MongoDB Schema

# 1. Identify the Main Entities

* - Students
* - Courses
* - Modules
* - Instructors
* - Reviews

# 2. Design the MongoDB Schema:

## a. Students

{  
 studentId: "haibh6",  
 name: "Hai Bui Hoang",  
 email: "haibh6@fpt.com",  
 courses: [ObjectId("nodejs)]  
}

## b. Instructors

{  
 \_id: ObjectId("vunt13"),  
 name: "Vu Nguyen Tuan",  
 department: "CLS"  
}

## c. Courses

{  
 \_id: ObjectId("nodejs"),  
 name: "Introduction to NodeJs",  
 modules: [  
 {  
 \_id: ObjectId("js"),  
 title: "Javascript",  
 instructorId: ObjectId("vunt13"),  
 reviews: [  
 {  
 studentId: ObjectId("haibh6"),  
 contentRating: 4,  
 instructorRating: 5,  
 feedback: "Great content and teaching",  
 date: ISODate("2025-06-01T00:00:00Z")  
 }  
 ]  
 }  
 ]  
}

## d. Reviews

Embedded inside course.modules. Contains both content and instructor ratings from a student.

# 2. MongoDB Aggregation Queries

## a. List course by ID

db.courses.find({ \_id: ObjectId("nodejs") })

## b. List all reviews for a specific module

db.courses.aggregate([  
 { $unwind: "$modules" },  
 { $match: { "modules.\_id": ObjectId("js") } },  
 {  
 $project: {  
 \_id: 0,  
 moduleTitle: "$modules.title",  
 reviews: "$modules.reviews"  
 }  
 }  
])

## c. Calculate average rating for a module

db.courses.aggregate([  
 { $unwind: "$modules" },  
 { $match: { "modules.\_id": ObjectId("js") } },  
 { $unwind: "$modules.reviews" },  
 {  
 $group: {  
 \_id: "$modules.\_id",  
 avgContentRating: { $avg: "$modules.reviews.contentRating" },  
 avgInstructorRating: { $avg: "$modules.reviews.instructorRating" }  
 }  
 }  
])

## d. Calculate average rating for an instructor

db.courses.aggregate([  
 { $unwind: "$modules" },  
 { $match: { "modules.instructorId": ObjectId("vutn13") } },  
 { $unwind: "$modules.reviews" },  
 {  
 $group: {  
 \_id: "$modules.instructorId",  
 avgInstructorRating: { $avg: "$modules.reviews.instructorRating" }  
 }  
 }  
])

## e. List highest-rated modules within each course

db.courses.aggregate([  
 { $unwind: "$modules" },  
 { $unwind: "$modules.reviews" },  
 {  
 $group: {  
 \_id: {  
 courseId: "$\_id",  
 moduleId: "$modules.\_id",  
 moduleTitle: "$modules.title"  
 },  
 avgContentRating: { $avg: "$modules.reviews.contentRating" }  
 }  
 },  
 { $sort: { "\_id.courseId": 1, avgContentRating: -1 } },  
 {  
 $group: {  
 \_id: "$\_id.courseId",  
 topModule: { $first: "$\_id.moduleTitle" },  
 rating: { $first: "$avgContentRating" }  
 }  
 }  
])