

ADBMS

Assignment 1

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TE-09 K-09

Problem Statement:

Create a database with suitable example using MongoDB and implement:

- 1) Inserting and Saving document
- 2) Removing document
- 3) Updating document
- 4) Execute atleast 10 queries on:
 - a) Find and FindOne
 - b) Query Criteria
 - c) Type Specific queries
 - d) where queries
 - e) Cursors

Theory:

Insertion of Document:

1. To Create a collection

```
db.createCollection("DB NAME")
```

2. To Create a capped collection

```
db.createCollection("COLLECTION NAME", {capped:true,  
size:20480})
```

3. To Insert a document into collection

```
db.CollectionName.insert( { Teacher_id: "Pic001", Teacher_Name:  
"Ravi",Dept_Name: "IT", Sal:30000, status: "A" } )
```

4. To Update a document into collection

```
db.CollectionName.update( { sal: { $gt: 25000 } }, { $set: {  
Dept_name: "ETC" } }, { multi: true } )
```

5. To Remove a document from collection

```
db.CollectionName.remove({Teacher_id: "pic001"});
```

6. To Alter a field into a mongodb document

```
db.Teacher_info.update( { }, { $set: { join_date: new Date() } }, { multi:  
true } )
```

7. To drop a particular collection

```
db.CollectionName.drop()
```

Retrieval From Database:-

1. Retrieve a collection in mongodb using Find command

```
db.CollectionName.find()
```

2. Retrieve a document from collection in mongodb using Find command using condition

```
db.CollectionName.find({sal: 25000})
```

3. Retrieve a document from collection in mongodb using Find

command using or operator

```
db.CollectionName.find( { $or: [ { status: "A" }, { sal:50000 } ] } )
```

4. Retrieve a document from collection in mongodb using Find

command using greater than , less than, greater than and equal to ,less than and equal to operator

```
db. CollectionName.find( { sal: { $gt: 40000 } } )
```

5. Retrieval a value from document which contain array field

Exact Match on an Array

```
db.Collection.find( { tags: [ 'fruit', 'food', 'citrus' ] } )
```

Match an Array Element

```
db.Collection.find( { tags: 'fruit' } )
```

Match a Specific Element of an Array

```
db.Collection.find( { 'tags.0' : 'fruit' } )
```

6. MongoDB provides a db.collection.findOne() method as a special case of find() that returns a single document.

7. Exclude One Field from a Result Set

```
db.Collection.Find( { "user_id": { $lt: 42 } }, { history: 0 } )
```

8. Return Two fields and the _id Field

```
db.Collection.find( { "user_id": { $lt: 42 } }, { "name": 1, "email": 1 } )
```

9. Return Two Fields and Exclude _id

```
db.records.find( { "user_id": { $lt: 42 } }, { "_id": 0, "name": 1 , "email": 1 } )
```

10. Retrieve a collection in mongodb using Find command and pretty appearance

```
db.<collection>.find().pretty()
```

11. Retrieve a document in ascending or descending order using

1 for ascending and -1 for descending from collection in

mongodb

```
db.Collection.find( { status: "A" } ).sort( {sal: -1 } )
```

db.Collection.find().sort({ \$natural: -1 }).limit (10)12. Retrieve document with a particular from collection in

mongodb

```
db.Collection.find().limit(2).pretty()
```

12. Retrieve document with a particular from collection in

mongodb

```
db.Collection.find().limit(2).pretty()
```

13. Retrieve document skipping some documents from collection

in mongodb

```
db.Collection.find().skip(3).pretty()
```

Implementation:

1) Inserting and Saving Document (Insert validation):

```
prasadkhalkar@prasadkhalkar-IdeaPad-L340-15IRH-Gaming:~$ sudo service mongod start;
[sudo] password for prasadkhalkar:
prasadkhalkar@prasadkhalkar-IdeaPad-L340-15IRH-Gaming:~$ mongo
MongoDB shell version v3.6.8
connecting to: mongodb://127.0.0.1:27017
Implicit session: session { "id" : UUID("e57ed0c1-ec43-4028-85e5-cc393c5412e2") }
MongoDB server version: 3.6.8
Server has startup warnings:
2021-08-27T07:16:31.579+0530 I STORAGE [initandlisten]
2021-08-27T07:16:31.579+0530 I STORAGE [initandlisten] ** WARNING: Using the XFS filesystem is strongly recommended with the WiredTiger storage engine
2021-08-27T07:16:31.579+0530 I STORAGE [initandlisten] ** See http://dochub.mongodb.org/core/prodnotes-filesystem
2021-08-27T07:16:37.909+0530 I CONTROL [initandlisten]
2021-08-27T07:16:37.909+0530 I CONTROL [initandlisten] ** WARNING: Access control is not enabled for the database.
2021-08-27T07:16:37.909+0530 I CONTROL [initandlisten] ** Read and write access to data and configuration is unrestricted.
2021-08-27T07:16:37.909+0530 I CONTROL [initandlisten]
> show dbs;
admin                0.000GB
config                0.000GB
local                0.000GB
student_database      0.000GB
> use student_database
switched to db student_database
> show collections;
student_info
> db.student_info.drop()
true
> show collections;
> db.createCollection("student_info",{ validator: { $jsonSchema:{
... bsonType: "object", required: [ "name","roll_no","dept","gpa","city" ],
... properties: {
... name: { bsonType: "string" }, roll_no: { bsonType: "int", minimum: 31000, maximum: 33999 } } } });
{ "ok" : 1 }
> db.student_info.createIndex({roll_no:1},{unique:true})
{
  "createdCollectionAutomatically" : false,
  "numIndexesBefore" : 1,
  "numIndexesAfter" : 2,
  "ok" : 1
}
> db.getCollectionInfos();
[
  {
    "name" : "student_info",
    "type" : "collection",
    "options" : {
      "validator" : {
        "$jsonSchema" : {
          "bsonType" : "object",
          "required" : [
            "name",
            "roll_no",
            "dept",
            "gpa",
            "city"
          ],
          "properties" : {
            "name" : {
              "bsonType" : "string"
            },
            "roll_no" : {
              "bsonType" : "int",
              "minimum" : 31000,
              "maximum" : 33999
            }
          }
        }
      }
    }
  },
  {
    "info" : {
      "readOnly" : false,
      "uuid" : UUID("549971fd-b0ec-4c34-a85e-8db12687153f")
    },
    "idIndex" : {
      "v" : 2,
      "key" : {
        "_id" : 1
      },
      "name" : "_id_",
      "ns" : "student_database.student_info"
    }
  }
]
> db.student_info.insert({name:"Prasad K",roll_no:NumberInt(33138),dept:"IT",gpa:9.6,city:"Nashik"});
WriteResult({ "nInserted" : 1 })
> db.student_info.insert({name:"Aniket K",roll_no:NumberInt(33138),dept:"IT",gpa:9.2,city:"Pune"});
WriteResult({
  "nInserted" : 0,
  "writeError" : {
    "code" : 11000,
    "errmsg" : "E11000 duplicate key error collection: student_database.student_info index: roll_no_1 dup key: { : 33138 }"
  }
})
```

```
Activities Terminal Aug 27 07:52 prasadkhalkar@prasadkhalkar-ideaPd-L340-15IRH-Gaming-
})
> db.student_info.insert([name:"Aniket K",roll_no:NumberInt(10536),dept:"IT",gpa:9.2,city:"Pune"]);
WriteResult({
  "nInserted": 0,
  "writeErrors": {
    "code": 121,
    "errmsg": "Document failed validation"
  }
})
> db.student_info.insert([name:"Aniket K",roll_no:NumberInt(33125),dept:"IT",gpa:9.2,city:"Pune"]);
WriteResult({ "nInserted": 1 })
> db.student_info.insert([name:"Rohit K",roll_no:NumberInt(33199),dept:"CS",gpa:8.5,city:"Pune"]);
WriteResult({ "nInserted": 1 })
> db.student_info.insert([name:"Rahul J",roll_no:NumberInt(33189),dept:"ENTC",gpa:9.5,city:"Nashik"]);
WriteResult({ "nInserted": 1 })
> db.student_info.insert([name:"Tannay B",roll_no:NumberInt(33256),dept:"IT",gpa:8.1,city:"Mumbai"]);
WriteResult({ "nInserted": 1 })
> db.student_info.insert([name:"Samay R",roll_no:NumberInt(33356),dept:"CS",gpa:8.2,city:"Mumbai"]);
WriteResult({ "nInserted": 1 })
> db.student_info.find();
{ "_id": ObjectId("612849a2d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.6, "city": "Nashik" }
{ "_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.2, "city": "Pune" }
{ "_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{ "_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{ "_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 33256, "dept": "IT", "gpa": 8.1, "city": "Mumbai" }
{ "_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.2, "city": "Mumbai" }
> db.student_info.insert([name:"Mithul N",roll_no:NumberInt(31111),dept:"ENTC",gpa:9.3,city:"Nagpur"]);
... (name:"Ketan P",roll_no:NumberInt(33299),dept:"IT",gpa:9.7,city:"Mumbai"}, (name:"Shubham P",roll_no:NumberInt(33122),dept:"ENTC",gpa:9.9,city:"Jalna"}, (name:"Mayur W",roll_no:NumberInt(31889),dept:"CS",gpa:9.7,city:"Aurangabad"},
... (name:"Tejas C",roll_no:NumberInt(33398),dept:"CS",gpa:9.8,city:"Nagpur"}, (name:"Vinay C",roll_no:NumberInt(33168),dept:"IT",gpa:9.9,city:"Nashik"}]);
BulkWriteResult({
  "writeErrors": [],
  "writeConcernErrors": [],
  "nInserted": 7,
  "nUpserted": 0,
  "nMatched": 0,
  "nModified": 0,
  "nRemoved": 0,
  "upserted": []
})
> db.student_info.find();
{ "_id": ObjectId("612849a2d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.6, "city": "Nashik" }
{ "_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.2, "city": "Pune" }
{ "_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{ "_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{ "_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 33256, "dept": "IT", "gpa": 8.1, "city": "Mumbai" }
{ "_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.2, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.7, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07c"), "name": "Lalit L", "roll_no": 33144, "dept": "CS", "gpa": 9, "city": "Akola" }
{ "_id": ObjectId("61284c172d512938fe2fd07d"), "name": "Shubham P", "roll_no": 33122, "dept": "ENTC", "gpa": 9.9, "city": "Jalna" }
{ "_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{ "_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas C", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.9, "city": "Nashik" }
```

2) Removing document:

```
db.student_info.find();
{ "_id": ObjectId("612849a2d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.6, "city": "Nashik" }
{ "_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.2, "city": "Pune" }
{ "_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{ "_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{ "_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 33256, "dept": "IT", "gpa": 8.1, "city": "Mumbai" }
{ "_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.2, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.7, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07c"), "name": "Lalit L", "roll_no": 33144, "dept": "CS", "gpa": 9, "city": "Akola" }
{ "_id": ObjectId("61284c172d512938fe2fd07d"), "name": "Shubham P", "roll_no": 33122, "dept": "ENTC", "gpa": 9.9, "city": "Jalna" }
{ "_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{ "_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas C", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.9, "city": "Nashik" }
db.student_info.deleteOne({roll_no:33144});
"acknowledged": true, "deletedCount": 1 }
db.student_info.find();
{ "_id": ObjectId("612849a2d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.6, "city": "Nashik" }
{ "_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.2, "city": "Pune" }
{ "_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{ "_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{ "_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 33256, "dept": "IT", "gpa": 8.1, "city": "Mumbai" }
{ "_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.2, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.7, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07d"), "name": "Shubham P", "roll_no": 33122, "dept": "ENTC", "gpa": 9.9, "city": "Jalna" }
{ "_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{ "_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas C", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.9, "city": "Nashik" }
db.student_info.remove({roll_no:33122});
WriteResult({ "nRemoved": 1 })
db.student_info.find();
{ "_id": ObjectId("612849a2d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.6, "city": "Nashik" }
{ "_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.2, "city": "Pune" }
{ "_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{ "_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{ "_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 33256, "dept": "IT", "gpa": 8.1, "city": "Mumbai" }
{ "_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.2, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.7, "city": "Mumbai" }
{ "_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{ "_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas C", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{ "_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.9, "city": "Nashik" }
```

3) Updating document (document replacement, using modifiers, up inserts, updating multiple documents, returning updated documents):

[illegible]

4) Execute atleast 10 queries on any suitable MongoDB database that demonstrates following:

a) Find and FindOne (specific values):

```
> db.student_info.find();
{"_id": ObjectId("612849a92d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.65, "city": "Nashik" }
{"_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.25, "city": "Pune" }
{"_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{"_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{"_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 31555, "dept": "CS", "gpa": 8.8, "city": "Mumbai" }
{"_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.5, "city": "Mumbai" }
{"_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.75, "city": "Mumbai" }
{"_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{"_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas P", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.93, "city": "Nashik" }
{"_id": ObjectId("61285f54c23b033c00ab042b"), "name": "Lalit L", "city": "Nashik", "dept": "IT", "gpa": 9.1, "roll_no": 33322 }
> db.student_info.find({gpa:{gt:8.99}});
{"_id": ObjectId("612849a92d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.65, "city": "Nashik" }
{"_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.25, "city": "Pune" }
{"_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{"_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.75, "city": "Mumbai" }
{"_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{"_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas P", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.93, "city": "Nashik" }
{"_id": ObjectId("61285f54c23b033c00ab042b"), "name": "Lalit L", "city": "Nashik", "dept": "IT", "gpa": 9.1, "roll_no": 33322 }
> db.student_info.find({gpa:{lt:9.0}});
{"_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{"_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 31555, "dept": "CS", "gpa": 8.8, "city": "Mumbai" }
{"_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.5, "city": "Mumbai" }
> db.student_info.findOne();
{
  "_id": ObjectId("612849a92d512938fe2fd072"),
  "name": "Prasad K",
  "roll_no": 33138,
  "dept": "IT",
  "gpa": 9.65,
  "city": "Nashik"
}
> db.student_info.findOne({roll_no:31111});
{
  "_id": ObjectId("61284c172d512938fe2fd07a"),
  "name": "Mithul N",
  "roll_no": 31111,
  "dept": "ENTC",
  "gpa": 9.3,
  "city": "Nagpur"
}
> db.student_info.findOne({gpa:9.75,dept:"IT"});
{
  "_id": ObjectId("61284c172d512938fe2fd07b"),
  "name": "Ketan P",
  "roll_no": 33299,
  "dept": "IT",
  "gpa": 9.75,
  "city": "Mumbai"
}
```

b) Query criteria(Query conditionals, OR queries, \$not, Conditional semantics):

```
> db.student_info.find({ $or:[{gpa:{gte:9.0}}, {dept:"IT"}] });
{"_id": ObjectId("612849a92d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.65, "city": "Nashik" }
{"_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.25, "city": "Pune" }
{"_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{"_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.75, "city": "Mumbai" }
{"_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{"_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas P", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.93, "city": "Nashik" }
{"_id": ObjectId("61285f54c23b033c00ab042b"), "name": "Lalit L", "city": "Nashik", "dept": "IT", "gpa": 9.1, "roll_no": 33322 }
> db.student_info.find({gpa:{not:{lt:9.4}}});
{"_id": ObjectId("612849a92d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.65, "city": "Nashik" }
{"_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{"_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.75, "city": "Mumbai" }
{"_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{"_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas P", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.93, "city": "Nashik" }
{"_id": ObjectId("61285f54c23b033c00ab042b"), "name": "Lalit L", "city": "Nashik", "dept": "IT", "gpa": 9.1, "roll_no": 33322 }
> db.student_info.find({dept:{not:{in:["ENTC","CS"]}}});
{"_id": ObjectId("612849a92d512938fe2fd072"), "name": "Prasad K", "roll_no": 33138, "dept": "IT", "gpa": 9.65, "city": "Nashik" }
{"_id": ObjectId("612849da2d512938fe2fd075"), "name": "Aniket K", "roll_no": 33125, "dept": "IT", "gpa": 9.25, "city": "Pune" }
{"_id": ObjectId("61284c172d512938fe2fd07b"), "name": "Ketan P", "roll_no": 33299, "dept": "IT", "gpa": 9.75, "city": "Mumbai" }
{"_id": ObjectId("61284c172d512938fe2fd080"), "name": "Vinay C", "roll_no": 33168, "dept": "IT", "gpa": 9.93, "city": "Nashik" }
{"_id": ObjectId("61285f54c23b033c00ab042b"), "name": "Lalit L", "city": "Nashik", "dept": "IT", "gpa": 9.1, "roll_no": 33322 }
> db.student_info.find({dept:{not:{seq:"IT"}}});
{"_id": ObjectId("61284a012d512938fe2fd076"), "name": "Rohit K", "roll_no": 33199, "dept": "CS", "gpa": 8.5, "city": "Pune" }
{"_id": ObjectId("61284a2e2d512938fe2fd077"), "name": "Rahul J", "roll_no": 33189, "dept": "ENTC", "gpa": 9.5, "city": "Nashik" }
{"_id": ObjectId("61284a612d512938fe2fd078"), "name": "Tannay B", "roll_no": 31555, "dept": "CS", "gpa": 8.8, "city": "Mumbai" }
{"_id": ObjectId("61284a822d512938fe2fd079"), "name": "Samay R", "roll_no": 33356, "dept": "CS", "gpa": 8.5, "city": "Mumbai" }
{"_id": ObjectId("61284c172d512938fe2fd07a"), "name": "Mithul N", "roll_no": 31111, "dept": "ENTC", "gpa": 9.3, "city": "Nagpur" }
{"_id": ObjectId("61284c172d512938fe2fd07e"), "name": "Mayur W", "roll_no": 31889, "dept": "CS", "gpa": 9.7, "city": "Aurangabad" }
{"_id": ObjectId("61284c172d512938fe2fd07f"), "name": "Tejas P", "roll_no": 33398, "dept": "CS", "gpa": 9.8, "city": "Nagpur" }
```


c) Type specific queries

i) Null and Regex (regular expressions):

```
> db.createCollection("student_work");
{ "ok" : 1 }
> db.student_work.insert({name:"Rohit K",expertise:"Frontend Developer",work:["Web","Android"]});
WriteResult({ "nInserted" : 1 })
> db.student_work.insert({name:"Kartik A",expertise:"Backend Developer",work:["Web","Android"]});
WriteResult({ "nInserted" : 1 })
> db.student_work.insert({name:"Rahul J",expertise:"IT Engineer",work:["Web"]});
WriteResult({ "nInserted" : 1 })
> db.student_work.insert({name:"Rahul J",expertise:"CS Engineer",work:["Android"]});
WriteResult({ "nInserted" : 1 })
> db.student_work.insert({name:"Pushkar J",expertise:"CS Engineer",work:["Android"]});
WriteResult({ "nInserted" : 1 })
> db.student_work.insert({name:"Tushar J",work:["Android","AI"]});
WriteResult({ "nInserted" : 1 })
> db.student_work.find({expertise:null}).pretty();
{
  "_id" : ObjectId("61286e232d512938fe2fd08a"),
  "name" : "Tushar J",
  "work" : [
    "Android",
    "AI"
  ]
}
> db.student_work.find({expertise:{regex:"Developer"}});
{ "_id" : ObjectId("61286dba2d512938fe2fd085"), "name" : "Rohit K", "expertise" : "Frontend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286dd32d512938fe2fd086"), "name" : "Kartik A", "expertise" : "Backend Developer", "work" : [ "Web", "Android" ] }
> db.student_work.find({expertise:{regex:"Engineer"}});
{ "_id" : ObjectId("61286deb2d512938fe2fd087"), "name" : "Rahul J", "expertise" : "IT Engineer", "work" : [ "Web" ] }
{ "_id" : ObjectId("61286df52d512938fe2fd088"), "name" : "Rahul J", "expertise" : "CS Engineer", "work" : [ "Android" ] }
{ "_id" : ObjectId("61286dff2d512938fe2fd089"), "name" : "Pushkar J", "expertise" : "CS Engineer", "work" : [ "Android" ] }
> db.student_info.find();
{ "_id" : ObjectId("612849a92d512938fe2fd072"), "name" : "Prasad K", "roll_no" : 33138, "dept" : "IT", "gpa" : 9.65, "city" : "Nashik" }
{ "_id" : ObjectId("612849da2d512938fe2fd075"), "name" : "Aniket K", "roll_no" : 33125, "dept" : "IT", "gpa" : 9.25, "city" : "Pune" }
{ "_id" : ObjectId("61284a012d512938fe2fd076"), "name" : "Rohit K", "roll_no" : 33199, "dept" : "CS", "gpa" : 8.5, "city" : "Pune" }
{ "_id" : ObjectId("61284a2e2d512938fe2fd077"), "name" : "Rahul J", "roll_no" : 33189, "dept" : "ENTC", "gpa" : 9.5, "city" : "Nashik" }
{ "_id" : ObjectId("61284a612d512938fe2fd078"), "name" : "Tanmay B", "roll_no" : 31555, "dept" : "CS", "gpa" : 8.8, "city" : "Mumbai" }
{ "_id" : ObjectId("61284a822d512938fe2fd079"), "name" : "Samay R", "roll_no" : 33356, "dept" : "CS", "gpa" : 8.5, "city" : "Mumbai" }
{ "_id" : ObjectId("61284c172d512938fe2fd07a"), "name" : "Mithul N", "roll_no" : 31111, "dept" : "ENTC", "gpa" : 9.3, "city" : "Nagpur" }
{ "_id" : ObjectId("61284c172d512938fe2fd07b"), "name" : "Ketan P", "roll_no" : 33299, "dept" : "IT", "gpa" : 9.75, "city" : "Mumbai" }
{ "_id" : ObjectId("61284c172d512938fe2fd07e"), "name" : "Mayur W", "roll_no" : 31889, "dept" : "CS", "gpa" : 9.7, "city" : "Aurangabad" }
{ "_id" : ObjectId("61284c172d512938fe2fd07f"), "name" : "Tejas P", "roll_no" : 33398, "dept" : "CS", "gpa" : 9.8, "city" : "Nagpur" }
{ "_id" : ObjectId("61284c172d512938fe2fd080"), "name" : "Vinay C", "roll_no" : 33168, "dept" : "IT", "gpa" : 9.93, "city" : "Nashik" }
{ "_id" : ObjectId("61285f54c23b033c00ab042b"), "name" : "Lalit L", "city" : "Nashik", "dept" : "IT", "gpa" : 9.1, "roll_no" : 33322 }
> db.student_info.find({name:{regex:"R"}});
{ "_id" : ObjectId("61284a012d512938fe2fd076"), "name" : "Rohit K", "roll_no" : 33199, "dept" : "CS", "gpa" : 8.5, "city" : "Pune" }
{ "_id" : ObjectId("61284a2e2d512938fe2fd077"), "name" : "Rahul J", "roll_no" : 33189, "dept" : "ENTC", "gpa" : 9.5, "city" : "Nashik" }
> db.student_info.find({name:{regex:"M"}});
{ "_id" : ObjectId("61284c172d512938fe2fd07a"), "name" : "Mithul N", "roll_no" : 31111, "dept" : "ENTC", "gpa" : 9.3, "city" : "Nagpur" }
{ "_id" : ObjectId("61284c172d512938fe2fd07e"), "name" : "Mayur W", "roll_no" : 31889, "dept" : "CS", "gpa" : 9.7, "city" : "Aurangabad" }
```

ii) Querying arrays:

```
> db.student_work.find();
{ "_id" : ObjectId("61286dba2d512938fe2fd085"), "name" : "Rohit K", "expertise" : "Frontend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286dd32d512938fe2fd086"), "name" : "Kartik A", "expertise" : "Backend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286deb2d512938fe2fd087"), "name" : "Rahul J", "expertise" : "IT Engineer", "work" : [ "Web" ] }
{ "_id" : ObjectId("61286df52d512938fe2fd088"), "name" : "Rahul J", "expertise" : "CS Engineer", "work" : [ "Android" ] }
{ "_id" : ObjectId("61286dff2d512938fe2fd089"), "name" : "Pushkar J", "expertise" : "CS Engineer", "work" : [ "Android" ] }
{ "_id" : ObjectId("61286e232d512938fe2fd08a"), "name" : "Tushar J", "work" : [ "Android", "AI" ] }
> db.student_work.find({"work":{"$size:2}});
{ "_id" : ObjectId("61286dba2d512938fe2fd085"), "name" : "Rohit K", "expertise" : "Frontend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286dd32d512938fe2fd086"), "name" : "Kartik A", "expertise" : "Backend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286e232d512938fe2fd08a"), "name" : "Tushar J", "work" : [ "Android", "AI" ] }
> db.student_work.find({ work: "Android"});
{ "_id" : ObjectId("61286dba2d512938fe2fd085"), "name" : "Rohit K", "expertise" : "Frontend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286dd32d512938fe2fd086"), "name" : "Kartik A", "expertise" : "Backend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286df52d512938fe2fd088"), "name" : "Rahul J", "expertise" : "CS Engineer", "work" : [ "Android" ] }
{ "_id" : ObjectId("61286dff2d512938fe2fd089"), "name" : "Pushkar J", "expertise" : "CS Engineer", "work" : [ "Android" ] }
{ "_id" : ObjectId("61286e232d512938fe2fd08a"), "name" : "Tushar J", "work" : [ "Android", "AI" ] }
> db.student_work.find({ work:{ $all: ["Android","Web"]}});
{ "_id" : ObjectId("61286dba2d512938fe2fd085"), "name" : "Rohit K", "expertise" : "Frontend Developer", "work" : [ "Web", "Android" ] }
{ "_id" : ObjectId("61286dd32d512938fe2fd086"), "name" : "Kartik A", "expertise" : "Backend Developer", "work" : [ "Web", "Android" ] }
```

