

1. AND, OR, LIMIT, SORT in MongoDB

◆ A. AND Operator

Returns documents that match all conditions.

javascript

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```
db.students.find({ age: { $gt: 20 }, course: "MCA" })
```

Alternative using \$and:

javascript

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```
db.students.find({  
  $and: [  
    { age: { $gt: 20 } },  
    { course: "MCA" }  
  ]  
})
```

◆ B. OR Operator

Returns documents that match any condition.

javascript

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```
db.students.find({  
  $or: [  
    { age: { $lt: 21 } },  
    { course: "BCA" }  
  ]  
})
```

◆ C. LIMIT Records

Limits the number of documents returned.

javascript

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```
db.students.find().limit(2)
```

◆ D. SORT Records

Sort documents in ascending (1) or descending (-1) order.

javascript

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```
// Sort by age in ascending order
```

```
db.students.find().sort({ age: 1 })
```

```
// Sort by marks in descending order
```

```
db.students.find().sort({ marks: -1 })
```

✓ 2. Indexing, Advanced Indexing, Aggregation, Map-Reduce

◆ A. Indexing

Create an index on the name field:

javascript

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```
db.students.createIndex({ name: 1 })
```

◆ B. Advanced Indexing (Compound Index)

Create an index on multiple fields:

javascript

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```
db.students.createIndex({ course: 1, age: -1 })
```

View all indexes:

javascript

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```
db.students.getIndexes()
```

Drop an index:

javascript

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```
db.students.dropIndex({ name: 1 })
```

◆ C. Aggregation Framework

Example: Group students by course and calculate average marks.

javascript

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```
db.students.aggregate([
  { $group: { _id: "$course", avgMarks: { $avg: "$marks" } } }
])
```

◆ D. Map-Reduce Example

Count number of students in each course:

javascript

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```
var mapFunction = function() {
  emit(this.course, 1);
};

var reduceFunction = function(key, values) {
  return Array.sum(values);
};

db.students.mapReduce(mapFunction, reduceFunction, { out: "course_counts" })

// View results
db.course_counts.find()
```

✓ 3. Arithmetic Operations Program in MongoDB

You can use aggregation operators like \$add, \$subtract, \$multiply, \$divide, and \$mod.

Example:

javascript

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```
db.students.insertOne({  
  name: "Sumit",  
  marks1: 75,  
  marks2: 85  
})
```

// Perform all arithmetic operations

```
db.students.aggregate([  
  {  
    $project: {  
      name: 1,  
      total: { $add: ["$marks1", "$marks2"] },  
      difference: { $subtract: ["$marks2", "$marks1"] },  
      product: { $multiply: ["$marks1", "$marks2"] },  
      average: { $divide: [ { $add: ["$marks1", "$marks2"] }, 2 ] },  
      mod: { $mod: ["$marks2", "$marks1"] }  
    }  
  }  
])
```