**Lab Exercise 1: Create a Database and Collection**

**Task:**

1. Create a database named school.
2. Inside this database, create a collection named students.

**Solution:**

use school;

db.createCollection("students");

**Lab Exercise 2: Insert One Document**

**Task:**

Insert a student document with the following data:

{

"name": "John Doe",

"age": 15,

"grade": "10th",

"subjects": ["Math", "Science", "English"]

}

**Solution:**

db.students.insertOne({

"name": "John Doe",

"age": 15,

"grade": "10th",

"subjects": ["Math", "Science", "English"]

});

**Lab Exercise 3: Insert Multiple Documents**

**Task:**

Insert the following students:

[

{"name": "Jane Doe", "age": 14, "grade": "9th", "subjects": ["Math", "History"]},

{"name": "Sam Smith", "age": 16, "grade": "11th", "subjects": ["Science", "Math"]},

{"name": "Lisa Ray", "age": 15, "grade": "10th", "subjects": ["English", "History"]}

]

**Solution:**

db.students.insertMany([

{"name": "Jane Doe", "age": 14, "grade": "9th", "subjects": ["Math", "History"]},

{"name": "Sam Smith", "age": 16, "grade": "11th", "subjects": ["Science", "Math"]},

{"name": "Lisa Ray", "age": 15, "grade": "10th", "subjects": ["English", "History"]}

]);

**Lab Exercise 4: Find One Document**

**Task:**

Find the first student who is in the "10th" grade.

**Solution:**

db.students.findOne({ "grade": "10th" });

**Lab Exercise 5: Find Multiple Documents**

**Task:**

Find all students who are 15 years old.

**Solution:**

db.students.find({ "age": 15 });

**Lab Exercise 6: Query with Projection**

**Task:**

Find all students and display only their names and grades.

**Solution:**

db.students.find({}, { "name": 1, "grade": 1, "\_id": 0 });

**Lab Exercise 7: Count Documents**

**Task:**

Count the number of students who take "Math" as a subject.

**Solution:**

db.students.countDocuments({ "subjects": "Math" });

**Lab Exercise 8: Sort Results**

**Task:**

List all students sorted by age in descending order.

**Solution:**

db.students.find().sort({ "age": -1 });

**Lab Exercise 9: Limit Results**

**Task:**

Show the first 2 students in the collection.

**Solution:**

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

**Lab Exercise 10: Update One Document**

**Task:**

Update Jane Doe's grade from "9th" to "10th".

**Solution:**

db.students.updateOne(

{ "name": "Jane Doe" },

{ $set: { "grade": "10th" } }

);

**Lab Exercise 11: Update Multiple Documents**

**Task:**

Change the grade of all students in "10th" to "11th".

**Solution:**

db.students.updateMany(

{ "grade": "10th" },

{ $set: { "grade": "11th" } }

);

**Lab Exercise 12: Increment Field Value**

**Task:**

Increase the age of all students by 1 year.

**Solution:**

db.students.updateMany({}, { $inc: { "age": 1 } });

**Lab Exercise 13: Add Element to Array**

**Task:**

Add "Computer Science" as a subject for Sam Smith.

**Solution:**

db.students.updateOne(

{ "name": "Sam Smith" },

{ $push: { "subjects": "Computer Science" } }

);

**Lab Exercise 14: Remove Element from Array**

**Task:**

Remove "History" from all students' subjects.

**Solution:**

db.students.updateMany(

{},

{ $pull: { "subjects": "History" } }

);

**Lab Exercise 15: Delete One Document**

**Task:**

Delete the student named "Lisa Ray".

**Solution:**

db.students.deleteOne({ "name": "Lisa Ray" });

**Lab Exercise 16: Delete Multiple Documents**

**Task:**

Delete all students who are older than 16.

**Solution:**

db.students.deleteMany({ "age": { $gt: 16 } });

**Lab Exercise 17: Drop Collection**

**Task:**

Delete the students collection from the school database.

**Solution:**

db.students.drop();

**Lab Exercise 18: Drop Database**

**Task:**

Drop the school database.

**Solution:**

use school;

db.dropDatabase();

**Lab Exercise 19: Using $and Condition**

**Task:**

Find students who are in "11th" grade and take "Math".

**Solution:**

db.students.find({

$and: [

{ "grade": "11th" },

{ "subjects": "Math" }

]

});

**Lab Exercise 20: Using $or Condition**

**Task:**

Find students who are either in "9th" grade or take "Science".

**Solution:**

db.students.find({

$or: [

{ "grade": "9th" },

{ "subjects": "Science" }

]

});