

## MongoDB Assignment

Q1. List the names and departments of students who have more than 85% attendance and are skilled in both "MongoDB" and "Python".

QUERY:

```
db.students.find(  
  {  
    attendance: { $gt: 85 },  
    skills: { $all: ["MongoDB", "Python"] }  
  },  
  {  
    _id: 0,  
    name: 1,  
    department: 1  
  }  
);
```

OUTPUT:

```
test> use schoolDB  
switched to db schoolDB  
schoolDB> db.students.find(  
...   {  
...     attendance: { $gt: 85 },  
...     skills: { $all: ["MongoDB", "Python"] }  
...   },  
...   {  
...     _id: 0,  
...     name: 1,  
...     department: 1  
...   }  
... );  
...
```

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

QUERY:

```
db.courses.aggregate([ { $group: { _id: "$faculty_id", totalCourses: { $sum: 1 } } }, { $match: { totalCourses: { $gt: 2 } } }, { $lookup: { from: "faculty", localField: "_id", foreignField: "_id", as: "facultyData" } }, { $unwind: "$facultyData" }, { $project: { _id: 0, facultyName: "$facultyData.name", totalCourses: 1 } } ] );
```

```
[
  { totalCourses: 3, facultyName: 'Michael Poole' },
  { totalCourses: 3, facultyName: 'Robert Lara' },
  { totalCourses: 3, facultyName: 'Darrell Velasquez' },
  { totalCourses: 3, facultyName: 'Matthew Hanna' },
  { totalCourses: 3, facultyName: 'Charles Newton' },
  { totalCourses: 3, facultyName: 'John Duran' },
  { totalCourses: 3, facultyName: 'Michael Johnson' },
  { totalCourses: 3, facultyName: 'Julia Cole' },
  { totalCourses: 3, facultyName: 'Daniel Allen' }
]
```

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).

QUERY:

```
db.enrollments.aggregate([
  {
    $lookup: {
      from: "students", localField: "student_id", foreignField: "_id", as: "student" }, { $unwind: "$student" }, { $lookup: { from: "courses", localField: "course_id", foreignField: "_id", as: "course" } }, { $unwind: "$course" }, { $project: { _id: 0, studentName: "$student.name", courseTitle: "$course.title" } } ] );
```

Q4. For each course, display the course title, number of students enrolled, and average marks

(use \$group).

QUERY:

```
db.enrollments.aggregate([ { $group: { _id: "$course_id", totalStudents: { $sum: 1 },
avgMarks: { $avg: "$marks" } } }, { $lookup: { from: "courses", localField: "_id", foreignField:
"_id", as: "course" } }, { $unwind: "$course" }, { $project: { _id: 0, courseTitle: "$course.title",
totalStudents: 1, avgMarks: { $round: ["$avgMarks", 2] } } } ] );
```

```
{
  studentName: 'Alexandre Bailey',
  courseTitle: 'Reactive neutral adapter'
},
{
  studentName: 'Regan Taylor',
  courseTitle: 'Sharable bifurcated paradigm'
},
{
  studentName: 'Alejandro Hart',
  courseTitle: 'Focused user-facing paradigm'
},
{
  studentName: 'Timothy Sparks',
  courseTitle: 'Focused user-facing paradigm'
},
{
  studentName: 'Juan Morris',
  courseTitle: 'Balanced asynchronous framework'
},
{
  studentName: 'Donna Morgan',
  courseTitle: 'Organic optimal product'
},
{
  studentName: 'Patricia Scott',
  courseTitle: 'Fully-configurable responsive solution'
},
{
  studentName: 'Carolyn Chandler',
  courseTitle: 'Horizontal attitude-oriented knowledgebase'
},
{
  studentName: 'Chelsey Davis',
  courseTitle: 'Balanced national function'
},
{
  studentName: 'Timothy Sparks',
  courseTitle: 'Seamless high-level installation'
},
{
  studentName: 'Timothy Lee',
  courseTitle: 'Configurable fresh-thinking analyzer'
},
{
  studentName: 'Kathryn Ferguson',
  courseTitle: 'Monitored bottom-line capability'
},
{
  studentName: 'Lydia Day',
  courseTitle: 'Quality-focused local leverage'
},
{
  studentName: 'Nicholas Turner',
  courseTitle: 'De-engineered static throughput'
},
{
  studentName: 'Monica Martin',
  courseTitle: 'Intuitive actuating superstructure'
},
{
  studentName: 'Michelle Weber',
  courseTitle: 'Enhanced full-range open architecture'
},
{
  studentName: 'Logan Murphy',
  courseTitle: 'Cloned contextually-based strategy'
},
{
  studentName: 'Jeremy Carrillo',
  courseTitle: 'User-centric bifurcated matrices'
},
{
  studentName: 'Daniel Brown',
  courseTitle: 'De-engineered well-modulated installation'
},
{
  studentName: 'Elizabeth Reed',
  courseTitle: 'Intuitive actuating superstructure'
}
```

Q.5-Find the top 3 students with the highest average marks across all enrolled courses.

```
db.enrollments.aggregate([ { $group: { _id: "$student_id", avgMarks: { $avg: "$marks" } } },
{ $sort: { avgMarks: -1 } }, { $limit: 3 }, { $lookup: { from: "students", localField: "_id",
foreignField: "_id", as: "student" } }, { $unwind: "$student" }, { $project: { _id: 0,
studentName: "$student.name", avgMarks: { $round: ["$avgMarks", 2] } } } ]]);
```

```
schoolDB> db.enrollments.aggregate([
...   {
...     $group: {
...       _id: "$student_id",
...       avgMarks: { $avg: "$marks" }
...     }
...   },
...   { $sort: { avgMarks: -1 } },
...   { $limit: 3 },
...   {
...     $lookup: {
...       from: "students",
...       localField: "_id",
...       foreignField: "_id",
...       as: "student"
...     }
...   },
...   { $unwind: "$student" },
...   {
...     $project: {
...       _id: 0,
...       studentName: "$student.name",
...       avgMarks: { $round: ["$avgMarks", 2] }
...     }
...   }
... ]);
... // NAME- Yash pandey , registration no-1240258512
[
  { studentName: 'Diane Phillips', avgMarks: 100 },
  { studentName: 'Brandon Rios', avgMarks: 98 },
  { studentName: 'Larry Ramsey', avgMarks: 94 }
]
```

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

QUERY:

```
db.students.aggregate([  
  
  {  
  
    $group: {  
  
      _id: "$department",  
  
      totalStudents: { $sum: 1 }  
  
    }  
  
  },  
  
  { $sort: { totalStudents: -1 } },  
  
  { $limit: 1 }  
  
]);
```

```
...
schoolDB> db.students.aggregate([
...   {
...     $group: {
...       _id: "$department",
...       totalStudents: { $sum: 1 }
...     }
...   },
...   { $sort: { totalStudents: -1 } },
...   { $limit: 1 }
... ]); // NAME-YASH PANDEY registration no 1240258512
[ { _id: 'Electrical', totalStudents: 23 } ]
```

Q7 — Update attendance to 100% for students who won any Hackathon

QUERY:

```
db.students.updateMany(  
  { activities: "Hackathon" },  
  { $set: { attendance: 100 } }  
);
```

```
schoolDB> db.students.updateMany(  
...   { activities: "Hackathon" },  
...   { $set: { attendance: 100 } }  
... );  
... //NAME:Yash pandey,Registration NO:1240258512  
{  
  acknowledged: true,  
  insertedId: null,  
  matchedCount: 0,  
  modifiedCount: 0,  
  upsertedCount: 0  
}  
schoolDB>
```

Q8 — Delete activity records before 2022

QUERY:

```
db.activities.deleteMany({ year: { $lt: 2022 } });
```

```
}
schoolDB> db.activities.deleteMany({ year: { $lt: 2022 } }); //NAME YASH PANDEY , Registration no:1240258512
{ acknowledged: true, deletedCount: 0 }
schoolDB> |
```

Q9 — Upsert course (insert if missing, else update title)

QUERY:

```
db.courses.updateOne(
  { course_id: "C150" },
  {
    $set: {
      title: "Advanced Data Structures",
      credits: 4
    }
  }, { upsert: true });
```

```
schoolDB> db.courses.updateOne(
...   { course_id: "C150" },
...   {
...     $set: {
...       title: "Advanced Data Structures",
...       credits: 4
...     }
...   },
...   { upsert: true }
... );
...
...
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 0,
  upsertedCount: 0
}
schoolDB>
```



## Q10 — Students who know Python but NOT C++

QUERY:

```
db.students.find(  
  
  {  
  
    skills: "Python",  
  
    skills: { $ne: "C++" }  
  
  },  
  
  { _id: 0, name: 1, skills: 1 }  
  
);
```

```
schoolDB> db.students.find(  
...   {  
...     skills: "Python",  
...     skills: { $ne: "C++" }  
...   },  
...   { _id: 0, name: 1, skills: 1 }  
... );  
... //NAME YASH PANDEY,registration no:124028512  
[  
  { 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' ] },  
  { name: 'Anthony Zavala', skills: [ 'Java', 'Git' ] },  
  { name: 'Cody Whitehead', skills: [ 'JavaScript', 'Python' ] },  
  { name: 'Thomas Jackson', skills: [ 'Python', 'AutoCAD' ] },  
  { name: 'Monica Martin', skills: [ 'Research', 'JavaScript' ] },  
  { name: 'Kathryn Ferguson', skills: [ 'Java', 'Linux' ] },  
  { name: 'Steven Wong', skills: [ 'MongoDB', 'Python' ] },  
  { name: 'Daniel Brown', skills: [ 'MongoDB', 'Research' ] },  
  { name: 'Jason Brown', skills: [ 'MongoDB', 'SQL' ] },  
  { name: 'Cheryl Jackson', skills: [ 'Research', 'Python' ] },  
  { name: 'Carolyn Chandler', skills: [ 'SQL', 'JavaScript' ] },  
  { name: 'Aaron Marshall', skills: [ 'Linux', 'Git' ] },  
  { name: 'Adam Solomon', skills: [ 'AutoCAD', 'MongoDB' ] },  
  { name: 'Mary Bennett', skills: [ 'Research', 'Git' ] },  
  { name: 'Patrick Clay', skills: [ 'Git', 'Research' ] },  
  { name: 'Mr. Darius Newman', skills: [ 'Python', 'SQL' ] }  
]  
Type "it" for more  
schoolDB> |
```

## Q11 — Students who participated in both Seminar & Hackathon

QUERY:

```
db.students.find(  
  {  
    activities: { $all: ["Seminar", "Hackathon"] }  
  },  
  {  
    _id: 0, name: 1});
```

```
schoolDB> db.students.find(
...   {
...     activities: { $all: ["Seminar", "Hackathon"] }
...   },
...   {
...     _id: 0,
...     name: 1
...   }
... );
schoolDB>
```

Q12 — Scored >80 in Web Development AND in Computer Science department

```
db.students.find(
{
  department: "Computer Science",
  marks: {
    $elemMatch: {
      course: "Web Development",
      score: { $gt: 80 }
    }
  }
},
{
  _id: 0,name: 1,department: 1});
```

```

schoolDB> db.students.find(
...   {
...     department: "Computer Science",
...     marks: {
...       $elemMatch: {
...         course: "Web Development",
...         score: { $gt: 80 }
...       }
...     }
...   },
...   {
...     _id: 0,
...     name: 1,
...     department: 1
...   }
... );
... //NAME YASH PANDEY,registration no 1240258512

```

Q13 — For each faculty, list student names + avg marks per faculty

QUERY:

```

db.courses.aggregate([ { $lookup: { from: "enrollments", localField: "_id", foreignField:
"course_id", as: "enrollments" } }, { $unwind: "$enrollments" }, { $lookup: { from: "students",
localField: "enrollments.student_id", foreignField: "_id", as: "student" } }, { $unwind:
"$student" }, { $group: { _id: "$faculty_id", students: { $addToSet: "$student.name" },
avgMarks: { $avg: "$enrollments.marks" } } }, { $lookup: { from: "faculty", localField: "_id",
foreignField: "_id", as: "facultyInfo" } }, { $unwind: "$facultyInfo" }, { $project: { _id: 0,
facultyName: "$facultyInfo.name", students: 1, avgMarks: { $round: ["$avgMarks", 2] } } } ] );

```

```

{
  students: [ 'Bruce Blair' ],
  facultyName: 'Jessica Black',
  avgMarks: 78
},
{
  students: [ 'Mathryn Ferguson', 'Timothy Lee', 'Lydia Day' ],
  facultyName: 'Robert Lara',
  avgMarks: 81.67
},
{
  students: [
    'Brandon Rios',
    'Carolyn Chandler',
    'David Rivera',
    'Juan Morris'
  ],
  facultyName: 'John Duran',
  avgMarks: 85
},
{
  students: [ 'Reginald Oliver' ],
  facultyName: 'Shelly Sawyer',
  avgMarks: 84
},
{
  students: [ 'Ronald Trevino' ],
  facultyName: 'Jessica Wiggins',
  avgMarks: 86
},
{
  students: [
    'Erin Harris',
    'Isaac Rivers',
    'Chelsey Davis',
    'Christina Gordon',
    'Ronald Trevino'
  ],
  facultyName: 'Charles Newton',
  avgMarks: 82.8
},
{
  students: [ 'Gabriela Le' ],
  facultyName: 'Matthew Hanna',
  avgMarks: 55
},
{
  students: [ 'Patricia Scott', 'Marie Wilson', 'Andrew Wilson' ],
  facultyName: 'Erin Allen',
  avgMarks: 88.33
},
{
  students: [ 'Thomas Jackson', 'Benjamin White', 'Donna Spencer' ],
  facultyName: 'Jacqueline Miller',
  avgMarks: 84.67
},
{
  students: [ 'Jessica Galvan' ],
  facultyName: 'Mathryn Young',
  avgMarks: 64
},
{
  students: [ 'Julie McKenzie', 'Fernando Rodriguez' ],
  facultyName: 'Meghan Watson',
  avgMarks: 64.5
},
{
  students: [ 'Timothy Sparks', 'Ryan Flores' ],
  facultyName: 'Cassandra Diaz',
  avgMarks: 82
},
{
  students: [ 'Erin Harris', 'Kyle Lee', 'Megan Taylor', 'Vincent Norris' ],
  facultyName: 'William Alexander',
  avgMarks: 82.5
},
{
  students: [ 'Ronald Trevino', 'Diane Phillips' ],

```

Q14 — Most popular activity by number of student participants

QUERY:

```

db.students.aggregate([

  { $unwind: "$activities" },

  {

    $group: {

```

```
    _id: "$activities",  
    totalParticipants: { $sum: 1 }  
  }  
},  
{ $sort: { totalParticipants: -1 } },  
{ $limit: 1 }  
]);
```

```
schoolDB> db.students.aggregate([  
...   { $unwind: "$activities" },  
...   {  
...     $group: {  
...       _id: "$activities",  
...       totalParticipants: { $sum: 1 }  
...     }  
...   },  
...   { $sort: { totalParticipants: -1 } },  
...   { $limit: 1 }  
... ]);  
...  
schoolDB>
```

NAME: YASH PANDEY

BATCH:DS-26

UNIVERSITY ROLL-NO:1240258512

