Babu Banarasi Das University

NAME: Gaurang Rastogi

ROLL NO: 1240258180(37)

SEC: BCADS23

SUB: NO SQL (Mongodb)

Submitted to : Mr. Ankit Soni

-:NO SQL MONGODB PROJECT:-

Q1. List the names and departments of students who have more than 85% attendance and are

skilled in both "MongoDB" and "Python".
ANS :

```
> db.students.find(
    {
      attendance: { $gt: 85 },
      skills: { $all: ["MongoDB", "Python"] }
    },
    { _id: 0, name: 1, department: 1 }
  )
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    name: 'Test Student',
    department: 'Computer Science'
  }
Assessmenttask > |
```

Q2. Show all faculty who are teaching more than 2 courses. Display their names and the total

number of courses they teach

ANS:

```
> db.faculty.aggregate([
    { $project: { name: 1, total_courses: { $size: "$courses" } } },
    { $match: { total_courses: { $gt: 2 } } },
    { $project: { _id: 0, name: 1, total_courses: 1 } }
  ])
// Name:Gaurang Rastogi          Registration No:1240258180

< {
    name: 'Charles Newton',
    total_courses: 3
  }
  {
    name: 'Julia Cole',
    total_courses: 3
  }
  {
    name: 'Darrell Velasquez',
    total_courses: 3
  }
```

Q3. Write a query to show each student's name along with the course titles they are enrolled in
(use $lookup between enrollments, students, and courses).

ANS:

```
> db.students.aggregate([
    {
      $lookup: {
        from: "enrollments",
        localField: "_id",
        foreignField: "student_id",
        as: "enrolled_courses"
      }
    },
    {
      $unwind: "$enrolled_courses"
    },
    {
      $lookup: {
        from: "courses",
        localField: "enrolled_courses.course_id",
        foreignField: "_id",
        as: "course_details"
      }
    },
    {
      $unwind: "$course_details"
```

```
    },
    {
      $unwind: "$course_details"
    },
    {
      $project: {
        _id: 0,
        student_name: "$name",
        course_title: "$course_details.title"
      }
    }
])
// Name:Gaurang Rastogi        Registration No:1240258180
< {
    student_name: 'Janet Jarvis',
    course_title: 'Configurable global framework'
  }
  {
    student_name: 'Janet Jarvis',
    course_title: 'Multi-lateral systemic success'
  }
  {
    student_name: 'Bruce Blair',
    course_title: 'Intuitive actuating superstructure'
```

```
  {
    student_name: 'Carolyn Chandler',
    course_title: 'Horizontal attitude-oriented knowledgebase'
  }
  {
    student_name: 'Carolyn Chandler',
    course_title: 'Innovative hybrid concept'
  }
  {
    student_name: 'Carolyn Chandler',
    course_title: 'Enhanced radical secured line'
  }
  {
    student_name: 'Aaron Marshall',
    course_title: 'Profit-focused high-level capability'
  }
  {
    student_name: 'Michelle Walters',
    course_title: 'Decentralized multimedia Local Area Network'
  }
  Type "it" for more
Assessmenttask >
```

Q4. For each course, display the course title, number of students enrolled, and average marks (use $group).

ANS:

```
db.enrollments.aggregate([
  {
    $lookup: {
      from: "courses",
      localField: "course_id",
      foreignField: "_id",
      as: "courseInfo"
    }
  },
  { $unwind: "$courseInfo" },
  {
    $group: {
      _id: "$courseInfo.title",
      totalStudents: { $sum: 1 },
      avgMarks: { $avg: "$marks" }
    }
  },
  {
    $project: {
      _id: 0,
      course_title: "$_id",
      totalStudents: 1,
```

```
  {
    $project: {
      _id: 0,
      course_title: "$_id",
      totalStudents: 1,
      avgMarks: 1
    }
  }
])
// Name:Gaurang Rastogi        Registration No:1240258180
{
    totalStudents: 1,
    avgMarks: 82,
    course_title: 'Open-architected tangible protocol'
}
{
    totalStudents: 1,
    avgMarks: 78,
    course_title: 'Balanced asynchronous framework'
}
{
    totalStudents: 1,
```

```
  {
    totalStudents: 1,
    avgMarks: 75,
    course_title: 'Organic incremental task-force'
  }
  {
    totalStudents: 1,
    avgMarks: 82,
    course_title: 'Triple-buffered cohesive frame'
  }
  {
    totalStudents: 1,
    avgMarks: 93,
    course_title: 'User-centric grid-enabled moderator'
  }
  {
    totalStudents: 1,
    avgMarks: 73,
    course_title: 'Innovative hybrid concept'
  }
```

Q5. Find the top 3 students with the highest average marks across all enrolled courses.

ANS:

```
> db.enrollments.aggregate([
    {
      $group: {
        _id: "$student_id",
        avgMarks: { $avg: "$marks" }
      }
    },
    { $sort: { avgMarks: -1 } },
    { $limit: 3 },
    {
      $lookup: {
        from: "students",
        localField: "_id",
        foreignField: "_id",
        as: "studentInfo"
      }
    },
    { $unwind: "$studentInfo" },
    { $project: { _id: 0, student_name: "$studentInfo.name", avgMarks: 1 } }
  ])
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    avgMarks: 100,
```

```
  [ $unwind:  "$studentInfo" },
    { $project: { _id: 0, student_name: "$studentInfo.name", avgMarks: 1 } }
  ])
  // Name:Gaurang Rastogi          Registration No:1240258180
< {
    avgMarks: 100,
    student_name: 'Diane Phillips'
  }
  {
    avgMarks: 98,
    student_name: 'Brandon Rios'
  }
  {
    avgMarks: 94,
    student_name: 'Christopher Benson'
  }
```

Q6. Count how many students are in each department. Display the department with the highest number of students

ANS:

```
> db.students.aggregate([
    { $group: { _id: "$department", count: { $sum: 1 } } },
    { $sort: { count: -1 } },
    { $limit: 1 },
    { $project: { _id: 0, department: "$_id", count: 1 } }
  ])
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    count: 23,
    department: 'Electrical'
  }
```

Q7. Update attendance to 100% for all students who won any "Hackathon".

ANS:

```
> db.students.updateMany(
    { activities: "Hackathon" },
    { $set: { attendance: 100 } }
  )
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    acknowledged: true,
    insertedId: null,
    matchedCount: 0,
    modifiedCount: 0,
    upsertedCount: 0
  }
```

Q8. Delete all student activity records where the activity year is before 2022.

ANS:

```
> db.student_activities.deleteMany(
    { year: { $lt: 2022 } }
  )
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    acknowledged: true,
    deletedCount: 0
  }
```

Q9. Upsert a course record for "Data Structures" with ID "C150" and credits 4—if it
doesn't exist, insert it; otherwise update its title to "Advanced Data Structures".

ANS:

```
> db.courses.updateOne(
    { _id: "C150" },
    { $set: { title: "Advanced Data Structures", credits: 4 } },
    { upsert: true }
  )
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    acknowledged: true,
    insertedId: null,
    matchedCount: 1,
    modifiedCount: 0,
    upsertedCount: 0
  }
```

Q10. Find all students who have "Python" as a skill but not "C++".

ANS:

```
> db.students.find(
    { skills: "Python", skills: { $ne: "C++" } },
    { _id: 0, name: 1, skills: 1 }
  )
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    name: 'Bruce Blair',
    skills: [
      'MongoDB',
      'Linux'
    ]
  }
  {
    name: 'Alexandra Bailey',
    skills: [
      'Research',
      'AutoCAD'
    ]
  }
```

```
  }
  {
    name: 'Kyle Hale',
    skills: [
      'Python',
      'Java'
    ]
  }
  {
    name: 'Daniel Robinson',
    skills: [
      'JavaScript',
      'Java'
    ]
  }
  {
    name: 'Tina Hodge',
    skills: [
      'SQL',
      'Research'
    ]
  }
```

Q11. Return names of students who participated in "Seminar" and "Hackathon" both.

ANS:

```
> db.activities.aggregate([
    {
      $match: { type: { $in: ["Seminar", "Hackathon"] } }
    },
    {
      $group: {
        _id: "$student_id",
        name: { $first: "$name" },
        types: { $addToSet: "$type" }
      }
    },
    {
      $match: { types: { $all: ["Seminar", "Hackathon"] } }
    },
    {
      $project: { _id: 0, name: 1 }
    }
  ])
  // Name:Gaurang Rastogi          Registration No:1240258180
< {
    name: 'Drive Dynamic Networks'
  }
```

```
  // Name:Gaurang Rastogi          Registration No:1240258180
< {
    name: 'Drive Dynamic Networks'
  }
  {
    name: 'Target Best-Of-Breed Relationships'
  }
  {
    name: 'Reinvent Out-Of-The-Box Communities'
  }
  {
    name: 'Repurpose Wireless E-Business'
  }
  {
    name: 'Re-Contextualize Next-Generation Vortals'
  }
Assessmenttask >
```

Q12. Find students who scored more than 80 in "Web Development" only if they belong to

the "Computer Science" department.

ANS:

```
> db.students.find(
    {
      department: "Computer Science",
      attendance: { $gt: 80 }
    },
    { _id: 0, name: 1, department: 1, attendance: 1 }
) // Name:Gaurang Rastogi        Registration No:1240258180
< {
    name: 'Daniel Robinson',
    department: 'Computer Science',
    attendance: 92.1
  }
  {
    name: 'Mary Bennett',
    department: 'Computer Science',
    attendance: 83.36
  }
  {
    name: 'Ashley Myers',
    department: 'Computer Science',
    attendance: 95.26
  }
```

```
  {
    name: 'Christina Gordon',
    department: 'Computer Science',
    attendance: 86.27
  }
  {
    name: 'Taylor Webb',
    department: 'Computer Science',
    attendance: 82.91
  }
  {
    name: 'Carlos Bryant',
    department: 'Computer Science',
    attendance: 91.74
  }
  {
    name: 'Test Student',
    department: 'Computer Science',
    attendance: 90
  }
Assessmenttask >
```

Q13. For each faculty member, list the names of all students enrolled in their courses along with
average marks per student per faculty.

ANS:

```
     $group: {
       _id: { faculty: "$name", student: "$studentInfo.name" },
       avgMarks: { $avg: "$courseEnrollments.marks" }
     }
   },
   {
     $group: {
       _id: "$_id.faculty",
       students: { $push: { student_name: "$_id.student", avgMarks: "$avgMarks" } ]
     }
   },
   { $project: { _id: 0, faculty_name: "$_id", students: 1 } }
 ])
 // Name:Gaurang Rastogi          Registration No:1240258180
< {
   students: [
     {
       student_name: 'Erin Harris',
       avgMarks: 92
     },
     {
       student_name: 'Megan Taylor',
       avgMarks: 90
```

```
> db.faculty.aggregate([
   { $unwind: "$courses" },
   {
     $lookup: {
       from: "enrollments",
       localField: "courses",
       foreignField: "course_id",
       as: "courseEnrollments"
     }
   },
   { $unwind: "$courseEnrollments" },
   {
     $lookup: {
       from: "students",
       localField: "courseEnrollments.student_id",
       foreignField: "_id",
       as: "studentInfo"
     }
   },
   { $unwind: "$studentInfo" },
   {
     $group: {
       _id: { faculty: "$name", student: "$studentInfo.name" },
```

```
      {
        student_name: 'Megan Taylor',
        avgMarks: 90
      },
      {
        student_name: 'Vincent Norris',
        avgMarks: 90
      },
      {
        student_name: 'Kyle Lee',
        avgMarks: 58
      }
    ],
    faculty_name: 'William Alexander'
  }
  {
    students: [
      {
        student_name: 'Brian Russell',
        avgMarks: 82
      }
    ],
```

Q14. Show the most popular activity type (e.g., Hackathon, Seminar, etc.) by number of student participants.

ANS:

```
> db.activities.aggregate([
  {
    $match: { type: { $in: ["Seminar", "Hackathon"] } }
  },
  {
    $group: {
      _id: "$type",
      totalParticipants: { $sum: 1 }
    }
  },
  {
    $project: { _id: 0, type: "$_id", totalParticipants: 1 }
  }
])
// Name:Gaurang Rastogi          Registration No:1240258180
< {
    totalParticipants: 35,
    type: 'Hackathon'
  }
  {
    totalParticipants: 35,
    type: 'Seminar'
```