Experiment No. 3: MongoDB CRUD Operations on Library Collection

Aim: To perform MongoDB Queries using CRUD operations (Create, Read, Update, Delete) and logical operators.

Objective: To understand and execute basic CRUD operations and logical queries in MongoDB.

Theory: MongoDB is a NoSQL, document-oriented database that stores data in JSON-like documents. It provides high performance, scalability, and flexibility. CRUD operations form the core of MongoDB functionality: Create, Read, Update, and Delete.

Code with Comments:

```
// ---------------- CREATE OPERATIONS ----------------

// Create a new collection named 'library'
db.createCollection("library")

// Insert one document
db.library.insertOne({ "bid": 1, "name": "C++" })

// Insert more documents
db.library.insertOne({ "bid": 2, "name": "Python" })
db.library.insertOne({ "bid": 3, "name": "Java" })

// Insert multiple documents at once
db.library.insertMany([
  { "bid": 4, "name": "MongoDB" },
  { "bid": 5, "name": "Data Structures" }
])


// ---------------- READ OPERATIONS ----------------

// Display all documents from library collection
db.library.find().pretty()

// Find a specific book by name
db.library.find({ name: "Python" }).pretty()

// Find all books where bid > 2
db.library.find({ bid: { $gt: 2 } }).pretty()

// Display books in ascending order by name
db.library.find().sort({ name: 1 }).pretty()

// Display only the first 3 documents
db.library.find().limit(3).pretty()


// ---------------- UPDATE OPERATIONS ----------------

// Update one book's name from 'C++' to 'Advanced C++ Programming'
db.library.updateOne(
  { name: "C++" },
  { $set: { name: "Advanced C++ Programming" } }
)

// Update multiple documents where bid < 4 and add a new field 'category'
db.library.updateMany(
  { bid: { $lt: 4 } },
  { $set: { category: "Programming" } }
)

// Using save() method to replace or insert document
db.library.save({
```

```
  _id: ObjectId("PUT_EXISTING_OBJECT_ID_HERE"),
  bid: 6,
  name: "Database Systems"
})


// ---------------- DELETE OPERATIONS ----------------

// Delete one document (book named 'Java')
db.library.deleteOne({ name: "Java" })

// Delete multiple documents where bid >= 5
db.library.deleteMany({ bid: { $gte: 5 } })

// Delete all documents (use with caution!)
db.library.deleteMany({})


// ---------------- LOGICAL OPERATORS ----------------

// OR operator: find books named 'Python' or 'Java'
db.library.find({
  $or: [{ name: "Python" }, { name: "Java" }]
}).pretty()

// AND condition: find books with bid > 1 AND name = 'Python'
db.library.find({
  bid: { $gt: 1 },
  name: "Python"
}).pretty()
```

Output: All CRUD operations executed successfully on the 'library' collection. The documents were inserted, retrieved, updated, and deleted as expected.

Conclusion: Thus, we have successfully performed and verified MongoDB CRUD operations (Create, Read, Update, Delete) using MongoDB shell commands.