

MCA Sem III – Div A
Big Data Analytics and Visualization
LabAssignmet: 3
MongoDB

Aim: To learn MongoDB and how it helps you to use new commands easily for managing and querying data more effectively.

Theory:

MongoDB is a NoSQL, open-source document-oriented database designed for ease of development and scaling. Unlike traditional relational databases that use tables and rows, MongoDB stores data in flexible, JSON-like documents called BSON (Binary JSON).

Features:

Document-Oriented Storage: Stores data in flexible, JSON-like documents (BSON).

Schema Flexibility: Allows dynamic schema changes without downtime.

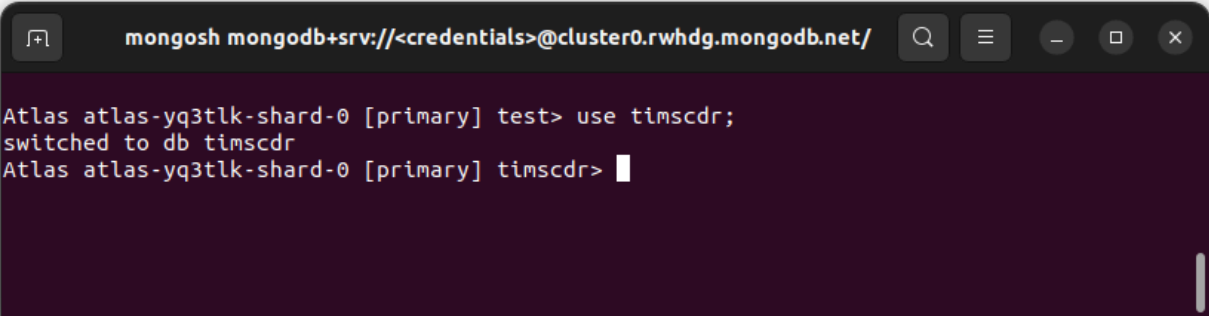
Horizontal Scalability: Distributes data across multiple servers using sharding.

High Performance: Provides fast read and write operations with in-memory processing.

Rich Query Language: Supports complex queries, indexing, and aggregation.

Output:

1. Create a Database with the name College using the MongoDB command prompt.



```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] test> use timsedr;
switched to db timsedr
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> 
```

2. Create a MongoDB collections employee and Department under the database college

<u>Employee:</u> empcode INT, empfname STRING, emplname STRING, job STRING, manager STRING, hiredate STRING, salary INT, commission INT, deptcode INT	<u>Dept table:</u> deptcode INT, deptname STRING, location STRING
---	---



```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] test> use timscdr;
switched to db timscdr
Atlas atlas-yq3tlk-shard-0 [primary] timscdr> db.Employee.insertOne({
...   empcode: 101,
...   empfname: "Siddhi",
...   emplname: "Kotre",
...   job: "Developer",
...   manager: "Jane Smith",
...   hiredate: "2023-08-25",
...   salary: 50000,
...   commission: 5000,
...   deptcode: 1
... })
{
  acknowledged: true,
  insertedId: ObjectId('66cb5c79db2e5c52345e739e')
}
Atlas atlas-yq3tlk-shard-0 [primary] timscdr>
```

```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
...   hiredate: "2023-08-25",
...   salary: 50000,
...   commission: 5000,
...   deptcode: 1
... })
{
  acknowledged: true,
  insertedId: ObjectId('66cb5c79db2e5c52345e739e')
}
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.Department.insert({
...   deptcode: 1,
...   deptname: "IT",
...   location: "Mumbai"
... })
{
  acknowledged: true,
  insertedIds: { '0': ObjectId('66cb5cb5db2e5c52345e739f') }
}
Atlas atlas-yq3tlk-shard-0 [primary] timsedr>
```

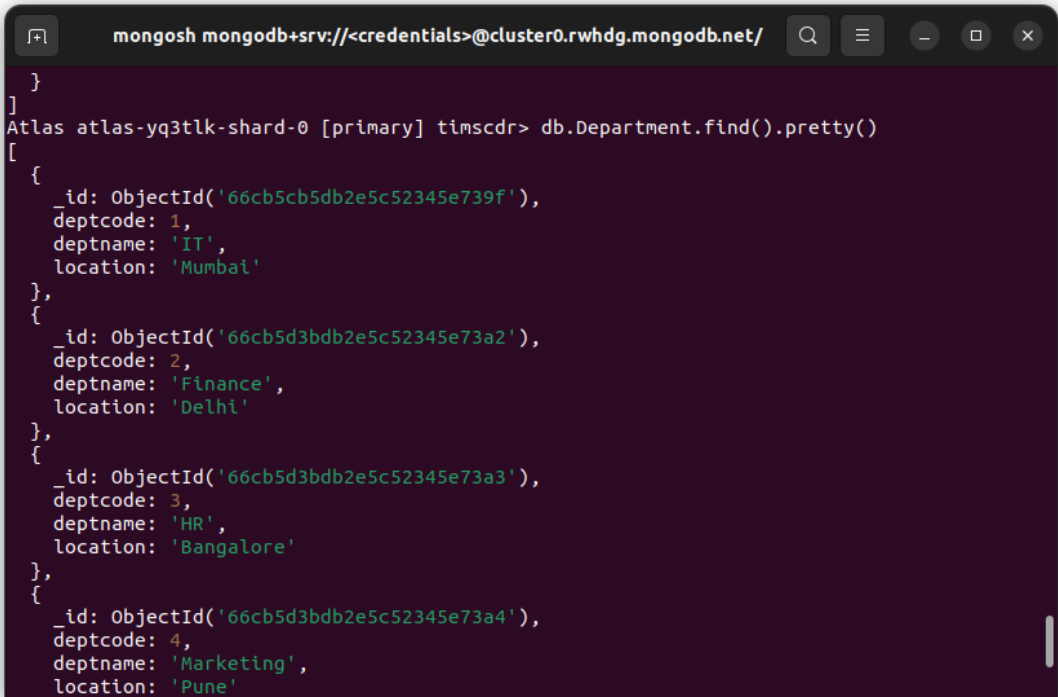
3. Insert multiple documents in the collections employee and department.

```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
(To exit, press Ctrl+C again or Ctrl+D or type .exit)
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.insertMany([
...   {
...     empcode: 201,
...     empfname: "Tom",
...     emplname: "Harris",
...     job: "ANALYST",
...     manager: "Siddhi Kotre",
...     hiredate: "2024-01-15",
...     salary: 55000,
...     commission: 3000,
...     deptcode: 1
...   },
...   {
...     empcode: 202,
...     empfname: "Sara",
...     emplname: "Miller",
...     job: "SALESMAN",
...     manager: "Jane Smith",
...     hiredate: "2024-02-20",
...     salary: 47000,
...     commission: 4000,
...     deptcode: 2
...   },
...   {
...     empcode: 203,
...     empfname: "Mike",
...   }
... ])
{
  acknowledged: true,
  insertedIds: { '0': ObjectId('66cb5cb5db2e5c52345e739f'), '1': ObjectId('66cb5cb5db2e5c52345e739f'), '2': ObjectId('66cb5cb5db2e5c52345e739f') }
}
Atlas atlas-yq3tlk-shard-0 [primary] timsedr>
```

```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.Department.insertMany([
...   {
...     deptcode: 2,
...     deptname: "Finance",
...     location: "Delhi"
...   },
...   {
...     deptcode: 3,
...     deptname: "HR",
...     location: "Bangalore"
...   },
...   {
...     deptcode: 4,
...     deptname: "Marketing",
...     location: "Pune"
...   },
...   {
...     deptcode: 5,
...     deptname: "Sales",
...     location: "Chennai"
...   },
...   {
...     deptcode: 6,
...     deptname: "Operations",
...     location: "Hyderabad"
...   }
... ])
```

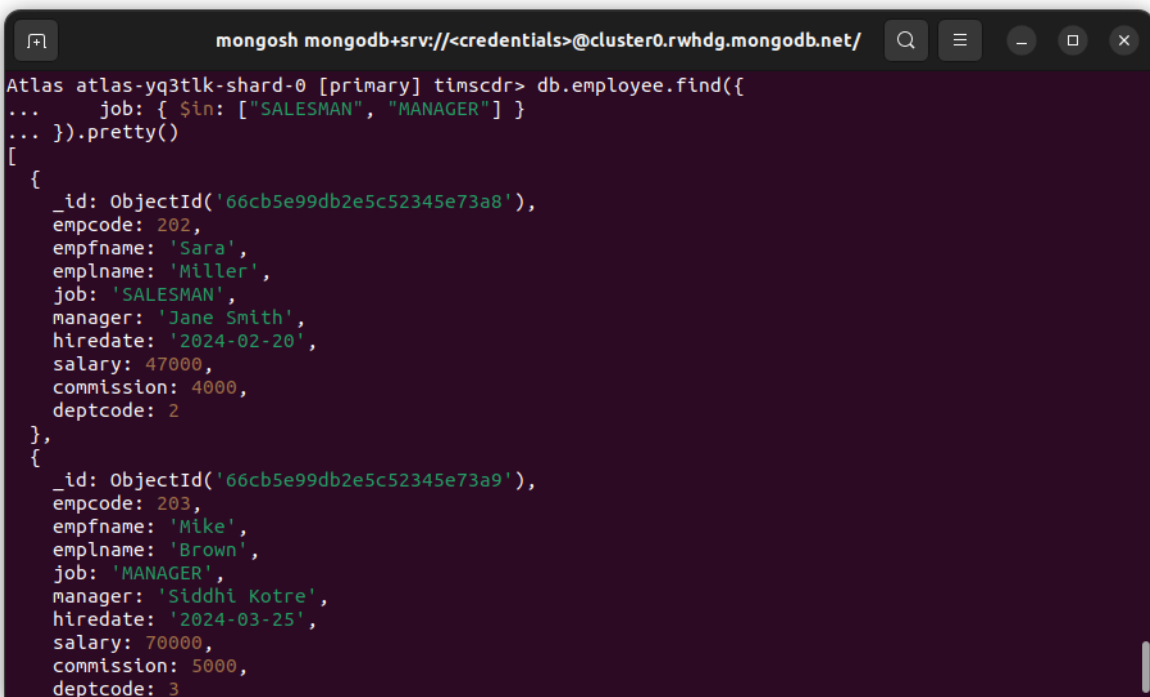
4. List all the documents inside a collections employee and department both.

```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
deptcode: 3
}
]
Atlas atlas-yq3tlk-shard-0 [primary] timsedr>
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find().pretty()
[
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a7'),
    empcode: 201,
    empfname: 'Tom',
    emplname: 'Harris',
    job: 'ANALYST',
    manager: 'Siddhi Kotre',
    hiredate: '2024-01-15',
    salary: 55000,
    commission: 3000,
    deptcode: 1
  },
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a8'),
    empcode: 202,
    empfname: 'Sara',
    emplname: 'Miller',
    job: 'SALESMAN',
    manager: 'Jane Smith',
    hiredate: '2024-02-20',
  },
]
```



```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.Department.find().pretty()
[
  {
    _id: ObjectId('66cb5cb5db2e5c52345e739f'),
    deptcode: 1,
    deptname: 'IT',
    location: 'Mumbai'
  },
  {
    _id: ObjectId('66cb5d3bdb2e5c52345e73a2'),
    deptcode: 2,
    deptname: 'Finance',
    location: 'Delhi'
  },
  {
    _id: ObjectId('66cb5d3bdb2e5c52345e73a3'),
    deptcode: 3,
    deptname: 'HR',
    location: 'Bangalore'
  },
  {
    _id: ObjectId('66cb5d3bdb2e5c52345e73a4'),
    deptcode: 4,
    deptname: 'Marketing',
    location: 'Pune'
  }
]
```

5. List all the documents of employee collection WHERE job in ("SALESMAN ",
"MANAGER"):

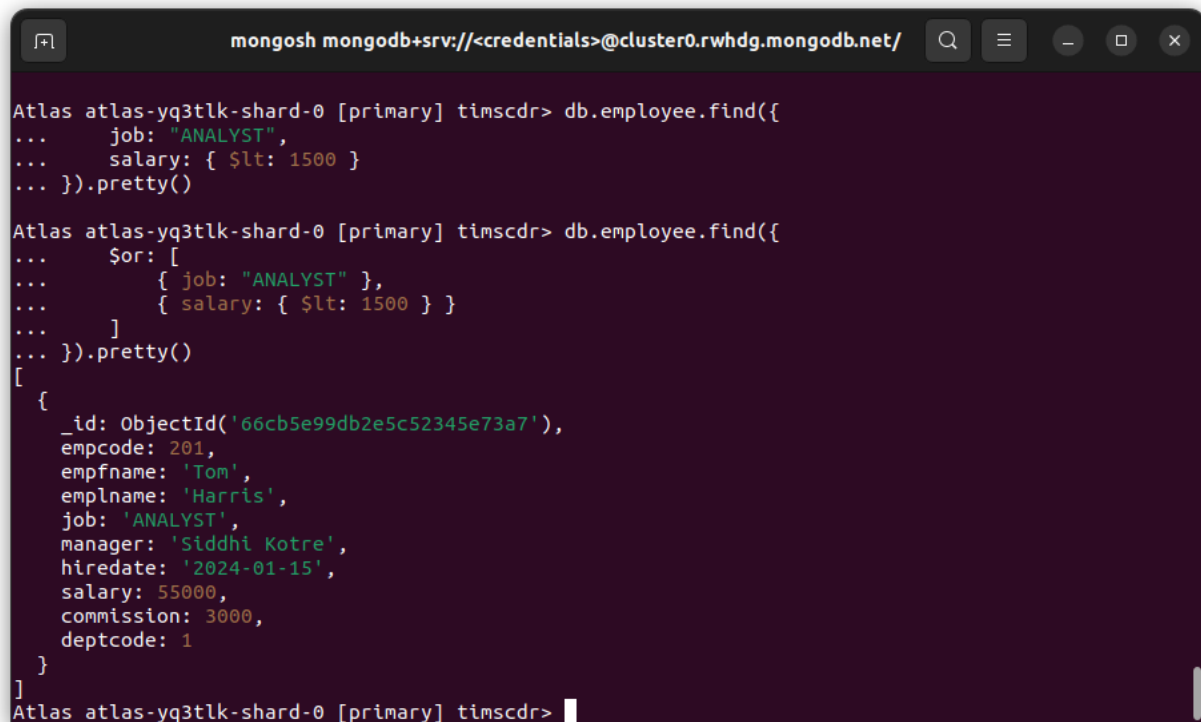


```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find({
...   job: { $in: ["SALESMAN", "MANAGER"] }
... }).pretty()
[
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a8'),
    empcode: 202,
    empfname: 'Sara',
    emplname: 'Miller',
    job: 'SALESMAN',
    manager: 'Jane Smith',
    hiredate: '2024-02-20',
    salary: 47000,
    commission: 4000,
    deptcode: 2
  },
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a9'),
    empcode: 203,
    empfname: 'Mike',
    emplname: 'Brown',
    job: 'MANAGER',
    manager: 'Siddhi Kotre',
    hiredate: '2024-03-25',
    salary: 70000,
    commission: 5000,
    deptcode: 3
  }
]
```

6. List all the documents of employee collection WHERE job = " ANALYST" AND
SALARY < 1500:

7. List all the documents of employee collection WHERE job = " ANALYST" or SALARY <
1500:

Output for 6&7:



```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/

Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find({
...   job: "ANALYST",
...   salary: { $lt: 1500 }
... }).pretty()

Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find({
...   $or: [
...     { job: "ANALYST" },
...     { salary: { $lt: 1500 } }
...   ]
... }).pretty()
[
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a7'),
    empcode: 201,
    empfname: 'Tom',
    emplname: 'Harris',
    job: 'ANALYST',
    manager: 'Siddhi Kotre',
    hiredate: '2024-01-15',
    salary: 55000,
    commission: 3000,
    deptcode: 1
  }
]
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> 
```

8. List all the documents of employee collection WHERE job = " ANALYST" AND (SALARY < 1500 OR empfname LIKE "T%")

```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
salary: 55000,
commission: 3000,
deptcode: 1
}
]
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find({
...   job: "ANALYST",
...   $or: [
...     { salary: { $lt: 1500 } },
...     { empfname: /^T/ }
...   ]
... }).pretty()
[
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a7'),
    empcode: 201,
    empfname: 'Tom',
    emplname: 'Harris',
    job: 'ANALYST',
    manager: 'Siddhi Kotre',
    hiredate: '2024-01-15',
    salary: 55000,
    commission: 3000,
    deptcode: 1
  }
]
Atlas atlas-yq3tlk-shard-0 [primary] timsedr>
```

9. List all the documents of employee collection in ascending order of job type.

```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
}
]
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find().sort({ job: 1 }).pretty()
[
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a7'),
    empcode: 201,
    empfname: 'Tom',
    emplname: 'Harris',
    job: 'ANALYST',
    manager: 'Siddhi Kotre',
    hiredate: '2024-01-15',
    salary: 55000,
    commission: 3000,
    deptcode: 1
  },
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a9'),
    empcode: 203,
    empfname: 'Mike',
    emplname: 'Brown',
    job: 'MANAGER',
    manager: 'Siddhi Kotre',
    hiredate: '2024-03-25',
    salary: 70000,
    commission: 5000,
    deptcode: 3
  }
]
```

10. Create an index on the empcode field of employee collection.
11. Create multiple indices on empcode and hiredate fields of employee collection.

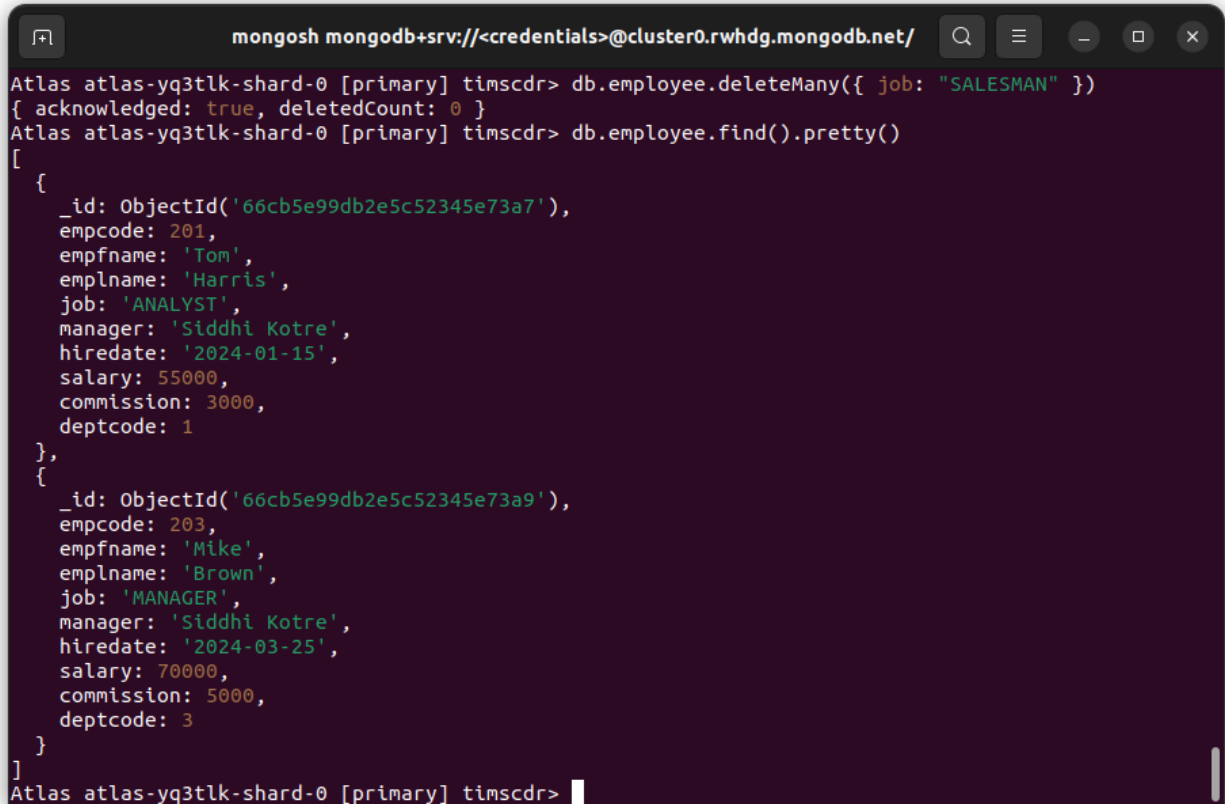
Output for 10&11:

```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.createIndex({ empcode: 1 })
empcode_1
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.createIndex({ empcode: 1 })
empcode_1
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.createIndex({ hiredate: 1 })
hiredate_1
Atlas atlas-yq3tlk-shard-0 [primary] timsedr>
```

12. Delete first record of employee collection where the job is SALESMAN.

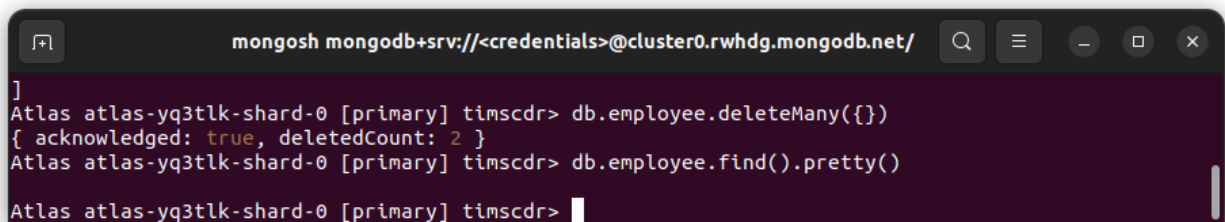
```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.deleteOne({ job: "SALESMAN" })
{ acknowledged: true, deletedCount: 1 }
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find().pretty()
[
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a7'),
    empcode: 201,
    empfname: 'Tom',
    emplname: 'Harris',
    job: 'ANALYST',
    manager: 'Siddhi Kotre',
    hiredate: '2024-01-15',
    salary: 55000,
    commission: 3000,
    deptcode: 1
  },
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a9'),
    empcode: 203,
    empfname: 'Mike',
    emplname: 'Brown',
    job: 'MANAGER',
    manager: 'Siddhi Kotre',
    hiredate: '2024-03-25',
    salary: 70000,
    commission: 5000,
    deptcode: 3
  }
]
Atlas atlas-yq3tlk-shard-0 [primary] timsedr>
```


13. Delete all the records of employee collection where the job is SALESMAN.



```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.deleteMany({ job: "SALESMAN" })
{ acknowledged: true, deletedCount: 0 }
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find().pretty()
[
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a7'),
    empcode: 201,
    empfname: 'Tom',
    emplname: 'Harris',
    job: 'ANALYST',
    manager: 'Siddhi Kotre',
    hiredate: '2024-01-15',
    salary: 55000,
    commission: 3000,
    deptcode: 1
  },
  {
    _id: ObjectId('66cb5e99db2e5c52345e73a9'),
    empcode: 203,
    empfname: 'Mike',
    emplname: 'Brown',
    job: 'MANAGER',
    manager: 'Siddhi Kotre',
    hiredate: '2024-03-25',
    salary: 70000,
    commission: 5000,
    deptcode: 3
  }
]
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> 
```

14. Delete all the records of employee collection



```
mongosh mongodb+srv://<credentials>@cluster0.rwhdg.mongodb.net/
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.deleteMany({})
{ acknowledged: true, deletedCount: 2 }
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> db.employee.find().pretty()
Atlas atlas-yq3tlk-shard-0 [primary] timsedr> 
```

Conclusion:

MongoDB aims to address the challenges of modern data management by providing a flexible, scalable, and high-performance database solution. Its design and features are geared towards supporting diverse data types, handling large volumes of data, and simplifying the development and operational aspects of database management.