# MongoDB Installation. Create and manage NoSQL Databases with MongoDB

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**Problem Statement 1:**

1. Create database: product
2. Create collection: inventory
3. Perform following operations on created collections:
   a. Insert documents (one and many).

```
> db.inventory.insertOne({
    item: "apple",
    status: "A",
    qty: 20
  })
< {
    acknowledged: true,
    insertedId: ObjectId('67342e2dcf347316856e6ba3')
  }
```

```
> db.inventory.insertMany([
    { item: "banana", status: "A", qty: 15 },
    { item: "cherry", status: "B", qty: 25 },
    { item: "date", status: "D", qty: 10 }
  ])
< {
    acknowledged: true,
    insertedIds: {
      '0': ObjectId('67342d9fcf347316856e6ba0'),
      '1': ObjectId('67342d9fcf347316856e6ba1'),
      '2': ObjectId('67342d9fcf347316856e6ba2')
    }
  }
```

   b. Update documents (one and many).

```
> db.inventory.updateOne(
    { item: "apple" },
    { $set: { qty: 30 } }
  )
< {
    acknowledged: true,
    insertedId: null,
    matchedCount: 0,
    modifiedCount: 0,
    upsertedCount: 0
  }
```

```
> db.inventory.updateMany(
    { status: "B" },
    { $set: { status: "A" } }
  )
< {
    acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0
  }
```

c. Replace documents (one and many).

```
> db.inventory.replaceOne(
    { item: "apple" },
    { item: "apple", status: "A", qty: 50 }
  )
< {
    acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0
  }
```

```
> db.inventory.updateMany(
    { status: "D" },
    { $set: { status: "A", qty: 40 } }
  )
< {
    acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0
  }
```

d. Delete documents (one and many).

```
> db.inventory.deleteOne({ item: "apple" })
< {
    acknowledged: true,
    deletedCount: 1
  }
```

e. Find documents.

```
> db.inventory.find({ status: "A" })
< {
    _id: ObjectId('67342d9fcf347316856e6ba0'),
    item: 'banana',
    status: 'A',
    qty: 15
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba1'),
    item: 'cherry',
    status: 'A',
    qty: 25
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba2'),
    item: 'date',
    status: 'A',
    qty: 40
  }
```

4. Use a filter to find documents in the database. Perform following queries in filter on inventory collection.

a. `SELECT * FROM inventory;`

```
> db.inventory.find()
< {
    _id: ObjectId('67342d9fcf347316856e6ba0'),
    item: 'banana',
    status: 'A',
    qty: 15
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba1'),
    item: 'cherry',
    status: 'A',
    qty: 25
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba2'),
    item: 'date',
    status: 'A',
    qty: 40
  }
```

b. `SELECT * FROM inventory WHERE status = "D"`

```
> db.inventory.find({ status: "D" })
<
```

c. `SELECT * FROM inventory WHERE status in ("A", "D")`

```
> db.inventory.find({ status: { $in: ["A", "D"] } })
< {
    _id: ObjectId('67342d9fcf347316856e6ba0'),
    item: 'banana',
    status: 'A',
    qty: 15
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba1'),
    item: 'cherry',
    status: 'A',
    qty: 25
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba2'),
    item: 'date',
    status: 'A',
    qty: 40
  }
> db.inventory.find({
    $and: [
      { status: "A" },
      { qty: { $lt: 30 } }
    ]
  })
```

d. `SELECT * FROM inventory WHERE status = "A" AND qty < 30`

```
> db.inventory.find({
    $and: [
      { status: "A" },
      { qty: { $lt: 30 } }
    ]
  })
< {
    _id: ObjectId('67342d9fcf347316856e6ba0'),
    item: 'banana',
    status: 'A',
    qty: 15
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba1'),
    item: 'cherry',
    status: 'A',
    qty: 25
  }
```

e. `SELECT * FROM inventory WHERE status = "A" OR qty < 30`

```
> db.inventory.find({
    $or: [
      { status: "A" },
      { qty: { $lt: 30 } }
    ]
  })
< {
    _id: ObjectId('67342d9fcf347316856e6ba0'),
    item: 'banana',
    status: 'A',
    qty: 15
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba1'),
    item: 'cherry',
    status: 'A',
    qty: 25
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba2'),
    item: 'date',
    status: 'A',
    qty: 40
  }
```

f. `SELECT * FROM inventory WHERE status = "A" AND (qty < 30OR item LIKE "p%")`

```
> db.inventory.find({
    $and: [
      { status: "A" },
      { $or: [
        { qty: { $lt: 30 } },
        { item: { $regex: "^p", $options: "i" } }  // case-insensitive regex for "p%"
      ]}
    ]
  })
< {
    _id: ObjectId('67342d9fcf347316856e6ba0'),
    item: 'banana',
    status: 'A',
    qty: 15
  }
  {
    _id: ObjectId('67342d9fcf347316856e6ba1'),
    item: 'cherry',
    status: 'A',
    qty: 25
  }
```

## Problem Statement 2:

1. Create collection: books under product database

```
> db.createCollection("books")
< { ok: 1 }
```

2. Insert the following documents into a books collection:

   { "title": "1984", "author": "George Orwell", "year": 1949, "genre": "Dystopian" }

   { "title": "To Kill a Mockingbird", "author": "Harper Lee", "year": 1960, "genre": "Fiction" }

   { "title": "The Great Gatsby", "author": "F. Scott Fitzgerald", "year": 1925, "genre": "Fiction" }

   { "title": "Brave New World", "author": "Aldous Huxley", "year": 1932, "genre": "Dystopian" }

   Add more such documents.

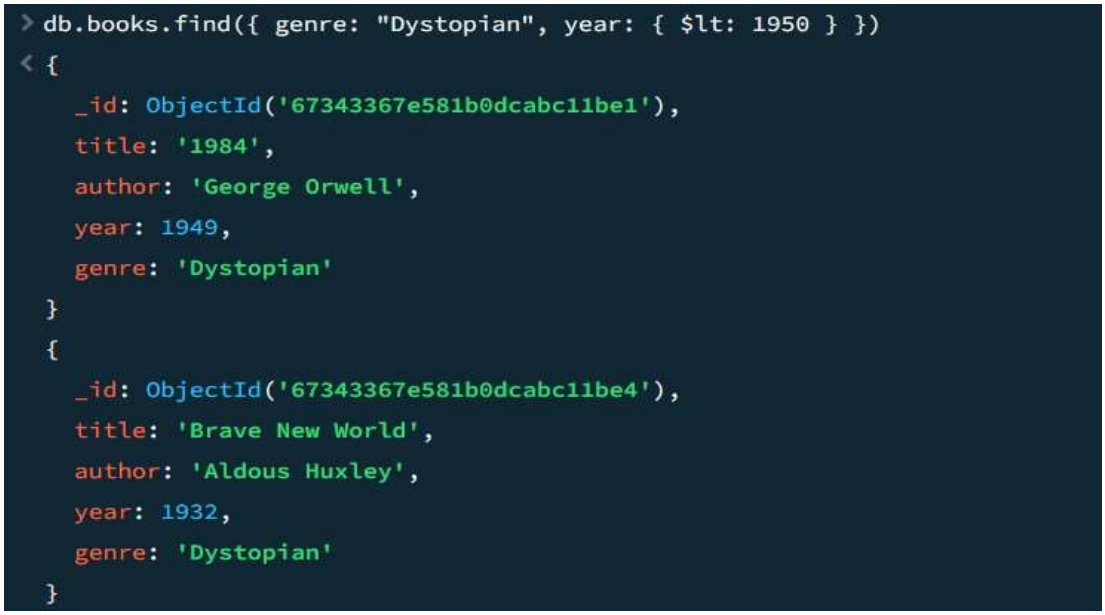
```
> db.books.insertMany([
    { "title": "1984", "author": "George Orwell", "year": 1949, "genre": "Dystopian" },
    { "title": "To Kill a Mockingbird", "author": "Harper Lee", "year": 1960, "genre": "Fiction" },
    { "title": "The Great Gatsby", "author": "F. Scott Fitzgerald", "year": 1925, "genre": "Fiction" },
    { "title": "Brave New World", "author": "Aldous Huxley", "year": 1932, "genre": "Dystopian" },
    { "title": "Fahrenheit 451", "author": "Ray Bradbury", "year": 1953, "genre": "Dystopian" },
    { "title": "Catch-22", "author": "Joseph Heller", "year": 1961, "genre": "Fiction" },
    { "title": "The Catcher in the Rye", "author": "J.D. Salinger", "year": 1951, "genre": "Fiction" }
  ])
< {
    acknowledged: true,
    insertedIds: {
      '0': ObjectId('67343367e581b0dcabc11be1'),
      '1': ObjectId('67343367e581b0dcabc11be2'),
      '2': ObjectId('67343367e581b0dcabc11be3'),
      '3': ObjectId('67343367e581b0dcabc11be4'),
      '4': ObjectId('67343367e581b0dcabc11be5'),
      '5': ObjectId('67343367e581b0dcabc11be6'),
      '6': ObjectId('67343367e581b0dcabc11be7')
    }
  }
```

3. Find all books published after year 1950.

```
> db.books.find({ year: { $gt: 1950 } })
< {
    _id: ObjectId('67343367e581b0dcabc11be2'),
    title: 'To Kill a Mockingbird',
    author: 'Harper Lee',
    year: 1960,
    genre: 'Fiction'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be5'),
    title: 'Fahrenheit 451',
    author: 'Ray Bradbury',
    year: 1953,
    genre: 'Dystopian'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be6'),
    title: 'Catch-22',
    author: 'Joseph Heller',
    year: 1961,
    genre: 'Fiction'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be7'),
    title: 'The Catcher in the Rye',
    author: 'J.D. Salinger',
    year: 1951,
    genre: 'Fiction'
  }
```

the

4. Find all Dystopian books published before 1950.



```
> db.books.find({ genre: "Dystopian", year: { $lt: 1950 } })
< {
    _id: ObjectId('67343367e581b0dcabc11be1'),
    title: '1984',
    author: 'George Orwell',
    year: 1949,
    genre: 'Dystopian'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be4'),
    title: 'Brave New World',
    author: 'Aldous Huxley',
    year: 1932,
    genre: 'Dystopian'
  }
```

5. Update the genre of "1984" to "Science Fiction".

```
> db.books.updateOne(
    { title: "1984" },
    { $set: { genre: "Science Fiction" } }
  )
< {
    acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 1,
    upsertedCount: 0
  }
```

6. Delete all books in the "Fiction" genre.

```
> db.books.deleteMany({ genre: "Fiction" })
< {
    acknowledged: true,
    deletedCount: 4
  }
```

7. Calculate the total number of books for each genre.

```
> db.books.aggregate([
    { $group: { _id: "$genre", count: { $sum: 1 } } }
  ])
< {
    _id: 'Dystopian',
    count: 2
  }
  {
    _id: 'Science Fiction',
    count: 1
  }
```

8. Create an index on the author field to improve query performance.

```
> db.books.createIndex({ author: 1 })
< author_1
```

9. Retrieve all books sorted by year in ascending order.

```
> db.books.find().sort({ year: 1 })
< {
    _id: ObjectId('67343367e581b0dcabc11be4'),
    title: 'Brave New World',
    author: 'Aldous Huxley',
    year: 1932,
    genre: 'Dystopian'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be1'),
    title: '1984',
    author: 'George Orwell',
    year: 1949,
    genre: 'Science Fiction'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be5'),
    title: 'Fahrenheit 451',
    author: 'Ray Bradbury',
    year: 1953,
    genre: 'Dystopian'
  }
```

10. Count the number of books written by "Harper Lee".

```
> db.books.countDocuments({ author: "Harper Lee" })
< 0
```

11. Retrieve only the titles and authors of all books.

```
> db.books.find({}, { title: 1, author: 1 })
< {
    _id: ObjectId('67343367e581b0dcabc11be1'),
    title: '1984',
    author: 'George Orwell'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be4'),
    title: 'Brave New World',
    author: 'Aldous Huxley'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be5'),
    title: 'Fahrenheit 451',
    author: 'Ray Bradbury'
  }
```

12. Use filter to find documents in database. Perform following queries in filter on inventory collection.
    a. Find books published between 1930 and 1960.

```
> db.books.find({ year: { $gte: 1930, $lte: 1960 } })
< {
    _id: ObjectId('67343367e581b0dcabc11be1'),
    title: '1984',
    author: 'George Orwell',
    year: 1949,
    genre: 'Science Fiction'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be4'),
    title: 'Brave New World',
    author: 'Aldous Huxley',
    year: 1932,
    genre: 'Dystopian'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be5'),
    title: 'Fahrenheit 451',
    author: 'Ray Bradbury',
    year: 1953,
    genre: 'Dystopian'
  }
```

b. Find books with titles containing the word "The".

```
> db.books.find({ title: { $regex: "The", $options: "i" } })
<
```

c. Find all books published before 1950 and in the Fiction genre.

```
> db.books.find({ year: { $lt: 1950 }, genre: "Fiction" })
<
```

d. Find all books not written by Aldous Huxley

```
> db.books.find({ author: { $ne: "Aldous Huxley" } })
< {
    _id: ObjectId('67343367e581b0dcabc11be1'),
    title: '1984',
    author: 'George Orwell',
    year: 1949,
    genre: 'Science Fiction'
  }
  {
    _id: ObjectId('67343367e581b0dcabc11be5'),
    title: 'Fahrenheit 451',
    author: 'Ray Bradbury',
    year: 1953,
    genre: 'Dystopian'
  }
```