VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

BIG DATA ANALYTICS
(20CS6PEBDA)

Submitted by

CHETHANA D (1BM20CS405)

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

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

B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "**BIG DATA ANALYTICS**" carried out by **CHETHANA D (1BM20CS405), who is bonafide student of B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a **BIG DATA ANALYTICS - (20CS6PEBDA)** work prescribed for the said degree.

Antara Roy Choudhary
Assistant Professor
Department of CSE
BMSCE, Bengaluru

Dr. Jyothi S Nayak
Professor and Head
Department of CSE
BMSCE, Bengaluru

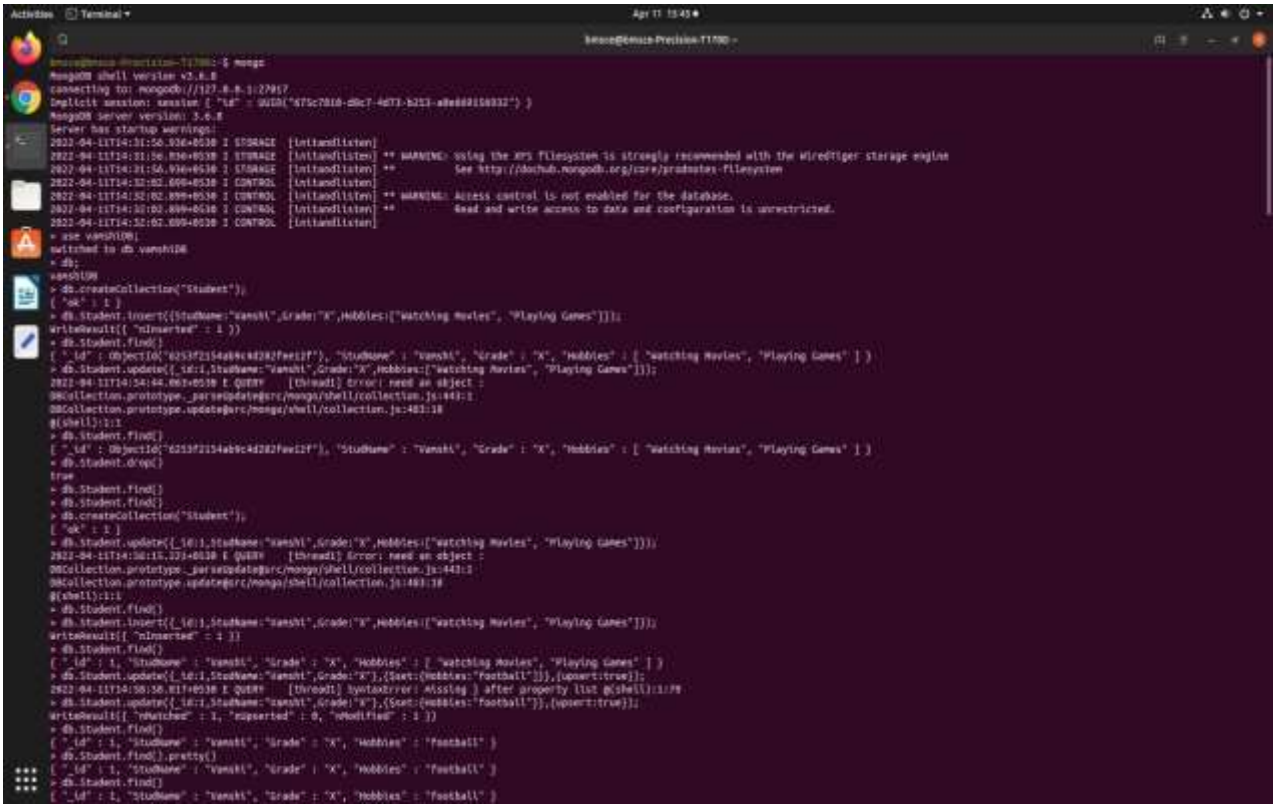
`

Index Sheet

Course Outcome

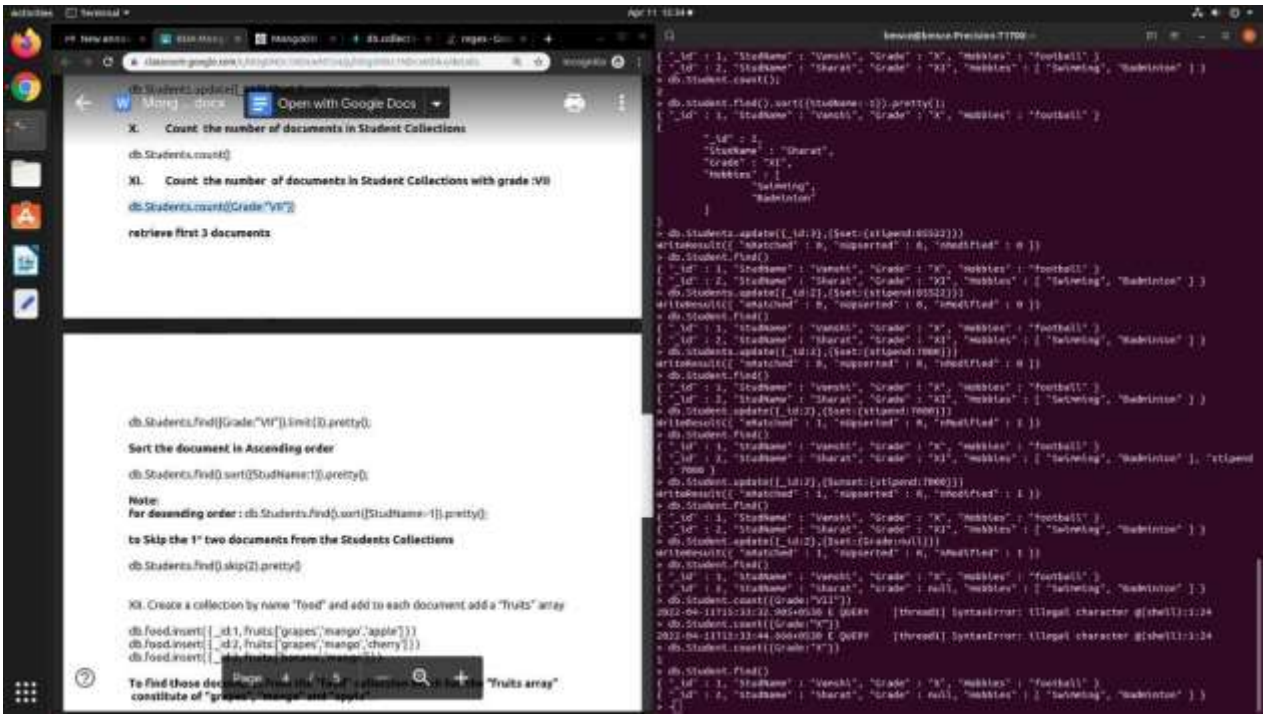
CO1	Apply the concept of NoSQL, Hadoop or Spark for a given task
CO2	Analyze the Big Data and obtain insight using data analytics mechanisms.
CO3	Design and implement Big data applications by applying NoSQL, Hadoop or Spark

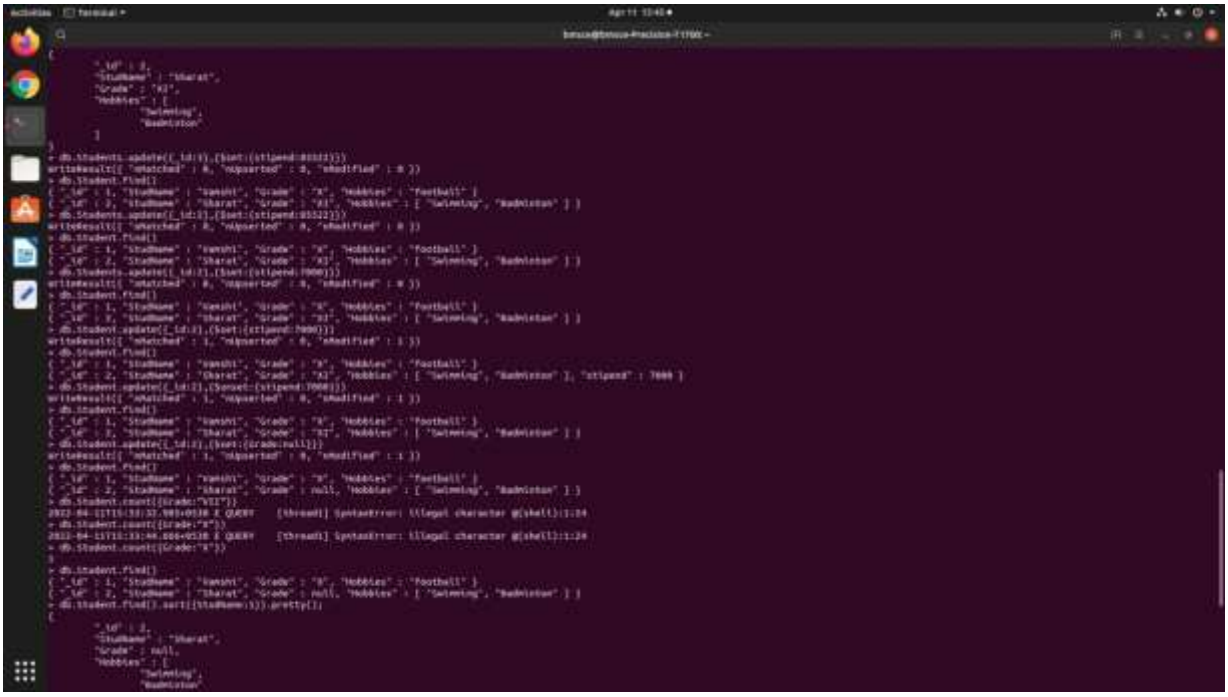
1. MongoDB- CRUD Demonstration



```
> db.Student.find()
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.find({StudName:{"Vamshi"},Grade:0,Hobbies:1})}
2022-04-11T13:05:45.360+0530 E QUERY    [thread1] SyntaxError: missing : after property id @(shell):1:35
> db.Student.find({StudName:{"Vamshi"},{id:1,Grade:0,Hobbies:1})}
2022-04-11T13:06:24.110+0530 E QUERY    [thread1] SyntaxError: missing : after property id @(shell):1:35
> db.Student.find({StudName:{"Vamshi"},{_id:1,Grade:0,Hobbies:1})}
2022-04-11T13:06:31.477+0530 E QUERY    [thread1] SyntaxError: missing : after property id @(shell):1:35
> db.Student.find({StudName:{},{_id:0,Grade:1,Hobbies:1})}
2022-04-11T13:06:13.711+0530 E QUERY    [thread1] SyntaxError: invalid property id @(shell):1:29
> db.Student.find({},{StudName:1,_id:0,Grade:1,Hobbies:1});
{ "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.find({},{StudName:1,_id:1,Grade:1,Hobbies:1});
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.find({Grade:{$eq:'VII'}}).pretty();
> db.Student.find({Grade:{$eq:'X'}}).pretty();
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.find({Grade:{$eq:'X'}});
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.insert({_id:2,StudName:"Sharat",Grade:"XI",Hobbies:["Swimming", "Badminton"]});
WriteResult({ "nInserted" : 1 })
> db.Student.find()
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
{ "_id" : 2, "StudName" : "Sharat", "Grade" : "XI", "Hobbies" : [ "Swimming", "Badminton" ] }
> db.Student.find({Grade:{$eq:'X'}});
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.find({Hobbies:{$in:['Football', 'Golf']}});
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.find({StudName:/^V/}).pretty();
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.Student.find({StudName:/^S/}).pretty();
{
        "_id" : 2,
        "StudName" : "Sharat",
        "Grade" : "XI",
        "Hobbies" : [
                "Swimming",
                "Badminton"
        ]
}
> db.Student.find({StudName:/ t$/}).pretty();
> db.Student.find({StudName:/ /}).pretty();
[1]+  Stopped                 mongo
bruce@bruce-Precision-T1700:~$ use vamshidb

Command 'use' not found, did you mean:

  command 'muse' from deb muse (3.0.2+dfsg-1)
  command 'nuse' from deb nuz (2.35+dfsg-3)
  command 'fuse' from deb fuse-emulator-gtk (1.5.7+dfsg1-1)
  command 'fuse' from deb fuse-emulator-sdl (1.5.7+dfsg1-1)
  command 'xuse' from deb xse (3.17.0-2ubuntu1)

Try: sudo apt install <deb name>

bruce@bruce-Precision-T1700:~$ mongo
```

```
bruce@bruce-Precision-T1700:~$ mongo
MongoDB shell version v3.6.8
connecting to: mongodb://127.0.0.1:27017
Implicit session: session { "id" : UUID("5ce67999-e8ec-4129-a4a2-b63c2115b4e8") }
MongoDB server version: 3.6.8
Server has startup warnings:
2022-04-11T14:31:56.935+0530 I STORAGE  [initandlisten]
2022-04-11T14:31:56.936+0530 I STORAGE  [initandlisten] ** WARNING: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine
2022-04-11T14:31:56.936+0530 I STORAGE  [initandlisten] **          See http://dochub.mongodb.org/core/prodnotes-filesystem
2022-04-11T14:32:02.899+0530 I CONTROL  [initandlisten]
2022-04-11T14:32:02.899+0530 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2022-04-11T14:32:02.899+0530 I CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
2022-04-11T14:32:02.899+0530 I CONTROL  [initandlisten]
> use vamshidb
switched to db vamshidb
> show dbs;
admin   0.000GB
config  0.000GB
local   0.000GB
mydb    0.000GB
vamshiDB  0.000GB
> db.Student.find({StudName:/t$/}).pretty();
> db.Student.find({StudName:/^t$/}).pretty();
...
...
> db.Student.find({StudName:/ t$/}).pretty();
> db.listcollections()
2022-04-11T15:22:11.116+0530 E QUERY    [thread1] TypeError: db.listcollection is not a function :
@(shell):1:1
> db.listcollections()
2022-04-11T15:22:20.336+0530 E QUERY    [thread1] TypeError: db.listcollections is not a function :
@(shell):1:1
> db.listcollections()
2022-04-11T15:22:36.345+0530 E QUERY    [thread1] TypeError: db.listcollections is not a function :
@(shell):1:1
> collections
2022-04-11T15:22:42.557+0530 E QUERY    [thread1] ReferenceError: collections is not defined :
@(shell):1:1
> show collections
> ;
> show collections;
> db.Student.find({StudName:/^V/}).pretty();
> db.Student.find({StudName:^V/}).pretty();
2022-04-11T15:23:30.784+0530 E QUERY    [thread1] SyntaxError: expected expression, got '^' @(shell):1:20
> db.student.find()
> use vamshiDB
switched to db vamshiDB
> use vamshiDB;
switched to db vamshiDB
> db.student.find()
> show collections;
Student
> db.Student.find()
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
{ "_id" : 2, "StudName" : "Sharat", "Grade" : "XI", "Hobbies" : [ "Swimming", "Badminton" ] }
```


Open with Google Docs
X. Count the number of documents in Student Collections
db.Students.count()
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 decending order : db.Students.find().sort({StudName:-1}).pretty();
to Skip the 1st two documents from the Students Collections
db.Students.find().skip(2).pretty()
XII. Create a collection by name "food" and add to each document add a "fruits" array
db.food.insert({_id:1,fruits:['grapes','mango','apple']})
db.food.insert({_id:2,fruits:['grapes','mango','cherry']})
"fruits array"



```
[ "_id" : 2, "StudName" : "Sharat", "Grade" : "XI", "Hobbies" : [ "Swimming", "Badminton" ] }
> db.Student.update({_id:2},{$set:{Grade:null}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.find()
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
{ "_id" : 2, "StudName" : "Sharat", "Grade" : null, "Hobbies" : [ "Swimming", "Badminton" ] }
> db.Student.count({Grade:"XII"})
2022-04-11T15:33:32.981+0530 E QUERY    [thread1] SyntaxError: illegal character @(shell):1:24
> db.Student.count({Grade:"X"})
2022-04-11T15:33:44.686+0530 E QUERY    [thread1] SyntaxError: illegal character @(shell):1:24
> db.Student.count({Grade:"X"})
1
> db.Student.find()
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
{ "_id" : 2, "StudName" : "Sharat", "Grade" : null, "Hobbies" : [ "Swimming", "Badminton" ] }
> db.Student.find().sort({StudName:1}).pretty();
{
        "_id" : 2,
        "StudName" : "Sharat",
        "Grade" : null,
        "Hobbies" : [
                "Swimming",
                "Badminton"
        ]
}
{ "_id" : 1, "StudName" : "Vamshi", "Grade" : "X", "Hobbies" : "Football" }
> db.createCollection("veggies");
{ "ok" : 1 }
> db.veggies.insert({_id:1,vegetables:['cucumber','beetroot','carrot']})
2022-04-11T15:38:04.363+0530 E QUERY    [thread1] SyntaxError: missing ) after argument list @(shell):1:21
> db.veggies.insert({_id:1,vegetables:['cucumber','beetroot','carrot']});
2022-04-11T15:38:11.867+0530 E QUERY    [thread1] SyntaxError: missing ) after argument list @(shell):1:21
> db.veggies.insert({_id:1,vegetables:['cucumber','beetroot','carrot']});
WriteResult({ "nInserted" : 1 })
> db.veggies.insert({_id:1,vegetables:['cabbage']});
WriteResult({
        "nInserted" : 0,
        "writeError" : [
                "code" : 11000,
                "errmsg" : "E11000 duplicate key error collection: samshi20.veggies index: _id_ dup key: { : 1.0 }"
        ]
})
> db.veggies.insert({_id:2,vegetables:['cabbage']});
WriteResult({ "nInserted" : 1 })
> db.veggies.find ({'vegetables.1':'beetroot'})
{ "_id" : 1, "vegetables" : [ "cucumber", "beetroot", "carrot" ] }
> db.veggies.find ({"vegetables":{$slice:1}})
{ "_id" : 1, "vegetables" : [ "cucumber", "beetroot", "carrot" ] }
> db.veggies.find({_id:1},{"vegetables":{$slice:1}})
2022-04-11T15:41:01.416+0530 E QUERY    [thread1] SyntaxError: illegal character @(shell):1:25
> db.veggies.find({_id:1},{"vegetables":{$slice:1}})
{ "_id" : 1, "vegetables" : [ "cucumber", "beetroot" ] }
> db.veggies.find({fruits:{$all:["cabbage"]}})
2022-04-11T15:44:29.849+0530 E QUERY    [thread1] SyntaxError: illegal character @(shell):1:33
> db.veggies.find({fruits:{$all:["cabbage"]}})
> []
```

```
$ script
Script started, file is typescript
$ mongo
MongoDB shell version v3.6.8
connecting to: mongodb://127.0.0.1:27017/
Implicit session: session { "id" : UUID("ff9ec7b5-b7d0-4fd4-9e81-5104d7b19996") }
MongoDB server version: 3.6.8
Server has startup warnings:
2022-04-18T14:01:29.519+0530 I STORAGE  [initandlisten]
2022-04-18T14:01:29.519+0530 I STORAGE  [initandlisten] ** WARNING: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine
2022-04-18T14:01:29.519+0530 I STORAGE  [initandlisten] **          See http://dochub.mongodb.org/core/prodnotes-filesystem
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten]
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten]
> show dbs
admin   0.000GB
config  0.000GB
local   0.000GB
sub     0.000GB
stuDB   0.000GB
studb   0.000GB
test    0.000GB
> use stuDB
switched to db stuDB
> show collections
student
> db.student.drop()
true
> db.create.collection("Student")
2022-04-18T14:10:50.524+0530 E QUERY    [thread1] TypeError: db.create.collection is not a function :
@(shell):1:1
> db.create.collection("Student")
2022-04-18T14:10:57.554+0530 E QUERY    [thread1] TypeError: db.create.collection is not a function :
@(shell):1:1
> db.createCollection("student")
{ "ok" : 1 }
> db.student.insert({_id:1, name:'Jeevan', usn:'1bm19cs004', semester:4, Dept_name:'Computer Science', Cgpa:8, hobbies:['Pakirt', 'Chakri']})
WriteResult({ "nInserted" : 1 })
> db.student.find()
{ "_id" : 1, "name" : "Jeevan", "usn" : "1bm19cs004", "semester" : 4, "Dept_name" : "Computer Science", "Cgpa" : 8, "hobbies" : [ "Pakirt", "Chakri" ] }
> db.student.insert({_id:4, name:'Shrath', usn:'1bm19cs007a', semester:4, Dept_name:'Computer Science', Cgpa:8, hobbies:['Rocket', 'Manga']})
WriteResult({ "nInserted" : 1 })
> db.student.insert({_id:5, name:'Vamsi', usn:'1bm19cs008', semester:4, Dept_name:'Computer Science', Cgpa:8, hobbies:['Rocket', 'Nanda']})
WriteResult({ "nInserted" : 1 })
> db.student.find({Dept_name:'Computer science'})
> db.student.find({Dept_name:'Computer Science'})
{ "_id" : 1, "name" : "Jeevan", "usn" : "1bm19cs004", "semester" : 4, "Dept_name" : "Computer Science", "Cgpa" : 8, "hobbies" : [ "Pakirt", "Chakri" ] }
{ "_id" : 4, "name" : "Shrath", "usn" : "1bm19cs007a", "semester" : 4, "Dept_name" : "Computer Science", "Cgpa" : 8, "hobbies" : [ "Rocket", "Manga" ] }
{ "_id" : 5, "name" : "Vamsi", "usn" : "1bm19cs008", "semester" : 4, "Dept_name" : "Computer Science", "Cgpa" : 8, "hobbies" : [ "Rocket", "Nanda" ] }
> db.students.aggregate([{match:{Dept_name:'Computer Science'}}, {$group:{sem:'$semester', avgCgpa:{$avg:'$Cgpa'}}}])
assert: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
```

```
{ "_id" : 4, "name" : "Shrath", "usn" : "1bm19cs074", "semester" : 6, "Dept_name" : "Computer Science", "cgpa" : 8, "hobbies" : [ "Rocket", "Manga" ] }
{ "_id" : 5, "name" : "Vamsi", "usn" : "1bm19cs080", "semester" : 6, "Dept_name" : "Computer Science", "cgpa" : 8, "hobbies" : [ "Rocket", "Noobs" ] }
> db.students.aggregate([$match:{Dept_name:"Computer Science"}], {$group:{sem:"$semester", avgCgpa:{$avg:"$Cgpa"}}})
assert: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:18:14
assert.commandWorked@src/mongo/shell/assert.js:403:5
DB.prototype._runAggregate@src/mongo/shell/db.js:260:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1

2022-04-18T14:39:54.336+0530 E QUERY    [thread1] Error: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed :
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:18:14
assert.commandWorked@src/mongo/shell/assert.js:403:5
DB.prototype._runAggregate@src/mongo/shell/db.js:260:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1
> db.students.aggregate([$match:{Dept_name:"Computer Science"}], {$group:{_id:"$_id", sem:"$semester", avgCgpa:{$avg:"$Cgpa"}}})
assert: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:18:14
assert.commandWorked@src/mongo/shell/assert.js:403:5
DB.prototype._runAggregate@src/mongo/shell/db.js:260:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1

2022-04-18T14:40:28.271+0530 E QUERY    [thread1] Error: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed :
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:18:14
assert.commandWorked@src/mongo/shell/assert.js:403:5
DB.prototype._runAggregate@src/mongo/shell/db.js:260:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1
> db.students.aggregate([$match:{Dept_name:"Computer Science"}], {$group:{_id:"$_id", "sem":"$semester", avgCgpa:{$avg:"$Cgpa"}}})
assert: command failed: {
```

```
> db.students.aggregate([$match:{Dept_name:"Computer Science"}], {$group:{_id:"$_id", "sem":"$semester", avgCgpa:{$avg:"$Cgpa"}}})
assert: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:18:14
assert.commandWorked@src/mongo/shell/assert.js:403:5
DB.prototype._runAggregate@src/mongo/shell/db.js:260:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1

2022-04-18T14:42:15.985+0530 E QUERY    [thread1] Error: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed :
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:18:14
assert.commandWorked@src/mongo/shell/assert.js:403:5
DB.prototype._runAggregate@src/mongo/shell/db.js:260:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1
> db.students.aggregate([$match:{Dept_name:"Computer Science"}], {$group:{_id:"$_id", avgCgpa:{$avg:"$Cgpa"}}})
> db.students.find()
> db.student.find()
{ "_id" : 1, "name" : "Jeevan", "usn" : "1bm19cs004", "semester" : 6, "Dept_name" : "Computer Science", "Cgpa" : 8, "hobbies" : [ "Pubirl", "Chpirl" ] }
{ "_id" : 4, "name" : "Shrath", "usn" : "1bm19cs074", "semester" : 6, "Dept_name" : "Computer Science", "Cgpa" : 8, "hobbies" : [ "Rocket", "Manga" ] }
{ "_id" : 5, "name" : "Vamsi", "usn" : "1bm19cs080", "semester" : 6, "Dept_name" : "Computer Science", "Cgpa" : 8, "hobbies" : [ "Rocket", "Noobs" ] }
> db.student.aggregate([$match:{Dept_name:"Computer Science"}], {$group:{_id:"$_id", avgCgpa:{$avg:"$Cgpa"}}})
{ "_id" : 1, "avgCgpa" : 8 }
{ "_id" : 4, "avgCgpa" : 8 }
{ "_id" : 4, "avgCgpa" : 8 }
> db.student.aggregate([$match:{Dept_name:"Computer Science"}], {$group:{sem:"$semester", avgCgpa:{$avg:"$Cgpa"}}})
assert: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:18:14
assert.commandWorked@src/mongo/shell/assert.js:403:5
DB.prototype._runAggregate@src/mongo/shell/db.js:260:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1

2022-04-18T14:49:06.313+0530 E QUERY    [thread1] Error: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed :
```

```
Activities   Terminal ▾                                   Apr 18 15:35
                                                          kouse@kouse-Precision-T1700: ~
@(shell):1:1

2022-04-18T14:48:06.333+0530 E QUERY    [thread1] Error: command failed: {
        "ok" : 0,
        "errmsg" : "The field 'sem' must be an accumulator object",
        "code" : 40234,
        "codeName" : "Location40234"
} : aggregate failed :
_getErrorWithCode@src/mongo/shell/utils.js:25:13
doassert@src/mongo/shell/assert.js:16:14
assert.commandWorked@src/mongo/shell/assert.js:403:3
DB.prototype._runAggregate@src/mongo/shell/db.js:269:9
DBCollection.prototype.aggregate@src/mongo/shell/collection.js:1212:12
@(shell):1:1
> db.student.aggregate([{match:{Dept_name:"Computer Science"}}, {$group:{_id:"$semester", avgGpa:{$avg:"$Gpa"}}}]
[ { "_id" : 6, "avgGpa" : 0 }
> db.student.insert({_id:3, name:"Vamsikee", usn:"1mi19cs000", semester:4, Dept_name:"Computer Science", Gpa:9, hobbies:["Rocket", "Books"]})
WriteResult({
        "nInserted" : 0,
        "writeError" : [
                "code" : 11000,
                "errmsg" : "E11000 duplicate key error collection: stu000.student index: _id_ dup key: { : 3.0 }"
        ]
})
> db.student.insert({_id:4, name:"Vamsikee", usn:"1mi19cs000", semester:4, Dept_name:"Computer Science", Gpa:9, hobbies:["Rocket", "Books"]})
WriteResult({ "nInserted" : 1 })
> db.student.aggregate([{match:{Dept_name:"Computer Science"}}, {$group:{_id:"$semester", avgGpa:{$avg:"$Gpa"}}}]
[ { "_id" : 4, "avgGpa" : 9 }
[ { "_id" : 6, "avgGpa" : 0 }
> db.student.aggregate([{match:{Dept_name:"Computer Science"}}, {$group:{_id:"$semester", avgGpa:{$avg:"$Gpa"}}},{$match:{avgGpa:{$gt:8.5}}}]
[ { "_id" : 4, "avgGpa" : 9 }
> db.student.aggregate([{match:{Dept_name:"Computer Science"}}, {$group:{_id:"$semester", avgGpa:{$avg:"$Gpa"}}},{$match:{avgGpa:{$gt:7.5}}}]
[ { "_id" : 4, "avgGpa" : 9 }
[ { "_id" : 6, "avgGpa" : 8 }
> mongoexport --host localhost --db Student --collection airlines --csv --out
2022-04-18T14:33:09.884+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> db
stu000
> mongoexport --host localhost --db stu000 --collection student --csv --out /home
2022-04-18T14:54:08.371+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --host localhost --db stu000 --collection student --csv --out
2022-04-18T14:54:08.515+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --host localhost --db stu000 --collection student --csv --out /home/out.txt
2022-04-18T14:54:18.940+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --host localhost --db stu000 --collection student --csv --out /home/out.txt;
2022-04-18T14:55:01.804+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --host localhost --db stu000 --collection student --csv --out "/home/out.txt";
2022-04-18T14:55:18.730+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --host localhost --db stu000 --collection student --csv --out /home/out.csv;
2022-04-18T14:55:46.181+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --host localhost --db stu000 --collection student --csv --out=/home/out.csv;
2022-04-18T14:57:36.277+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --host localhost --db stu000 --collection student --fields _id --csv --out=/home/out.csv;
2022-04-18T14:57:59.439+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db stu000 --collection student --fields _id --csv --out=/home/out.csv;
2022-04-18T14:58:03.110+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
```

```
Activities   Terminal ▾                                   Apr 18 15:35
                                                          kouse@kouse-Precision-T1700: ~
> mongoexport --db stu000 --collection student --fields _id --type=csv --out home\out.csv;
2022-04-18T15:00:12.993+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db stu000 --collection student --fields _id --type=csv --out home\out.csv;
2022-04-18T15:00:37.479+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db stu000 --collection student --fields _id --type=csv --out home\out.csv;^C
bye
kouse@kouse-Precision-T1700:~$ ^C
kouse@kouse-Precision-T1700:~$ mongo
MongoDB shell version v3.6.8
connecting to: mongodb://127.0.0.1:27017
Implicit session: session { "id" : UUID("1ee8b771-0e9e-4ef9-b090-7e1164790be0") }
MongoDB server version: 3.6.8
Server has startup warnings:
2022-04-18T14:01:29.318+0530 I STORAGE  [initandlisten]
2022-04-18T14:01:29.318+0530 I STORAGE  [initandlisten] ** WARNING: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine
2022-04-18T14:01:29.318+0530 I STORAGE  [initandlisten] **          See http://dochub.mongodb.org/core/prodnotes-filesystem
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten]
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten]
> use stu000
switched to db stu000
> mongoexport --db stu000 --collection student --fields _id --type=csv --out home\out.csv;
2022-04-18T15:02:34.473+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db stu000 --collection student --fields _id --type=csv --out Home\out_test.csv;
2022-04-18T15:09:26.760+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db stu000 --collection student --fields _id --type=csv --out Home\out_test.csv;
2022-04-18T15:12:09.833+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db stu000 --collection student --fields _id --type=csv --out Home\out_test.csv;
2022-04-18T15:12:18.496+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> db.createCollection("Bank")
{ "ok" : 1 }
> db.Bank.insert({_id:1, accNo:121212, name:"Ramesha", bal:1000, type:"S"})
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({_id:2, accNo:121213, name:"Rameshaa", bal:1000, type:"S"})
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({_id:3, accNo:121214, name:"Rameshaaa", bal:1000, type:"S"})
WriteResult({ "nInserted" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S" }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshaa", "bal" : 1000, "type" : "S" }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.update({_id:1}, {$push:{nominee:{n1:"Sam1", n2:"Sam2"}}})
... }
... }
2022-04-18T15:26:23.815+0530 E QUERY    [thread1] SyntaxError: missing } after property list @(shell):1:63
> db.Bank.update({_id:1}, {$push:{nominee:{n1:"Sam1", n2:"Sam2"}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { { "n1" : "Sam1", "n2" : "Sam2" } } }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshaa", "bal" : 1000, "type" : "S" }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.update({_id:1}, {$push:{nominee:"Sam3"}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { { "n1" : "Sam1", "n2" : "Sam2" }, "Sam3" } }
```

```
> mongoexport --db studDB --collection student --fields _id --type=csv --out \home\out.csv;
2022-04-18T15:00:12.941+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db studDB --collection student --fields _id --type=csv --out home\out.csv;
2022-04-18T15:06:37.479+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db studDB --collection student --fields _id --type=csv --out home\out.csv;^C
bye
[redacted]$ ^C
[redacted]$ mongo
MongoDB shell version v3.6.8
connecting to: mongodb://127.0.0.1:27017
Implicit session: session { "id" : UUID("[redacted]") }
MongoDB server version: 3.6.8
Server has startup warnings:
2022-04-18T14:01:28.318+0530 I STORAGE  [initandlisten]
2022-04-18T14:01:28.318+0530 I STORAGE  [initandlisten] ** WARNING: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine
2022-04-18T14:01:28.318+0530 I STORAGE  [initandlisten] **          See http://dochub.mongodb.org/core/prodnotes-filesystem
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten]
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the database.
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten] **          Read and write access to data and configuration is unrestricted.
2022-04-18T14:01:33.775+0530 I CONTROL  [initandlisten]
> use studDB
switched to db studDB
> mongoexport --db studDB --collection student --fields _id --type=csv --out home\out.csv;
2022-04-18T15:02:34.472+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db studDB --collection student --fields _id --type=csv --out home\out_test.csv;
2022-04-18T15:05:28.760+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db studDB --collection student --fields _id --type=csv --out home\out_test.csv;
2022-04-18T15:12:09.815+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> mongoexport --db studDB --collection student --fields _id --type=csv --out home\out_test.csv;
2022-04-18T15:13:18.456+0530 E QUERY    [thread1] SyntaxError: missing ; before statement @(shell):1:14
> db.createCollection("Bank")
{ "ok" : 1 }
> db.Bank.insert({_id:1, accNo:121212, name:"Ramesha", bal:1000, type:"S"})
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({_id:2, accNo:121213, name:"Rameshua", bal:1000, type:"S"})
WriteResult({ "nInserted" : 1 })
> db.Bank.insert({_id:3, accNo:121214, name:"Rameshaaa", bal:1000, type:"S"})
WriteResult({ "nInserted" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S" }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshua", "bal" : 1000, "type" : "S" }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.update({_id:1}, {$push:{nominee:{n1:"ban1", n2:"ban2"}}})
... }
... }
2022-04-18T15:26:23.835+0530 E QUERY    [thread1] SyntaxError: missing } after property list @(shell):1:63
> db.Bank.update({_id:1}, {$push:{nominee:{n1:"ban1",n2:"ban2"}}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { "n1" : "ban1", "n2" : "ban2" } }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshua", "bal" : 1000, "type" : "S" }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.update({_id:1}, {$push:{nominee:"ban1"}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { "n1" : "ban1", "n2" : "ban2" }, "ban1" }
```

```
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { "n1" : "ban1", "n2" : "ban2" } }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshua", "bal" : 1000, "type" : "S" }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.update({_id:1}, {$push:{nominee:"ban1"}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { "n1" : "ban1", "n2" : "ban2" }, "ban1" }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshua", "bal" : 1000, "type" : "S" }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.update({_id:1}, {$push:{nominee:"ban1"}})
WriteResult({
        "nMatched" : 0,
        "nUpserted" : 0,
        "nModified" : 0,
        "writeError" : {
                "code" : 9,
                "errmsg" : "Expected a number in: nominee: \"ban1\""
        }
})
> db.Bank.update({_id:1}, {$push:{nominee:"ban1"}})
WriteResult({
        "nMatched" : 0,
        "nUpserted" : 0,
        "nModified" : 0,
        "writeError" : {
                "code" : 9,
                "errmsg" : "Expected a number in: nominee: \"ban1\""
        }
})
> db.Bank.update({_id:1}, {$pop:{nominee:1}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { "n1" : "ban1", "n2" : "ban2" }, "ban1" }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshua", "bal" : 1000, "type" : "S", "nominee" : [ ] }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.update({_id:1}, {$pop:{nominee:-1}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Bank.find()
{ "_id" : 1, "accNo" : 121212, "name" : "Ramesha", "bal" : 1000, "type" : "S", "nominee" : { "ban1" } }
{ "_id" : 2, "accNo" : 121213, "name" : "Rameshua", "bal" : 1000, "type" : "S", "nominee" : [ ] }
{ "_id" : 3, "accNo" : 121214, "name" : "Rameshaaa", "bal" : 1000, "type" : "S" }
> db.Bank.createIndex({name:1})
{
        "createCollectionAutomatically" : false,
        "numIndexesBefore" : 1,
        "numIndexesAfter" : 2,
        "ok" : 1
}
```

2. Perform the following DB operations using Cassandra.

1. Create a keyspace by name Employee
2. Create a column family by name Employee-Info
   with attributes
   Emp_Id Primary Key, Emp_Name,
   Designation, Date_of_Joining, Salary,
   Dept_Name
3. Insert the values into the table in batch
4. Update Employee name and Department of Emp-Id 121
5. Sort the details of Employee records based on salary
6. Alter the schema of the table Employee_Info to add a column Projects which stores a set of Projects done by the corresponding Employee.
7. Update the altered table to add project names.
8. Create a TTL of 15 seconds to display the values of Employee

1. Create a key space by name Employee

```
cqlsh> describe keyspaces;

system_schema  system        system_distributed
system_auth    test_keyspace  system_traces

cqlsh> create keyspace Employee with replication={'class':'SimpleStrategy','replication_factor':2};
cqlsh> describe keyspace Employee;

CREATE KEYSPACE employee WITH replication = {'class': 'SimpleStrategy', 'replication_factor': '2'}  AND durable_writes = true;

cqlsh> use employee;
```

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

```
cqlsh:employee> CREATE TABLE Employee_Info(cluster_col text,Emp_id int,Emp_Name text,Designation text,Date_of_Joining timestamp,Salary int,Dept_Name text,primary key((clust
r_col,Salary)) WITH CLUSTERING ORDER BY(Salary DESC);
cqlsh:employee> select*from employee;
InvalidRequest: Error from server: code=2200 [Invalid query] message="unconfigured table employee"
cqlsh:employee> select*from employee_info;

 cluster_col | salary | date_of_joining | dept_name | designation | emp_id | emp_name
-------------+--------+-----------------+-----------+-------------+--------+----------
```

3. Insert the values into the table in batch

```
(0 rows)
cqlsh:employee> BEGIN BATCH
           ... INSERT INTO Employee_Info(cluster_col,emp_id,emp_name,designation,Date_of_Joining,Salary,Dept_Name) VALUES ('xyz',1,'Ravi','HTS','2020-08-24',12000,'TESTIN
');
           ... INSERT INTO Employee_Info(cluster_col,emp_id,emp_name,designation,Date_of_Joining,Salary,Dept_Name) VALUES ('xyz',2,'Vamshi','MANAGER','2021-03-18',50000,'
EVELOPMENT');
           ... INSERT INTO Employee_Info(cluster_col,emp_id,emp_name,designation,Date_of_Joining,Salary,Dept_Name) VALUES ('xyz',121,'Kiran','SDE','2019-04-21',10000,'PRO
ECTION');
           ... INSERT INTO Employee_Info(cluster_col,emp_id,emp_name,designation,Date_of_Joining,Salary,Dept_Name) VALUES ('xyz',3,'Ramesh','ANALYST','2020-05-07',20000,'
UALITY');
           ... APPLY BATCH;
cqlsh:employee> SELECT*FROM Employee_Info;

 cluster_col | salary | date_of_joining                 | dept_name   | designation | emp_id | emp_name
-------------+--------+---------------------------------+-------------+-------------+--------+----------
         xyz |  50000 | 2021-03-18 18:30:00.000000+0000 | DEVELOPMENT |     MANAGER |      2 |  Vamshi
         xyz |  20000 | 2020-05-06 18:30:00.000000+0000 |     QUALITY |     ANALYST |      3 |  Ramesh
         xyz |  12000 | 2020-08-23 18:30:00.000000+0000 |     TESTING |         HTS |      1 |    Ravi
         xyz |  10000 | 2019-04-20 18:30:00.000000+0000 |  PRODUCTION |         SDE |    121 |   Kiran

(4 rows)
```

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

```
cqlsh:employee> update Employee_Info SET emp_name='karthik',dept_name='Compliance' where cluster_col='xyz' and salary=10000 IF emp_id=121;

 [applied]
-----------
      True

cqlsh:employee> SELECT*FROM Employee_Info;

 cluster_col | salary | date_of_joining                 | dept_name    | designation | emp_id | emp_name | projects
-------------+--------+---------------------------------+--------------+-------------+--------+----------+-----------------------
         xyz |  50000 | 2021-03-19 18:30:00.000000+0000 | DEVELOPEMENT |     MANAGER |      2 |   Vamshi |          {'AI', 'OS'}
         xyz |  20000 | 2020-05-06 18:30:00.000000+0000 |      QUALITY |     ANALYST |      3 |   Ramesh |            {'DEVOPS'}
         xyz |  12000 | 2020-08-23 18:30:00.000000+0000 |      TESTING |         MTS |      1 |     Ravi |                  {'ML'}
         xyz |  10000 | 2019-04-20 18:30:00.000000+0000 |   Compliance |         SDE |    121 |  karthik | {'QUANTUM COMPUTING'}
```

5. Sort the details of Employee records based on salary

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

 cluster_col | salary | date_of_joining                 | dept_name    | designation | emp_id | emp_name | projects
-------------+--------+---------------------------------+--------------+-------------+--------+----------+----------
         xyz |  50000 | 2021-03-19 18:30:00.000000+0000 | DEVELOPEMENT |     MANAGER |      2 |   Vamshi |     null
         xyz |  20000 | 2020-05-06 18:30:00.000000+0000 |      QUALITY |     ANALYST |      3 |   Ramesh |     null
         xyz |  12000 | 2020-08-23 18:30:00.000000+0000 |      TESTING |         MTS |      1 |     Ravi |     null
         xyz |  10000 | 2019-04-20 18:30:00.000000+0000 |      Finance |         SDE |    121 |  Jignesh |     null
```

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

```
cqlsh:employee> alter table Employee_Info add Projects set<text>;
cqlsh:employee> SELECT*FROM Employee_Info;

 cluster_col | salary | date_of_joining                 | dept_name    | designation | emp_id | emp_name | projects
-------------+--------+---------------------------------+--------------+-------------+--------+----------+----------
         xyz |  50000 | 2021-03-19 18:30:00.000000+0000 | DEVELOPEMENT |     MANAGER |      2 |   Vamshi |     null
         xyz |  20000 | 2020-05-06 18:30:00.000000+0000 |      QUALITY |     ANALYST |      3 |   Ramesh |     null
         xyz |  12000 | 2020-08-23 18:30:00.000000+0000 |      TESTING |         MTS |      1 |     Ravi |     null
         xyz |  10000 | 2019-04-20 18:30:00.000000+0000 |      Finance |         SDE |    121 |  Jignesh |     null

(4 rows)
```

7. Update the altered table to add project names.

```
cqlsh:employee> update Employee_Info SET projects=projects+{'ML'} where cluster_col='xyz' and salary=12000 IF emp_id=1;

 [applied]
-----------
      True

cqlsh:employee> update Employee_Info SET projects=projects+{'AI','DS'} where cluster_col='xyz' and salary=50000 IF emp_id=2;

 [applied]
-----------
      True

cqlsh:employee> update Employee_Info SET projects=projects+{'DEVOPS'} where cluster_col='xyz' and salary=20000 IF emp_id=3;

 [applied]
-----------
      True

cqlsh:employee> update Employee_Info SET projects=projects+{'QUANTUM COMPUTING'} where cluster_col='xyz' and salary=10000 IF emp_id=121;

 [applied]
-----------
      True

cqlsh:employee> SELECT*FROM Employee_Info;

 cluster_col | salary | date_of_joining                 | dept_name    | designation | emp_id | emp_name | projects
-------------+--------+---------------------------------+--------------+-------------+--------+----------+-----------------------
         xyz |  50000 | 2021-03-19 18:30:00.000000+0000 | DEVELOPEMENT |     MANAGER |      2 |   Vamshi |          {'AI', 'DS'}
         xyz |  20000 | 2020-05-06 18:30:00.000000+0000 |      QUALITY |     ANALYST |      3 |   Ramesh |           {'DEVOPS'}
         xyz |  12000 | 2020-08-23 18:30:00.000000+0000 |      TESTING |         MTS |      1 |     Ravi |                {'ML'}
         xyz |  10000 | 2019-04-20 18:30:00.000000+0000 |      Finance |         SDE |    121 |  Jignesh | {'QUANTUM COMPUTING'}
```

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

```
(4 rows)
cqlsh:employee> INSERT INTO Employee_Info(cluster_col,emp_id,emp_name,designation,Date_of_Joining,Salary,Dept_Name) VALUES ('xyz',121,'Modi','SDE','2022-04-
TION') using TTL 15;
cqlsh:employee> SELECT*FROM Employee_Info;

 cluster_col | salary | date_of_joining                 | dept_name    | designation | emp_id | emp_name | projects
-------------+--------+---------------------------------+--------------+-------------+--------+----------+-----------------------
         xyz |  50000 | 2021-03-19 18:30:00.000000+0000 | DEVELOPEMENT |     MANAGER |      2 |   Vamshi |          {'AI', 'DS'}
         xyz |  20000 | 2020-05-06 18:30:00.000000+0000 |      QUALITY |     ANALYST |      3 |   Ramesh |           {'DEVOPS'}
         xyz |  12000 | 2020-08-23 18:30:00.000000+0000 |      TESTING |         MTS |      1 |     Ravi |                {'ML'}
         xyz |  10000 | 2019-04-20 18:30:00.000000+0000 |      Finance |         SDE |    121 |  Jignesh | {'QUANTUM COMPUTING'}
         xyz |   1000 | 2022-04-20 18:30:00.000000+0000 |   PRODUCTION |         SDE |    121 |     Modi |                  null

(5 rows)
cqlsh:employee> SELECT*FROM Employee_Info;

 cluster_col | salary | date_of_joining                 | dept_name    | designation | emp_id | emp_name | projects
-------------+--------+---------------------------------+--------------+-------------+--------+----------+-----------------------
         xyz |  50000 | 2021-03-19 18:30:00.000000+0000 | DEVELOPEMENT |     MANAGER |      2 |   Vamshi |          {'AI', 'DS'}
         xyz |  20000 | 2020-05-06 18:30:00.000000+0000 |      QUALITY |     ANALYST |      3 |   Ramesh |           {'DEVOPS'}
         xyz |  12000 | 2020-08-23 18:30:00.000000+0000 |      TESTING |         MTS |      1 |     Ravi |                {'ML'}
         xyz |  10000 | 2019-04-20 18:30:00.000000+0000 |      Finance |         SDE |    121 |  Jignesh | {'QUANTUM COMPUTING'}

(4 rows)
```

3. Perform the following DB operations using Cassandra.

1. Create a keyspace by name Library
2. Create a column family by name Library-Info with attributes
   Stud_Id Primary Key,
   Counter_value of type Counter,
   Stud_Name, Book-Name, Book-Id,
   Date_of_issue
3. Insert the values into the table in batch
4. Display the details of the table created and increase the value of the counter
5. Write a query to show that a student with id 112 has taken a book “BDA” 2 times.
6. Export the created column to a csv file
7. Import a given csv dataset from local file system into Cassandra column family

1. Create a key space by name Library

```
cqlsh> describe keyspaces;

system_schema  system        system_distributed  system_traces
system_auth    test_keyspace  employee

cqlsh> CREATE KEYSPACE library WITH replication={'class':'SimpleStrategy','replication_factor':'1'};
cqlsh> describe keyspace library;

CREATE KEYSPACE library WITH replication = {'class': 'SimpleStrategy', 'replication_factor': '1'}  AND durable_writes = true;

cqlsh> use 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 (Stud_Id int,Counter_value counter,Stud_Name text,Book_Name text,Book_Id int,Date_of_issue timestamp,PRIMARY KEY(Stud_Id,Stud_Name,
Book_Name,Book_Id,Date_of_issue));
cqlsh:library> describe table library_info

CREATE TABLE library.library_info (
    stud_id int,
    stud_name text,
    book_name text,
    book_id int,
    date_of_issue timestamp,
    counter_value counter,
    PRIMARY KEY (stud_id, stud_name, book_name, book_id, date_of_issue)
) WITH CLUSTERING ORDER BY (stud_name ASC, book_name ASC, book_id ASC, date_of_issue ASC)
    AND bloom_filter_fp_chance = 0.01
    AND caching = {'keys': 'ALL', 'rows_per_partition': 'NONE'}
    AND comment = ''
    AND compaction = {'class': 'org.apache.cassandra.db.compaction.SizeTieredCompactionStrategy', 'max_threshold': '32', 'min_threshold': '4'}
    AND compression = {'chunk_length_in_kb': '64', 'class': 'org.apache.cassandra.io.compress.LZ4Compressor'}
    AND crc_check_chance = 1.0
    AND dclocal_read_repair_chance = 0.1
    AND default_time_to_live = 0
    AND gc_grace_seconds = 864000
    AND max_index_interval = 2048
    AND memtable_flush_period_in_ms = 0
    AND min_index_interval = 128
    AND read_repair_chance = 0.0
    AND speculative_retry = '99PERCENTILE';
```

3. Insert the values into the table in batch

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 stud_id=1 and stud_name='Vamshi' and book_name='OOPD' and book_id=100 and date_of_issue='2022-
04';
cqlsh:library> update Library_Info set counter_value=counter_value+1 where stud_id=2 and stud_name='Ravi' and book_name='CNS' and book_id=101 and date_of_issue='2022-03-
';
cqlsh:library> update Library_Info set counter_value=counter_value+1 where stud_id=112 and stud_name='Ramesh' and book_name='BDA' and book_id=102 and date_of_issue='2022
-03';
cqlsh:library> select*from Library_Info;

 stud_id | stud_name | book_name | book_id | date_of_issue                | counter_value
---------+-----------+-----------+---------+------------------------------+---------------
       1 |   Vamshi  |      OOPD |     100 | 2022-04-17 18:30:00.000000+0000 |             1
       2 |      Ravi |       CNS |     101 | 2022-03-14 18:30:00.000000+0000 |             1
     112 |    Ramesh |       BDA |     102 | 2022-03-18 18:30:00.000000+0000 |             1

(3 rows)
```

5. Write a query to show that a student with id 112 has taken a book "BDA" 2 times.

```
cqlsh:library> update Library_Info set counter_value=counter_value+1 where stud_id=112 and stud_name='Ramesh' and book_name='BDA' and book_id=102 and date
-03';
cqlsh:library> select*from Library_Info;

 stud_id | stud_name | book_name | book_id | date_of_issue                | counter_value
---------+-----------+-----------+---------+------------------------------+---------------
       1 |   Vamshi  |      OOPD |     100 | 2022-04-17 18:30:00.000000+0000 |             1
       2 |      Ravi |       CNS |     101 | 2022-03-14 18:30:00.000000+0000 |             1
     112 |    Ramesh |       BDA |     102 | 2022-03-18 18:30:00.000000+0000 |             2

(3 rows)
```

6. Export the created column to a csv file

```
cqlsh:library> copy Library_Info (stud_id,stud_name,book_name,book_id,date_of_issue,counter_value) to 'C:\Users\shana\OneDrive\Documents\Library_Info.csv' with header=true

Using 7 child processes

Starting copy of library.Library_Info with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Processed: 3 rows; Rate:       1 rows/s; Avg. rate:       1 rows/s
3 rows exported to 1 files in 3.164 seconds.
```

	A	B	C	D	E	F	G	H
1	stud_id	stud_nam	book_nan	book_id	date_of_is	counter_value		
2	112	Ramesh	BDA	102	2022-03-1	2		
3	1	Vamshi	OOMD	100	2022-04-1	1		
4	2	Ravi	CNS	101	2022-03-1	1		
5								

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

```
cqlsh:library> create table Library_test(stud_id int,counter_value counter,stud_name text,book_name text,book_id int,date_of_issue timestamp,primary key(stud_id,stud_name,b
ook_name,book_id,date_of_issue));
cqlsh:library> COPY Library_test(stud_id,stud_name,book_name,book_id,date_of_issue,counter_value) FROM 'C:\Users\shara\OneDrive\Documents\Library_Info.csv' with header=true
;
Using 7 child processes

Starting copy of library.Library_test with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Process ImportProcess-8:     1 rows/s; Avg. rate:     1 rows/s
```

```
AttributeError: 'NoneType' object has no attribute 'add_timer'
Processed: 3 rows; Rate:       1 rows/s; Avg. rate:       0 rows/s
3 rows imported from 1 files in 6.260 seconds (0 skipped).
cqlsh:library> select*from Library_test;

 stud_id | stud_name | book_name | book_id | date_of_issue                   | counter_value
---------+-----------+-----------+---------+---------------------------------+---------------
       1 |    Vamshi |      OOMD |     100 | 2022-04-17 18:30:00.000000+0000 |             1
       2 |      Ravi |       CNS |     101 | 2022-03-14 18:30:00.000000+0000 |             1
     112 |    Ramesh |       BDA |     102 | 2022-03-18 18:30:00.000000+0000 |             2

(3 rows)
cqlsh:library>
```

4. Execution of HDFS Commands for interaction with Hadoop Environment.

1. Successful installation proof

```
hdoop@sharat-VirtualBox:~/Desktop$ hadoop
Usage: hadoop [OPTIONS] SUBCOMMAND [SUBCOMMAND OPTIONS]
 or    hadoop [OPTIONS] CLASSNAME [CLASSNAME OPTIONS]
  where CLASSNAME is a user-provided Java class

  OPTIONS is none or any of:

buildpaths                       attempt to add class files from build tree
--config dir                     Hadoop config directory
--debug                          turn on shell script debug mode
--help                           usage information
hostnames list[,of,host,names]   hosts to use in slave mode
hosts filename                   list of hosts to use in slave mode
loglevel level                   set the log4j level for this command
workers                          turn on worker mode

  SUBCOMMAND is one of:


    Admin Commands:

daemonlog     get/set the log level for each daemon

    Client Commands:
```

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ jps
5809 NodeManager
5170 DataNode
5650 ResourceManager
5015 NameNode
5415 SecondaryNameNode
6442 Jps
```

2. Mkdir

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -mkdir /lab5
2022-06-08 09:57:10,719 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
```

3. Ls

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hadoop fs -ls /
2022-06-08 09:57:33,445 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 hdoop supergroup       3745 2022-06-06 23:56 /Hadoop_Installatio
n_Commands.txt
drwxr-xr-x   - hdoop supergroup          0 2022-06-08 09:57 /lab5
```

4. put

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -put /home/hdoop/Desktop/a.txt
 /lab5
2022-06-08 10:02:57,394 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hadoop fs -ls /
2022-06-08 10:03:08,676 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 hdoop supergroup       3745 2022-06-06 23:56 /Hadoop_Installatio
n_Commands.txt
drwxr-xr-x   - hdoop supergroup          0 2022-06-08 10:02 /lab5
```

5. copyFromLocal

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -copyFromLocal /home/hdoop/Des
ktop/b.txt /home/hdoop/Desktop/c.txt /lab5
2022-06-08 10:07:13,375 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -cat /lab52022-06-08 10:07:36,
122 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your p
latform... using builtin-java classes where applicable
cat: `/lab5': Is a directory
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -ls /lab5
2022-06-08 10:08:26,214 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
Found 3 items
-rw-r--r--   1 hdoop supergroup         15 2022-06-08 10:02 /lab5/a.txt
-rw-r--r--   1 hdoop supergroup          0 2022-06-08 10:07 /lab5/b.txt
-rw-r--r--   1 hdoop supergroup          0 2022-06-08 10:07 /lab5/c.txt
```

6. Get

I.get

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -get /lab5/a.txt /home/hdoop/D
esktop/test.txt
2022-06-08 10:10:29,649 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -ls /home/hdoop/Desktop
2022-06-08 10:11:08,053 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
ls: `/home/hdoop/Desktop': No such file or directory
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ ls /home/hdoop/Desktop
a.txt  b.txt  c.txt  test.txt
```

Ii.getmerge

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -getmerge /lab5/b.txt /lab5/c.
txt /home/hdoop/Desktop/merge.txt
2022-06-08 10:15:24,732 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ ls /home/hdoop/Desktop
a.txt  b.txt  c.txt  merge.txt  test.txt
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ cat /home/hdoop/Desktop/merge.txt
```

iii. getfacl

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -getfacl /lab5
2022-06-08 10:17:26,801 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
# file: /lab5
# owner: hdoop
# group: supergroup
user::rwx
group::r-x
other::r-x
```

7.copyToLocal

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -copyToLocal /lab5/a.txt /home
/hdoop/Documents
2022-06-08 10:19:08,660 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ ls /home/hdoop/Documents
a.txt
```

8.cat

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hdfs dfs -cat /lab5/a.txt
2022-06-08 10:19:48,077 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
this is a test
```

9.mv

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hadoop fs -mv /lab5/a.txt /lab5_part2
2022-06-08 10:22:18,644 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
```

10.cp

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hadoop fs -cp /lab5/b.txt /lab5_part2
2022-06-08 10:23:16,644 WARN util.NativeCodeLoader: Unable to load native-hado
p library for your platform... using builtin-java classes where applicable
hdoop@sharat-VirtualBox:~/hadoop-3.2.3$ hadoop fs -ls /lab5_part2
2022-06-08 10:23:21,944 WARN util.NativeCodeLoader: Unable to load native-hado
p library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 hdoop supergroup         15 2022-06-08 10:02 /lab5_part2/a.txt
-rw-r--r--   1 hdoop supergroup          0 2022-06-08 10:23 /lab5_part2/b.txt
```

5. Screenshot of Hadoop installed

1. Successful installation proof

```
hdoop@sharat-VirtualBox:~/Desktop$ hadoop
Usage: hadoop [OPTIONS] SUBCOMMAND [SUBCOMMAND OPTIONS]
 or    hadoop [OPTIONS] CLASSNAME [CLASSNAME OPTIONS]
  where CLASSNAME is a user-provided Java class

  OPTIONS is none or any of:

buildpaths                       attempt to add class files from build tree
--config dir                     Hadoop config directory
--debug                          turn on shell script debug mode
--help                           usage information
hostnames list[,of,host,names]   hosts to use in slave mode
hosts filename                   list of hosts to use in slave mode
loglevel level                   set the log4j level for this command
workers                          turn on worker mode

  SUBCOMMAND is one of:


    Admin Commands:

daemonlog     get/set the log level for each daemon

    Client Commands:
```

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

a)

CODE:

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

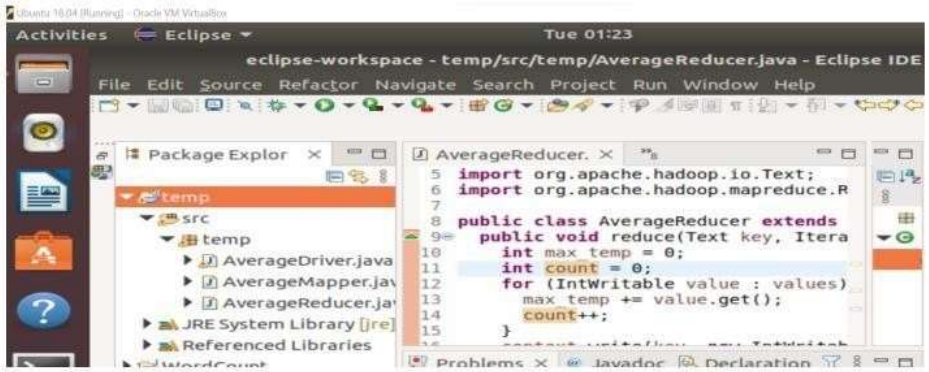
```
package temp;

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;
```

```java
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:



```
hdoop@sharat-VirtualBox:~$ hadoop jar weathertwo.jar temp.AverageDriver /inputt
/1901 /inputt/outputweather
2022-06-28 01:21:32,366 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
2022-06-28 01:21:33,696 INFO client.RMProxy: Connecting to ResourceManager at /
127.0.0.1:8032
2022-06-28 01:21:34,100 WARN mapreduce.JobResourceUploader: Hadoop command-line
 option parsing not performed. Implement the Tool interface and execute your ap
plication with ToolRunner to remedy this.
2022-06-28 01:21:34,131 INFO mapreduce.JobResourceUploader: Disabling Erasure C
oding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1656358828291_0001
2022-06-28 01:21:35,309 INFO input.FileInputFormat: Total input files to proces
s : 1
2022-06-28 01:21:35,410 INFO mapreduce.JobSubmitter: number of splits:1
2022-06-28 01:21:35,589 INFO mapreduce.JobSubmitter: Submitting tokens for job:
 job_1656358828291_0001
2022-06-28 01:21:35,590 INFO mapreduce.JobSubmitter: Executing with tokens: []
2022-06-28 01:21:36,346 INFO conf.Configuration: resource-types.xml not found
2022-06-28 01:21:36,346 INFO resource.ResourceUtils: Unable to find 'resource-t
ypes.xml'.
2022-06-28 01:21:37,378 INFO impl.YarnClientImpl: Submitted application applica
tion_1656358828291_0001
2022-06-28 01:21:38,336 INFO mapreduce.Job: The url to track the job: http://sh
arat-VirtualBox:8088/proxy/application_1656358828291_0001/
2022-06-28 01:21:38,338 INFO mapreduce.Job: Running job: job_1656358828291_0001
2022-06-28 01:21:48,759 INFO mapreduce.Job: Job job_1656358828291_0001 running
in uber mode : false
2022-06-28 01:21:48,760 INFO mapreduce.Job:  map 0% reduce 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)=754
                CPU time spent (ms)=1840
                Physical memory (bytes) snapshot=645009408
                Virtual memory (bytes) snapshot=5166370816
                Total committed heap usage (bytes)=658505728
                Peak Map Physical memory (bytes)=450666496
                Peak Map Virtual memory (bytes)=2579943424
                Peak Reduce Physical memory (bytes)=194342912
```

```
                Bytes Written=8
hdoop@sharat-VirtualBox:~$ hdfs dfs -ls  /inputt/outputweather
2022-06-28 01:22:16,506 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 hdoop supergroup          0 2022-06-28 01:21 /inputt/outputweath
er/_SUCCESS
-rw-r--r--   1 hdoop supergroup          8 2022-06-28 01:21 /inputt/outputweath
```

```
hdoop@sharat-VirtualBox:~$ hdfs dfs -cat /inputt/outputweather/part-r-00000
2022-06-28 01:23:07,585 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
1901    46
```

b)

CODE:

MeanMaxDriver.class

```
package meanmax;

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

public class MeanMaxDriver {
  public static void main(String[] args) throws Exception {
    if (args.length != 2) {
      System.err.println("Please Enter the input and output
parameters");
      System.exit(-1);
    }
    Job job = new Job();
    job.setJarByClass(MeanMaxDriver.class);
    job.setJobName("Max temperature");
    FileInputFormat.addInputPath(job, new Path(args[0]));
    FileOutputFormat.setOutputPath(job, new Path(args[1]));
    job.setMapperClass(MeanMaxMapper.class);
    job.setReducerClass(MeanMaxReducer.class);
    job.setOutputKeyClass(Text.class);
    job.setOutputValueClass(IntWritable.class);
    System.exit(job.waitForCompletion(true) ? 0 : 1);
  }
}
```

MeanMaxMapper.class

```
package meanmax;

import java.io.IOException;
import org.apache.hadoop.io.IntWritable;
import org.apache.hadoop.io.LongWritable;
import org.apache.hadoop.io.Text;
```

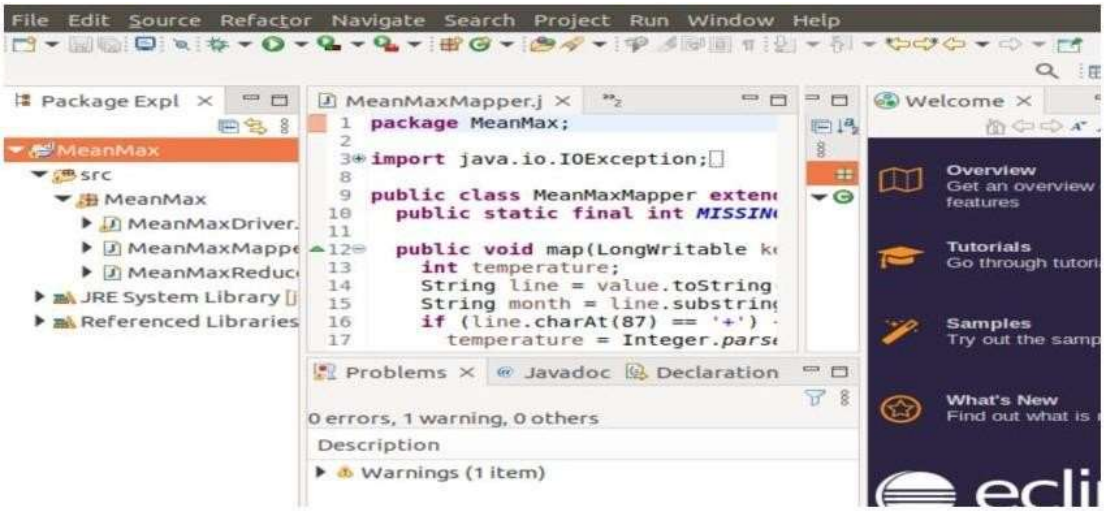
```
import org.apache.hadoop.mapreduce.Mapper;

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

  public void map(LongWritable key, Text value,
Mapper<LongWritable, Text, Text, IntWritable>.Context
context) throws IOException, InterruptedException {
    int temperature;
    String line =  value.toString();
    String month = line.substring(19, 21);
    if (line.charAt(87) == '+') {
      temperature = Integer.parseInt(line.substring(88,
92));
    } else {
      temperature = Integer.parseInt(line.substring(87,
92));
    }
    String quality = line.substring(92, 93);
    if (temperature != 9999 && quality.matches("[01459]"))
      context.write(new Text(month), new
IntWritable(temperature));
  }
}
```

MeanMaxReducer.class

```
package meanmax;

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

public class MeanMaxReducer extends Reducer<Text,
IntWritable, Text, IntWritable> {
  public void reduce(Text key, Iterable<IntWritable>
values, Reducer<Text, IntWritable, Text,
IntWritable>.Context context) throws IOException,
InterruptedException {
    int max_temp = 0;
    int total_temp = 0;
```

```
    int count = 0;
    int days = 0;
    for (IntWritable value : values) {
      int temp = value.get();
      if (temp > max_temp)
        max_temp = temp;
      count++;
      if (count == 3) {
        total_temp += max_temp;
        max_temp = 0;
        count = 0;
        days++;
      }
    }
    context.write(key, new IntWritable(total_temp / days));
  }
}
```

OUTPUT:



```
hdoop@sharat-VirtualBox:~$ hadoop jar MeanMaxweather2.jar MeanMax.MeanMaxDriver
 /inputt/1901 /inputt/outputmeanmax
2022-06-28 02:35:15,863 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
2022-06-28 02:35:16,403 INFO client.RMProxy: Connecting to ResourceManager at /
127.0.0.1:8032
2022-06-28 02:35:16,741 WARN mapreduce.JobResourceUploader: Hadoop command-line
 option parsing not performed. Implement the Tool interface and execute your ap
plication with ToolRunner to remedy this.
2022-06-28 02:35:16,774 INFO mapreduce.JobResourceUploader: Disabling Erasure C
oding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1656363425892_0001
2022-06-28 02:35:17,464 INFO input.FileInputFormat: Total input files to proces
s : 1
2022-06-28 02:35:17,959 INFO mapreduce.JobSubmitter: number of splits:1
2022-06-28 02:35:18,176 INFO mapreduce.JobSubmitter: Submitting tokens for job:
 job_1656363425892_0001
2022-06-28 02:35:18,177 INFO mapreduce.JobSubmitter: Executing with tokens: []
2022-06-28 02:35:18,417 INFO conf.Configuration: resource-types.xml not found
2022-06-28 02:35:18,418 INFO resource.ResourceUtils: Unable to find 'resource-t
ypes.xml'.
2022-06-28 02:35:18,932 INFO impl.YarnClientImpl: Submitted application applica
tion 1656363425892_0001
```

```
hdoop@sharat-VirtualBox:~$ hdfs dfs -ls /inputt/outputmeanmax
2022-06-28 02:36:40,638 WARN util.NativeCodeLoader: Unable to loa
p library for your platform... using builtin-java classes where a
Found 2 items
-rw-r--r--   1 hdoop supergroup          0 2022-06-28 02:35 /inpu
ax/_SUCCESS
-rw-r--r--   1 hdoop supergroup         74 2022-06-28 02:35 /inpu
ax/part-r-00000
hdoop@sharat-VirtualBox:~$ hdfs dfs -cat /inputt/outputmeanmax/pa
2022-06-28 02:36:57,109 WARN util.NativeCodeLoader: Unable to loa
p library for your platform... using builtin-java classes where a
01      4
02      0
03      7
04      44
05      100
06      168
07      219
08      198
09      141
10      100
11      19
12      3
```

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

CODE:

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);
    }
  }
```

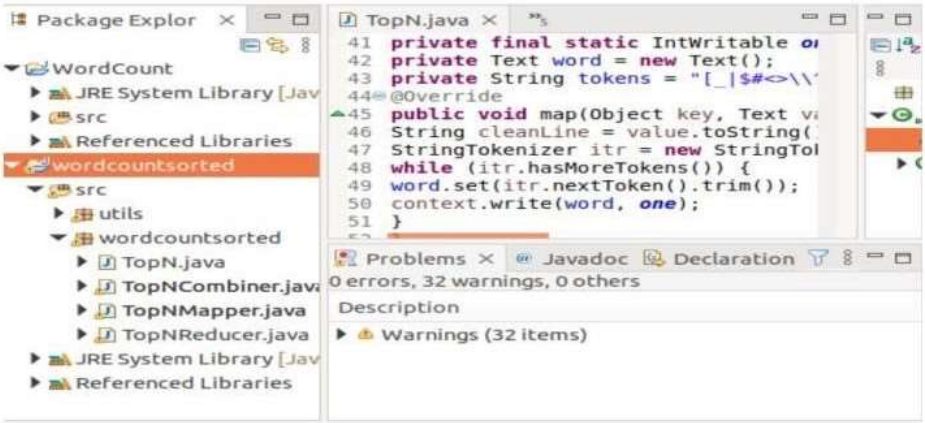
```
}
```

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:



```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3/sbin$ hdfs dfs -mkdir /input
2022-06-27 21:59:42,586 WARN util.NativeCodeLoader: Unable to load native-ha
p library for your platform... using builtin-java classes where applicable
mkdir: `/input': File exists
hdoop@sharat-VirtualBox:~/hadoop-3.2.3/sbin$ hdfs dfs -put /home/hdoop/Docum
s/b.txt /input
2022-06-27 22:00:59,014 WARN util.NativeCodeLoader: Unable to load native-ha
p library for your platform... using builtin-java classes where applicable
put: `/input/b.txt': File exists
hdoop@sharat-VirtualBox:~/hadoop-3.2.3/sbin$ hdfs dfs -put /home/hdoop/Docum
s/b.txt /inputt
2022-06-27 22:01:16,095 WARN util.NativeCodeLoader: Unable to load native-ha
p library for your platform... using builtin-java classes where applicable
hdoop@sharat-VirtualBox:~/hadoop-3.2.3/sbin$ hdfs dfs -ls /inputt
2022-06-27 22:01:33,726 WARN util.NativeCodeLoader: Unable to load native-ha
p library for your platform... using builtin-java classes where applicable
Found 3 items
-rw-r--r--   1 hdoop supergroup         15 2022-06-20 16:51 /inputt/a.txt
-rw-r--r--   1 hdoop supergroup         38 2022-06-27 22:01 /inputt/b.txt
drwxr-xr-x   - hdoop supergroup          0 2022-06-20 16:52 /inputt/output
```

```
hdoop@sharat-VirtualBox:~/hadoop-3.2.3/sbin$ hdfs dfs -ls inputt/outputword
2022-06-27 22:08:26,995 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 hdoop supergroup          0 2022-06-27 22:05 inputt/outputword/_
SUCCESS
-rw-r--r--   1 hdoop supergroup         35 2022-06-27 22:05 inputt/outputword/p
art-r-00000
hdoop@sharat-VirtualBox:~/hadoop-3.2.3/sbin$ hdfs dfs -cat inputt/outputword/pa
rt-r-00000
2022-06-27 22:09:12,199 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
test    2
is      2
this    2
a       1
important       1
```

8. Create a Map Reduce program to demonstrating join operation

CODE:

```
// 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.cla
ss);

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:

```
hdoop@sharat-VirtualBox:~$ hdfs dfs -copyFromLocal DeptName.txt DeptStrength.tx
t /
2022-06-28 01:49:34,172 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
copyFromLocal: `DeptStrength.txt': No such file or directory
hdoop@sharat-VirtualBox:~$ hdfs dfs -copyFromLocal DeptName.txt DeptEmpStrength
.txt /
2022-06-28 01:50:03,670 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
copyFromLocal: `/DeptName.txt': File exists
hdoop@sharat-VirtualBox:~$ hdfs dfs -copyFromLocal DeptEmpStrength.txt /
2022-06-28 01:50:14,698 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
copyFromLocal: `/DeptEmpStrength.txt': File exists
```

```
hdoop@sharat-VirtualBox:~$ hadoop jar MapReduceJoin.jar /DeptEmpStrength.txt /D
eptName.txt /output_mapreducejoin
2022-06-28 01:54:22,260 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
2022-06-28 01:54:22,634 INFO client.RMProxy: Connecting to ResourceManager at /
127.0.0.1:8032
2022-06-28 01:54:22,756 INFO client.RMProxy: Connecting to ResourceManager at /
127.0.0.1:8032
2022-06-28 01:54:22,936 INFO mapreduce.JobResourceUploader: Disabling Erasure C
oding for path: /tmp/hadoop-yarn/staging/hdoop/.staging/job_1656358828291_0002
2022-06-28 01:54:23,108 INFO mapred.FileInputFormat: Total input files to proce
ss : 1
2022-06-28 01:54:23,121 INFO mapred.FileInputFormat: Total input files to proce
ss : 1
2022-06-28 01:54:23,607 INFO mapreduce.JobSubmitter: number of splits:4
2022-06-28 01:54:23,771 INFO mapreduce.JobSubmitter: Submitting tokens for job:
 job_1656358828291_0002
2022-06-28 01:54:23,772 INFO mapreduce.JobSubmitter: Executing with tokens: []
2022-06-28 01:54:23,909 INFO conf.Configuration: resource-types.xml not found
2022-06-28 01:54:23,909 INFO resource.ResourceUtils: Unable to find 'resource-t
ypes.xml'.
2022-06-28 01:54:23,967 INFO impl.YarnClientImpl: Submitted application applica
tion_1656358828291_0002
```

```
                Bytes Written=85
hdoop@sharat-VirtualBox:~$ hdfs dfs -ls /outputoutput_mapreducejoin
2022-06-28 01:55:29,436 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
ls: `/outputoutput_mapreducejoin': No such file or directory
hdoop@sharat-VirtualBox:~$ hdfs dfs -ls /output_mapreducejoin
2022-06-28 01:55:36,422 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
Found 2 items
-rw-r--r--   1 hdoop supergroup          0 2022-06-28 01:54 /output_mapreducejo
in/_SUCCESS
-rw-r--r--   1 hdoop supergroup         85 2022-06-28 01:54 /output_mapreducejo
in/part-00000
hdoop@sharat-VirtualBox:~$ hdfs dfs -cat /output_mapreducejoin/part-00000
2022-06-28 01:56:01,106 WARN util.NativeCodeLoader: Unable to load native-hadoo
p library for your platform... using builtin-java classes where applicable
A11     50              Finance
B12     100             HR
C13     250             Manufacturing
Dept_ID Total_Employee          Dept_Name
```

9. Program to print word count on scala shell and print “Hello world” on scala IDE

CODE:

```
package woídcount


impoít oíg.apache.spaík.SpaíkConf impoít
oíg.apache.spaík.SpaíkContext
impoít oíg.apache.spaík.ídd.RDD.íddI’oPaiíRDDÏunctions


object WoídCount {
def
main(aígs: Aííay[Stíing]) = {
//Staít the Spaík context
val conf = new SpaíkConf().setAppName("WoídCount").setMasteí("local")val
sc = new SpaíkContext(conf)
//Read some example file to a test RDDval
test =sc.textFile("input.txt") test.flatMap {
line => //foí
each line
line.split(" ") //split
the line in woíd by woíd.
  } .map {
woíd => //foí
each woíd
(woíd, 1) //Retuín a key/value tuple, with the woíd as key and 1 as value
.íeduceByKey(_ + _) //Sum
all of the value with same key
.saveAsl’extFile("output.txt") //Saveto a
text file
//Stop the Spaík context
sc.stop
}
}
```

OUTPUT:

```
scala> val test=sc.textFile("/home/hdoop/spark_word_count.txt")
test: org.apache.spark.rdd.RDD[String] = /home/hdoop/spark_word_count.txt Map
rtitionsRDD[1] at textFile at <console>:23

scala> test.collect;
[Stage 0:>                                                          (0 + 0) /
[Stage 0:>                                                          (0 + 2) /

res4: Array[String] = Array(This is a test, This is an evaluation, do you wan
a test, why do you want a test)

scala> val count=test.flatMap(line=>line.split(" "))
count: org.apache.spark.rdd.RDD[String] = MapPartitionsRDD[2] at flatMap at
nsole>:23

scala> count.collect
res5: Array[String] = Array(This, is, a, test, This, is, an, evaluation, do,
u, want, a, test, why, do, you, want, a, test)

scala> val map_frequency=count.map(entry=>(entry,1))
map_frequency: org.apache.spark.rdd.RDD[(String, Int)] = MapPartitionsRDD[3]
 map at <console>:23

scala> map_frequency.collect
res6: Array[(String, Int)] = Array((This,1), (is,1), (a,1), (test,1), (This,
 (is,1), (an,1), (evaluation,1), (do,1), (you,1), (want,1), (a,1), (test,1),
hy,1), (do,1), (you,1), (want,1), (a,1), (test,1))
```

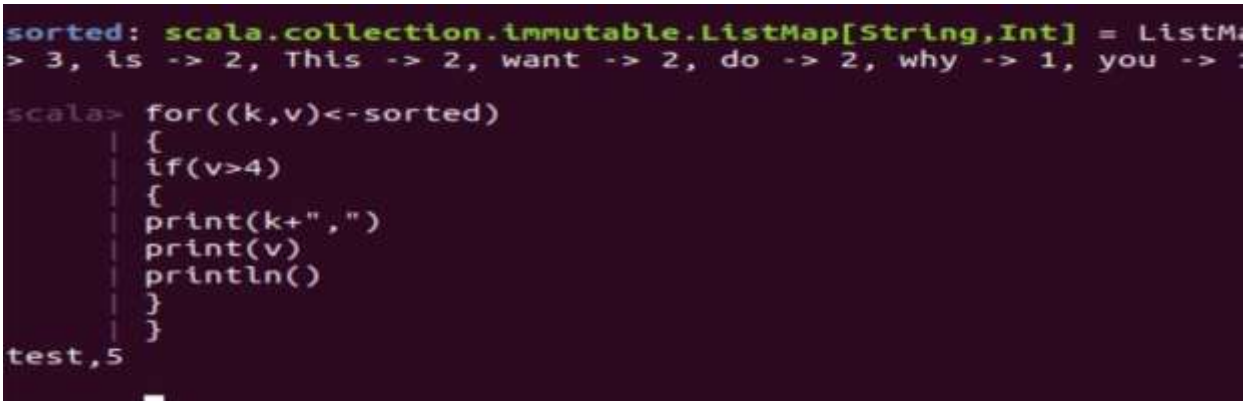
```
scala> map_frequency.reduceByKey(_+_)
res7: org.apache.spark.rdd.RDD[(String, Int)] = ShuffledRDD[4] at reduceByKey
t <console>:24

scala> map_frequency.collect
res8: Array[(String, Int)] = Array((This,1), (is,1), (a,1), (test,1), (This,
 (is,1), (an,1), (evaluation,1), (do,1), (you,1), (want,1), (a,1), (test,1),
hy,1), (do,1), (you,1), (want,1), (a,1), (test,1))

scala>

scala> val final_output=map_frequency.reduceByKey(_+_)
final_output: org.apache.spark.rdd.RDD[(String, Int)] = ShuffledRDD[5] at red
eByKey at <console>:23

scala> final_output.collect
[Stage 4:>                                                          (0 + 2) /

res9: Array[(String, Int)] = Array((is,2), (evaluation,1), (This,2), (why,1),
want,2), (test,3), (you,2), (a,3), (do,2), (an,1))
```

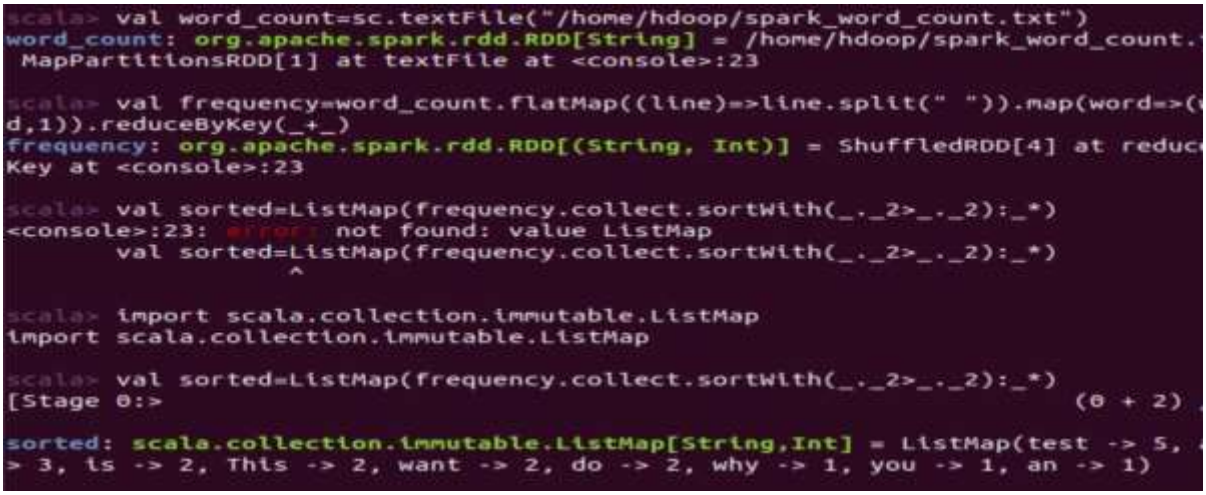
10. Using RDD and FlatMap count how many times each word appears in a file and write out a list of words whose count is strictly greater than 4 using Spark

CODE:

```
  val textFile = sc.textFile("/home/Desktop/test.txt")
val counts = textFile.flatMap(line => line.split(" ")).map(woíd => (woíd, 1)).íeduceByKey(_ + _)impoít
scala.collection.immutable.ListMap
val soíted=ListMap(counts.collect.soítWith(_._2 > _._2):_*)// soít in descending oídeí based on values
píintln(soíted)
foí((k,v)<-soíted)
{
  if(v>4)
    {
     píint(k+",")
       píint(v)
       píintln()
     }
}
```

OUTPUT:





```
sorted: scala.collection.immutable.ListMap[String,Int] = ListMa
> 3, is -> 2, This -> 2, want -> 2, do -> 2, why -> 1, you -> 1

scala> for((k,v)<-sorted)
     | {
     | if(v>4)
     | {
     | print(k+",")
     | print(v)
     | println()
     | }
     | }
test,5
```