

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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Department of Computer Science and Engineering



CERTIFICATE

This is to certify that the Lab work entitled “**BIG DATA ANALYTICS**” was carried out by **NITISH KUMAR M (1BM19CS107)**, who is bona fide student of **B. M. S. College of Engineering**. It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of the course **BIG DATA ANALYTICS (20CS6PEBDA)** work prescribed for the said degree.

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Course Outcome

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

Cassandra Lab Program 1: -

Perform the following DB operations using Cassandra.

1. Create a key space by name Employee

```
Command Prompt - cqlsh
Microsoft Windows [Version 10.0.22000.675]
(c) Microsoft Corporation. All rights reserved.

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

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

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

system_schema  system  system_distributed  system_traces
system_auth    samples  employee

cqlsh>
```

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

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

cqlsh:employee> SELECT * FROM EMPLOYEEINFO;

empid | salary | dateofjoining | deptname | designation | empname
-----+-----+-----+-----+-----+-----
(0 rows)
cqlsh:employee>
```

3. Insert the values into the table in batch

```

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

cqlsh:employee> SELECT * FROM EMPLOYEEINFO;

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

(8 rows)
cqlsh:employee>

```

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

```

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

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

(8 rows)
cqlsh:employee>

```

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

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

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

(7 rows)

```
cqlsh:employee>
```

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

(7 rows)

```
cqlsh:employee> ALTER TABLE EMPLOYEEINFO ADD PROJECTS LIST<TEXT>;
```

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

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

(8 rows)

```
cqlsh:employee>
```

- Update the altered table to add project names.

Command Prompt - cqlsh

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

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

(8 rows)

```
cqlsh:employee>
```

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

//BEFORE 15 seconds

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

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

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

Cassandra Lab Program 2: -

Perform the following DB operations using Cassandra.

1.Create a key space by name Library

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

system_schema  system  samples  employee
system_auth    library system_distributed system_traces

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

- 2. Create a column family by name Library-Info with attributes Stud_Id Primary Key, Counter_value of type Counter, Stud_Name, Book-Name, Book-Id, Date_of_issue

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

studid | studname | bookname | bookid | dateofissue | counter_value
-----+-----+-----+-----+-----+-----
(0 rows)
cqlsh:library>
```

- 3.Insert the values into the table in batch


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

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

(1 rows)
cqlsh:library>
```

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

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

(2 rows)
cqlsh:library>
```

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

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

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

(3 rows)
cqlsh:library>
```

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

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

(3 rows)
cqlsh:library>
```

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

(4 rows)

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

```

C:\ Command Prompt - CQLSH
cqlsh:library> select * from library_info where studid = 112;

studid | studname | bookname | bookid | dateofissue | counter_value
-----+-----+-----+-----+-----+-----
112    | Rajesh   | BDA      | 3       | 2022-01-01 18:30:00.000000+0000 | 3
(1 rows)
cqlsh:library>

```

6. Export the created column to a csv file

```

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

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

```

Clipboard

Font

Alignment

POSSIBLE DATA LOSS

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

A1

113

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

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

```

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

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

```

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

MongoDB Lab Program 1 (CRUD Demonstration): -

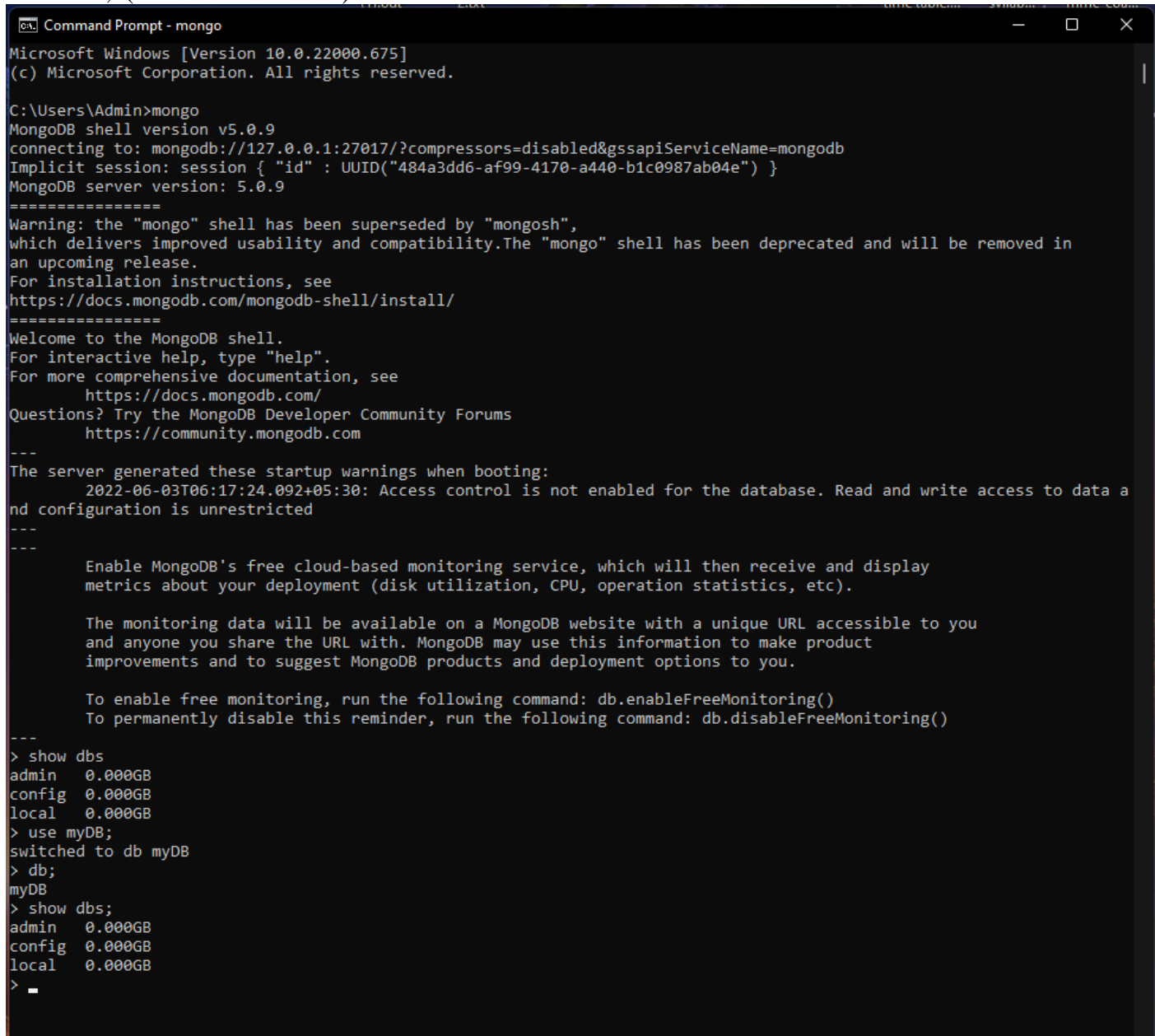
Execute the queries and upload a document with output.

I. CREATE DATABASE IN MONGODB.

use myDB;

db; (Confirm the existence of your database)

show dbs; (To list all databases)



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

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

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

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

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

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

prior to the creation of the new collection "Student".

```
db.createCollection("Student");
```

2. To drop a collection by the name "Student".

```
db.Student.drop();
```

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

```
db.Student.insert({_id:1,StudName:"MichelleJacintha",Grade:"VII",Hobbies:"InternetSurfing"});
```

4. Insert the document for "AryanDavid" in to the Students collection only if it does not already exist in the collection. However, if it is already present in the collection, then update the document with new values. (Update his Hobbies from "Skating" to "Chess".)
) Use "Update else insert" (if there is an existing document, it will attempt to update it, if there is no existing document then it will insert it).

```
db.Student.update({_id:3,StudName:"AryanDavid",Grade:"VII"},{$set:{Hobbies:"Chess"}},{upsert:true});
```

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

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

5. FIND METHOD

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

```
db.Student.find({StudName:"Aryan David"});
({cond..},{columns.. column:1, columnname:0} )
```

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

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

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

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

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

```
db.Student.find({Grade:{"$eq":"VII"}}).pretty();
```

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

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

```
db.Student.find({Hobbies : { $in: ['Chess','Skating']}}).pretty ();
```

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

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

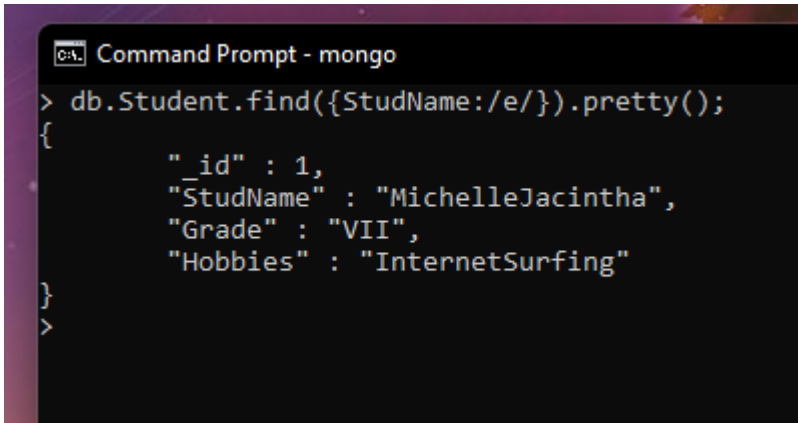
```
db.Student.find({StudName:/^M/}).pretty();
```

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

F. To find documents from the Students collection where the StudName has an "e" in any

position.

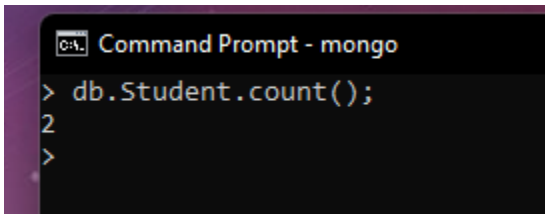
```
db.Student.find({StudName:/e/}).pretty();
```



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

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

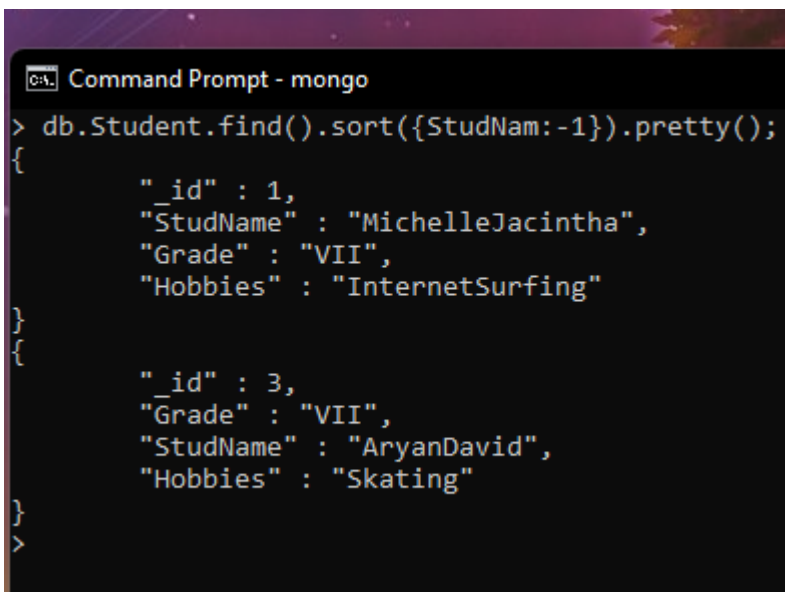
```
db.Student.count();
```



```
Command Prompt - mongo
> db.Student.count();
2
```

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

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

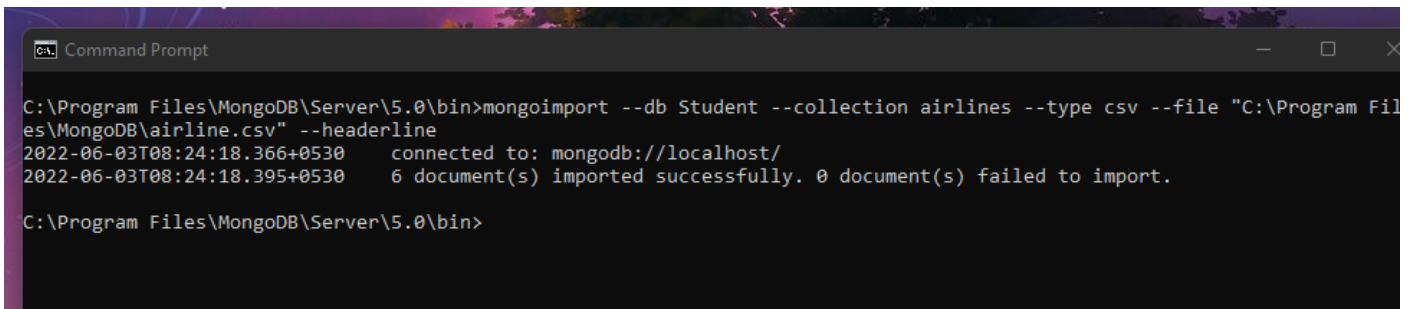


```
Command Prompt - mongo
> db.Student.find().sort({StudNam:-1}).pretty();
{
  "_id" : 1,
  "StudName" : "MichelleJacintha",
  "Grade" : "VII",
  "Hobbies" : "InternetSurfing"
}
{
  "_id" : 3,
  "Grade" : "VII",
  "StudName" : "AryanDavid",
  "Hobbies" : "Skating"
}
```

III. Import data from a CSV file

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

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

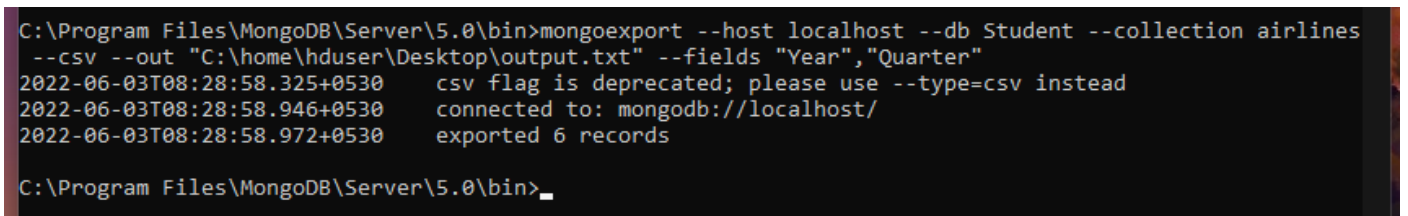


```
CA Command Prompt  
C:\Program Files\MongoDB\Server\5.0\bin>mongoimport --db Student --collection airlines --type csv --file "C:\Program Files\MongoDB\airline.csv" --headerline  
2022-06-03T08:24:18.366+0530 connected to: mongodb://localhost/  
2022-06-03T08:24:18.395+0530 6 document(s) imported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

IV. Export data to a CSV file

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

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



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

V. Save Method :

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

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

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

VI. Add a new field to existing Document:

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

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

VII. Remove the field in an existing Document

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

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

VIII. Finding Document based on search criteria suppressing few fields

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

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

```
db.Student.find({Grade:{$ne:"VII"}}).pretty();
```

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

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

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

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

IX. to set a particular field value to NULL

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

X Count the number of documents in Student Collections

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

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

```
db.Students.count({Grade:"VII"})
```

retrieve first 3 documents

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

Sort the document in Ascending order

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

Note:

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

to Skip the 1 st two documents from the Students Collections

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

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

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

```
db.food.insert( { _id:1, fruits:['grapes','mango','apple'] } )
```

```
db.food.insert( { _id:2, fruits:['grapes','mango','cherry'] } )
```

```
db.food.insert( { _id:3, fruits:['banana','mango'] } )
```

```

C:\_ Command Prompt - mongo
> db.food.insert({_id:1,fruits:['grapes','mango','apple']})
WriteResult({ "nInserted" : 1 })
> db.food.insert({_id:2,fruits:['grapes','mango','cherry']})
WriteResult({ "nInserted" : 1 })
> db.food.insert({_id:3,fruits:['banana','mango']})
WriteResult({ "nInserted" : 1 })
>

```

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

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

```

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

```

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

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

```

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

```

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

`db.food.find ({ "fruits": {$size:2} })`

```

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

```

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

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

```

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

```

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

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

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

update on Array:

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

```
db.food.update({_id:3},{ $set:{'fruits.1':'apple'}})
```

insert new key value pairs in the fruits array

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

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

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

XII. Aggregate Function :

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

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

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

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

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

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

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

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

MongoDB Lab Program 2 (CRUD Demonstration): -

1) Using MongoDB

i) Create a database for Students and Create a Student Collection (_id, Name, USN, Semester, Dept_Name, CGPA, Hobbies(Set)).

ii) Insert required documents to the collection.

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

compute the Average CPGA for that semester and filter those documents where the "Avg_CPGA" is greater than 7.5.

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

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

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

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

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



```

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

```

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

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

```

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

```

```

{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-65611729", "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", "080-23651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pranod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "080-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-65611729" ] }
> db.Bank.createIndex({Name:1, Type:1},{name:'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", "080-23651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pranod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "080-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-65611729" ] }
> db.Bank.getIndexes()
[
  {
    "v" : 2,
    "key" : {
      "Name" : 1,
      "Type" : 1
    },
    "name" : "name"
  },
  {
    "v" : 2,
    "key" : {
      "Name" : 1,
      "Type" : 1
    },
    "name" : "Find current account holders"
  }
]

```

```

@ (shell):1:20
> db.Bank.update({_id:625d78659329139694f188a6}, {$set: {CustID:5}}, {upsert:true});
uncaught exception: Identifier starts immediately after numeric literal :
@ (shell):1:20
> db.Bank.update({_id:"625d78659329139694f188a6"}, {$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", "080-23651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pranod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "080-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-65611729" ] }
{ "_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", "080-23651452" ] }
{ "_id" : ObjectId("625d77e69329139694f188a4"), "CustID" : 3, "Name" : "Vaishak Bhat", "Type" : "Savings", "Contact" : [ "8971456321", "080-33529458" ] }
{ "_id" : ObjectId("625d78229329139694f188a5"), "CustID" : 4, "Name" : "Pranod P Parande", "Type" : "Current", "Contact" : [ "9745236589", "080-56324587" ] }
{ "_id" : ObjectId("625d78659329139694f188a6"), "CustID" : 4, "Name" : "Shreyas R S", "Type" : "Current", "Contact" : [ "9445678321", "044-65611729" ] }
{ "_id" : "625d78659329139694f188a6", "CustID" : 5, "Contact" : [ "9856321478", "011-65897458" ], "Name" : "Sumantha K S", "Type" : "Savings" }
>

```

1) Using MongoDB,

i) Create a database for Faculty and Create a Faculty Collection(Faculty_id, Name, Designation ,Department, Age, Salary, Specialization(Set)).

ii) Insert required documents to the collection.

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

compute the Average Salary for that Designation and filter those

documents where the “Avg_Sal” is greater than 650000. iv)

Demonstrate usage of import and export commands

Write MongoDB queries for the following:

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

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

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

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

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

```
> db.createCollection("faculty");
{ "ok" : 1 }
> db.faculty.insert({_id:1,name:"Dr. Balaraman Ravindran",designation:"Professor",department:"CSE",age:45,salary:100000,specialization:['python','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:['python','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:['autocad','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:['autocad','flight-dynamics','Finite Element Analysis']});
WriteResult({ "nInserted" : 1 })
> db.faculty.aggregate ( {$match:{department:"ME"}}, {$group : { _id : "$designation", AverageSal : {$avg:"$salary"} } }, {$match:{AverageSal:{$gt:50000}}});
{ "_id" : "Associate Professor", "AverageSal" : 75000 }
{ "_id" : "Assistant Professor", "AverageSal" : 95000 }
> db.createCollection("product");
{ "ok" : 1 }
> db.product.insert({pid:1,pname:"keyboard",mdate:2001,price:1800,quantity:2});
WriteResult({ "nInserted" : 1 })
> db.product.insert({pid:2,pname:"mouse",mdate:2005,price:1500,quantity:5});
WriteResult({ "nInserted" : 1 })
> db.product.insert({pid:3,pname:"monitor",mdate:2015,price:10000,quantity:9});
WriteResult({ "nInserted" : 1 })
> db.product.insert({pid:4,pname:"motherboard",mdate:2021,price:15000,quantity:4});
WriteResult({ "nInserted" : 1 })
> db.product.find({}, {pname:1,_id:0})
{ "pname" : "keyboard" }
{ "pname" : "mouse" }
{ "pname" : "monitor" }
{ "pname" : "motherboard" }
> db.product.find({pid:1},{pid:1,_id:0,mdate:1,quantity:1});
{ "pid" : 1, "mdate" : 2001, "quantity" : 2 }
> db.product.find({price:{$ne:15000}},{pname:1,_id:0});
{ "pname" : "keyboard" }
```


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

choice.

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

Updation

5.

```
{ "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 })
>
```