LAB ASSIGNMENT – 5

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```
test> use companyDB
switched to db companyDB
companyDB> db.employees.insertMany([
...    { emp_id: 101, name: "Amit", department: "IT", designation: "Developer", city: "Kolkata", salary: 60000, experience: 3 },
...    { emp_id: 102, name: "Neha", department: "HR", designation: "HR Executive", city: "Delhi", salary: 45000, experienceexperience: 2 },
...    { emp_id: 103, name: "Ravi", department: "IT", designation: "Tester", city: "Mumbai", salary: 50000, experience: 4 },
...    { emp_id: 104, name: "Pooja", department: "Finance", designation: "Accountant", city: "Chennai", salary: 55000, expexperience: 5 },
...    { emp_id: 105, name: "Karan", department: "IT", designation: "Developer", city: "Kolkata", salary: 65000, experiencexperience: 6 },
...    { emp_id: 106, name: "Sneha", department: "HR", designation: "Manager", city: "Delhi", salary: 70000, experience: 7 },
...    { emp_id: 107, name: "Arjun", department: "Finance", designation: "Analyst", city: "Mumbai", salary: 48000, experieexperience: 2 },
...    { emp_id: 108, name: "Meera", department: "IT", designation: "Developer", city: "Bangalore", salary: 75000, experieexperience: 8 },
...    { emp_id: 109, name: "Rohit", department: "IT", designation: "Team Lead", city: "Pune", salary: 90000, experience: 10 },
...    { emp_id: 110, name: "Anjali", department: "HR", designation: "Recruiter", city: "Kolkata", salary: 42000, experienexperience: 1 }
... ])
...
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('69933cefbf993df0db1e2621'),
    '1': ObjectId('69933cefbf993df0db1e2622'),
    '2': ObjectId('69933cefbf993df0db1e2623'),
    '3': ObjectId('69933cefbf993df0db1e2624'),
    '4': ObjectId('69933cefbf993df0db1e2625'),
    '5': ObjectId('69933cefbf993df0db1e2626'),
    '6': ObjectId('69933cefbf993df0db1e2627'),
    '7': ObjectId('69933cefbf993df0db1e2628'),
    '8': ObjectId('69933cefbf993df0db1e2629'),
    '9': ObjectId('69933cefbf993df0db1e262a')
  }
}
companyDB> db.employees.find().pretty()
[
  {
    _id: ObjectId('69933cefbf993df0db1e2621'),
    emp_id: 101,
    name: 'Amit',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 60000,
    experience: 3
  },
```

LAB QUESTIONS:

Q1. Display all employee records.

```
}
companyDB> db.employees.find()
[
  {
    _id: ObjectId('6994161ce0dbda7a881e2621'),
    emp_id: 101,
    name: 'Amit',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 60000,
    experience: 3
  },
  {
    _id: ObjectId('6994161ce0dbda7a881e2622'),
    emp_id: 102,
    name: 'Neha',
    department: 'HR',
    designation: 'HR Executive',
    city: 'Delhi',
    salary: 45000,
    experience: 2
  },
  {
    _id: ObjectId('6994161ce0dbda7a881e2623'),
    emp_id: 103,
    name: 'Ravi',
    department: 'IT',
    designation: 'Tester',
    city: 'Mumbai',
    salary: 50000,
    experience: 4
  },
  {
    _id: ObjectId('6994161ce0dbda7a881e2624'),
    emp_id: 104,
    name: 'Pooja',
    department: 'Finance',
    designation: 'Accountant',
    city: 'Chennai',
    salary: 55000,
    experience: 5
  },
    _id: ObjectId('6994161ce0dbda7a881e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
  {
    _id: ObjectId('6994161ce0dbda7a881e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  },
  {
    _id: ObjectId('6994161ce0dbda7a881e2627'),
    emp_id: 107,
    name: 'Arjun',
    department: 'Finance',
    designation: 'Analyst',
    city: 'Mumbai',
    salary: 48000,
    experience: 2
  },
  {
    _id: ObjectId('6994161ce0dbda7a881e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6994161ce0dbda7a981e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
```

```
  _id: ObjectId('6994161ce0dbda7a081e262a'),
  emp_id: 110,
  name: 'Anjali',
  department: 'HR',
  designation: 'Recruiter',
  city: 'Kolkata',
  salary: 42000,
  experience: 1
}
```

Q2. Create an index on emp_id field.

```
companyDB> db.employees.createIndex({ emp_id: 1 })
emp_id_1
```

Q3. Create an index on department field.

```
companyDB> db.employees.createIndex({ department: 1 })
department_1
```

Q4. Create a compound index on department and salary.

```
companyDB> db.employees.createIndex({ department: 1, salary: 1 })
department_1_salary_1
```

Q5. Find employees working in IT department.

```
companyDB> db.employees.find({ department: "IT" })
[
  {
    _id: ObjectId('6994161ce0dbda7a081e2621'),
    emp_id: 101,
    name: 'Amit',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 60000,
    experience: 3
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2623'),
    emp_id: 103,
    name: 'Ravi',
    department: 'IT',
    designation: 'Tester',
    city: 'Mumbai',
    salary: 50000,
    experience: 4
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
```

```
{
  _id: ObjectId('6994161ce0dbda7a081e2629'),
  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.

```
companyDB> db.employees.find({ salary: { $gt: 60000 } })
[
  {
    _id: ObjectId('6994161ce0dbda7a081e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
  }
```

Q7. Sort employees by salary in descending order.

```
companyDB> db.employees.find().sort({ salary: -1 })
[
  {
    _id: ObjectId('6994161ce0dbda7a081e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
```

```
    _id: ObjectId('6994161ce0dbda7a081e2621'),
    emp_id: 101,
    name: 'Amit',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 60000,
    experience: 3
  },
    _id: ObjectId('6994161ce0dbda7a081e2624'),
    emp_id: 104,
    name: 'Pooja',
    department: 'Finance',
    designation: 'Accountant',
    city: 'Chennai',
    salary: 55000,
    experience: 5
  },
    _id: ObjectId('6994161ce0dbda7a081e2623'),
    emp_id: 103,
    name: 'Ravi',
    department: 'IT',
    designation: 'Tester',
    city: 'Mumbai',
    salary: 50000,
    experience: 4
  },
    _id: ObjectId('6994161ce0dbda7a081e2627'),
    emp_id: 107,
    name: 'Arjun',
    department: 'Finance',
    designation: 'Analyst',
    city: 'Mumbai',
    salary: 48000,
    experience: 2
  },
```

```
{
  _id: ObjectId('6994161ce0dbda7a081e2622'),
  emp_id: 102,
  name: 'Neha',
  department: 'HR',
  designation: 'HR Executive',
  city: 'Delhi',
  salary: 45000,
  experience: 2
},
{
  _id: ObjectId('6994161ce0dbda7a081e262a'),
  emp_id: 110,
  name: 'Anjali',
  department: 'HR',
  designation: 'Recruiter',
  city: 'Kolkata',
  salary: 42000,
  experience: 1
}
```

Q8. Display top 3 highest paid employees.

```
companyDB> db.employees.find().sort({ salary: -1 }).limit(3)
[
  {
    _id: ObjectId('6994161ce0dbda7a081e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6994161ce0dbda7a081e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  }
]
```

Q9. Display employees having experience more than 5 years.

```
companyDB> db.employees.find({ experience: { $gt: 5 } })
[
  {
    _id: ObjectId('6994161ce8dbda7a081e2625'),
    emp_id: 105,
    name: 'Karan',
    department: 'IT',
    designation: 'Developer',
    city: 'Kolkata',
    salary: 65000,
    experience: 6
  },
  {
    _id: ObjectId('6994161ce8dbda7a081e2626'),
    emp_id: 106,
    name: 'Sneha',
    department: 'HR',
    designation: 'Manager',
    city: 'Delhi',
    salary: 70000,
    experience: 7
  },
  {
    _id: ObjectId('6994161ce8dbda7a081e2628'),
    emp_id: 108,
    name: 'Meera',
    department: 'IT',
    designation: 'Developer',
    city: 'Bangalore',
    salary: 75000,
    experience: 8
  },
  {
    _id: ObjectId('6994161ce8dbda7a081e2629'),
    emp_id: 109,
    name: 'Rohit',
    department: 'IT',
    designation: 'Team Lead',
    city: 'Pune',
    salary: 90000,
    experience: 10
  }
]
```

Q10. Analyze query performance using explain().

```
companyDB> db.employees.find({ department: "IT" }).explain("executionStats")
{
  explainVersion: '1',
  queryPlanner: {
    namespace: 'companyDB.employees',
    parsedQuery: { department: { '$eq': 'IT' } },
    indexFilterSet: false,
    queryHash: 'EB9C5E66',
    planCacheShapeHash: 'EB9C5E66',
    planCacheKey: '25CB5D62',
    optimizationTimeMillis: 0,
    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: 0,
    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: 'FE21473C47D6B0791D414DDA8B6DD21E41AEC879B948CAB3BB7409CAE4290E3D',
  command: {
    find: 'employees',
    filter: { department: 'IT' },
    '$db': 'companyDB'
  },
  serverInfo: {
    host: 'LAPTOP-QP45PJS4',
    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
}
companyDB>
```