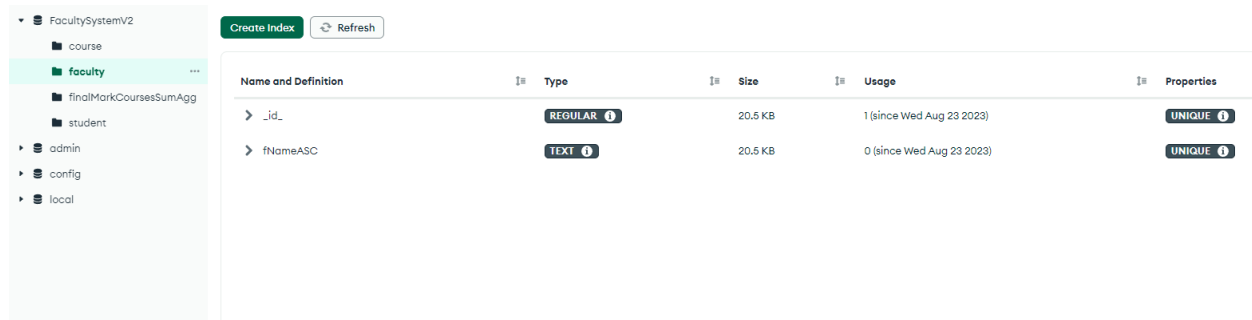# Day 2 Lab Assignments

Use [FacultySystemV2] DB the following assignments (Use GUI App for mongoDB):
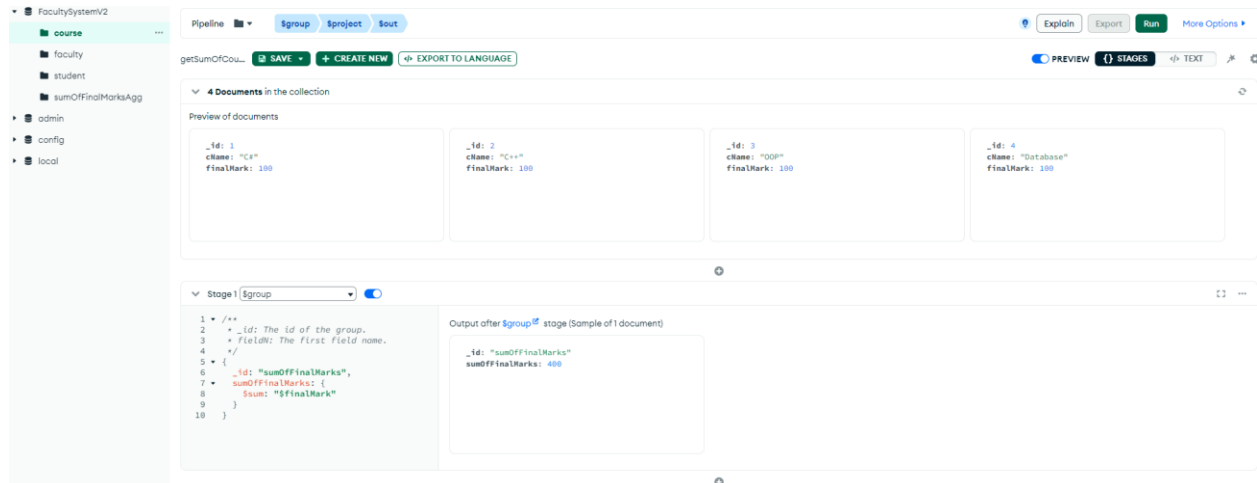
1. Create unique index on FacultyName on the Faculty collection.

2. Using aggregation display the sum of final mark for all courses in Course collection.

FacultySystemV2
  course
  faculty
  student
  sumOfFinalMarksAgg
admin
config
local

Pipeline ▸ $group $project $out

getSumOfCou... 💾 SAVE ▾ + CREATE NEW </> EXPORT TO LANGUAGE

⊕

Stage 2 [$project ▾] ⬤

```
1 ▾ /**
2    * specifications: The fields to
3    *   include or exclude.
4    */
5 ▾ {
6      _id:0
7    }
```

Output after $project ⧉ stage (Sample of 1 document)

```
sumOfFinalMarks: 400
```

⊕

Stage 3 [$out ▾] ⬤

```
1 ▾ /**
2    * Provide the name of the output collect
3    */
4    'sumOfFinalMarksAgg'
```

Documents will be saved to FacultySystemV2.sumOfFinalMarksAgg.

The $out operator will cause the pipeline to persist the
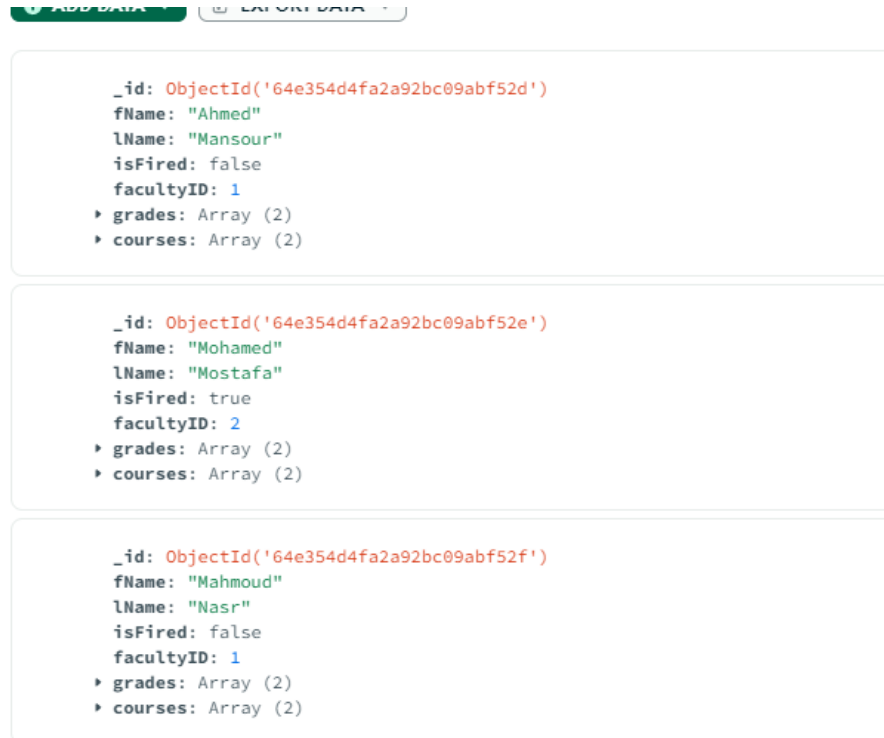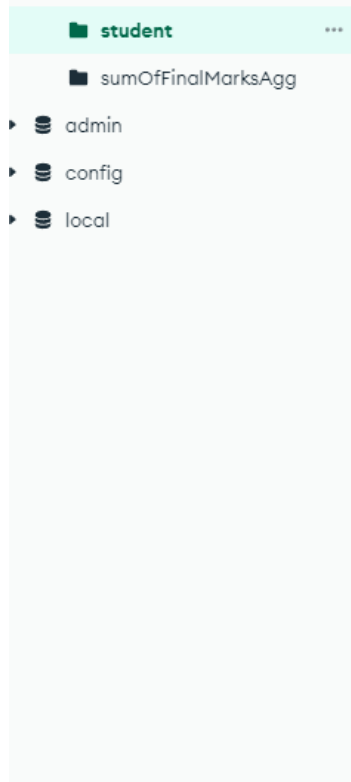

FacultySystemV2
  course
  faculty
  student
  sumOfFinalMarksAgg ...
admin

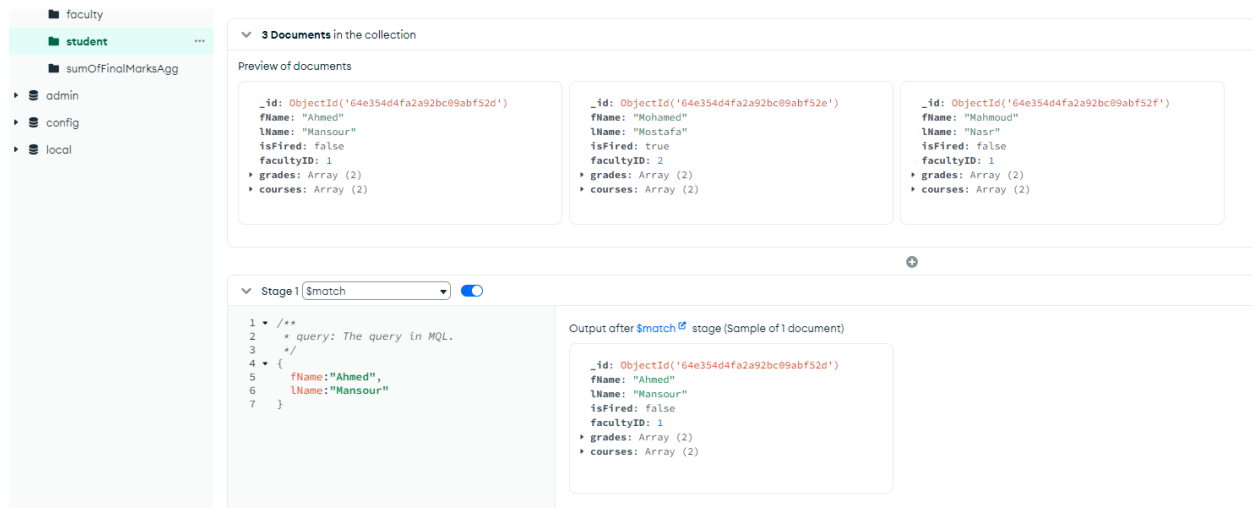Filter ⧉ 🕐 ▾   Type a query: { field: 'value' }

⊕ ADD DATA ▾   ⧉ EXPORT DATA ▾

```
_id: ObjectId('64e5e7b0941918b6895a00bd')
sumOfFinalMarks: 400
```

3. Implement (one to many) relation between Student and Course, by adding array of Courses IDs in the student object.

student

sumOfFinalMarksAgg

▸ 🛢 admin

▸ 🛢 config

▸ 🛢 local

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
▸ courses: Array (2)
```

```
_id: ObjectId('64e354d4fa2a92bc09abf52e')
fName: "Mohamed"
lName: "Mostafa"
isFired: true
facultyID: 2
▸ grades: Array (2)
▸ courses: Array (2)
```

```
_id: ObjectId('64e354d4fa2a92bc09abf52f')
fName: "Mahmoud"
lName: "Nasr"
isFired: false
facultyID: 1
▸ grades: Array (2)
▸ courses: Array (2)
```

- Select specific student with his name, and then display his courses.

faculty
student
sumOfFinalMarksAgg
▸ 🛢 admin
▸ 🛢 config
▸ 🛢 local

3 Documents in the collection

Preview of documents

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
▸ courses: Array (2)
```

```
_id: ObjectId('64e354d4fa2a92bc09abf52e')
fName: "Mohamed"
lName: "Mostafa"
isFired: true
facultyID: 2
▸ grades: Array (2)
▸ courses: Array (2)
```

```
_id: ObjectId('64e354d4fa2a92bc09abf52f')
fName: "Mahmoud"
lName: "Nasr"
isFired: false
facultyID: 1
▸ grades: Array (2)
▸ courses: Array (2)
```

Stage 1 $match

```
1 ▾ /**
2    * query: The query in MQL.
3    */
4 ▾ {
5      fName:"Ahmed",
6      lName:"Mansour"
7 }
```

Output after $match stage (Sample of 1 document)

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
▸ courses: Array (2)
```

Stage 2 $unwind

```
1  /**
2   * path: Path to the array field.
3   * includeArrayIndex: Optional name for i
4   * preserveNullAndEmptyArrays: Optional
5   *   toggle to unwind null and empty valu
6   */
7  {
8    path: "$courses"
9  }
```

Output after $unwind stage (Sample of 2 documents)

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
courses: 1
```

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
courses: 2
```

Stage 3 $lookup

```
1  /**
2   * from: The target collection.
3   * localField: The local join field.
4   * foreignField: The target join field.
5   * as: The name for the results.
6   * pipeline: Optional pipeline to run on t
7   * let: Optional variables to use in the p
8   */
9  {
10   from: "course",
11   localField: "courses",
12   foreignField: "_id",
13   as: "courseAsArray"
14 }
```

Output after $lookup stage (Sample of 2 documents)

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
courses: 1
▸ courseAsArray: Array (1)
```

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
courses: 2
▸ courseAsArray: Array (1)
```

Stage 4 $replaceRoot

```
1  /**
2   * replacementDocument: A document or stri
3   */
4  {
5    newRoot: {
6      $mergeObjects:[
7        "$$ROOT",
8        {
9          "courseObject": {
10           $arrayElemAt:["$courseAsArray",
11         }
12       }
13     ]
14   }
15 }
```

Output after $replaceRoot stage (Sample of 2 documents)

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
courses: 1
▸ courseAsArray: Array (1)
▸ courseObject: Object
```

```
_id: ObjectId('64e354d4fa2a92bc09abf52d')
fName: "Ahmed"
lName: "Mansour"
isFired: false
facultyID: 1
▸ grades: Array (2)
courses: 2
▸ courseAsArray: Array (1)
▸ courseObject: Object
```

Stage 5 $project

```
1  /**
2   * specifications: The fields to
3   *   include or exclude.
4   */
5  {
6    {
7      _id:0,
8      fName:1,
9      lName:1,
10     courseObject:1
    }
```

Output after $project stage (Sample of 2 documents)

```
fName: "Ahmed"
lName: "Mansour"
▸ courseObject: Object
```

```
fName: "Ahmed"
lName: "Mansour"
▸ courseObject: Object
```

Stage 6 $out

```
1  /**
2   * Provide the name of the output collect
3   */
4  'allCoursesInfoForOneStudent'
```

allCoursesInfoForOn... ···

course

faculty

student

sumOfFinalMarksAgg

▶ admin

▶ config

▶ local

Filter 🕓 ▾   Type a query: { field: 'value' }

⊕ ADD DATA ▾   ☑ EXPORT DATA ▾

```
_id: ObjectId('64e5ec32941918b6895a035c')
fName: "Ahmed"
lName: "Mansour"
▶ courseObject: Object
```

```
_id: ObjectId('64e5ec32941918b6895a035d')
fName: "Ahmed"
lName: "Mansour"
▶ courseObject: Object
```

4. Implement relation between Student and faculty by adding the faculty object in the student using _id Relation.

- Using $Lookup Select specific student with his name, and then display his faculty.

Stage 4 `$out`

```
1 ▼  /**
2       * Provide the name of the output collect
3       */
4     'facultyForOneStudent'
```

Docur

FacultySystemV2
- allCoursesInfoForOneStu...
- course
- faculty
- **facultyForOneStudent** ...
- student
- sumOfFinalMarksAgg

▶ admin
▶ config
▶ local

Filter ⧉ 🕐 ▾   Type a query: { field: 'value' }

⊕ ADD DATA ▾   ⧉ EXPORT DATA ▾

```
_id: ObjectId('64e354d4fa2a92bc09abf52e')
fName: "Mohamed"
lName: "Mostafa"
isFired: true
facultyID: 2
▸ grades: Array (2)
▸ courses: Array (2)
▸ facultyAsArray: Array (1)
▸ facultyObject: Object
```

5. Display each student Full Name along with his average grade in all courses.
   $concat

Bonus:

1. In Assignment No.4, Display Student data along with his faculty data (in one Object).
2. Re-implement the relation between Student and faculty, by Adding a list of students in the faculty object using DBRef.
   - Select specific faculty and display the students on it.
3. Retrieve and insert to MongoDB using a C# Desktop / Web application.
4. Install Redis database, and try to insert and select data from it.

<Script>document.write("Thank YOU") </Script>