

## ICA-02(Practical)

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01.Create the students and grades collections and insert the sample documents into both collections.

```
> use ica-02
< switched to db ica-02
> db.createCollection("grades")
< { ok: 1 }
> db.createCollection("students")
< { ok: 1 }
```

Inserting documents to the students collection

```
> db.students.insertMany([
  {
    _id: ObjectId("64b1fcd1f4a13a001e3d41a1"),
    name: "Alice Johnson",
    enrollmentYear: 2021,
    major: "Computer Science",
    email: "alice.johnson@example.com",
    gender: "Female",
    age: 20
  },
  {
    _id: ObjectId("64b1fcd1f4a13a001e3d41a2"),
    name: "Bob Smith",
    enrollmentYear: 2020,
    major: "Mathematics",
    email: "bob.smith@example.com",
    gender: "Male",
    age: 22
  },
])
```

Successfully inserted the documents to the students.

```
< {
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('64b1fcd1f4a13a001e3d41a1'),
    '1': ObjectId('64b1fcd1f4a13a001e3d41a2'),
    '2': ObjectId('64b1fcd1f4a13a001e3d41a3'),
    '3': ObjectId('64b1fcd1f4a13a001e3d41a4'),
    '4': ObjectId('64b1fcd1f4a13a001e3d41a5'),
    '5': ObjectId('64b1fcd1f4a13a001e3d41a6'),
    '6': ObjectId('64b1fcd1f4a13a001e3d41a7'),
    '7': ObjectId('64b1fcd1f4a13a001e3d41a8'),
    '8': ObjectId('64b1fcd1f4a13a001e3d41a9'),
    '9': ObjectId('64b1fcd1f4a13a001e3d41aa')
  }
}
```

Inserting documents to the grades collection.

```
> db.grades.insertMany([ { subject: "Mathematics", score: 85, term: "Fall 2022", studentId: ObjectId("64b1fcd1f4a13a001e3d41a1") },
  { subject: "English", score: 90, term: "Fall 2022", studentId: ObjectId("64b1fcd1f4a13a001e3d41a1") },

  { subject: "Mathematics", score: 75, term: "Spring 2022", studentId: ObjectId("64b1fcd1f4a13a001e3d41a2") },
  { subject: "Statistics", score: 80, term: "Fall 2022", studentId: ObjectId("64b1fcd1f4a13a001e3d41a2") },

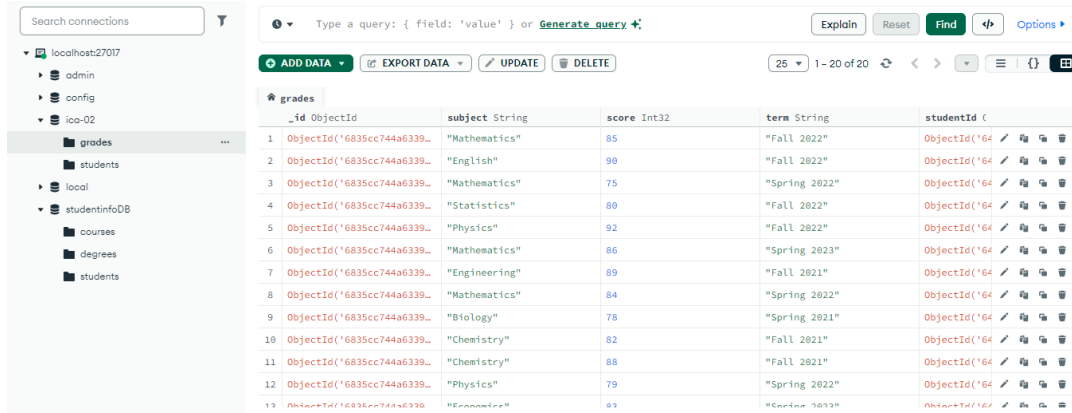
  { subject: "Physics", score: 92, term: "Fall 2022", studentId: ObjectId("64b1fcd1f4a13a001e3d41a3") },
  { subject: "Mathematics", score: 86, term: "Spring 2023", studentId: ObjectId("64b1fcd1f4a13a001e3d41a3") },
```

Successfully inserted the documents to the students.

```
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('6835cc744a6339c33008c4d2'),
    '1': ObjectId('6835cc744a6339c33008c4d3'),
    '2': ObjectId('6835cc744a6339c33008c4d4'),
    '3': ObjectId('6835cc744a6339c33008c4d5'),
    '4': ObjectId('6835cc744a6339c33008c4d6'),
    '5': ObjectId('6835cc744a6339c33008c4d7'),
    '6': ObjectId('6835cc744a6339c33008c4d8'),
    '7': ObjectId('6835cc744a6339c33008c4d9'),
    '8': ObjectId('6835cc744a6339c33008c4da'),
    '9': ObjectId('6835cc744a6339c33008c4db'),
    '10': ObjectId('6835cc744a6339c33008c4dc'),
    '11': ObjectId('6835cc744a6339c33008c4dd'),
    '12': ObjectId('6835cc744a6339c33008c4de'),
    '13': ObjectId('6835cc744a6339c33008c4df'),
    '14': ObjectId('6835cc744a6339c33008c4e0'),
    '15': ObjectId('6835cc744a6339c33008c4e1'),
    '16': ObjectId('6835cc744a6339c33008c4e2'),
    '17': ObjectId('6835cc744a6339c33008c4e3'),
    '18': ObjectId('6835cc744a6339c33008c4e4'),
    '19': ObjectId('6835cc744a6339c33008c4e5')
  }
}
```

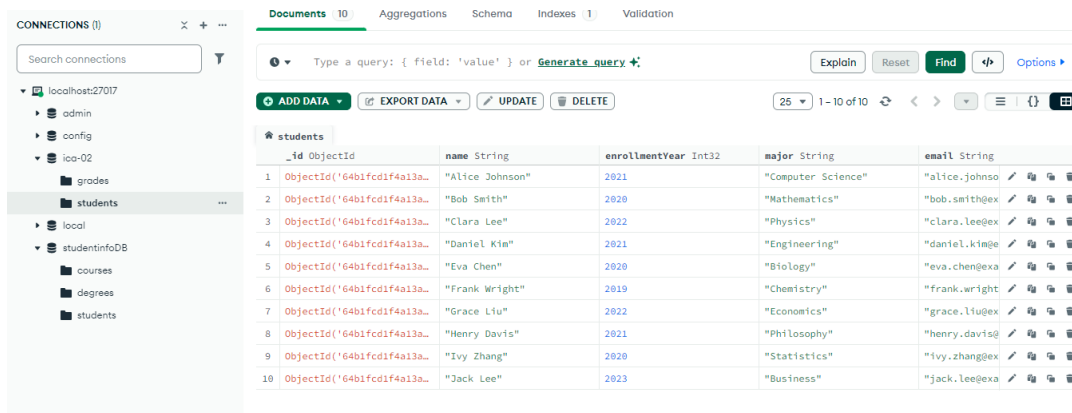
## 02. Show both collections in table view.

### Table view of grades collection.



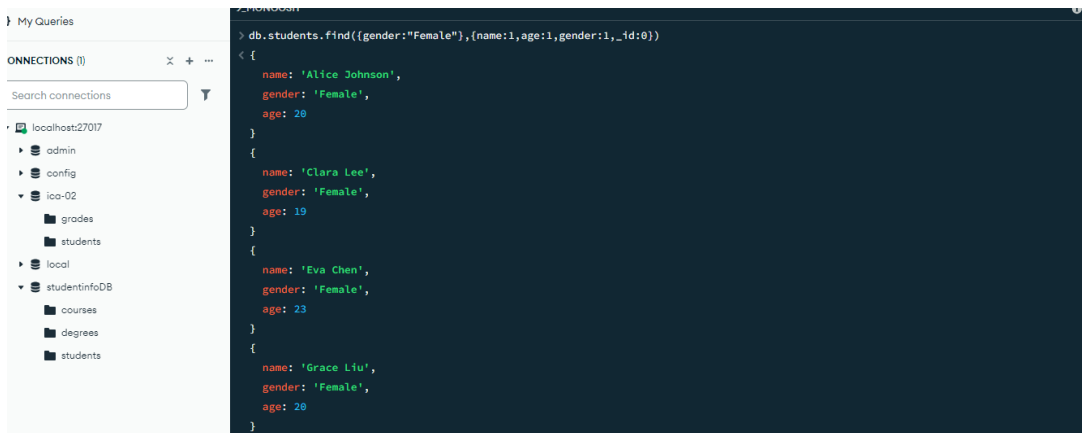
	grades
1	ObjectID('6835cc744a6339...')
2	ObjectID('6835cc744a6339...')
3	ObjectID('6835cc744a6339...')
4	ObjectID('6835cc744a6339...')
5	ObjectID('6835cc744a6339...')
6	ObjectID('6835cc744a6339...')
7	ObjectID('6835cc744a6339...')
8	ObjectID('6835cc744a6339...')
9	ObjectID('6835cc744a6339...')
10	ObjectID('6835cc744a6339...')
11	ObjectID('6835cc744a6339...')
12	ObjectID('6835cc744a6339...')
13	ObjectID('6835cc744a6339...')

### Table view of students collection.



	students
1	ObjectID('64b1fcd1f4a13a...')
2	ObjectID('64b1fcd1f4a13a...')
3	ObjectID('64b1fcd1f4a13a...')
4	ObjectID('64b1fcd1f4a13a...')
5	ObjectID('64b1fcd1f4a13a...')
6	ObjectID('64b1fcd1f4a13a...')
7	ObjectID('64b1fcd1f4a13a...')
8	ObjectID('64b1fcd1f4a13a...')
9	ObjectID('64b1fcd1f4a13a...')
10	ObjectID('64b1fcd1f4a13a...')

## 03. Find the female students and only display their name, age and gender.



```
> db.students.find({'gender':'Female'}, {'name:1, age:1, gender:1, _id:0})
{
  "name": "Alice Johnson",
  "gender": "Female",
  "age": 20
}
{
  "name": "Clara Lee",
  "gender": "Female",
  "age": 19
}
{
  "name": "Eva Chen",
  "gender": "Female",
  "age": 23
}
{
  "name": "Grace Liu",
  "gender": "Female",
  "age": 20
}
```

04. Find the students who are younger than 22 and enrolled after 2020.

```
> db.students.find({age:{$lt:22},enrollmentYear:{$gt:2020}})
< {
  _id: ObjectId('64b1fcd1f4a13a001e3d41a1'),
  name: 'Alice Johnson',
  enrollmentYear: 2021,
  major: 'Computer Science',
  email: 'alice.johnson@example.com',
  gender: 'Female',
  age: 20
}
{
  _id: ObjectId('64b1fcd1f4a13a001e3d41a3'),
  name: 'Clara Lee',
  enrollmentYear: 2022,
  major: 'Physics',
  email: 'clara.lee@example.com',
  gender: 'Female',
  age: 19
}
{
  _id: ObjectId('64b1fcd1f4a13a001e3d41a4'),
  name: 'Daniel Kim',
  enrollmentYear: 2021,
  major: 'Engineering',
  email: 'daniel.kim@example.com'
}
```

05. Find all grades for "Alice Johnson".

```
> db.students.aggregate([{$match:{"name":"Alice Johnson"}},
...
  {
    $lookup:{
      from:"grades",
      localField:"_id",
      foreignField:"studentId",
      as:"studentInfo"
    }
  }
]);
< {
  _id: ObjectId('64b1fcd1f4a13a001e3d41a1'),
  name: 'Alice Johnson',
  enrollmentYear: 2021,
  major: 'Computer Science',
  email: 'alice.johnson@example.com',
  gender: 'Female',
  age: 20,
  studentInfo: [
    {
      _id: ObjectId('6835cc744a6339c33008c4d2'),
      subject: 'Mathematics',
      score: 85,
      term: 'Fall 2022',
      studentId: ObjectId('64b1fcd1f4a13a001e3d41a1')
    }
  ],
}
```

06. Find how many students followed the subject "Mathematics".

```
> db.grades.countDocuments({ subject:"Mathematics"});
< 4
ica-02>
```

07. Find all students with grades in the term "Fall 2022".

```
> db.grades.aggregate([
  {
    $match: { term: "Fall 2022" }
  },
  {
    $lookup: {
      from: "students",
      localField: "studentId",
      foreignField: "_id",
      as: "studentsInfo"
    }
  },
  {
    $project: {
      name: "$studentsInfo.name",
      term: 1,
      _id: 0
    }
  }
]);
```

Output:

```
< {
  term: 'Fall 2022',
  name: [
    'Alice Johnson'
  ]
}
{
  term: 'Fall 2022',
  name: [
    'Alice Johnson'
  ]
}
{
  term: 'Fall 2022',
  name: [
    'Bob Smith'
  ]
}
{
  term: 'Fall 2022',
  name: [
    'Clara Lee'
  ]
}
```