VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

BIG DATA ANALYTICS
(20CS6PEBDA)

Submitted by

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

B.M.S. COLLEGE OF ENGINEERING
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B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "**BIG DATA ANALYTICS**" carried out by **KIRAN M K(1BM19CS073),** 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 Laboratory - (20CS6PEBDA)** work prescribed for the said degree.

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Course Outcome

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

Cassandra Program 1

Program 1. Perform the following DB operations using Cassandra.

1. Create a key space by name Employee

```
cqlsh> CREATE KEYSPACE employee WITH replication = {'class':'SimpleStrategy', 'replication_factor':1};
cqlsh> describe keyspace
No keyspace specified and no current keyspace
cqlsh> describe Employee;

CREATE KEYSPACE employee WITH replication = {'class': 'SimpleStrategy', 'replication_factor': '1'}  AND durable_writes = true;
cqlsh> create table Employee.employee_info(emp_id int Primary Key, emp_name text, designation text, date_of_joining timestamp, salary double,
dept_name text);
cqlsh> select * from Employee.employee_info;

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

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> begin batch insert into Employee.employee_info(emp_id, date_of_joining, dept_name, designation, emp_name, salary) values (1, '2021-06-0
3', 'Deploymemt', 'Manager', 'KIRAN', 1500000.50); apply batch;
cqlsh> select * from Employee.employee_info;

 emp_id | date_of_joining                 | dept_name  | designation | emp_name | salary
--------+---------------------------------+------------+-------------+----------+--------
      1 | 2021-06-02 18:30:00.000000+0000 | Deployment |     Manager |    KIRAN | 1.5e+06

(1 rows)
cqlsh> begin batch
   ... insert into Employee.employee_info(emp_id, date_of_joining, dept_name, designation, emp_name, salary) values (2, '2020-09-03', 'Develop
ment', 'Web Developer', 'VAISHAK', 1700000.50);
   ... insert into Employee.employee_info(emp_id, date_of_joining, dept_name, designation, emp_name, salary) values (121, '2019-05-03', 'Resea
rch and Development', 'Intern', 'VISHVESH', 2000000.50);
   ... apply batch;
cqlsh> select * from Employee.employee_info;

 emp_id | date_of_joining                 | dept_name                | designation   | emp_name | salary
--------+---------------------------------+--------------------------+---------------+----------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |               Deployment |       Manager |    KIRAN | 1.5e+06
      2 | 2020-09-02 18:30:00.000000+0000 |              Development | Web Developer |  VAISHAK | 1.7e+06
    121 | 2019-05-02 18:30:00.000000+0000 | Research and Development |        Intern | VISHVESH |   2e+06

(3 rows)
```

3. Insert the values into the table in batch

```
cqlsh> update Employee.employee_info SET emp_name = 'PRAMOD', dept_name = 'Testing' WHERE emp_id = 121;
cqlsh> select * from Employee.employee_info;

 emp_id | date_of_joining                 | dept_name   | designation   | emp_name | salary
--------+---------------------------------+-------------+---------------+----------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |       Manager |    KIRAN | 1.5e+06
      2 | 2020-09-02 18:30:00.000000+0000 | Development | Web Developer |  VAISHAK | 1.7e+06
    121 | 2019-05-02 18:30:00.000000+0000 |     Testing |        Intern |   PRAMOD |   2e+06
```

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

```
cqlsh> create table Employee.emp(emp_id int, emp_name text, designation text, date_of_joining timestamp, salary double, dept_name text, prim
y key(emp_id, salary) );
cqlsh> begin batch
   ... insert into Employee.emp(emp_id, salary, date_of_joining, dept_name, designation, emp_name) values (1, 1500000.50, '2021-06-03', 'Dep
yment', 'Manager', 'KIRAN');
   ... insert into Employee.emp(emp_id, salary,date_of_joining, dept_name, designation, emp_name) values (2, 1100000.50, '2022-05-03', 'Deve
pment', 'Web Developer', 'VAISHAK');
   ... insert into Employee.emp(emp_id, salary, date_of_joining, dept_name, designation, emp_name) values (121, 1900000.50, '2022-05-05', 'R
earch and Development', 'Intern', 'VISHVESH');
   ... apply batch;
cqlsh> select * from Employee.emp;

 emp_id | salary  | date_of_joining                 | dept_name               | designation   | emp_name
--------+---------+---------------------------------+-------------------------+---------------+----------
      1 | 1.5e+06 | 2021-06-02 18:30:00.000000+0000 |              Deployment |       Manager |    KIRAN
      2 | 1.1e+06 | 2022-05-02 18:30:00.000000+0000 |             Development | Web Developer |  VAISHAK
    121 | 1.9e+06 | 2022-05-04 18:30:00.000000+0000 | Research and Development |        Intern | VISHVESH

(3 rows)
cqlsh> alter table Employee.employee_info add projects set<text>;
cqlsh> select * from Employee.emp;

 emp_id | salary  | date_of_joining                 | dept_name               | designation   | emp_name
--------+---------+---------------------------------+-------------------------+---------------+----------
      1 | 1.5e+06 | 2021-06-02 18:30:00.000000+0000 |              Deployment |       Manager |    KIRAN
      2 | 1.1e+06 | 2022-05-02 18:30:00.000000+0000 |             Development | Web Developer |  VAISHAK
    121 | 1.9e+06 | 2022-05-04 18:30:00.000000+0000 | Research and Development |        Intern | VISHVESH
```

5. Sort the details of Employee records based on salary

```
cqlsh> update Employee.employee_info set projects = projects + {'Hospital Management', 'Payment Interface'} where emp_id = 1;
cqlsh> select * from Employee.employee_info;

 emp_id | date_of_joining                 | dept_name   | designation   | emp_name | projects                                          | salary
--------+---------------------------------+-------------+---------------+----------+---------------------------------------------------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |       Manager |    KIRAN | {'Hospital Management', 'Payment Interface'} | 1.5e+06
      2 | 2020-09-02 18:30:00.000000+0000 | Development | Web Developer |  VAISHAK |                                              null | 1.7e+06
    121 | 2019-05-02 18:30:00.000000+0000 |     Testing |        Intern |   PRAMOD |                                              null |   2e+06

(3 rows)
cqlsh> update Employee.employee_info set projects = projects + {'Lab', 'Helper'} where emp_id = 121;
cqlsh> select * from Employee.employee_info;

 emp_id | date_of_joining                 | dept_name   | designation   | emp_name | projects                                          | salary
--------+---------------------------------+-------------+---------------+----------+---------------------------------------------------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |       Manager |    KIRAN | {'Hospital Management', 'Payment Interface'} | 1.5e+06
      2 | 2020-09-02 18:30:00.000000+0000 | Development | Web Developer |  VAISHAK |                                              null | 1.7e+06
    121 | 2019-05-02 18:30:00.000000+0000 |     Testing |        Intern |   PRAMOD |                                 {'Helper', 'Lab'} |   2e+06
```

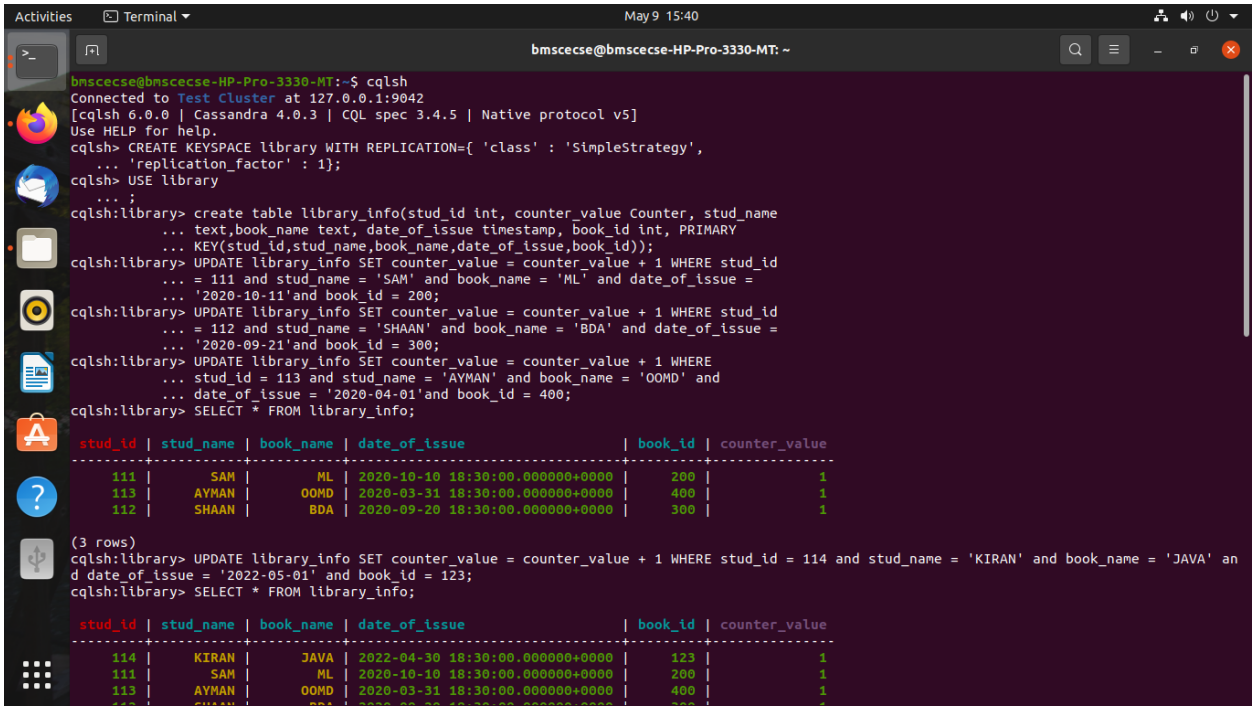
6. Alter the schema of the table Employee_Info to add a column Projects which stores a set of Projects done by the corresponding Employee.

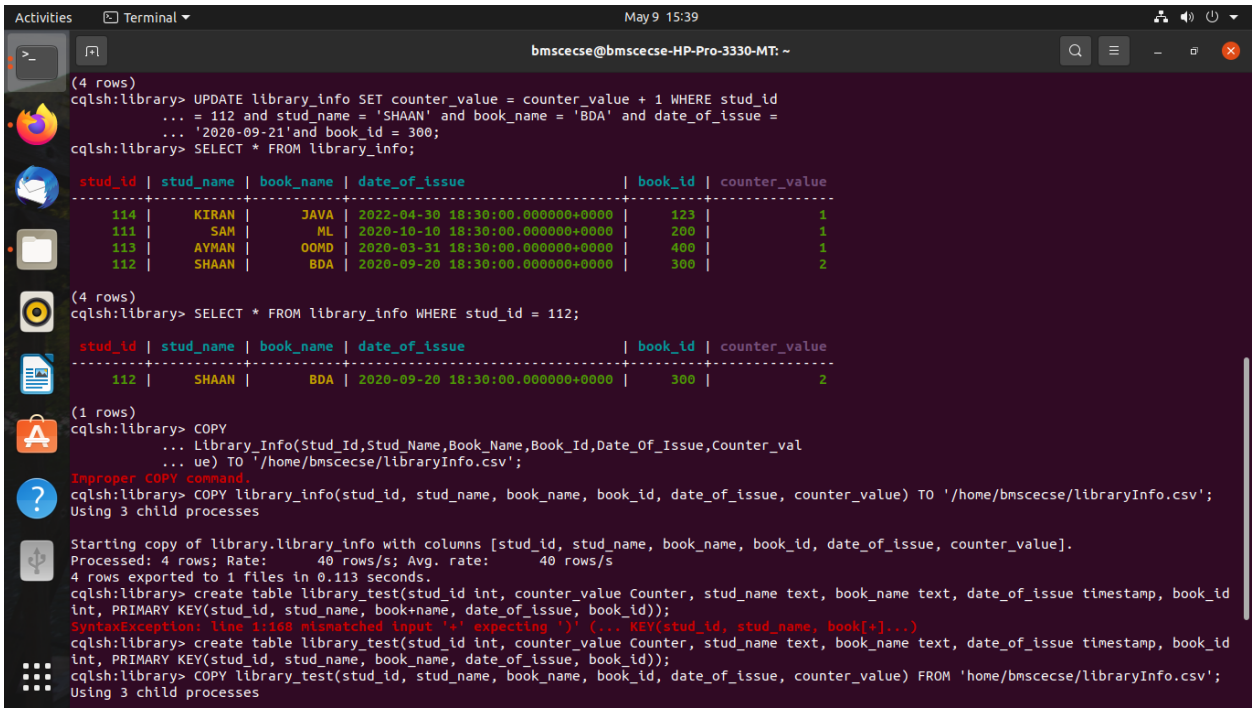
```
cqlsh> insert into Employee.employee_info(emp_id, date_of_joining, dept_name, designation, emp_name, salary) values (11, '2019-05-05', 'Resear
ch and Development', 'Intern', 'SHREYAS', 1000000.50) using TTL 15;
cqlsh> select * from Employee.employee_info;

 emp_id | date_of_joining                 | dept_name               | designation   | emp_name | projects
 | salary
--------+---------------------------------+-------------------------+---------------+----------+-----------------------------------------
-+---------
     11 | 2019-05-04 18:30:00.000000+0000 | Research and Development |        Intern |  SHREYAS |                                      null
 |   1e+06
      1 | 2021-06-02 18:30:00.000000+0000 |              Deployment |       Manager |    KIRAN | {'Hospital Management', 'Payment Interface'}
 | 1.5e+06
      2 | 2020-09-02 18:30:00.000000+0000 |             Development | Web Developer |  VAISHAK |                                      null
 | 1.7e+06
    121 | 2019-05-02 18:30:00.000000+0000 |                 Testing |        Intern |   PRAMOD |                         {'Helper', 'Lab'}
 |   2e+06

(4 rows)
cqlsh> select * from Employee.employee_info;

 emp_id | date_of_joining                 | dept_name   | designation   | emp_name | projects                                          | salary
--------+---------------------------------+-------------+---------------+----------+---------------------------------------------------+---------
      1 | 2021-06-02 18:30:00.000000+0000 |  Deployment |       Manager |    KIRAN | {'Hospital Management', 'Payment Interface'} | 1.5e+06
      2 | 2020-09-02 18:30:00.000000+0000 | Development | Web Developer |  VAISHAK |                                              null | 1.7e+06
    121 | 2019-05-02 18:30:00.000000+0000 |     Testing |        Intern |   PRAMOD |                                 {'Helper', 'Lab'} |   2e+06
```

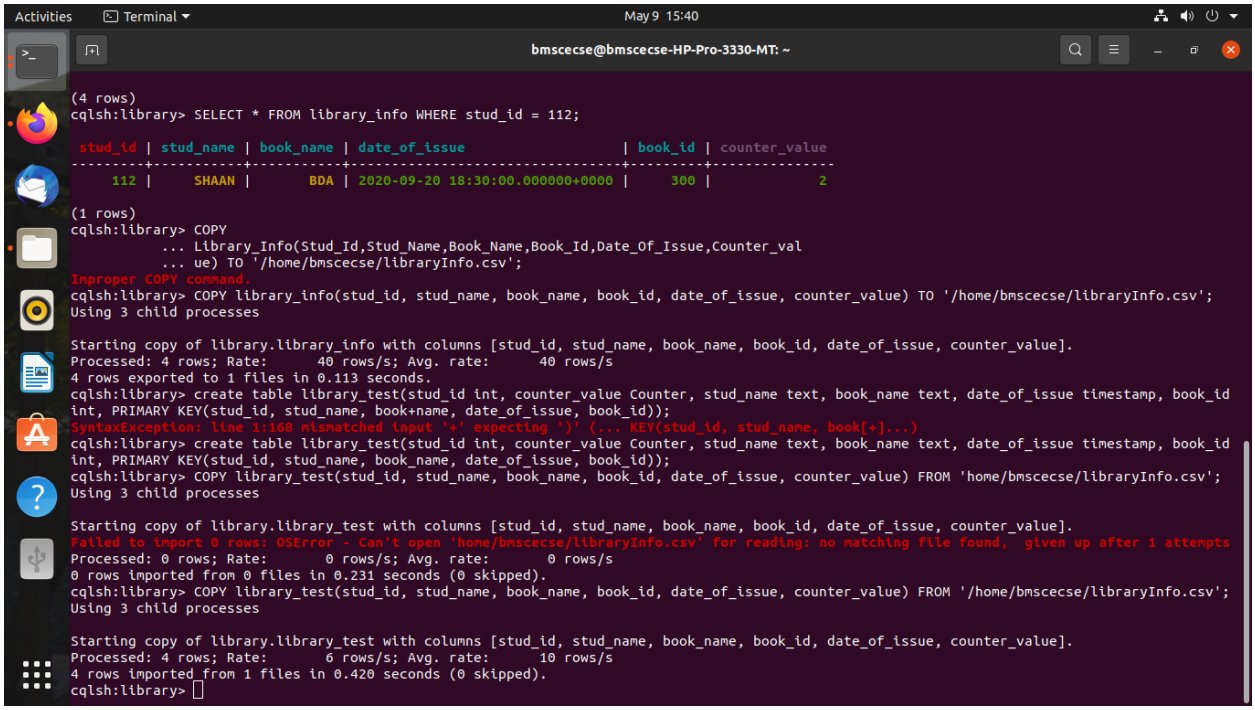
7. Update the altered table to add project names.

```
cqlsh> update Employee.employee_info set projects = projects + {'API', 'Mood detection'} where emp_id = 2;
cqlsh> paging off;
Disabled Query paging.
cqlsh> select * from Employee.emp where emp_id in (1,2,121) order by salary;

 emp_id | salary  | date_of_joining                 | dept_name              | designation    | emp_name
--------+---------+---------------------------------+------------------------+----------------+----------
      2 | 1.1e+06 | 2022-05-02 18:30:00.000000+0000 |             Development | Web Developer |  VAISHAK
      1 | 1.5e+06 | 2021-06-02 18:30:00.000000+0000 |              Deployment |       Manager |     KIRAN
    121 | 1.9e+06 | 2022-05-04 18:30:00.000000+0000 | Research and Development |        Intern | VISHVESH
```

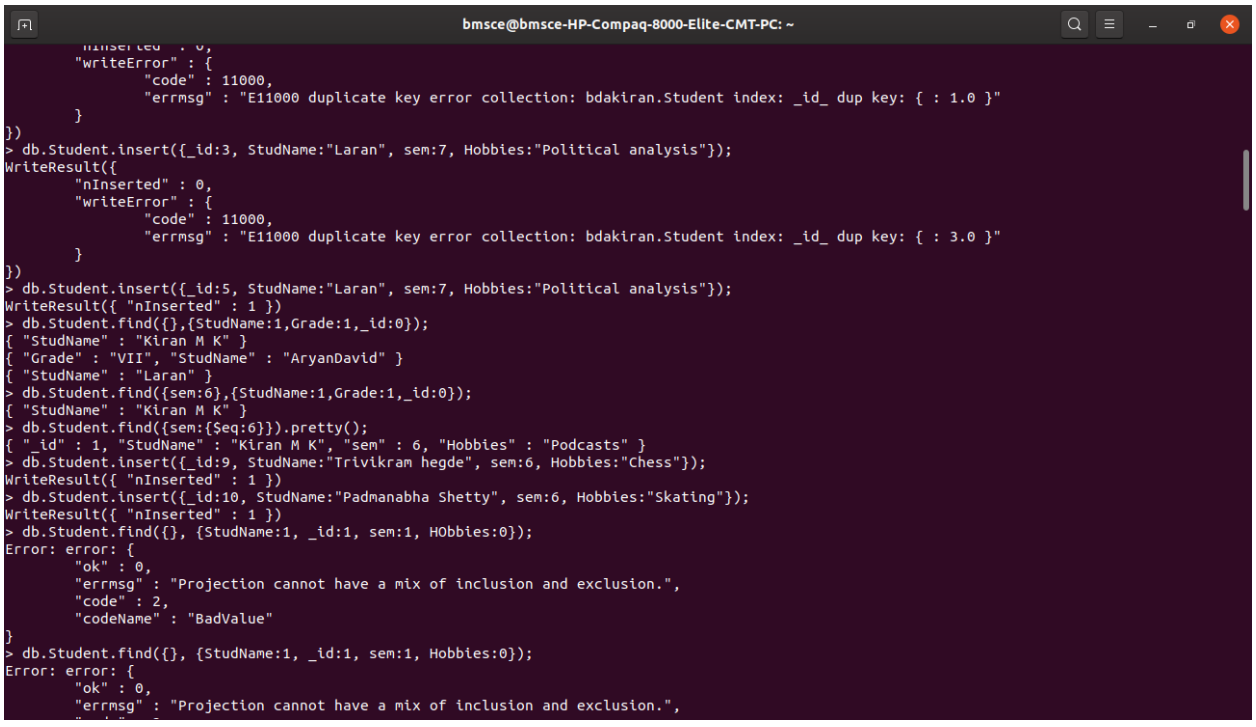
Cassandra Program 2


Activities
Terminal
May 9 15:40
bmscecse@bmscecse-HP-Pro-3330-MT: ~
bmscecse@bmscecse-HP-Pro-3330-MT:~$ cqlsh
Connected to Test Cluster at 127.0.0.1:9042
[cqlsh 6.0.0 | Cassandra 4.0.3 | CQL spec 3.4.5 | Native protocol v5]
Use HELP for help.
cqlsh> CREATE KEYSPACE library WITH REPLICATION={ 'class' : 'SimpleStrategy',
... 'replication_factor' : 1};
cqlsh> USE library
... ;
cqlsh:library> create table library_info(stud_id int, counter_value Counter, stud_name
... text,book_name text, date_of_issue timestamp, book_id int, PRIMARY
... KEY(stud_id,stud_name,book_name,date_of_issue,book_id));
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id
... = 111 and stud_name = 'SAM' and book_name = 'ML' and date_of_issue =
... '2020-10-11'and book_id = 200;
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id
... = 112 and stud_name = 'SHAAN' and book_name = 'BDA' and date_of_issue =
... '2020-09-21'and book_id = 300;
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE
... stud_id = 113 and stud_name = 'AYMAN' and book_name = 'OOMD' and
... date_of_issue = '2020-04-01'and book_id = 400;
cqlsh:library> SELECT * FROM library_info;
stud_id | stud_name | book_name | date_of_issue | book_id | counter_value
111 | SAM | ML | 2020-10-10 18:30:00.000000+0000 | 200 | 1
113 | AYMAN | OOMD | 2020-03-31 18:30:00.000000+0000 | 400 | 1
112 | SHAAN | BDA | 2020-09-20 18:30:00.000000+0000 | 300 | 1
(3 rows)
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id = 114 and stud_name = 'KIRAN' and book_name = 'JAVA' an
d date_of_issue = '2022-05-01' and book_id = 123;
cqlsh:library> SELECT * FROM library_info;
stud_id | stud_name | book_name | date_of_issue | book_id | counter_value
114 | KIRAN | JAVA | 2022-04-30 18:30:00.000000+0000 | 123 | 1
111 | SAM | ML | 2020-10-10 18:30:00.000000+0000 | 200 | 1
113 | AYMAN | OOMD | 2020-03-31 18:30:00.000000+0000 | 400 | 1


Activities
Terminal
May 9 15:39
bmscecse@bmscecse-HP-Pro-3330-MT: ~
(4 rows)
cqlsh:library> UPDATE library_info SET counter_value = counter_value + 1 WHERE stud_id
... = 112 and stud_name = 'SHAAN' and book_name = 'BDA' and date_of_issue =
... '2020-09-21'and book_id = 300;
cqlsh:library> SELECT * FROM library_info;
stud_id | stud_name | book_name | date_of_issue | book_id | counter_value
114 | KIRAN | JAVA | 2022-04-30 18:30:00.000000+0000 | 123 | 1
111 | SAM | ML | 2020-10-10 18:30:00.000000+0000 | 200 | 1
113 | AYMAN | OOMD | 2020-03-31 18:30:00.000000+0000 | 400 | 1
112 | SHAAN | BDA | 2020-09-20 18:30:00.000000+0000 | 300 | 2
(4 rows)
cqlsh:library> SELECT * FROM library_info WHERE stud_id = 112;
stud_id | stud_name | book_name | date_of_issue | book_id | counter_value
112 | SHAAN | BDA | 2020-09-20 18:30:00.000000+0000 | 300 | 2
(1 rows)
cqlsh:library> COPY
... Library_Info(Stud_Id,Stud_Name,Book_Name,Book_Id,Date_Of_Issue,Counter_val
... ue) TO '/home/bmscecse/libraryInfo.csv';
Improper COPY command.
cqlsh:library> COPY library_info(stud_id, stud_name, book_name, book_id, date_of_issue, counter_value) TO '/home/bmscecse/libraryInfo.csv';
Using 3 child processes
Starting copy of library.library_info with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Processed: 4 rows; Rate: 40 rows/s; Avg. rate: 40 rows/s
4 rows exported to 1 files in 0.113 seconds.
cqlsh:library> create table library_test(stud_id int, counter_value Counter, stud_name text, book_name text, date_of_issue timestamp, book_id
int, PRIMARY KEY(stud_id, stud_name, book+name, date_of_issue, book_id));
SyntaxException: line 1:168 mismatched input '+' expecting ')' (... KEY(stud_id, stud_name, book[+]...)
cqlsh:library> create table library_test(stud_id int, counter_value Counter, stud_name text, book_name text, date_of_issue timestamp, book_id
int, PRIMARY KEY(stud_id, stud_name, book_name, date_of_issue, book_id));
cqlsh:library> COPY library_test(stud_id, stud_name, book_name, book_id, date_of_issue, counter_value) FROM 'home/bmscecse/libraryInfo.csv';
Using 3 child processes


Activities
Terminal
May 9 15:40
bmscecse@bmscecse-HP-Pro-3330-MT: ~
(4 rows)
cqlsh:library> SELECT * FROM library_info WHERE stud_id = 112;
stud_id | stud_name | book_name | date_of_issue | book_id | counter_value
112 | SHAAN | BDA | 2020-09-20 18:30:00.000000+0000 | 300 | 2
(1 rows)
cqlsh:library> COPY
... Library_Info(Stud_Id,Stud_Name,Book_Name,Book_Id,Date_Of_Issue,Counter_val
... ue) TO '/home/bmscecse/libraryInfo.csv';
Improper COPY command.
cqlsh:library> COPY library_info(stud_id, stud_name, book_name, book_id, date_of_issue, counter_value) TO '/home/bmscecse/libraryInfo.csv';
Using 3 child processes
Starting copy of library.library_info with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Processed: 4 rows; Rate: 40 rows/s; Avg. rate: 40 rows/s
4 rows exported to 1 files in 0.113 seconds.
cqlsh:library> create table library_test(stud_id int, counter_value Counter, stud_name text, book_name text, date_of_issue timestamp, book_id int, PRIMARY KEY(stud_id, stud_name, book+name, date_of_issue, book_id));
SyntaxException: line 1:168 mismatched input '+' expecting ')' (... KEY(stud_id, stud_name, book[+]...)
cqlsh:library> create table library_test(stud_id int, counter_value Counter, stud_name text, book_name text, date_of_issue timestamp, book_id int, PRIMARY KEY(stud_id, stud_name, book_name, date_of_issue, book_id));
cqlsh:library> COPY library_test(stud_id, stud_name, book_name, book_id, date_of_issue, counter_value) FROM 'home/bmscecse/libraryInfo.csv';
Using 3 child processes
Starting copy of library.library_test with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Failed to import 0 rows: OSError - Can't open 'home/bmscecse/libraryInfo.csv' for reading: no matching file found, given up after 1 attempts
Processed: 0 rows; Rate: 0 rows/s; Avg. rate: 0 rows/s
0 rows imported from 0 files in 0.231 seconds (0 skipped).
cqlsh:library> COPY library_test(stud_id, stud_name, book_name, book_id, date_of_issue, counter_value) FROM '/home/bmscecse/libraryInfo.csv';
Using 3 child processes
Starting copy of library.library_test with columns [stud_id, stud_name, book_name, book_id, date_of_issue, counter_value].
Processed: 4 rows; Rate: 6 rows/s; Avg. rate: 10 rows/s
4 rows imported from 1 files in 0.420 seconds (0 skipped).
cqlsh:library>

Mongo DB Program 1



```
> db.Student.find({StudName:/M/}).pretty();
{ "_id" : 1, "StudName" : "Kiran M K", "sem" : 6, "Hobbies" : "Podcasts" }
> db.Student.find({StudName:/M/i}).pretty();
{ "_id" : 1, "StudName" : "Kiran M K", "sem" : 6, "Hobbies" : "Podcasts" }
{
        "_id" : 9,
        "StudName" : "Trivikram hegde",
        "sem" : 6,
        "Hobbies" : "Chess"
}
{
        "_id" : 10,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Skating"
}
> db.Student.find({StudName:/[mM]/}).pretty();
{ "_id" : 1, "StudName" : "Kiran M K", "sem" : 6, "Hobbies" : "Podcasts" }
{
        "_id" : 9,
        "StudName" : "Trivikram hegde",
        "sem" : 6,
        "Hobbies" : "Chess"
}
{
        "_id" : 10,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Skating"
```

```
> db.Student.find({Hobbies:{$eq:'Chess'}}).pretty();
{
        "_id" : 3,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Chess"
}
> db.Student.find({Hobbies :{ $in: ['Political analysis','Skating']}}).pretty ();
{
        "_id" : 2,
        "StudName" : "Trivikram Hegde",
        "sem" : 6,
        "Hobbies" : "Political analysis"
}
{ "_id" : 4, "StudName" : "Laran", "sem" : 6, "Hobbies" : "Skating" }
> db.Student.find({StudName:/^P/}).pretty();
{
        "_id" : 3,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Chess"
}
> db.Student.find({StudName:/e/}).pretty();
{
        "_id" : 2,
        "StudName" : "Trivikram Hegde",
        "sem" : 6,
        "Hobbies" : "Political analysis"
}
{
        "_id" : 3,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Chess"
}
```

```
> db.Student.find({_id:1},{StudName:1,sem:1,_id:0});
{ "StudName" : "Kiran", "sem" : 6 }
> db.Student.find({Hobbies:{$ne:'Chess'}}).pretty();
{ "_id" : 1, "StudName" : "Kiran", "sem" : 6, "Hobbies" : "Podcasts" }
{
        "_id" : 2,
        "StudName" : "Trivikram Hegde",
        "sem" : 6,
        "Hobbies" : "Political analysis"
}
{
        "_id" : 4,
        "StudName" : "Laran",
        "sem" : 6,
        "Hobbies" : "Skating",
        "Location" : "Bengaluru"
}
{ "_id" : ObjectId("62543111e29a7583f87aa599"), "StudName" : "Kiran" }
> db.Student.update({_id:3},{$set:{Location:null}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.count();
5
> db.Student.find({sem:6}).limit(3).pretty();
{ "_id" : 1, "StudName" : "Kiran", "sem" : 6, "Hobbies" : "Podcasts" }
{
        "_id" : 2,
        "StudName" : "Trivikram Hegde",
        "sem" : 6,
        "Hobbies" : "Political analysis"
}
{
        "_id" : 3,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Chess",
        "Location" : null
}
```

```
> db.Student.count();
4
> db.Student.find().sort({StudName:-1}).pretty();
{
       "_id" : 2,
       "StudName" : "Trivikram Hegde",
       "sem" : 6,
       "Hobbies" : "Political analysis"
}
{
       "_id" : 3,
       "StudName" : "Padmanabha Shetty",
       "sem" : 6,
       "Hobbies" : "Chess"
}
{ "_id" : 4, "StudName" : "Laran", "sem" : 6, "Hobbies" : "Skating" }
{ "_id" : 1, "StudName" : "Kiran", "sem" : 6, "Hobbies" : "Podcasts" }
> db.Student.save({StudName:"Kiran"})
WriteResult({ "nInserted" : 1 })
> db.Student.find();
{ "_id" : 1, "StudName" : "Kiran", "sem" : 6, "Hobbies" : "Podcasts" }
{ "_id" : 2, "StudName" : "Trivikram Hegde", "sem" : 6, "Hobbies" : "Political analysis" }
{ "_id" : 3, "StudName" : "Padmanabha Shetty", "sem" : 6, "Hobbies" : "Chess" }
{ "_id" : 4, "StudName" : "Laran", "sem" : 6, "Hobbies" : "Skating" }
{ "_id" : ObjectId("62543111e29a7583f87aa599"), "StudName" : "Kiran" }
> db.Student.update({_id:4},{$set:{Location:"Bengaluru"}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.Student.find();
{ "_id" : 1, "StudName" : "Kiran", "sem" : 6, "Hobbies" : "Podcasts" }
{ "_id" : 2, "StudName" : "Trivikram Hegde", "sem" : 6, "Hobbies" : "Political analysis" }
{ "_id" : 3, "StudName" : "Padmanabha Shetty", "sem" : 6, "Hobbies" : "Chess" }
{ "_id" : 4, "StudName" : "Laran", "sem" : 6, "Hobbies" : "Skating", "Location" : "Bengaluru" }
{ "_id" : ObjectId("62543111e29a7583f87aa599"), "StudName" : "Kiran" }
```

```
> db.Student.find().sort({StudName:1}).pretty();
{ "_id" : 1, "StudName" : "Kiran", "sem" : 6, "Hobbies" : "Podcasts" }
{ "_id" : ObjectId("62543111e29a7583f87aa599"), "StudName" : "Kiran" }
{
        "_id" : 4,
        "StudName" : "Laran",
        "sem" : 6,
        "Hobbies" : "Skating",
        "Location" : "Bengaluru"
}
{
        "_id" : 3,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Chess",
        "Location" : null
}
{
        "_id" : 2,
        "StudName" : "Trivikram Hegde",
        "sem" : 6,
        "Hobbies" : "Political analysis"
}
> db.Student.find().skip(2).pretty();
{
        "_id" : 3,
        "StudName" : "Padmanabha Shetty",
        "sem" : 6,
        "Hobbies" : "Chess",
        "Location" : null
}
{
        "_id" : 4,
        "StudName" : "Laran",
        "sem" : 6,
        "Hobbies" : "Skating",
        "Location" : "Bengaluru"
```

```
> db.createCollection("food");
{ "ok" : 1 }
> 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 })
> db.food.find( {fruits: ['grapes','mango','apple'] } ).pretty();
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
> db.food.find( {'fruits.1':'grapes'} )
> ;
> db.food.find({'fruits.1':'grapes'});
> db.food.find( {"fruits": {$size:2}} );
{ "_id" : 3, "fruits" : [ "banana", "mango" ] }
> db.food.find({_id:1},{"fruits":{$slice:2}})
{ "_id" : 1, "fruits" : [ "grapes", "mango" ] }
> db.food.find({fruits:{$all:[“mango”,”grapes”]}})
uncaught exception: SyntaxError: illegal character :
@(shell):1:28
> db.food.find({fruits:{$all:["mango", "grapes"]}});
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ] }
> db.food.update({_id:3},{$set:{'fruits.1':'apple'}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.food.find();
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ] }
{ "_id" : 3, "fruits" : [ "banana", "apple" ] }
> db.food.update({_id:2},{$push:{price:{grapes:80,mango:200,cherry:100}}});
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.food.find();
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ], "price" : [ { "grapes" : 80, "mango" : 200, "cherry" : 100 } ] }
{ "_id" : 3, "fruits" : [ "banana", "apple" ] }
```

```
> db.food.insertOne( { _id: 5, fruits: [ "mango", "apple", "orange" ] } );
{ "acknowledged" : true, "insertedId" : 5 }
> db.food.updateOne( { _id: 5 }, { $pop: { fruits: -1 } } );
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
> db.food.find();
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ], "price" : [ { "grapes" : 80, "mango" : 200, "cherry" : 100 } ] }
{ "_id" : 3, "fruits" : [ "banana", "apple" ] }
{ "_id" : 5, "fruits" : [ "apple", "orange" ] }
```

```
> db.createCollection("Customers");
{ "ok" : 1 }
> db.Customers.insert({_id:1, custID:1, AccBal: 15000, AccType: "Savings"});
WriteResult({ "nInserted" : 1 })
> db.Customers.insert({_id:2, custID:1, AccBal: 16000, AccType: "Savings"});
WriteResult({ "nInserted" : 1 })
> db.Customers.insert({_id:3, custID:2, AccBal: 18000, AccType: "Savings"});
WriteResult({ "nInserted" : 1 })
> db.Customers.insert({_id:4, custID:2, AccBal: 20000, AccType: "Savings"});
WriteResult({ "nInserted" : 1 })
> db.Customers.aggregate( {$group : { _id : "$custID",TotAccBal : {$sum:"$AccBal"} } } );
{ "_id" : 2, "TotAccBal" : 38000 }
{ "_id" : 1, "TotAccBal" : 31000 }
> db.Customers.insert({custID:5, AccBal:10000000, AccType: "Current"});
WriteResult({ "nInserted" : 1 })
> db.Customers.aggregate( {$match:{AcctType:"Savings"}},{$group : { _id : "$custID",TotAccBal : {$sum:"$AccBal"} } } );
> db.Customers.aggregate( {$match:{AccType:"Savings"}},{$group : { _id : "$custID",TotAccBal : {$sum:"$AccBal"} } } );
{ "_id" : 2, "TotAccBal" : 38000 }
{ "_id" : 1, "TotAccBal" : 31000 }
> db.Customers.find();
{ "_id" : 1, "custID" : 1, "AccBal" : 15000, "AccType" : "Savings" }
{ "_id" : 2, "custID" : 1, "AccBal" : 16000, "AccType" : "Savings" }
{ "_id" : 3, "custID" : 2, "AccBal" : 18000, "AccType" : "Savings" }
{ "_id" : 4, "custID" : 2, "AccBal" : 20000, "AccType" : "Savings" }
{ "_id" : ObjectId("625448f0ee5e75021943909a"), "custID" : 5, "AccBal" : 10000000, "AccType" : "Current" }
> db.Customers.insert({custID: 3, AccBal:1000, AccType: "Savings"});
WriteResult({ "nInserted" : 1 })
> db.Customers.find();
{ "_id" : 1, "custID" : 1, "AccBal" : 15000, "AccType" : "Savings" }
{ "_id" : 2, "custID" : 1, "AccBal" : 16000, "AccType" : "Savings" }
{ "_id" : 3, "custID" : 2, "AccBal" : 18000, "AccType" : "Savings" }
{ "_id" : 4, "custID" : 2, "AccBal" : 20000, "AccType" : "Savings" }
{ "_id" : ObjectId("625448f0ee5e75021943909a"), "custID" : 5, "AccBal" : 10000000, "AccType" : "Current" }
{ "_id" : ObjectId("62544974ee5e75021943909b"), "custID" : 3, "AccBal" : 1000, "AccType" : "Savings" }
```

```
> db.food.updateOne({_id:1},{$addToSet:{fruits:"banana"}});
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
> db.food.find();
{ "_id" : 1, "fruits" : [ "grapes", "mango", "apple", "banana" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ], "price" : [ { "grapes" : 80, "mango" : 200, "cherry" : 100 } ] }
{ "_id" : 3, "fruits" : [ "banana", "apple" ] }
{ "_id" : 5, "fruits" : [ "apple", "orange" ] }
> db.food.updateOne({_id:1}, {$pullAll:{fruits:["mango", "apple"]}});
{ "acknowledged" : true, "matchedCount" : 1, "modifiedCount" : 1 }
> db.food.find();
{ "_id" : 1, "fruits" : [ "grapes", "banana" ] }
{ "_id" : 2, "fruits" : [ "grapes", "mango", "cherry" ], "price" : [ { "grapes" : 80, "mango" : 200, "cherry" : 100 } ] }
{ "_id" : 3, "fruits" : [ "banana", "apple" ] }
{ "_id" : 5, "fruits" : [ "apple", "orange" ] }
> db.food.updateMany({},{$pull:{fruits:{$in:["mango", "grapes"]}}});
{ "acknowledged" : true, "matchedCount" : 4, "modifiedCount" : 2 }
> db.food.find();
{ "_id" : 1, "fruits" : [ "banana" ] }
{ "_id" : 2, "fruits" : [ "cherry" ], "price" : [ { "grapes" : 80, "mango" : 200, "cherry" : 100 } ] }
{ "_id" : 3, "fruits" : [ "banana", "apple" ] }
{ "_id" : 5, "fruits" : [ "apple", "orange" ] }
```

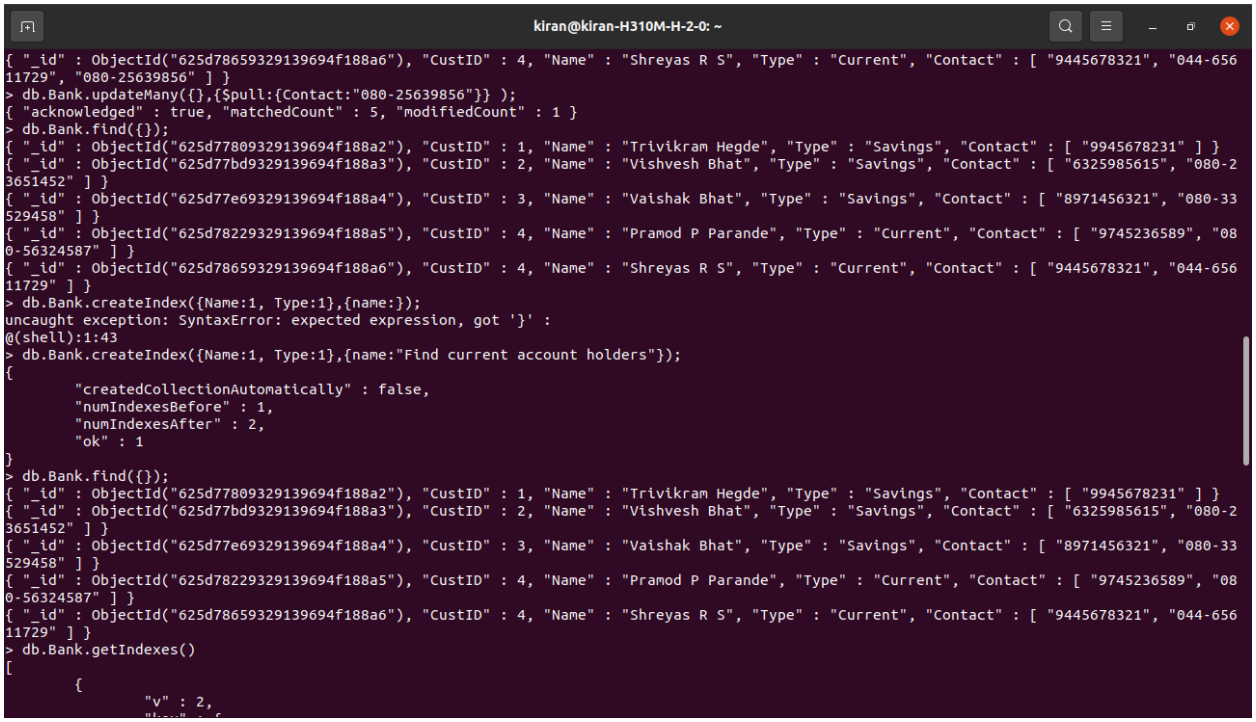
Mongo DB Program 2

```
bmscecse@bmscecse-HP-Pro-3330-MT:~$ sudo mongoexport --host localhost --db 1bm19cs073_kiranmk --collection Student --type=csv  --out /home/bms
ce/Desktop/output.txt --fields "_id","Name","USN","Sem","Dept","CGPA","Hobbies"
2022-04-18T15:13:05.991+0530    connected to: mongodb://localhost/
2022-04-18T15:13:05.996+0530    exported 6 records
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ls
024  Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
bmscecse@bmscecse-HP-Pro-3330-MT:~$ cd Desktop
bmscecse@bmscecse-HP-Pro-3330-MT:~/Desktop$ ls
bmscecse@bmscecse-HP-Pro-3330-MT:~/Desktop$ mongoexport --host localhost --db 1bm19cs073_kiranmk --collection Student --csv  --out /home/bmsce
/Desktop/output.txt --fields "_id","Name","USN","Sem","Dept","CGPA","Hobbies"
2022-04-18T15:14:16.323+0530    csv flag is deprecated; please use --type=csv instead
2022-04-18T15:14:16.325+0530    connected to: mongodb://localhost/
2022-04-18T15:14:16.325+0530    error opening output stream: mkdir /home/bmsce/Desktop: permission denied
bmscecse@bmscecse-HP-Pro-3330-MT:~/Desktop$ sudo mongoexport --host localhost --db 1bm19cs073_kiranmk --collection Student --csv  --out /home/
bmsce/Desktop/output.txt --fields "_id","Name","USN","Sem","Dept","CGPA","Hobbies"
2022-04-18T15:14:22.162+0530    csv flag is deprecated; please use --type=csv instead
2022-04-18T15:14:22.164+0530    connected to: mongodb://localhost/
2022-04-18T15:14:22.169+0530    exported 6 records
bmscecse@bmscecse-HP-Pro-3330-MT:~/Desktop$ pwd
/home/bmscecse/Desktop
bmscecse@bmscecse-HP-Pro-3330-MT:~/Desktop$ sudo mongoexport --host localhost --db 1bm19cs073_kiranmk --collection Student --type=csv  --out /
home/bmscecse/Desktop/output.txt --fields "_id","Name","USN","Sem","Dept","CGPA","Hobbies"
2022-04-18T15:15:10.012+0530    connected to: mongodb://localhost/
2022-04-18T15:15:10.017+0530    exported 6 records
bmscecse@bmscecse-HP-Pro-3330-MT:~/Desktop$ cd ..
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ls
024  Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
bmscecse@bmscecse-HP-Pro-3330-MT:~$ cd ..
bmscecse@bmscecse-HP-Pro-3330-MT:/home$ ls
bmsce  bmscecse  lost+found
bmscecse@bmscecse-HP-Pro-3330-MT:/home$ cd bmsce
bash: cd: bmsce: Permission denied
bmscecse@bmscecse-HP-Pro-3330-MT:/home$ sudo cd bmsce
sudo: cd: command not found
bmscecse@bmscecse-HP-Pro-3330-MT:/home$ login bmsce
login: Cannot possibly work without effective root
bmscecse@bmscecse-HP-Pro-3330-MT:/home$ cd bmscecse
bmscecse@bmscecse-HP-Pro-3330-MT:~$
```

```
        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()
---
> use 1bm19cs073_kiranmk;
switched to db 1bm19cs073_kiranmk
> db.createCollection("Student");
{ "ok" : 1 }
> db.Student.insert({_id:1, Name:"Kodandaraman C V", USN:"1BM19CS078", Sem: 6, Dept: "CSE", CGPA: 9.4, Hobbies:"Politics"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:2, Name:"Shrinivas Shastry P", USN:"1BM19CS077", Sem: 6, Dept: "CSE", CGPA: 8.3, Hobbies:"YouTuber"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:3, Name:"H N Subramanyam", USN:"1BM19IS025", Sem: 6, Dept: "ISE", CGPA: 9.6, Hobbies:"History of India"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:4, Name:"J Ashwani Kumar", USN:"1BM19IS050", Sem: 6, Dept: "ISE", CGPA: 9.8, Hobbies:"Quantum Physics"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:5, Name:"Sonar H Maruti", USN:"1BM19CS075", Sem: 6, Dept: "CSE", CGPA: 9.2, Hobbies:"Organic Chemistry"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:5, Name:"H K Venkatesh Bhat", USN:"1BM20CS081", Sem: 4, Dept: "CSE", CGPA: 9.8, Hobbies:"Multivariable Vector Calculu
s"});
WriteResult({
        "nInserted" : 0,
        "writeError" : {
                "code" : 11000,
                "errmsg" : "E11000 duplicate key error collection: 1bm19cs073_kiranmk.Student index: _id_ dup key: { _id: 5.0 }"
        }
})
> db.Student.insert({_id:6, Name:"H K Venkatesh Bhat", USN:"1BM20CS081", Sem: 4, Dept: "CSE", CGPA: 9.8, Hobbies:"Multivariable Vector Calculu
s"});
WriteResult({ "nInserted" : 1 })
> db.Customers.aggregate ( {$match:{AcctType:"S"}},{$group : { _id : "$custID",TotAccBal : {$sum:"$AccBal"} } }, {$match:{TotAccBal:{$gt:1200}
}});
uncaught exception: SyntaxError: illegal character :
@(shell):1:43
> db.Student.aggregate({$match:{Dept:"CSE"}}, {$group:{Sem:[4,6], AvgCGPA:{$avg:"$CGPA"}}}, {$match:{AvgCGPA:{$gt:7.5}}});
uncaught exception: Error: command failed: {
        "ok" : 0,
```

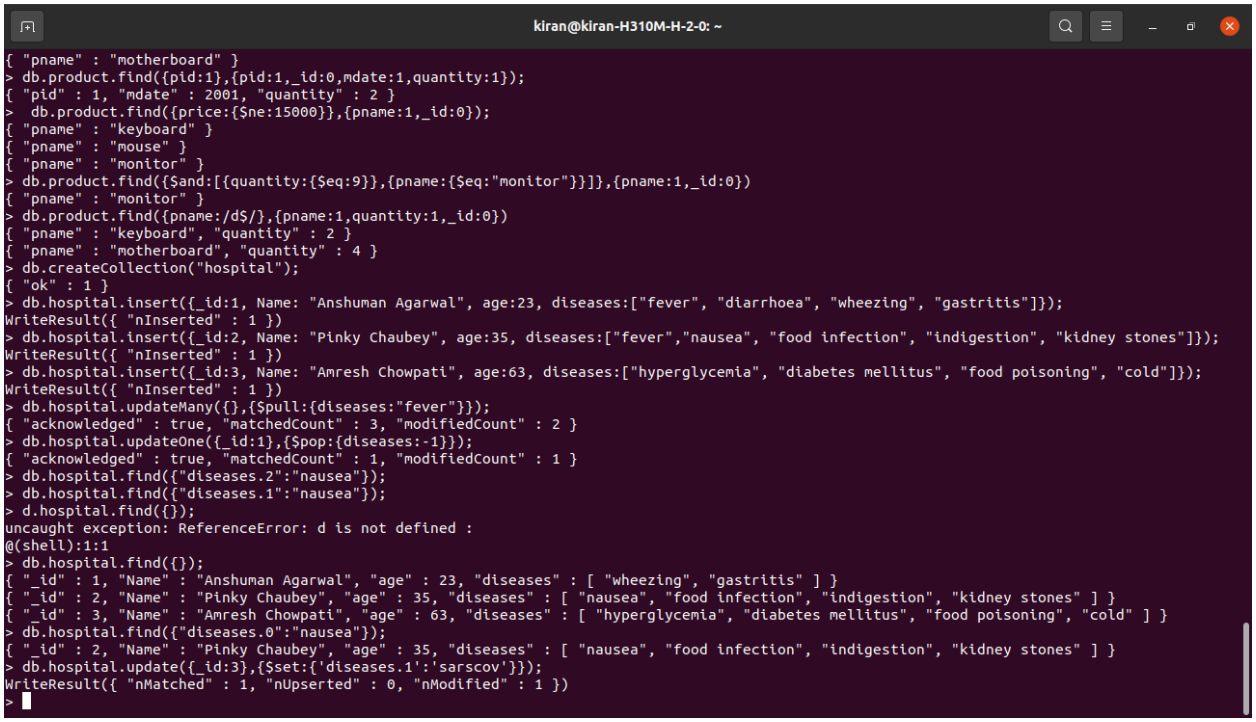
```
bmscecse@bmscecse-HP-Pro-3330-MT: ~

        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()
---
> use 1bm19cs073_kiranmk;
switched to db 1bm19cs073_kiranmk
> db.createCollection("Student");
{ "ok" : 1 }
> db.Student.insert({_id:1, Name:"Kodandaraman C V", USN:"1BM19CS078", Sem: 6, Dept: "CSE", CGPA: 9.4, Hobbies:"Politics"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:2, Name:"Shrinivas Shastry P", USN:"1BM19CS077", Sem: 6, Dept: "CSE", CGPA: 8.3, Hobbies:"YouTuber"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:3, Name:"H N Subramanyam", USN:"1BM19IS025", Sem: 6, Dept: "ISE", CGPA: 9.6, Hobbies:"History of India"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:4, Name:"J Ashwani Kumar", USN:"1BM19IS050", Sem: 6, Dept: "ISE", CGPA: 9.8, Hobbies:"Quantum Physics"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:5, Name:"Sonar H Maruti", USN:"1BM19CS075", Sem: 6, Dept: "CSE", CGPA: 9.2, Hobbies:"Organic Chemistry"});
WriteResult({ "nInserted" : 1 })
> db.Student.insert({_id:5, Name:"H K Venkatesh Bhat", USN:"1BM20CS081", Sem: 4, Dept: "CSE", CGPA: 9.8, Hobbies:"Multivariable Vector Calculu
s"});
WriteResult({
        "nInserted" : 0,
        "writeError" : {
                "code" : 11000,
                "errmsg" : "E11000 duplicate key error collection: 1bm19cs073_kiranmk.Student index: _id_ dup key: { _id: 5.0 }"
        }
})
> db.Student.insert({_id:6, Name:"H K Venkatesh Bhat", USN:"1BM20CS081", Sem: 4, Dept: "CSE", CGPA: 9.8, Hobbies:"Multivariable Vector Calculu
s"});
WriteResult({ "nInserted" : 1 })
> db.Customers.aggregate ( {$match:{AcctType:"S"}},{$group : { _id : "$custID",TotAccBal : {$sum:"$AccBal"} } }, {$match:{TotAccBal:{$gt:1200}
}});
uncaught exception: SyntaxError: illegal character :
@(shell):1:43
> db.Student.aggregate({$match:{Dept:"CSE"}}, {$group:{Sem:[4,6], AvgCGPA:{$avg:"$CGPA"}}}, {$match:{AvgCGPA:{$gt:7.5}}});
uncaught exception: Error: command failed: {
        "ok" : 0,
```

```
kiran@kiran-H310M-H-2-0: ~

> 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" ] }
```


kiran@kiran-H310M-H-2-0: ~
{ "_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,

```
kiran@kiran-H310M-H-2-0: ~
@(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"
}
>
```

```
kiran@kiran-H310M-H-2-0: ~
}
> 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" }
```


kiran@kiran-H310M-H-2-0: ~
{ "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 })
>