LAB NO 9

INTRODUCTION TO NOSQL : MONGODB

OBJECTIVE:

- To understand NoSQl.
- To get familiar with MongoDB and its terminologies
- To apply CRUD operations in MongoDB.

LAB TASKS:

1. Create a database with the name bookstore and create multiple collections. For instance: Books, authors etc.

```
test> use bookstore  // Switches to or creates the database
...
... db.createCollection("books")      // Create books collection
... db.createCollection("authors")    // Create authors collection
...
switched to db bookstore
bookstore>
```

2. Insert few records in both collections with different fields.

```
bookstore> db.books.insertMany([
...     {
...         title: "Peer-e-Kamil",
...         author: "Umera Ahmed",
...         rating: 5,
...         genre: "Spiritual Fiction"
...     },
...     {
...         title: "A Thousand Splendid Suns",
...         author: "Khaled Hosseini",
...         rating: 4.5,
...         genre: "Drama"
...     },
...     {
...         title: "Namal",
...         author: "Nimra Ahmed",
...         rating: 5,
...         genre: "Thriller"
...     },
...     {
...         title: "Humsafar",
...         author: "Farhat Ishtiaq",
...         rating: 4.8,
...         genre: "Romantic Fiction"
...     }
... ])
...
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('6841596b7c3957b84c50eb67'),
    '1': ObjectId('6841596b7c3957b84c50eb68'),
    '2': ObjectId('6841596b7c3957b84c50eb69'),
    '3': ObjectId('6841596b7c3957b84c50eb6a')
  }
}
bookstore>
```

```
bookstore> db.authors.insertMany([
...    {
...        name: "Umera Ahmed",
...        nationality: "Pakistani",
...        birthYear: 1976
...    },
...    {
...        name: "Nimra Ahmed",
...        nationality: "Pakistani",
...        birthYear: 1980
...    },
...    {
...        name: "Farhat Ishtiaq",
...        nationality: "Pakistani",
...        birthYear: 1983
...    },
...    {
...        name: "Khaled Hosseini",
...        nationality: "Afghan-American",
...        birthYear: 1965
...    }
... ])
...
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('6841617f7c3957b84c50eb6b'),
    '1': ObjectId('6841617f7c3957b84c50eb6c'),
    '2': ObjectId('6841617f7c3957b84c50eb6d'),
    '3': ObjectId('6841617f7c3957b84c50eb6e')
  }
}
```

3. Find the books with the rating 5 from the books collection. Find the author details whose name is Umera Ahmed.

```
bookstore> db.books.find({ rating: 5 })
[
  {
    _id: ObjectId('6841596b7c3957b84c50eb67'),
    title: 'Peer-e-Kamil',
    author: 'Umera Ahmed',
    rating: 5,
    genre: 'Spiritual Fiction'
  },
  {
    _id: ObjectId('6841596b7c3957b84c50eb69'),
    title: 'Namal',
    author: 'Nimra Ahmed',
    rating: 5,
    genre: 'Thriller'
  }
]
bookstore> db.authors.find({ name: "Umera Ahmed" })
[
  {
    _id: ObjectId('6841617f7c3957b84c50eb6b'),
    name: 'Umera Ahmed',
    nationality: 'Pakistani',
    birthYear: 1976
  }
]
```

4. Update the names of the books with the author name Umera Ahmed.

```
bookstore> db.books.updateMany(
...     { author: "Umera Ahmed" },
...     { $set: { title: "Updated by Umera Ahmed" } }
... )
...
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```

5. Explore and embed the method sort(), distinct(), count().

```
bookstore> db.books.find().sort({ rating: -1 })
[
  {
    _id: ObjectId('6841596b7c3957b84c50eb67'),
    title: 'Updated by Umera Ahmed',
    author: 'Umera Ahmed',
    rating: 5,
    genre: 'Spiritual Fiction'
  },
  {
    _id: ObjectId('6841596b7c3957b84c50eb69'),
    title: 'Namal',
    author: 'Nimra Ahmed',
    rating: 5,
    genre: 'Thriller'
  },
  {
    _id: ObjectId('6841596b7c3957b84c50eb6a'),
    title: 'Humsafar',
    author: 'Farhat Ishtiaq',
    rating: 4.8,
    genre: 'Romantic Fiction'
  },
  {
    _id: ObjectId('6841596b7c3957b84c50eb68'),
    title: 'A Thousand Splendid Suns',
    author: 'Khaled Hosseini',
    rating: 4.5,
    genre: 'Drama'
  }
]
bookstore> db.books.distinct("genre")
[ 'Drama', 'Romantic Fiction', 'Spiritual Fiction', 'Thriller' ]
bookstore> db.books.countDocuments({ author: "Nimra Ahmed" })
1
```

6. Delete the book with the name 'A thousand splendid suns' from the books collection.

```
bookstore> db.books.deleteOne({ title: "A Thousand Splendid Suns" })
{ acknowledged: true, deletedCount: 1 }
```

7. Answer the following questions: • What have you learned from the lab task? • What was the most challenging task and how did you overcome that challenge?

What have you learned from the lab task?
- Learned the difference between SQL and NoSQL databases.
- Understood MongoDB's structure: databases → collections → documents.
- Practiced CRUD operations (Create, Read, Update, Delete) in MongoDB.
- Used MongoDB functions like `sort()`, `distinct()`, and `count()`.
- Gained experience inserting and querying real-world data using Pakistani authors and books.

What was the most challenging task and how did you overcome it?
- The most challenging part was updating specific fields for multiple documents.
- Initially confused about how `updateMany()` and `$set` work together.
- Overcame it by reading documentation and testing queries in Mongo Shell.
- Practiced with Pakistani author data to better understand condition-based updates.