Name:- Snigdha Sucharita Kar

RollNo: UG/02/BTCSEAIML/2023/075

RegNO: AU/2023/0010993

Section :'E'

Schema

{ emp_id, name, department, designation, city, salary, experience }

Initial Data

Emp ID	Name	Department	Designation	City	Salary	Experience
101	Amit	IT	Developer	Kolkata	60000	3
102	Neha	HR	HR Executive	Delhi	45000	2
103	Ravi	IT	Tester	Mumbai	50000	4
104	Pooja	Finance	Accountant	Chennai	55000	5
105	Karan	IT	Developer	Kolkata	65000	6
106	Sneha	HR	Manager	Delhi	70000	7
107	Arjun	Finance	Analyst	Mumbai	48000	2
108	Meera	IT	Developer	Bangalore	75000	8
109	Rohit	IT	Team Lead	Pune	90000	10
110	Anjali	HR	Recruiter	Kolkata	42000	1

```
test> use EmployeeDB_AIML075
switched to db EmployeeDB_AIML075
EmployeeDB_AIML075> db.createCollection("EmployeeList_AIML075")
{ ok: 1 }
EmployeeDB_AIML075> db.EmployeeList_AIML075.insertMany([{emp_id:101,name:"Amit",department:"IT",designation:"Developer",city:"Kolkata",salary:60000,experience:3},{emp_id:10
2,name:"Neha",department:"HR",designation:"HR Executive",city:"Delhi",salary:45000,experience:2},{emp_id:103,name:"Ravi",department:"IT",designation:"Tester",city:"Mumbai",
salary:50000,expexperience:4},{emp_id:104,name:"Pooja",department:"Finance",designation:"Accountant",city:"Chennai",salary:55000,experieexperience:5},{emp_id:105,name:"Kara
n",department:"IT",designation:"Developer",city:"Kolkata",salary:65000,experience:6},{emp_id:106,name:"Sneha",department:"HR",designation:"Manager",city:"Delhi",salary:7000
0,experience:7},{emp_id:107name:"Arjun",department:"Finance",designation:"Analyst",city:"Mumbai",salary:48000,experience:2},{emp_id:108,name:"Meera",department:"IT",designa
tion:"Developer",city:"Bangalore",salary:75000,experience:8},{emp_id:109,name:"Rohit",department:"IT",designation:"Team Lead",city:"Pune",salary:90000,experience:10},{emp_i
d:110,name:"Anjali",department:"HR",designation:"Recruiter",city:"Kolkata",salary:42000,experience:1}])
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('6992d717147b27b4c01e2621'),
    '1': ObjectId('6992d717147b27b4c01e2622'),
    '2': ObjectId('6992d717147b27b4c01e2623'),
    '3': ObjectId('6992d717147b27b4c01e2624'),
    '4': ObjectId('6992d717147b27b4c01e2625'),
    '5': ObjectId('6992d717147b27b4c01e2626'),
    '6': ObjectId('6992d717147b27b4c01e2627'),
    '7': ObjectId('6992d717147b27b4c01e2628'),
    '8': ObjectId('6992d717147b27b4c01e2629'),
    '9': ObjectId('6992d717147b27b4c01e262a')
  }
}
```

Lab Questions

Q1. Display all employee records.

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.find()
[
  {
    _id: ObjectId('6992d717147b27b4c01e2621'),
    emp_id: 101,
    name: 'Amit',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 60000,
    experience: 3
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2622'),
    emp_id: 102,
    name: 'Neha',
    department: 'HR',
    designation: 'HR Executive',
    city: 'Delhi',
    salary: 45000,
    experience: 2
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2623'),
    emp_id: 103,
    name: 'Ravi',
    department: 'IT',
    designation: 'Tester',
    city: 'Mumbai',
    salary: 50000,
    experience: 4
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2624'),
    emp_id: 104,
    name: 'Pooja',
    department: 'Finance',
    designation: 'Accountant',
    city: 'Chennai',
    salary: 55000,
    experience: 5
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2627'),
    emp_id: 107,
    name: 'Arjun',
    department: 'Finance',
    designation: 'Analyst',
    city: 'Mumbai',
    salary: 48000,
    experience: 2
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
```

```
},
{
    _id: ObjectId('6992d717147b27b4c01e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
},
{
    _id: ObjectId('6992d717147b27b4c01e262a'),
    emp_id: 110,
    name: 'Anjali',
    department: 'HR',
    designation: 'Recruiter',
    city: 'Kolkata',
    salary: 42000,
    experience: 1
}
]
```

Q2. Create an index on emp_id field.

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.createIndex({emp_id:1})
emp_id_1
```

Q3. Create an index on department field.

```
]
EmployeeDB_AIML075> db.EmployeeList_AIML075.createIndex({department:1})
department_1
```

Q4. Create a compound index on department and salary.

```
EmployeeDB_AIML075>
department_1_salary_1
```

Q5. Find employees working in IT department.

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.find({department:"IT"
[epartment_1_salary_1
{
    _id: ObjectId('6992d717147b27b4c01e2621'),
    emp_id: 101,
    name: 'Amit',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 60000,
    experience: 3
},
{
    _id: ObjectId('6992d717147b27b4c01e2623'),
    emp_id: 103,
    name: 'Ravi',
    department: 'IT',
    designation: 'Tester',
    city: 'Mumbai',
    salary: 50000,
    experience: 4
},
{
    _id: ObjectId('6992d717147b27b4c01e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
},
```

```
{
    _id: ObjectId('6992d717147b27b4c01e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
},
{
    _id: ObjectId('6992d717147b27b4c01e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
}
]
```

Q6. Display employees whose salary is greater than 60,000.

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.find({salary:{$gt:60000}})
[
    {
        _id: ObjectId('6992d717147b27b4c01e2625'),
        emp_id: 105,
        name: 'Karan',
        department: 'IT',
        designation: 'Developer',
        city: 'Kolkata',
        salary: 65000,
        experience: 6
    },
    {
        _id: ObjectId('6992d717147b27b4c01e2626'),
        emp_id: 106,
        name: 'Sneha',
        department: 'HR',
        designation: 'Manager',
        city: 'Delhi',
        salary: 70000,
        experience: 7
    },
    {
        _id: ObjectId('6992d717147b27b4c01e2628'),
        emp_id: 108,
        name: 'Meera',
        department: 'IT',
        designation: 'Developer',
        city: 'Bangalore',
        salary: 75000,
        experience: 8
    },
    {
        _id: ObjectId('6992d717147b27b4c01e2629'),
        emp_id: 109,
        name: 'Rohit',
        department: 'IT',
        designation: 'Team Lead',
        city: 'Pune',
        salary: 90000,
        experience: 10
    }
]
```

Q7. Sort employees by salary in descending order.

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.find().sort({salary:-1})
[
  {
    _id: ObjectId('6992d717147b27b4c01e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
```

```
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2621'),
    emp_id: 101,
    name: 'Amit',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 60000,
    experience: 3
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2624'),
    emp_id: 104,
    name: 'Pooja',
    department: 'Finance',
    designation: 'Accountant',
    city: 'Chennai',
    salary: 55000,
    experience: 5
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2623'),
    emp_id: 103,
    name: 'Ravi',
    department: 'IT',
    designation: 'Tester',
    city: 'Mumbai',
    salary: 50000,
    experience: 4
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2627'),
    emp_id: 107,
    name: 'Arjun',
    department: 'Finance',
    designation: 'Analyst',
    city: 'Mumbai',
    salary: 48000,
    experience: 2
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2622'),
    emp_id: 102,
    name: 'Neha',
    department: 'HR',
    designation: 'HR Executive',
    city: 'Delhi',
    salary: 45000,
    experience: 2
  },
  {
    _id: ObjectId('6992d717147b27b4c01e262a'),
    emp_id: 110,
    name: 'Anjali',
    department: 'HR',
    designation: 'Recruiter',
    city: 'Kolkata',
    salary: 42000,
    experience: 1
  }
]
```

Q8. Display top 3 highest paid employees.

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.find().sort({salary:-1}).limit(3)
[
  {
    _id: ObjectId('6992d717147b27b4c01e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  }
]
```

Q9. Display employees having experience more than 5 years.

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.find({experience:{$gt:5}})
[
  {
    _id: ObjectId('6992d717147b27b4c01e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6992d717147b27b4c01e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
  }
]
```

Q10. Analyze query performance using explain().

```
EmployeeDB_AIML075> db.EmployeeList_AIML075.find({department:"IT"}).explain("executionStats")
{
  explainVersion: '1',
  queryPlanner: {
    namespace: 'EmployeeDB_AIML075.EmployeeList_AIML075',
    parsedQuery: { department: { '$eq': 'IT' } },
    indexFilterSet: false,
    queryHash: 'EB9C5E66',
    planCacheShapeHash: 'EB9C5E66',
    planCacheKey: '25CB5D62',
    optimizationTimeMillis: 13,
    maxIndexedOrSolutionsReached: false,
    maxIndexedAndSolutionsReached: false,
    maxScansToExplodeReached: false,
    prunedSimilarIndexes: false,
    winningPlan: {
      isCached: false,
      stage: 'FETCH',
      inputStage: {
        stage: 'IXSCAN',
        keyPattern: { department: 1 },
        indexName: 'department_1',
        isMultiKey: false,
        multiKeyPaths: { department: [] },
        isUnique: false,
        isSparse: false,
        isPartial: false,
        indexVersion: 2,
        direction: 'forward',
        indexBounds: { department: [ '["IT", "IT"]' ] }
      }
    },
```

```
    rejectedPlans: [
      {
        isCached: false,
        stage: 'FETCH',
        inputStage: {
          stage: 'IXSCAN',
          keyPattern: { department: 1, salary: 1 },
          indexName: 'department_1_salary_1',
          isMultiKey: false,
          multiKeyPaths: { department: [], salary: [] },
          isUnique: false,
          isSparse: false,
          isPartial: false,
          indexVersion: 2,
          direction: 'forward',
          indexBounds: {
            department: [ '["IT", "IT"]' ],
            salary: [ '[MinKey, MaxKey]' ]
          }
        }
      }
    ]
  },
  executionStats: {
    executionSuccess: true,
    nReturned: 5,
    executionTimeMillis: 81,
    totalKeysExamined: 5,
    totalDocsExamined: 5,
    executionStages: {
      isCached: false,
      stage: 'FETCH',
      nReturned: 5,
      executionTimeMillisEstimate: 0,
      works: 7,
      advanced: 5,
      needTime: 0,
      needYield: 0,
      saveState: 0,
      restoreState: 0,
      isEOF: 1,
```

```
      docsExamined: 5,
      alreadyHasObj: 0,
      inputStage: {
        stage: 'IXSCAN',
        nReturned: 5,
        executionTimeMillisEstimate: 0,
        works: 6,
        advanced: 5,
        needTime: 0,
        needYield: 0,
        saveState: 0,
        restoreState: 0,
        isEOF: 1,
        keyPattern: { department: 1 },
        indexName: 'department_1',
        isMultiKey: false,
        multiKeyPaths: { department: [] },
        isUnique: false,
        isSparse: false,
        isPartial: false,
        indexVersion: 2,
        direction: 'forward',
        indexBounds: { department: [ '["IT", "IT"]' ] },
        keysExamined: 5,
        seeks: 1,
        dupsTested: 0,
        dupsDropped: 0
      }
    }
  },
  queryShapeHash: '1CE4BFA612EB579363D6C624E154F726CEF419951D1780613A25FB935559FBAC',
  command: {
    find: 'EmployeeList_AIML075',
    filter: { department: 'IT' },
    '$db': 'EmployeeDB_AIML075'
  },
  serverInfo: {
    host: 'DESKTOP-GALP49E',
    port: 27017,
    version: '8.2.3',
    gitVersion: '36f41c9c30a2f13f834d033ba03c3463c891fb01'
  },
  serverParameters: {
    internalQueryFacetBufferSizeBytes: 104857600,
    internalQueryFacetMaxOutputDocSizeBytes: 104857600,
    internalLookupStageIntermediateDocumentMaxSizeBytes: 104857600,
    internalDocumentSourceGroupMaxMemoryBytes: 104857600,
    internalQueryMaxBlockingSortMemoryUsageBytes: 104857600,
    internalQueryProhibitBlockingMergeOnMongoS: 0,
    internalQueryMaxAddToSetBytes: 104857600,
    internalDocumentSourceSetWindowFieldsMaxMemoryBytes: 104857600,
    internalQueryFrameworkControl: 'trySbeRestricted',
    internalQueryPlannerIgnoreIndexWithCollationForRegex: 1
  },
  ok: 1
}
```

MONGODB COMPASS

MongoDB Compass - localhost:27017/EmployeeDB_AIML075.EmployeeList_AIML075

Connections   Edit   View   Collection   Help

Compass
{} My Queries
Data Modeling

CONNECTIONS (1)

Search connections

localhost:27017
    EmployeeDB_AIML075
        EmployeeList_AIML075
    admin
    collegeDB
    collegeDB_AIML075
    college_AIML075
    config
    local
    test

EmployeeList_AIML075 +

localhost:27017 > EmployeeDB_AIML075 > EmployeeList_AIML075

Documents 10   Aggregations   Schema   Indexes 4   Validation

Type a query: { field: 'value' } or Generate query   Explain   Reset   Find   Options ▸

25 ▾   1 – 10 of 10

```
_id: ObjectId('6992d717147b27b4c01e2621')
emp_id : 101
name : "Amit"
department : "IT"
designation : "Developer"
city : "Kolkata"
salary : 60000
experience : 3

_id: ObjectId('6992d717147b27b4c01e2622')
emp_id : 102
name : "Neha"
department : "HR"
designation : "HR Executive"
city : "Delhi"
salary : 45000
experience : 2

_id: ObjectId('6992d717147b27b4c01e2623')
emp_id : 103
```


MongoDB Compass - localhost:27017/EmployeeDB_AIML075.EmployeeList_AIML075

Connections   Edit   View   Collection   Help

Compass
{} My Queries
Data Modeling

CONNECTIONS (1)

Search connections

localhost:27017
    EmployeeDB_AIML075
        EmployeeList_AIML075
    admin
    collegeDB
    collegeDB_AIML075
    college_AIML075
    config
    local
    test

EmployeeList_AIML075 +

localhost:27017 > EmployeeDB_AIML075 > EmployeeList_AIML075

Documents 10   Aggregations   Schema   Indexes 4   Validation

Type a query: { field: 'value' } or Generate query   Explain   Reset   Find   Options ▸

25 ▾   1 – 10 of 10

```
salary : 50000
experience : 4

_id: ObjectId('6992d717147b27b4c01e2624')
emp_id : 104
name : "Pooja"
department : "Finance"
designation : "Accountant"
city : "Chennai"
salary : 55000
experience : 5

_id: ObjectId('6992d717147b27b4c01e2625')
emp_id : 105
name : "Karan"
department : "IT"
designation : "Developer"
city : "Kolkata"
salary : 65000
experience : 6
```