClass(ClassLoader.java:351)
 at java.lang.Class.forName0(Native Method)
 at java.lang.Class.forName(Class.java:348)
 at org.apache.hadoop.util.RunJar.run(RunJar.java:214)
 at org.apache.hadoop.util.RunJar.main(RunJar.java:136)
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hadoop jar topn.jar topn.TopNDriver
/khushil_topn/input.txt /khushil_topn/output
22/06/27 15:45:22 INFO Configuration.deprecation: session.id is deprecated. Instead, use
dfs.metrics.session-id
22/06/27 15:45:22 INFO jvm.JvmMetrics: Initializing JVM Metrics with processName=JobTracker,
sessionId=
22/06/27 15:45:22 INFO input.FileInputFormat: Total input paths to process : 1
22/06/27 15:45:22 INFO mapreduce.JobSubmitter: number of splits:1
22/06/27 15:45:22 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local691635730_0001
22/06/27 15:45:22 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
22/06/27 15:45:22 INFO mapreduce.Job: Running job: job_local691635730_0001
22/06/27 15:45:22 INFO mapred.LocalJobRunner: OutputCommitter set in config null
22/06/27 15:45:22 INFO mapred.LocalJobRunner: OutputCommitter is
org.apache.hadoop.mapreduce.lib.output.FileOutputCommitter
22/06/27 15:45:22 INFO mapred.LocalJobRunner: Waiting for map tasks
22/06/27 15:45:22 INFO mapred.LocalJobRunner: Starting task: attempt_local691635730_0001_m_000000_0
22/06/27 15:45:22 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
22/06/27 15:45:22 INFO mapred.MapTask: Processing split:
hdfs://localhost:54310/khushil_topn/input.txt:0+103
22/06/27 15:45:22 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
22/06/27 15:45:22 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
22/06/27 15:45:22 INFO mapred.MapTask: soft limit at 83886080
22/06/27 15:45:22 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
22/06/27 15:45:22 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
22/06/27 15:45:22 INFO mapred.MapTask: Map output collector class =
org.apache.hadoop.mapred.MapTask$MapOutputBuffer
22/06/27 15:45:22 INFO mapred.LocalJobRunner:
22/06/27 15:45:22 INFO mapred.MapTask: Starting flush of map output
22/06/27 15:45:22 INFO mapred.MapTask: Spilling map output
22/06/27 15:45:22 INFO mapred.MapTask: bufstart = 0; bufend = 187; bufvoid = 104857600
22/06/27 15:45:22 INFO mapred.MapTask: kvstart = 26214396(104857584); kvend = 26214316(104857264);
length = 81/6553600
22/06/27 15:45:22 INFO mapred.MapTask: Finished spill 0
22/06/27 15:45:22 INFO mapred.Task: Task:attempt_local691635730_0001_m_000000_0 is done. And is in
the process of committing
22/06/27 15:45:22 INFO mapred.LocalJobRunner: map
22/06/27 15:45:22 INFO mapred.Task: Task 'attempt_local691635730_0001_m_000000_0' done.
22/06/27 15:45:22 INFO mapred.LocalJobRunner: Finishing task: attempt_local691635730_0001_m_000000_0
22/06/27 15:45:22 INFO mapred.LocalJobRunner: map task executor complete.
22/06/27 15:45:22 INFO mapred.LocalJobRunner: Waiting for reduce tasks
22/06/27 15:45:22 INFO mapred.LocalJobRunner: Starting task: attempt_local691635730_0001_r_000000_0
22/06/27 15:45:22 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
```



```
 Map input records=6
 Map output records=21
 Map output bytes=187
 Map output materialized bytes=235
 Input split bytes=110
 Combine input records=0
 Combine output records=0
 Reduce input groups=15
 Reduce shuffle bytes=235
 Reduce input records=21
 Reduce output records=15
 Spilled Records=42
 Shuffled Maps =1
 Failed Shuffles=0
 Merged Map outputs=1
 GC time elapsed (ms)=42
 CPU time spent (ms)=0
 Physical memory (bytes) snapshot=0
 Virtual memory (bytes) snapshot=0
 Total committed heap usage (bytes)=578289664
 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=103
 File Output Format Counters
 Bytes Written=105
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -ls /khushil_topn/output/
Found 2 items
-rw-r--r--   1 hduser supergroup          0 2022-06-27 15:45 /khushil_topn/output/_SUCCESS
-rw-r--r--   1 hduser supergroup        105 2022-06-27 15:45 /khushil_topn/output/part-r-00000
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -cat /khushil_topn/output/part-r-00000
hadoop  4
i3
am      2
hi      1
im      1
is      1
there   1
bye     1
learing 1
awesome 1
love    1
khushil 1
cool    1
and     1
using   1
hduser@bmsce-Precision-T1700:~/Desktop/temperature$
```

3) Average Temperature

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);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);
    System.exit(job.waitForCompletion(true) ? 0 : 1);
  }
}
```

AverageMapper

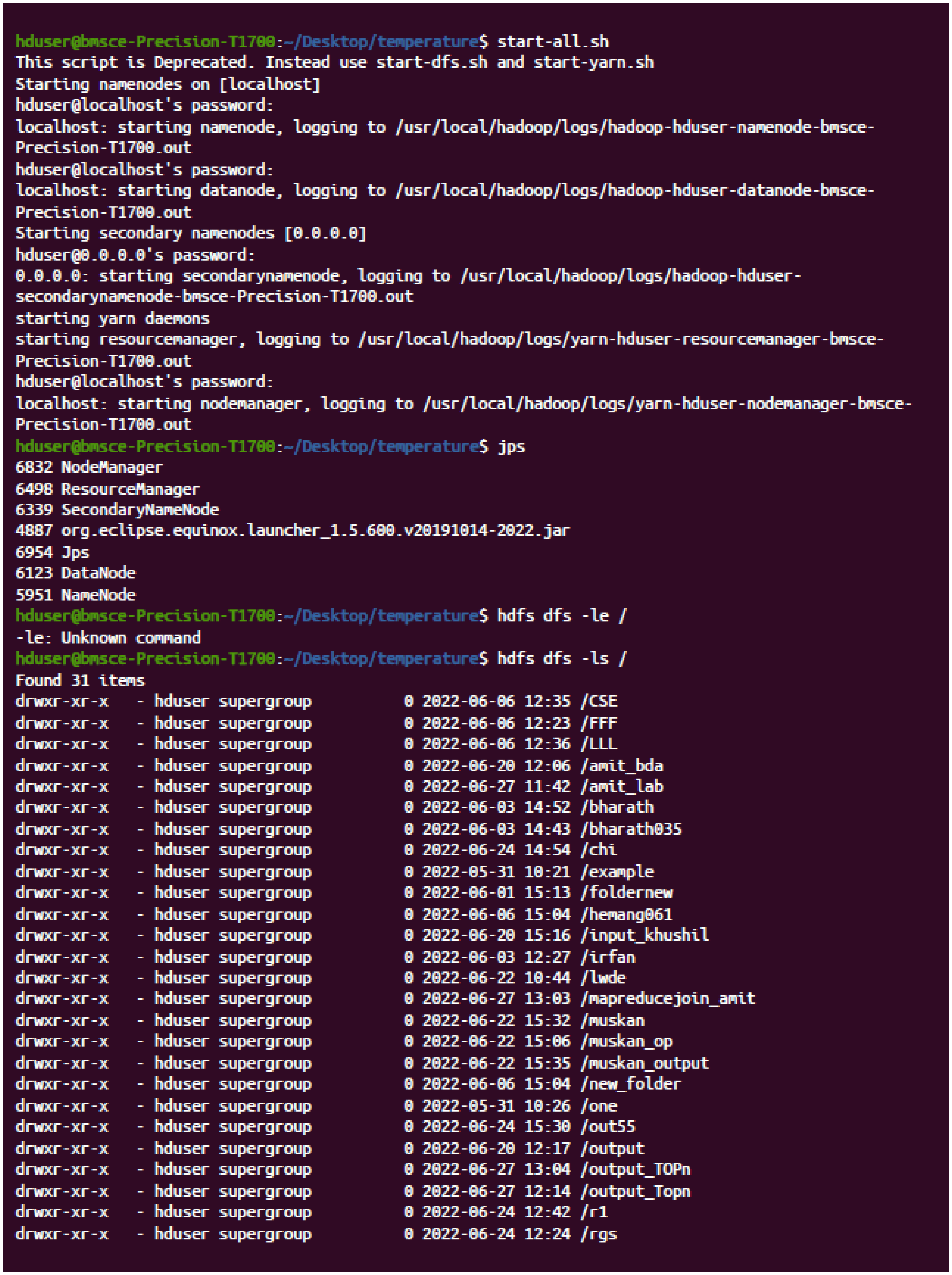
```
package temp;

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));
  }
}
```

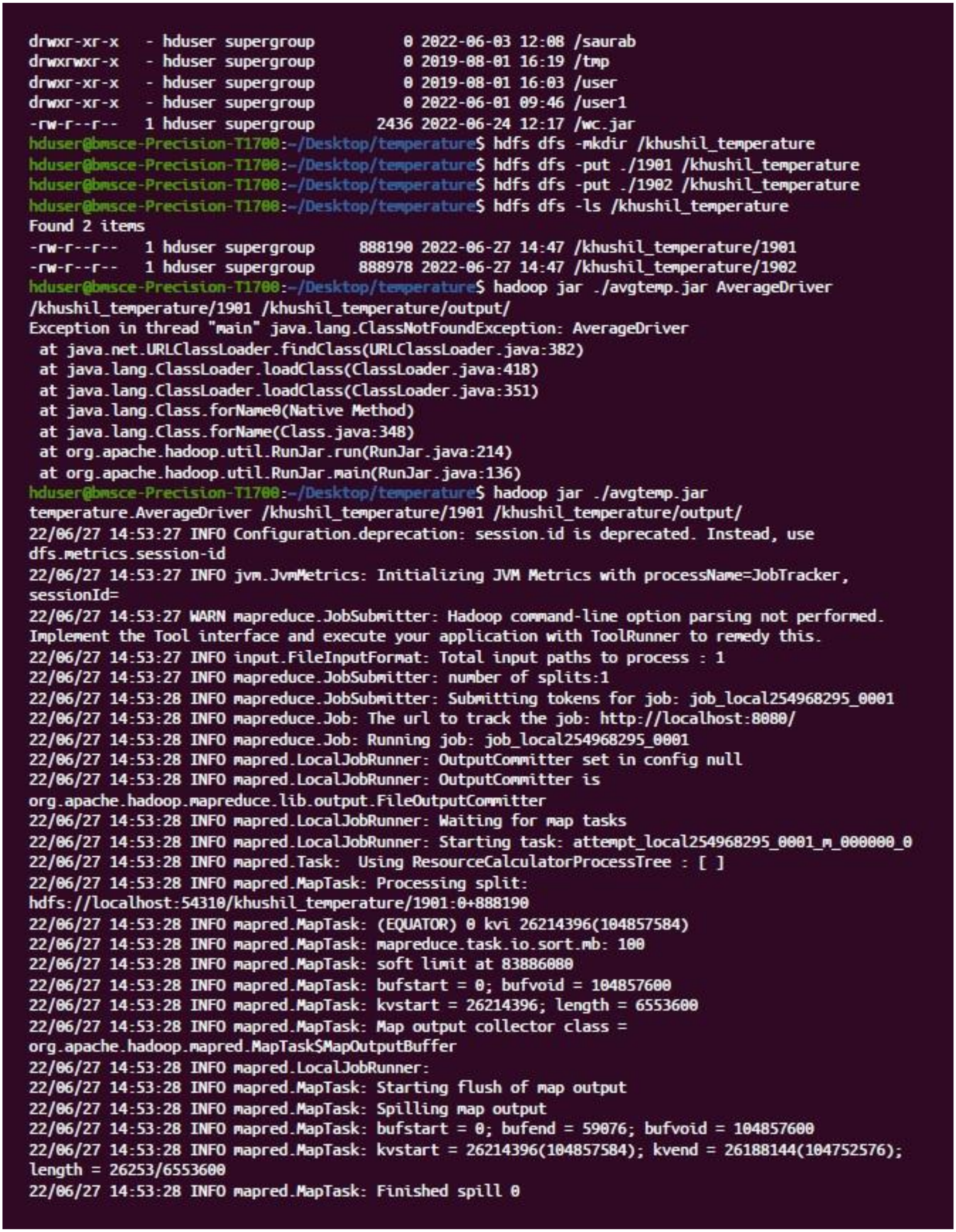
AverageReducer

```
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));
  }
}
```

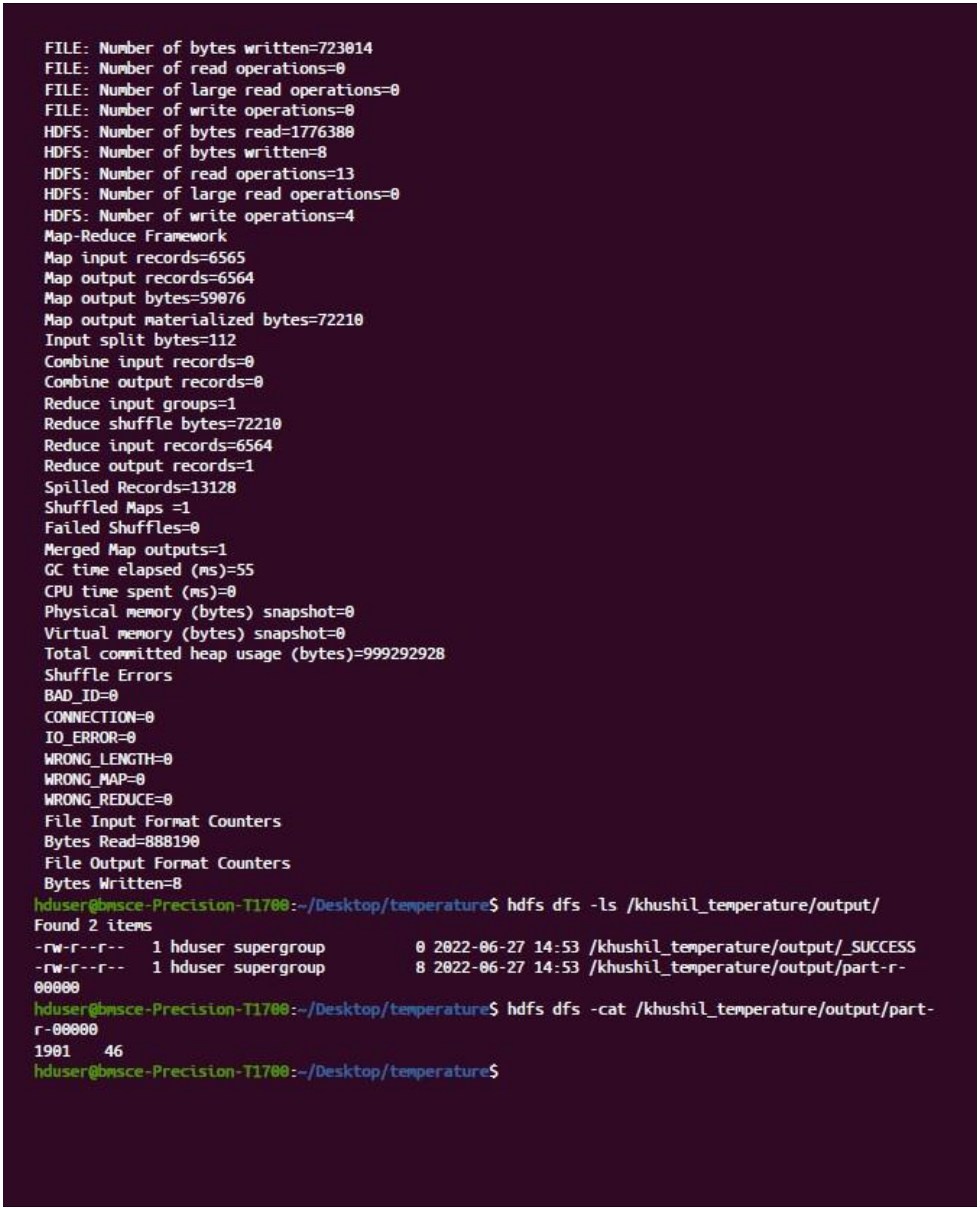
Output:



```
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ 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: starting namenode, logging to /usr/local/hadoop/logs/hadoop-hduser-namenode-bmsce-
Precision-T1700.out
hduser@localhost's password:
localhost: starting datanode, logging to /usr/local/hadoop/logs/hadoop-hduser-datanode-bmsce-
Precision-T1700.out
Starting secondary namenodes [0.0.0.0]
hduser@0.0.0.0's password:
0.0.0.0: starting secondarynamenode, logging to /usr/local/hadoop/logs/hadoop-hduser-
secondarynamenode-bmsce-Precision-T1700.out
starting yarn daemons
starting resourcemanager, logging to /usr/local/hadoop/logs/yarn-hduser-resourcemanager-bmsce-
Precision-T1700.out
hduser@localhost's password:
localhost: starting nodemanager, logging to /usr/local/hadoop/logs/yarn-hduser-nodemanager-bmsce-
Precision-T1700.out
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ jps
6832 NodeManager
6498 ResourceManager
6339 SecondaryNameNode
4887 org.eclipse.equinox.launcher_1.5.600.v20191014-2022.jar
6954 Jps
6123 DataNode
5951 NameNode
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -le /
-le: Unknown command
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -ls /
Found 31 items
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:35 /CSE
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:23 /FFF
drwxr-xr-x   - hduser supergroup          0 2022-06-06 12:36 /LLL
drwxr-xr-x   - hduser supergroup          0 2022-06-20 12:06 /amit_bda
drwxr-xr-x   - hduser supergroup          0 2022-06-27 11:42 /amit_lab
drwxr-xr-x   - hduser supergroup          0 2022-06-03 14:52 /bharath
drwxr-xr-x   - hduser supergroup          0 2022-06-03 14:43 /bharath035
drwxr-xr-x   - hduser supergroup          0 2022-06-24 14:54 /chi
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:21 /example
drwxr-xr-x   - hduser supergroup          0 2022-06-01 15:13 /foldernew
drwxr-xr-x   - hduser supergroup          0 2022-06-06 15:04 /hemang061
drwxr-xr-x   - hduser supergroup          0 2022-06-20 15:16 /input_khushil
drwxr-xr-x   - hduser supergroup          0 2022-06-03 12:27 /irfan
drwxr-xr-x   - hduser supergroup          0 2022-06-22 10:44 /lwde
drwxr-xr-x   - hduser supergroup          0 2022-06-27 13:03 /mapreducejoin_amit
drwxr-xr-x   - hduser supergroup          0 2022-06-22 15:32 /muskan
drwxr-xr-x   - hduser supergroup          0 2022-06-22 15:06 /muskan_op
drwxr-xr-x   - hduser supergroup          0 2022-06-22 15:35 /muskan_output
drwxr-xr-x   - hduser supergroup          0 2022-06-06 15:04 /new_folder
drwxr-xr-x   - hduser supergroup          0 2022-05-31 10:26 /one
drwxr-xr-x   - hduser supergroup          0 2022-06-24 15:30 /out55
drwxr-xr-x   - hduser supergroup          0 2022-06-20 12:17 /output
drwxr-xr-x   - hduser supergroup          0 2022-06-27 13:04 /output_TOPn
drwxr-xr-x   - hduser supergroup          0 2022-06-27 12:14 /output_Topn
drwxr-xr-x   - hduser supergroup          0 2022-06-24 12:42 /r1
drwxr-xr-x   - hduser supergroup          0 2022-06-24 12:24 /rgs
```



```
drwxr-xr-x   - hduser supergroup          0 2022-06-03 12:08 /saurab
drwxrwxr-x   - hduser supergroup          0 2019-08-01 16:19 /tmp
drwxr-xr-x   - hduser supergroup          0 2019-08-01 16:03 /user
drwxr-xr-x   - hduser supergroup          0 2022-06-01 09:46 /user1
-rw-r--r--   1 hduser supergroup       2436 2022-06-24 12:17 /wc.jar
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -mkdir /khushil_temperature
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -put ./1901 /khushil_temperature
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -put ./1902 /khushil_temperature
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -ls /khushil_temperature
Found 2 items
-rw-r--r--   1 hduser supergroup     888190 2022-06-27 14:47 /khushil_temperature/1901
-rw-r--r--   1 hduser supergroup     888978 2022-06-27 14:47 /khushil_temperature/1902
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hadoop jar ./avgtemp.jar AverageDriver
/khushil_temperature/1901 /khushil_temperature/output/
Exception in thread "main" java.lang.ClassNotFoundException: AverageDriver
 at java.net.URLClassLoader.findClass(URLClassLoader.java:382)
 at java.lang.ClassLoader.loadClass(ClassLoader.java:418)
 at java.lang.ClassLoader.loadClass(ClassLoader.java:351)
 at java.lang.Class.forName0(Native Method)
 at java.lang.Class.forName(Class.java:348)
 at org.apache.hadoop.util.RunJar.run(RunJar.java:214)
 at org.apache.hadoop.util.RunJar.main(RunJar.java:136)
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hadoop jar ./avgtemp.jar
temperature.AverageDriver /khushil_temperature/1901 /khushil_temperature/output/
22/06/27 14:53:27 INFO Configuration.deprecation: session.id is deprecated. Instead, use
dfs.metrics.session-id
22/06/27 14:53:27 INFO jvm.JvmMetrics: Initializing JVM Metrics with processName=JobTracker,
sessionId=
22/06/27 14:53:27 WARN mapreduce.JobSubmitter: Hadoop command-line option parsing not performed.
Implement the Tool interface and execute your application with ToolRunner to remedy this.
22/06/27 14:53:27 INFO input.FileInputFormat: Total input paths to process : 1
22/06/27 14:53:27 INFO mapreduce.JobSubmitter: number of splits:1
22/06/27 14:53:28 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local254968295_0001
22/06/27 14:53:28 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
22/06/27 14:53:28 INFO mapreduce.Job: Running job: job_local254968295_0001
22/06/27 14:53:28 INFO mapred.LocalJobRunner: OutputCommitter set in config null
22/06/27 14:53:28 INFO mapred.LocalJobRunner: OutputCommitter is
org.apache.hadoop.mapreduce.lib.output.FileOutputCommitter
22/06/27 14:53:28 INFO mapred.LocalJobRunner: Waiting for map tasks
22/06/27 14:53:28 INFO mapred.LocalJobRunner: Starting task: attempt_local254968295_0001_m_000000_0
22/06/27 14:53:28 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
22/06/27 14:53:28 INFO mapred.MapTask: Processing split:
hdfs://localhost:54310/khushil_temperature/1901:0+888190
22/06/27 14:53:28 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
22/06/27 14:53:28 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
22/06/27 14:53:28 INFO mapred.MapTask: soft limit at 83886080
22/06/27 14:53:28 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
22/06/27 14:53:28 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
22/06/27 14:53:28 INFO mapred.MapTask: Map output collector class =
org.apache.hadoop.mapred.MapTask$MapOutputBuffer
22/06/27 14:53:28 INFO mapred.LocalJobRunner:
22/06/27 14:53:28 INFO mapred.MapTask: Starting flush of map output
22/06/27 14:53:28 INFO mapred.MapTask: Spilling map output
22/06/27 14:53:28 INFO mapred.MapTask: bufstart = 0; bufend = 59076; bufvoid = 104857600
22/06/27 14:53:28 INFO mapred.MapTask: kvstart = 26214396(104857584); kvend = 26188144(104752576);
length = 26253/6553600
22/06/27 14:53:28 INFO mapred.MapTask: Finished spill 0
```



```
 FILE: Number of bytes written=723014
 FILE: Number of read operations=0
 FILE: Number of large read operations=0
 FILE: Number of write operations=0
 HDFS: Number of bytes read=1776380
 HDFS: Number of bytes written=8
 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=6565
 Map output records=6564
 Map output bytes=59076
 Map output materialized bytes=72210
 Input split bytes=112
 Combine input records=0
 Combine output records=0
 Reduce input groups=1
 Reduce shuffle bytes=72210
 Reduce input records=6564
 Reduce output records=1
 Spilled Records=13128
 Shuffled Maps =1
 Failed Shuffles=0
 Merged Map outputs=1
 GC time elapsed (ms)=55
 CPU time spent (ms)=0
 Physical memory (bytes) snapshot=0
 Virtual memory (bytes) snapshot=0
 Total committed heap usage (bytes)=999292928
 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
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -ls /khushil_temperature/output/
Found 2 items
-rw-r--r--   1 hduser supergroup          0 2022-06-27 14:53 /khushil_temperature/output/_SUCCESS
-rw-r--r--   1 hduser supergroup          8 2022-06-27 14:53 /khushil_temperature/output/part-r-
00000
hduser@bmsce-Precision-T1700:~/Desktop/temperature$ hdfs dfs -cat /khushil_temperature/output/part-
r-00000
1901    46
hduser@bmsce-Precision-T1700:~/Desktop/temperature$
```

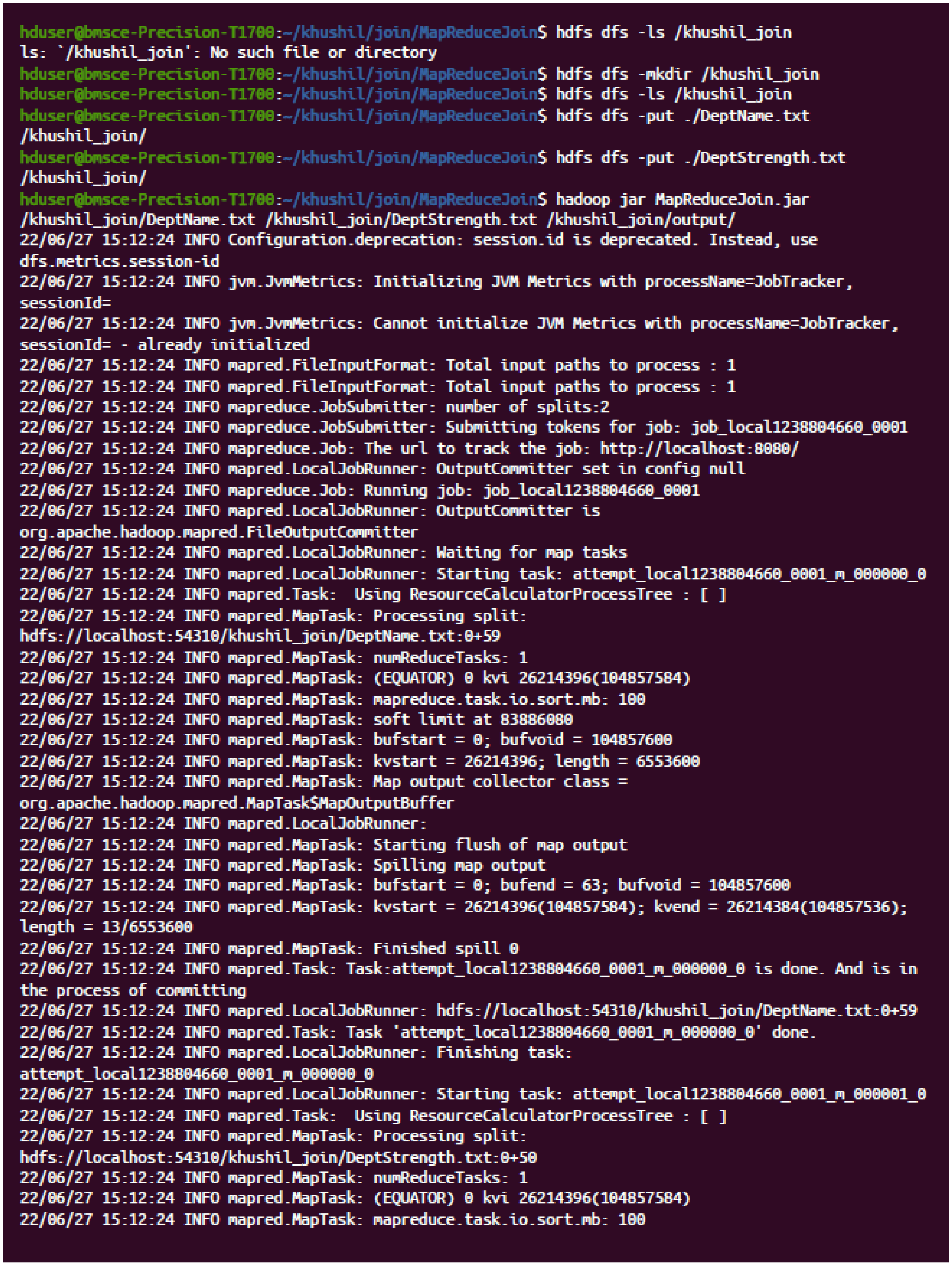
4) Join

```
// JoinDriver.java
import org.apache.hadoop.conf.Configured;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.*;
import org.apache.hadoop.mapred.lib.MultipleInputs;
import org.apache.hadoop.util.*;

public class JoinDriver extends Configured implements Tool {

    public static class KeyPartitioner implements Partitioner<TextPair, Text> {
        @Override
        public void configure(JobConf job) {
        }

        @Override
        public int getPartition(TextPair key, Text value, int numPartitions) {
            return (key.getFirst().hashCode() & Integer.MAX_VALUE) %
                    numPartitions;
        }
    }

@Override

public int run(String[] args) throws Exception {

if (args.length != 3) {
System.out.println("Usage: <Department Emp Strength input>

<Department Name input> <output>");
return -1;
}

JobConf conf = new JobConf(getConf(), getClass());

conf.setJobName("Join 'Department Emp Strength input' with 'Department Name
input'");

Path AInputPath = new Path(args[0]);
Path BInputPath = new Path(args[1]);
Path outputPath = new Path(args[2]);

MultipleInputs.addInputPath(conf, AInputPath, TextInputFormat.class,
Posts.class);
MultipleInputs.addInputPath(conf, BInputPath, TextInputFormat.class,
User.class);
FileOutputFormat.setOutputPath(conf, outputPath);
conf.setPartitionerClass(KeyPartitioner.class);
conf.setOutputValueGroupingComparator(TextPair.FirstComparator.class);
conf.setMapOutputKeyClass(TextPair.class);
conf.setReducerClass(JoinReducer.class);
conf.setOutputKeyClass(Text.class);
JobClient.runJob(conf);

return 0;
}

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

        int exitCode = ToolRunner.run(new JoinDriver(), args);
        System.exit(exitCode);
    }
}

// JoinReducer.java
import java.io.IOException;
import java.util.Iterator;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.*;
public class JoinReducer extends MapReduceBase implements Reducer<TextPair, Text, Text,
Text> {
@Override
public void reduce (TextPair key, Iterator<Text> values, OutputCollector<Text, Text>
output, Reporter reporter)
throws IOException
{

Text nodeId = new Text(values.next());
while (values.hasNext()) {

Text node = values.next();
Text outValue = new Text(nodeId.toString() + "\t\t" + node.toString());
output.collect(key.getFirst(), outValue);
}
}
}

// User.java
import java.io.IOException;
import java.util.Iterator;
import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.fs.FSDataInputStream;
import org.apache.hadoop.fs.FSDataOutputStream;
import org.apache.hadoop.fs.FileSystem;
import org.apache.hadoop.fs.Path;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.io.Text;
import org.apache.hadoop.mapred.*;

import org.apache.hadoop.io.IntWritable;

public class User extends MapReduceBase implements Mapper<LongWritable, Text, TextPair,
Text> {

@Override
public void map(LongWritable key, Text value, OutputCollector<TextPair, Text> output,
Reporter reporter)

throws IOException

{

String valueString = value.toString();

String[] SingleNodeData = valueString.split("\t");
output.collect(new TextPair(SingleNodeData[0], "1"), new

Text(SingleNodeData[1]));
}
}

// Posts.java
import java.io.IOException;

import org.apache.hadoop.io.*;
import org.apache.hadoop.mapred.*;

public class Posts extends MapReduceBase implements Mapper<LongWritable, Text, TextPair,
Text> {

@Override
public void map(LongWritable key, Text value, OutputCollector<TextPair, Text> output,
Reporter reporter)
throws IOException
{
```

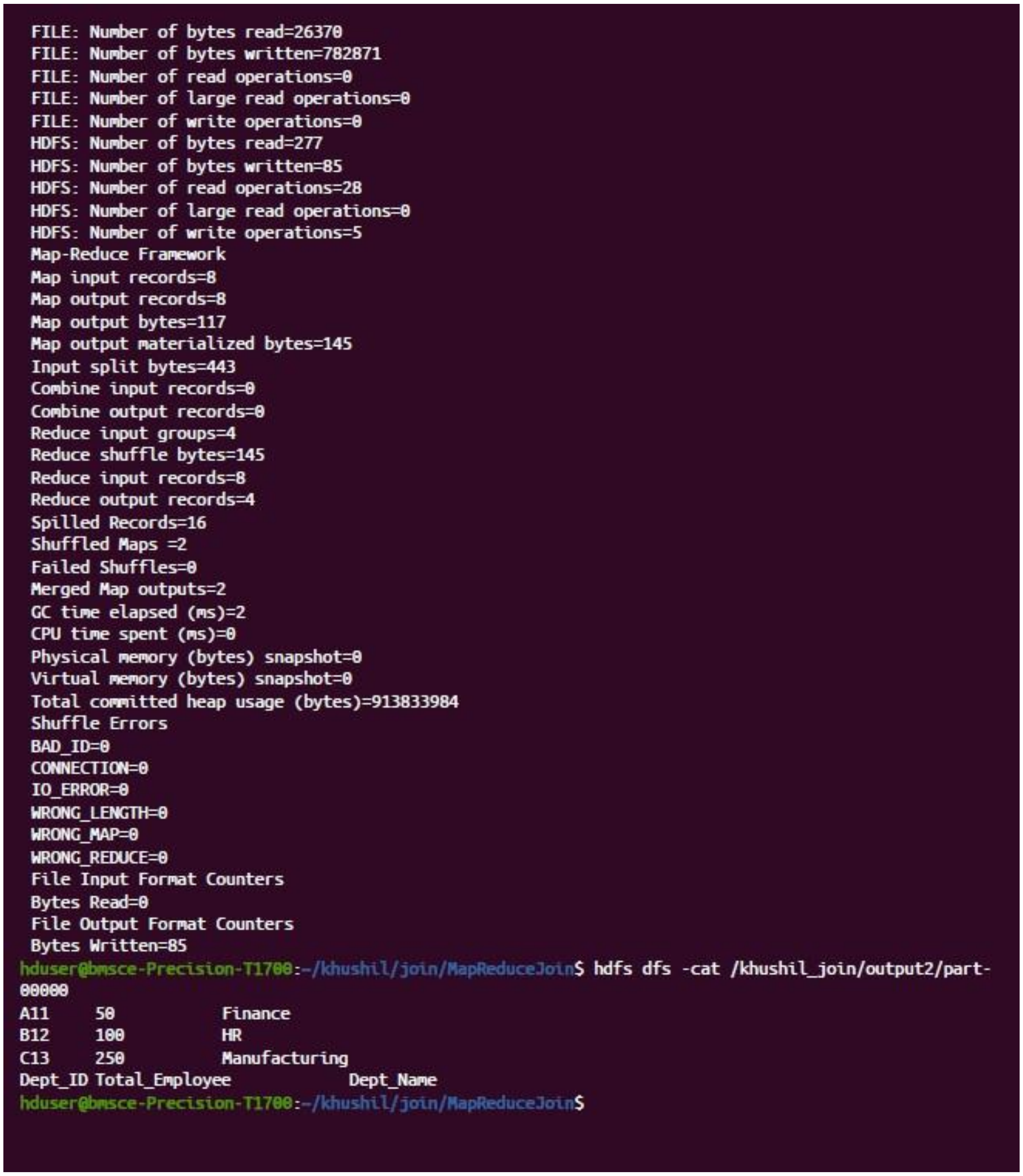
```
String valueString = value.toString();
String[] SingleNodeData = valueString.split("\t");
output.collect(new TextPair(SingleNodeData[3], "0"), new

Text(SingleNodeData[9]));
}
}

// TextPair.java
import java.io.*;

import org.apache.hadoop.io.*;

public class TextPair implements WritableComparable<TextPair> {

    private Text first;
    private Text second;

    public TextPair() {
        set(new Text(), new Text());
    }

    public TextPair(String first, String second) {
        set(new Text(first), new Text(second));
    }

    public TextPair(Text first, Text second) {
        set(first, second);
    }

    public void set(Text first, Text second) {
        this.first = first;
        this.second = second;
    }

    public Text getFirst() {
        return first;
    }

    public Text getSecond() {
        return second;
    }

    @Override
    public void write(DataOutput out) throws IOException {
        first.write(out);
        second.write(out);
    }

    @Override
    public void readFields(DataInput in) throws IOException {
        first.readFields(in);
        second.readFields(in);
    }

    @Override
    public int hashCode() {
        return first.hashCode() * 163 + second.hashCode();
    }

    @Override
    public boolean equals(Object o) {
        if (o instanceof TextPair) {
            TextPair tp = (TextPair) o;
            return first.equals(tp.first) && second.equals(tp.second);
        }
        return false;
    }

    @Override
    public String toString() {
        return first + "\t" + second;
    }

    @Override
    public int compareTo(TextPair tp) {
        int cmp = first.compareTo(tp.first);
        if (cmp != 0) {
            return cmp;
        }
        return second.compareTo(tp.second);
    }
    // ^^ TextPair

    // vv TextPairComparator
    public static class Comparator extends WritableComparator {

        private static final Text.Comparator TEXT_COMPARATOR = new Text.Comparator();

        public Comparator() {
            super(TextPair.class);
        }
        @Override
        public int compare(byte[] b1, int s1, int l1,
            byte[] b2, int s2, int l2) {

          try {
            int firstL1 = WritableUtils.decodeVIntSize(b1[s1]) + readVInt(b1, s1);
            int firstL2 = WritableUtils.decodeVIntSize(b2[s2]) + readVInt(b2, s2);
            int cmp = TEXT_COMPARATOR.compare(b1, s1, firstL1, b2, s2, firstL2);
            if (cmp != 0) {
              return cmp;
            }
            return TEXT_COMPARATOR.compare(b1, s1 + firstL1, l1 - firstL1,

                b2, s2 + firstL2, l2 - firstL2);
          } catch (IOException e) {
            throw new IllegalArgumentException(e);
          }
        }
      }

      static {
        WritableComparator.define(TextPair.class, new Comparator());
      }

      public static class FirstComparator extends WritableComparator {

        private static final Text.Comparator TEXT_COMPARATOR = new Text.Comparator();

        public FirstComparator() {
          super(TextPair.class);
        }

        @Override
        public int compare(byte[] b1, int s1, int l1,
            byte[] b2, int s2, int l2) {

          try {
            int firstL1 = WritableUtils.decodeVIntSize(b1[s1]) + readVInt(b1, s1);
            int firstL2 = WritableUtils.decodeVIntSize(b2[s2]) + readVInt(b2, s2);
            return TEXT_COMPARATOR.compare(b1, s1, firstL1, b2, s2, firstL2);
          } catch (IOException e) {
            throw new IllegalArgumentException(e);
          }
        }
```

```
        @Override
        public int compare(WritableComparable a, WritableComparable b) {
            if (a instanceof TextPair && b instanceof TextPair) {
                return ((TextPair) a).first.compareTo(((TextPair) b).first);
            }
            return super.compare(a, b);
        }
    }
}
```

Output:



```
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$ hdfs dfs -ls /khushil_join
ls: `/khushil_join': No such file or directory
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$ hdfs dfs -mkdir /khushil_join
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$ hdfs dfs -ls /khushil_join
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$ hdfs dfs -put ./DeptName.txt
/khushil_join/
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$ hdfs dfs -put ./DeptStrength.txt
/khushil_join/
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$ hadoop jar MapReduceJoin.jar
/khushil_join/DeptName.txt /khushil_join/DeptStrength.txt /khushil_join/output/
22/06/27 15:12:24 INFO Configuration.deprecation: session.id is deprecated. Instead, use
dfs.metrics.session-id
22/06/27 15:12:24 INFO jvm.JvmMetrics: Initializing JVM Metrics with processName=JobTracker,
sessionId=
22/06/27 15:12:24 INFO jvm.JvmMetrics: Cannot initialize JVM Metrics with processName=JobTracker,
sessionId= - already initialized
22/06/27 15:12:24 INFO mapred.FileInputFormat: Total input paths to process : 1
22/06/27 15:12:24 INFO mapred.FileInputFormat: Total input paths to process : 1
22/06/27 15:12:24 INFO mapreduce.JobSubmitter: number of splits:2
22/06/27 15:12:24 INFO mapreduce.JobSubmitter: Submitting tokens for job: job_local1238804660_0001
22/06/27 15:12:24 INFO mapreduce.Job: The url to track the job: http://localhost:8080/
22/06/27 15:12:24 INFO mapred.LocalJobRunner: OutputCommitter set in config null
22/06/27 15:12:24 INFO mapreduce.Job: Running job: job_local1238804660_0001
22/06/27 15:12:24 INFO mapred.LocalJobRunner: OutputCommitter is
org.apache.hadoop.mapred.FileOutputCommitter
22/06/27 15:12:24 INFO mapred.LocalJobRunner: Waiting for map tasks
22/06/27 15:12:24 INFO mapred.LocalJobRunner: Starting task: attempt_local1238804660_0001_m_000000_0
22/06/27 15:12:24 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
22/06/27 15:12:24 INFO mapred.MapTask: Processing split:
hdfs://localhost:54310/khushil_join/DeptName.txt:0+59
22/06/27 15:12:24 INFO mapred.MapTask: numReduceTasks: 1
22/06/27 15:12:24 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
22/06/27 15:12:24 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
22/06/27 15:12:24 INFO mapred.MapTask: soft limit at 83886080
22/06/27 15:12:24 INFO mapred.MapTask: bufstart = 0; bufvoid = 104857600
22/06/27 15:12:24 INFO mapred.MapTask: kvstart = 26214396; length = 6553600
22/06/27 15:12:24 INFO mapred.MapTask: Map output collector class =
org.apache.hadoop.mapred.MapTask$MapOutputBuffer
22/06/27 15:12:24 INFO mapred.LocalJobRunner:
22/06/27 15:12:24 INFO mapred.MapTask: Starting flush of map output
22/06/27 15:12:24 INFO mapred.MapTask: Spilling map output
22/06/27 15:12:24 INFO mapred.MapTask: bufstart = 0; bufend = 63; bufvoid = 104857600
22/06/27 15:12:24 INFO mapred.MapTask: kvstart = 26214396(104857584); kvend = 26214384(104857536);
length = 13/6553600
22/06/27 15:12:24 INFO mapred.MapTask: Finished spill 0
22/06/27 15:12:24 INFO mapred.Task: Task:attempt_local1238804660_0001_m_000000_0 is done. And is in
the process of committing
22/06/27 15:12:24 INFO mapred.LocalJobRunner: hdfs://localhost:54310/khushil_join/DeptName.txt:0+59
22/06/27 15:12:24 INFO mapred.Task: Task 'attempt_local1238804660_0001_m_000000_0' done.
22/06/27 15:12:24 INFO mapred.LocalJobRunner: Finishing task:
attempt_local1238804660_0001_m_000000_0
22/06/27 15:12:24 INFO mapred.LocalJobRunner: Starting task: attempt_local1238804660_0001_m_000001_0
22/06/27 15:12:24 INFO mapred.Task:  Using ResourceCalculatorProcessTree : [ ]
22/06/27 15:12:24 INFO mapred.MapTask: Processing split:
hdfs://localhost:54310/khushil_join/DeptStrength.txt:0+50
22/06/27 15:12:24 INFO mapred.MapTask: numReduceTasks: 1
22/06/27 15:12:24 INFO mapred.MapTask: (EQUATOR) 0 kvi 26214396(104857584)
22/06/27 15:12:24 INFO mapred.MapTask: mapreduce.task.io.sort.mb: 100
```

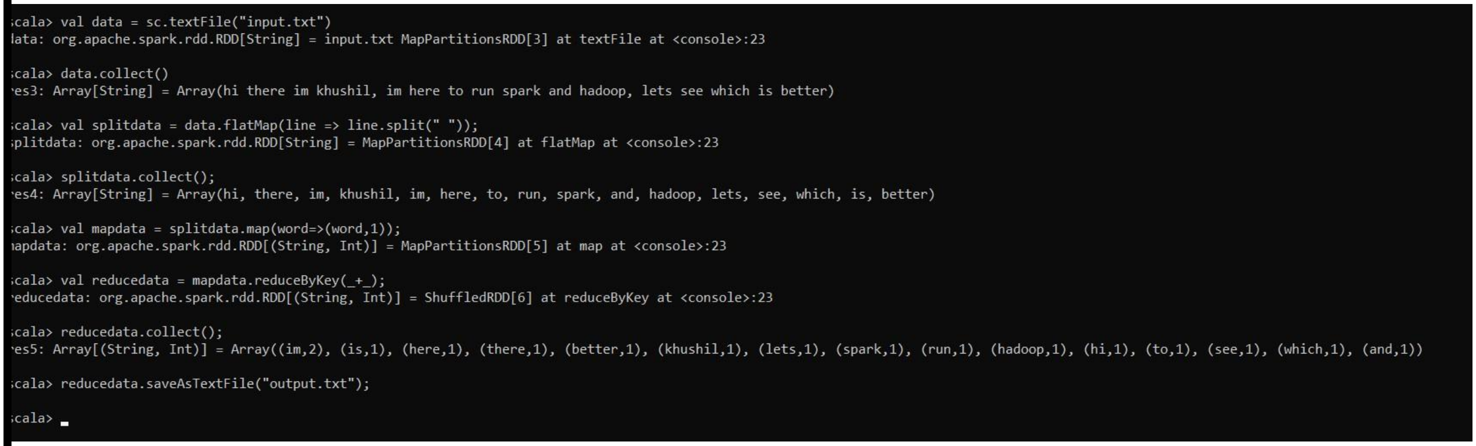


```
  FILE: Number of bytes read=26370
  FILE: Number of bytes written=782871
  FILE: Number of read operations=0
  FILE: Number of large read operations=0
  FILE: Number of write operations=0
  HDFS: Number of bytes read=277
  HDFS: Number of bytes written=85
  HDFS: Number of read operations=28
  HDFS: Number of large read operations=0
  HDFS: Number of write operations=5
  Map-Reduce Framework
  Map input records=8
  Map output records=8
  Map output bytes=117
  Map output materialized bytes=145
  Input split bytes=443
  Combine input records=0
  Combine output records=0
  Reduce input groups=4
  Reduce shuffle bytes=145
  Reduce input records=8
  Reduce output records=4
  Spilled Records=16
  Shuffled Maps =2
  Failed Shuffles=0
  Merged Map outputs=2
  GC time elapsed (ms)=2
  CPU time spent (ms)=0
  Physical memory (bytes) snapshot=0
  Virtual memory (bytes) snapshot=0
  Total committed heap usage (bytes)=913833984
  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=0
  File Output Format Counters
  Bytes Written=85
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$ hdfs dfs -cat /khushil_join/output2/part-
00000
A11     50          Finance
B12     100         HR
C13     250         Manufacturing
Dept_ID Total_Employee          Dept_Name
hduser@bmsce-Precision-T1700:~/khushil/join/MapReduceJoin$
```

Scala Programming:

Lab 9:

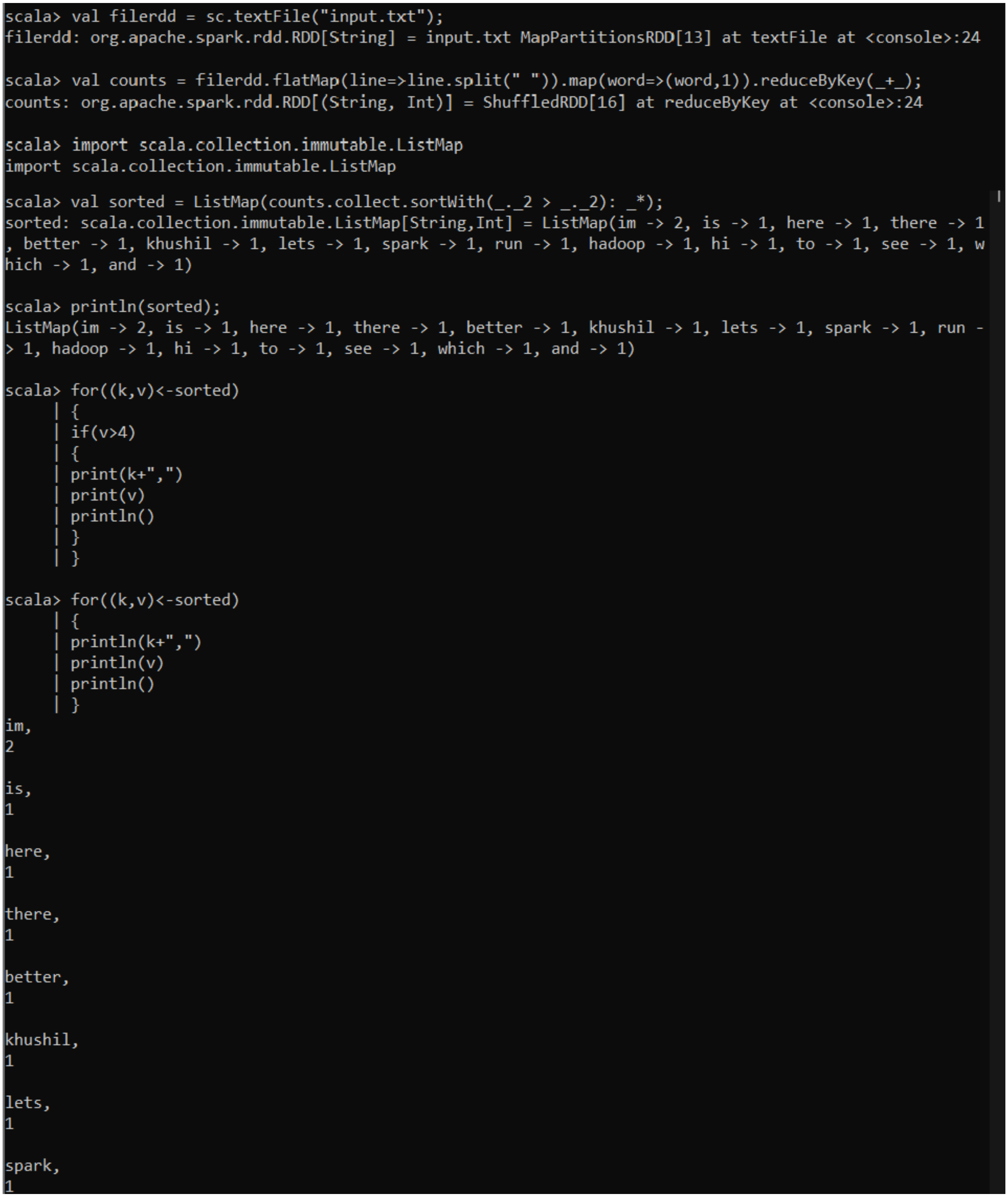
```
val data=sc.textFile("sparkdata.txt")
data.collect;
val splitdata = data.flatMap(line => line.split(" "));
splitdata.collect;
val mapdata = splitdata.map(word => (word,1));
mapdata.collect;
val reducedata = mapdata.reduceByKey(_+_);
reducedata.collect;
```



```
cala> val data = sc.textFile("input.txt")
ata: org.apache.spark.rdd.RDD[String] = input.txt MapPartitionsRDD[3] at textFile at <console>:23

cala> data.collect()
es3: Array[String] = Array(hi there im khushil, im here to run spark and hadoop, lets see which is better)

cala> val splitdata = data.flatMap(line => line.split(" "));
plitdata: org.apache.spark.rdd.RDD[String] = MapPartitionsRDD[4] at flatMap at <console>:23

cala> splitdata.collect();
es4: Array[String] = Array(hi, there, im, khushil, im, here, to, run, spark, and, hadoop, lets, see, which, is, better)

cala> val mapdata = splitdata.map(word=>(word,1));
apdata: org.apache.spark.rdd.RDD[(String, Int)] = MapPartitionsRDD[5] at map at <console>:23

cala> val reducedata = mapdata.reduceByKey(_+_);
educedata: org.apache.spark.rdd.RDD[(String, Int)] = ShuffledRDD[6] at reduceByKey at <console>:23

cala> reducedata.collect();
es5: Array[(String, Int)] = Array((im,2), (is,1), (here,1), (there,1), (better,1), (khushil,1), (lets,1), (spark,1), (run,1), (hadoop,1), (hi,1), (to,1), (see,1), (which,1), (and,1))

cala> reducedata.saveAsTextFile("output.txt");

cala> _
```

Lab 10:

```
val textFile = sc.textFile("/home/bhoom/Desktop/wc.txt")
val counts = textFile.flatMap(line => line.split(" ")).map(word => (word, 1)).reduceByKey(_ + _)
import scala.collection.immutable.ListMap
val sorted=ListMap(counts.collect.sortWith(_._2 > _._2):_*)// sort in descending order based on values
println(sorted)
for((k,v)<-sorted)
{
if(v>4)
{
print(k+",")
print(v)
println()
}}
```



```
scala> val filerdd = sc.textFile("input.txt");
filerdd: org.apache.spark.rdd.RDD[String] = input.txt MapPartitionsRDD[13] at textFile at <console>:24

scala> val counts = filerdd.flatMap(line=>line.split(" ")).map(word=>(word,1)).reduceByKey(_+_);
counts: org.apache.spark.rdd.RDD[(String, Int)] = ShuffledRDD[16] at reduceByKey at <console>:24

scala> import scala.collection.immutable.ListMap
import scala.collection.immutable.ListMap

scala> val sorted = ListMap(counts.collect.sortWith(_._2 > _._2): _*);
sorted: scala.collection.immutable.ListMap[String,Int] = ListMap(im -> 2, is -> 1, here -> 1, there -> 1
, better -> 1, khushil -> 1, lets -> 1, spark -> 1, run -> 1, hadoop -> 1, hi -> 1, to -> 1, see -> 1, w
hich -> 1, and -> 1)

scala> println(sorted);
ListMap(im -> 2, is -> 1, here -> 1, there -> 1, better -> 1, khushil -> 1, lets -> 1, spark -> 1, run -
> 1, hadoop -> 1, hi -> 1, to -> 1, see -> 1, which -> 1, and -> 1)

scala> for((k,v)<-sorted)
     | {
     | if(v>4)
     | {
     | print(k+",")
     | print(v)
     | println()
     | }
     | }

scala> for((k,v)<-sorted)
     | {
     | println(k+",")
     | println(v)
     | println()
     | }
im,
2

is,
1

here,
1

there,
1

better,
1

khushil,
1

lets,
1

spark,
1
```