Assignment
ExpressJS Web Application with MySQL and Mongo Databases

Contents

Introduction

Write an ExpressJS web application that queries and updates a MySQL database and a Mongo database.

The MySQL database is called `proj2024mysql` and can be downloaded from the *Project* section of Moodle for this module (*proj2024Mysql.sql*).

MySQL Database

The `proj2024mysql` database consists of 3 tables:

student	
Column Name	**Details**
`sid`	Student ID
`name`	Student Name
`age`	Student Age

module	
Column Name	**Details**
`mid`	Module ID
`name`	Module Name
`credits`	Module Credits
`lecturer`	The ID of the lecturer for this module

grade	
Column Name	**Details**
`sid`	Student ID
`mid`	Module ID
`grade`	The Student's grade in this module

Full details of the Primary and Foreign Keys as well as datatypes can be found in the database itself.

Import *proj2024Mysql.sql* into MySQL to setup the initial database.

Mongo Database

The Mongo database can be downloaded from the *Project* section of Moodle for this module (*proj2024MongoDB.json*).

The Mongo database name must be `proj2024MongoDB`, and the collection containing the documents must be called `lecturers`.

The file *proj2024MongoDB.json* contains:

```
{ "_id": "L001", "name": "Mark Collins", "did": "ART" }
{ "_id": "L002", "name": "Barbara O'Toole", "did": "ART" }
{ "_id": "L003", "name": "Paddy McDonagh", "did": "CIV" }
{ "_id": "L004", "name": "Josie Sullivan", "did": "COM" }
{ "_id": "L005", "name": "Tommy Hyde", "did": "COM" }
{ "_id": "L006", "name": "Anne Mulligan", "did": "ENG" }
{ "_id": "L007", "name": "Arthur McNamee", "did": "ENG" }
{ "_id": "L008", "name": "Fiona Murphy", "did": "MAT" }
{ "_id": "L009", "name": "John Armstrong", "did": "MAT" }
{ "_id": "L010", "name": "Cathal O'Donovan", "did": "MEC" }
{ "_id": "L011", "name": "Fergus McMathuna", "did": "SOC" }
```

Import *proj2024MongoDB.json* into MongoDB to setup the initial database as follows:

```
mongoimport.exe --db=proj2024MongoDB --collection=lecturers --
file="<path proj2024MongoDB.json>"
```

Marks

This assignment is worth 50% of the marks for the module.
90% of the marks for this assignment will be for implementing the functionality in this document.
10% of the marks for this assignment will be for innovation, extra functionality, exceeding the requirements listed in this document.

Any innovation etc. must be clearly indicated in a file called *Innovation.pdf* stored in the root folder of your application.

NOTE: Students may be invited to an MS Teams meeting for a viva explanation of any or all parts of their submission.

Plagiarism will be dealt with in accordance with the university's Student Code.

Submission of the Project

The zipped project (named GXXXXXXXX.zip where GXXXXXXXX is your student number) should be uploaded to the *Project* section of Moodle no later than **Tuesday, January 6th, 2025 at 9:00am.**

You must have a file entitled *GitLocation.pdf* in the root folder of your application which contains a link to the GIT repository you used when developing your project.

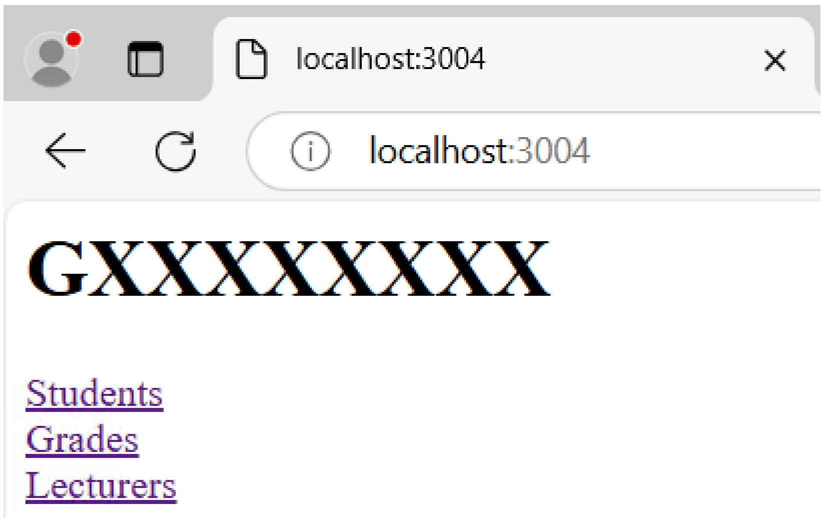
Overview of Web App

The web app must run on port 3004, and handle the following HTTP routes and methods:

GET /(Home Page)

The Home page consists of 3 links:

- One to the *Students* page
- One to the *Grades* page
- One to the *Lecturers* (MongoDB) page



GXXXXXXXX

Students
Grades
Lecturers

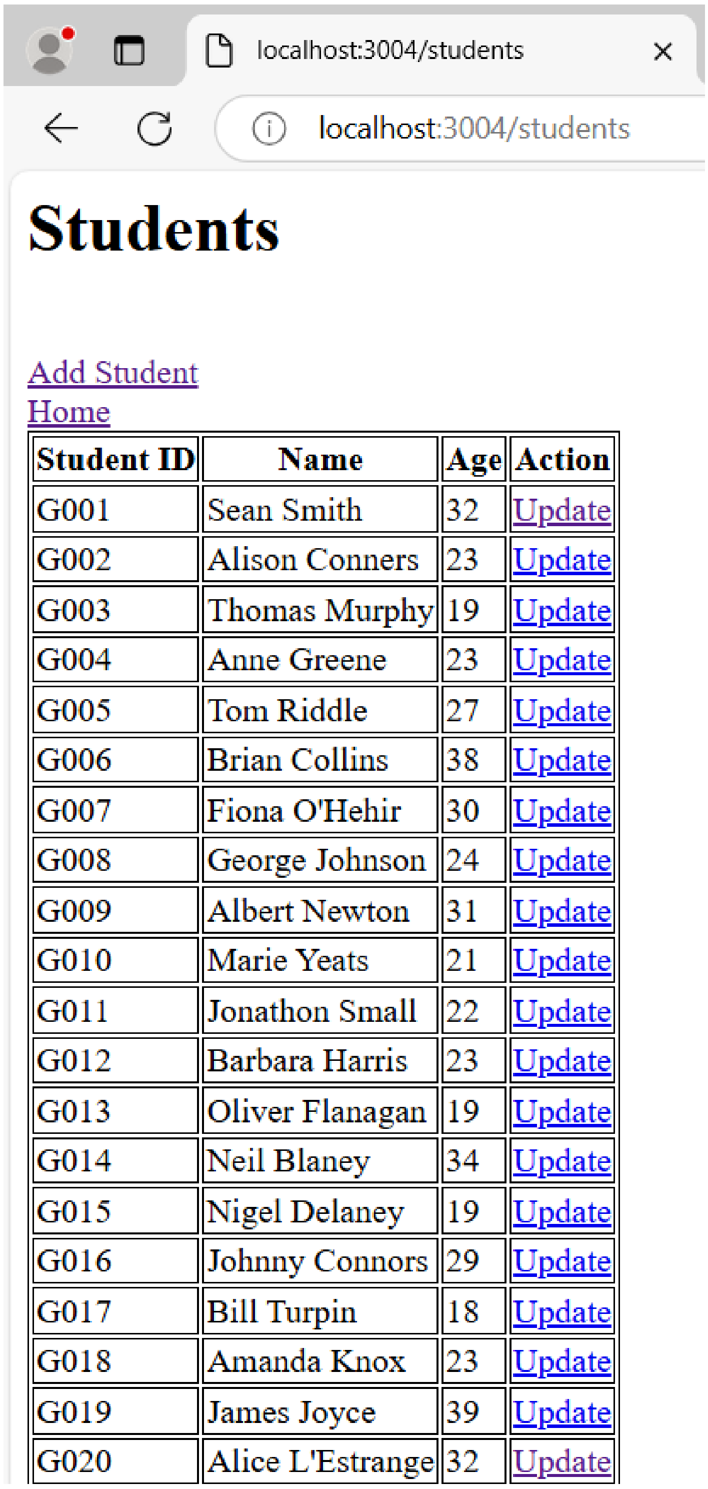
Figure 1 Main Page

GET /students (Students Page)

The *Students* page:

- Shows details of all Students.
- Has an *Update* link for each Student.
- Has an *Add Student* link.
- Has a link to the *Home* page.

The *Students Page* should show data in alphabetical order by student ID.



Students

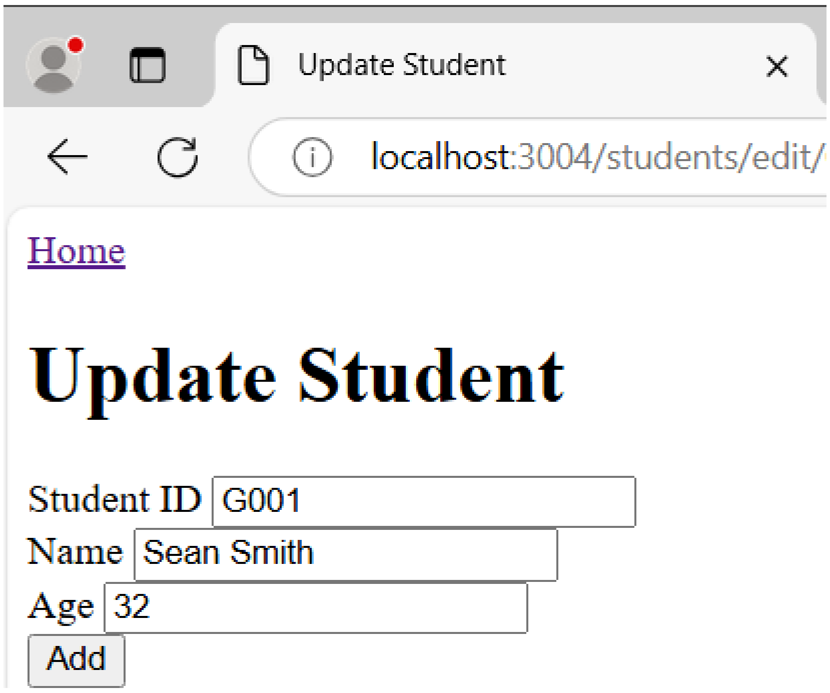
Add Student
Home

Student ID	Name	Age	Action
G001	Sean Smith	32	Update
G002	Alison Conners	23	Update
G003	Thomas Murphy	19	Update
G004	Anne Greene	23	Update
G005	Tom Riddle	27	Update
G006	Brian Collins	38	Update
G007	Fiona O'Hehir	30	Update
G008	George Johnson	24	Update
G009	Albert Newton	31	Update
G010	Marie Yeats	21	Update
G011	Jonathon Small	22	Update
G012	Barbara Harris	23	Update
G013	Oliver Flanagan	19	Update
G014	Neil Blaney	34	Update
G015	Nigel Delaney	19	Update
G016	Johnny Connors	29	Update
G017	Bill Turpin	18	Update
G018	Amanda Knox	23	Update
G019	James Joyce	39	Update
G020	Alice L'Estrange	32	Update

Figure 2 Students Page

GET /students/edit/:sid, POST /students/edit/:sid (Update Student Page)

When the *Update* link is clicked beside a student, a GET request is sent to `/students/edit/:sid` and the student's details are shown.



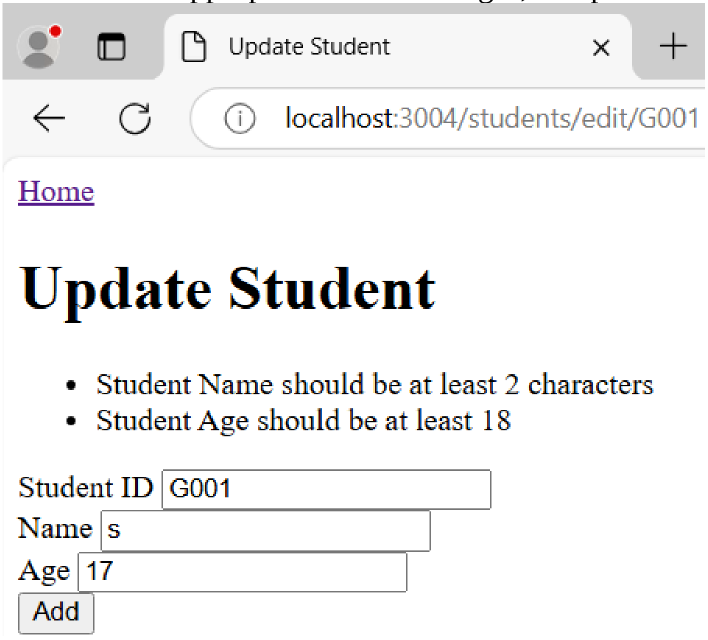
Update Student

Student ID G001
Name Sean Smith
Age 32
Add

Figure 3 Update Student Page

- Student ID is not editable.
- Name should be a minimum of 2 characters.
- Age should be 18 or older.

If incorrect information is entered, the *Update Student* page should be returned to the user with the appropriate error messages, and previous data entered.



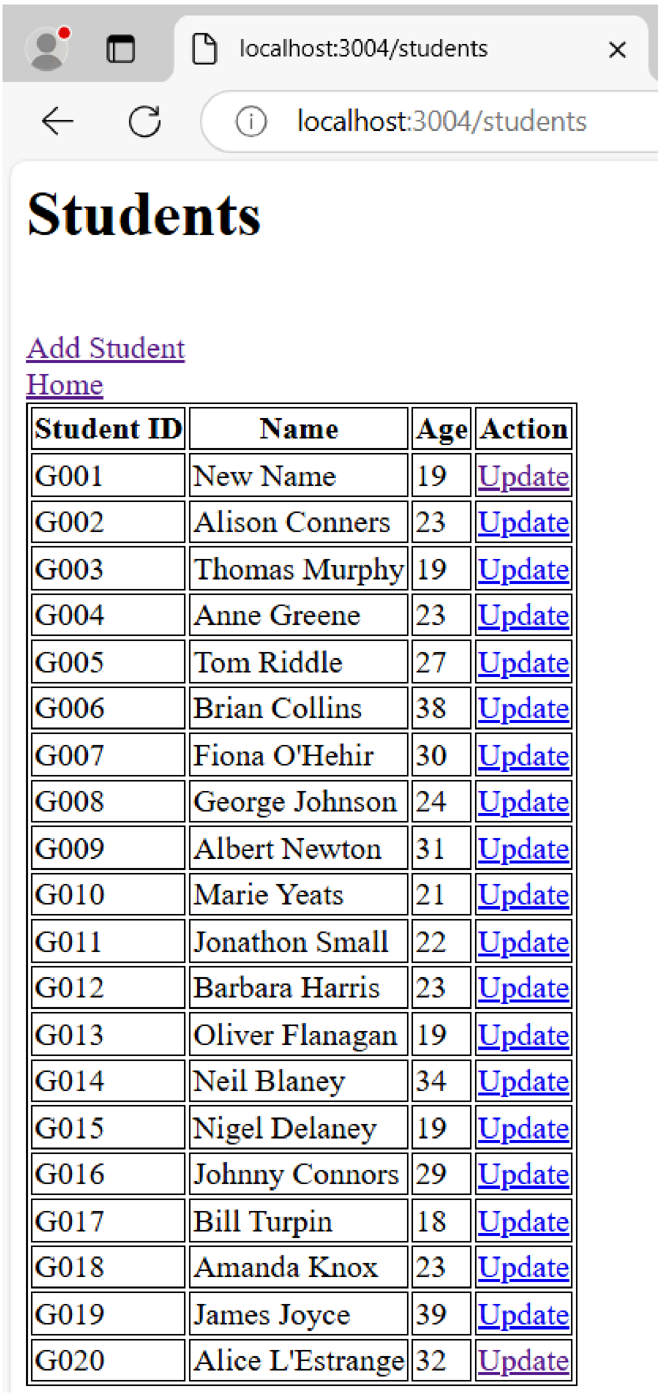
Update Student

- Student Name should be at least 2 characters
- Student Age should be at least 18

Student ID G001
Name s
Age 17
Add

Figure 4 Update Student Page with Errors

When a Student has been successfully updated in the MySQL database, the user is returned to the *Students Page*.


localhost:3004/students

localhost:3004/students

Students

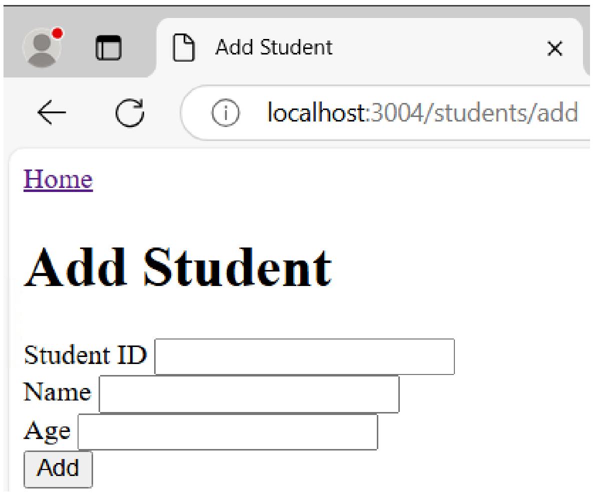
Add Student
Home

Student ID	Name	Age	Action
G001	New Name	19	Update
G002	Alison Conners	23	Update
G003	Thomas Murphy	19	Update
G004	Anne Greene	23	Update
G005	Tom Riddle	27	Update
G006	Brian Collins	38	Update
G007	Fiona O'Hehir	30	Update
G008	George Johnson	24	Update
G009	Albert Newton	31	Update
G010	Marie Yeats	21	Update
G011	Jonathon Small	22	Update
G012	Barbara Harris	23	Update
G013	Oliver Flanagan	19	Update
G014	Neil Blaney	34	Update
G015	Nigel Delaney	19	Update
G016	Johnny Connors	29	Update
G017	Bill Turpin	18	Update
G018	Amanda Knox	23	Update
G019	James Joyce	39	Update
G020	Alice L'Estrange	32	Update

Figure 5 Student successfully updated.

GET /students/add, POST /students/add (Add Student Page)

When the *Add Student* link is clicked on the *Student Page*, a GET request is sent to `/students/add` the following form returned:



Add Student

localhost:3004/students/add

Home

Add Student

Student ID

Name

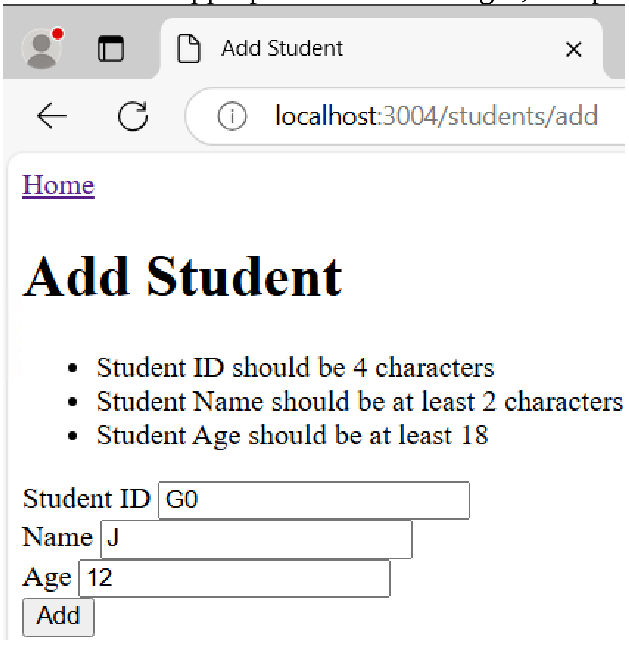
Age

Add

Figure 6 Add Student Page

- Student ID is 4 characters.
- Name should be a minimum of 2 characters.
- Age should be 18 or older.

If incorrect information is entered, the *ADD Student* page should be returned to the user with the appropriate error messages, and previous data entered.



Add Student

localhost:3004/students/add

Home

Add Student

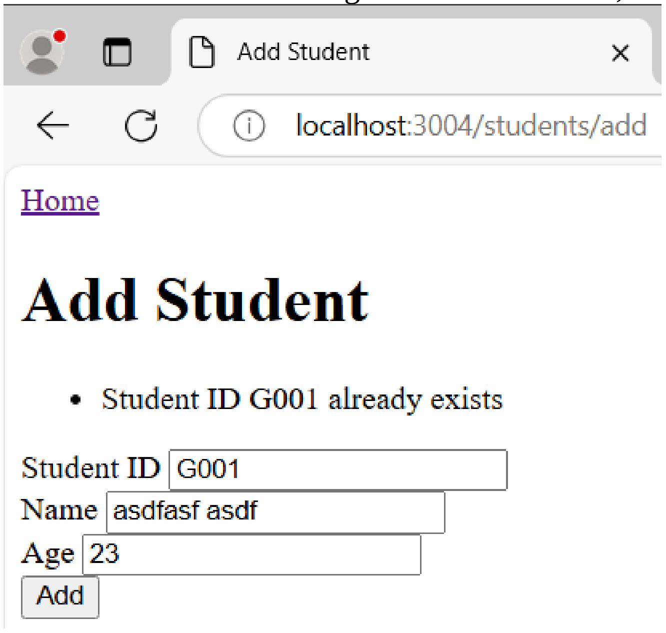
- Student ID should be 4 characters
- Student Name should be at least 2 characters
- Student Age should be at least 18

Student ID	G0
Name	J
Age	12

Add

Figure 7 Add Student Page with Errors

If a student with an existing student ID is added, an error message should be shown:



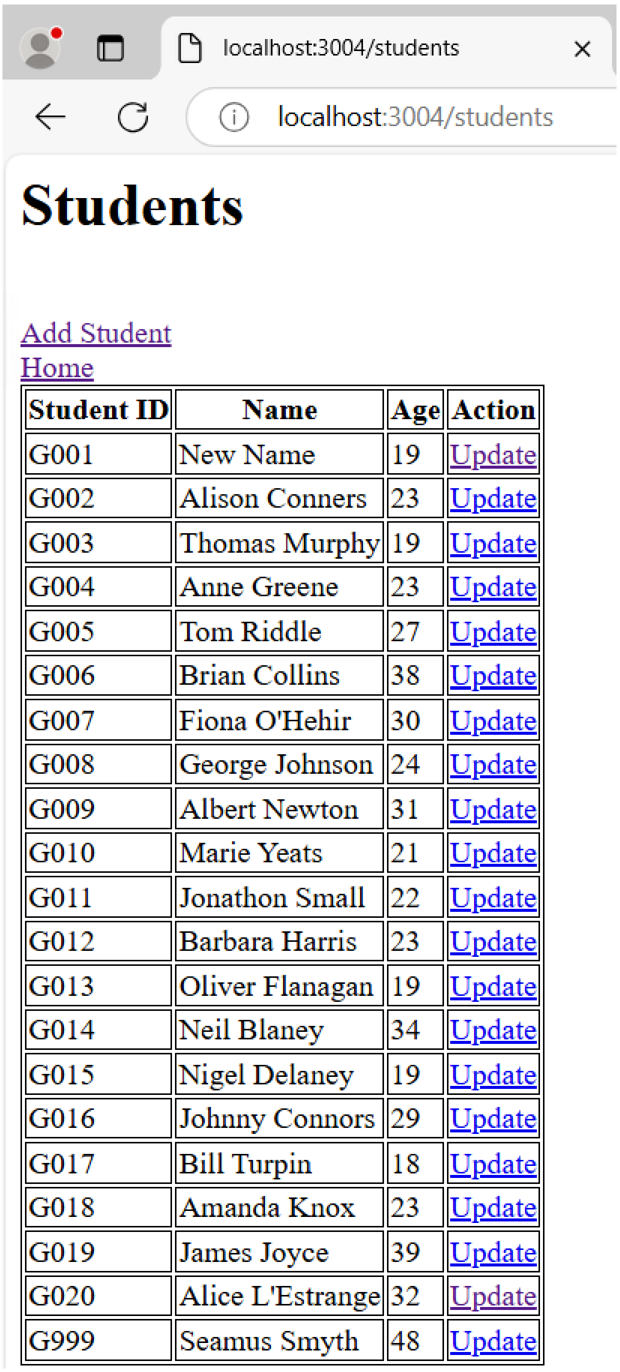
Add Student

- Student ID G001 already exists

Student ID	G001
Name	asdfasf asdf
Age	23

Figure 8 Student with ID G001 already exists

When a Student has been successfully added to the MySQL database, the user is returned to the *Students Page*.



localhost:3004/students

localhost:3004/students

Students

Add Student
Home

Student ID	Name	Age	Action
G001	New Name	19	Update
G002	Alison Conners	23	Update
G003	Thomas Murphy	19	Update
G004	Anne Greene	23	Update
G005	Tom Riddle	27	Update
G006	Brian Collins	38	Update
G007	Fiona O'Hehir	30	Update
G008	George Johnson	24	Update
G009	Albert Newton	31	Update
G010	Marie Yeats	21	Update
G011	Jonathon Small	22	Update
G012	Barbara Harris	23	Update
G013	Oliver Flanagan	19	Update
G014	Neil Blaney	34	Update
G015	Nigel Delaney	19	Update
G016	Johnny Connors	29	Update
G017	Bill Turpin	18	Update
G018	Amanda Knox	23	Update
G019	James Joyce	39	Update
G020	Alice L'Estrange	32	Update
G999	Seamus Smyth	48	Update

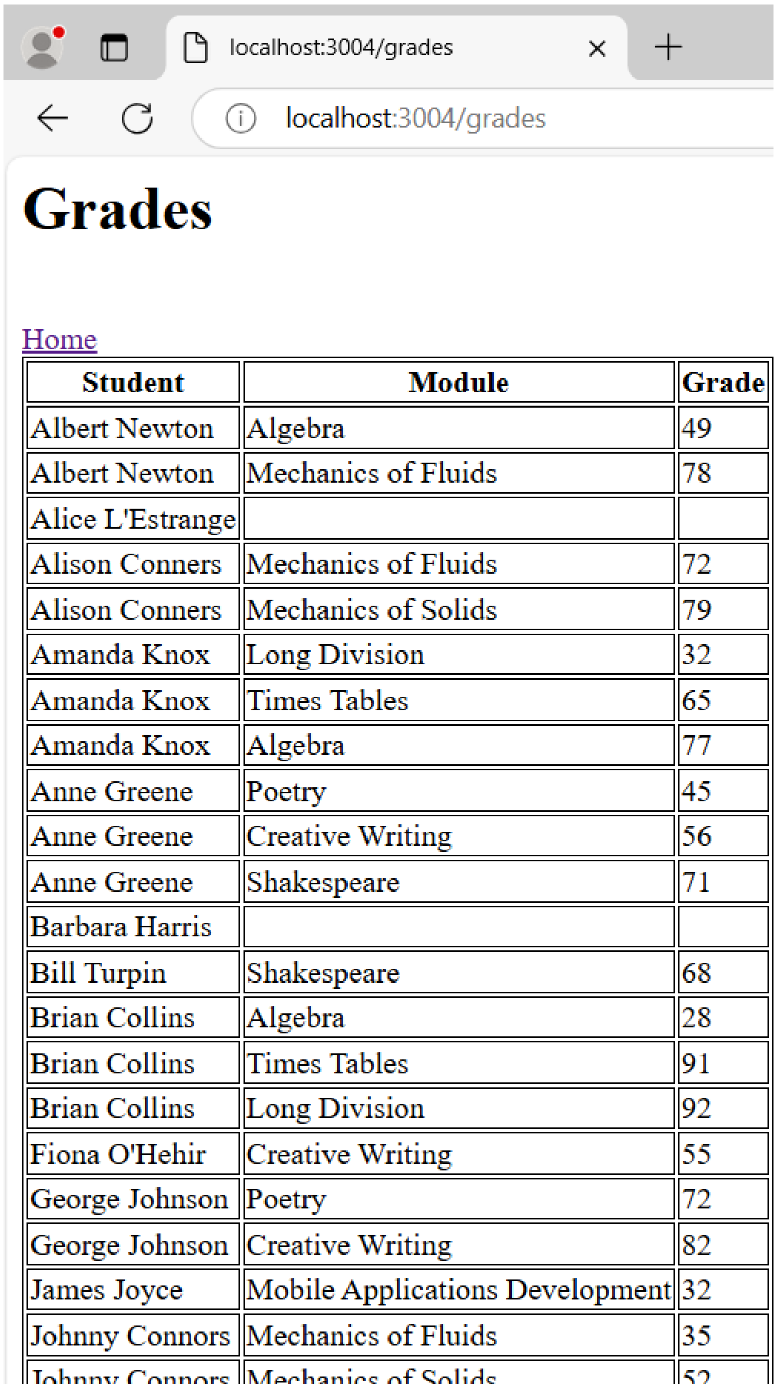
Figure 9 List of Students with newly added Student

GET /grades (Grades Page)

The *Grades* page:

- Shows each Student's *name*.
- Shows the name of each Module studied by a Student.
- Shows the grade received in each Module by a Student.
- If a student isn't studying any Module, then just the Student name should be shown.
- Has a link to the *Home* page.

The *Grades Page* should show data in alphabetical order by student name, and within that in grade order from lowest to highest.



localhost:3004/grades

Grades

Home

Student	Module	Grade
Albert Newton	Algebra	49
Albert Newton	Mechanics of Fluids	78
Alice L'Estrange		
Alison Conners	Mechanics of Fluids	72
Alison Conners	Mechanics of Solids	79
Amanda Knox	Long Division	32
Amanda Knox	Times Tables	65
Amanda Knox	Algebra	77
Anne Greene	Poetry	45
Anne Greene	Creative Writing	56
Anne Greene	Shakespeare	71
Barbara Harris		
Bill Turpin	Shakespeare	68
Brian Collins	Algebra	28
Brian Collins	Times Tables	91
Brian Collins	Long Division	92
Fiona O'Hehir	Creative Writing	55
George Johnson	Poetry	72
George Johnson	Creative Writing	82
James Joyce	Mobile Applications Development	32
Johnny Connors	Mechanics of Fluids	35
Johnny Connors	Mechanics of Solids	52

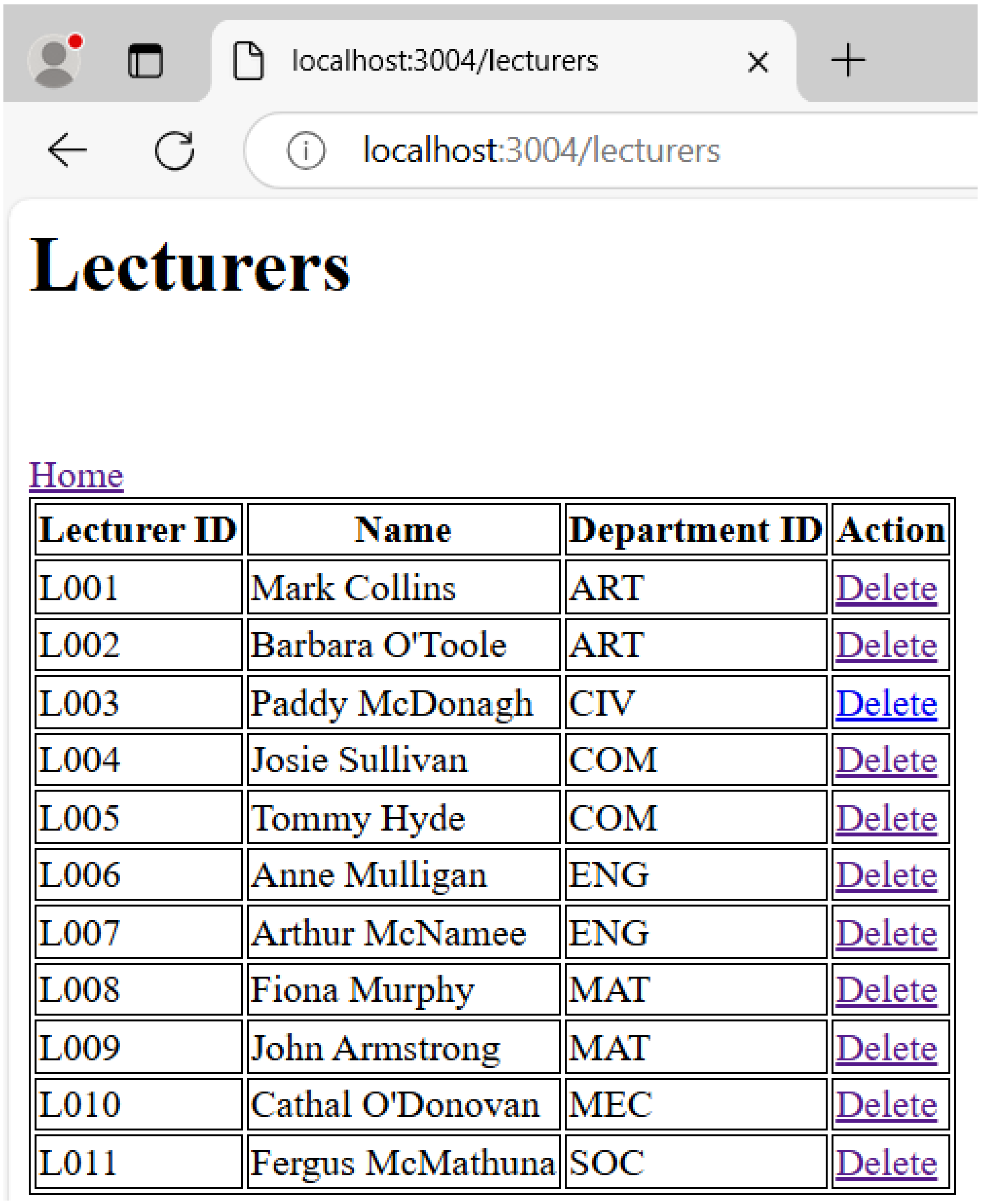
Figure 10 Grades Page

GET /lecturers (Lecturers (MongoDB) Page)

The *Lecturers* (MongoDB) page:

- Shows details of all Lecturers (from MongoDB).
- Has a *Delete* link for each Lecturer.
- Has a link back to the *Main* page.

The *Lecturers Page* should show data in alphabetical order by lecturer ID.



Lecturers

Home

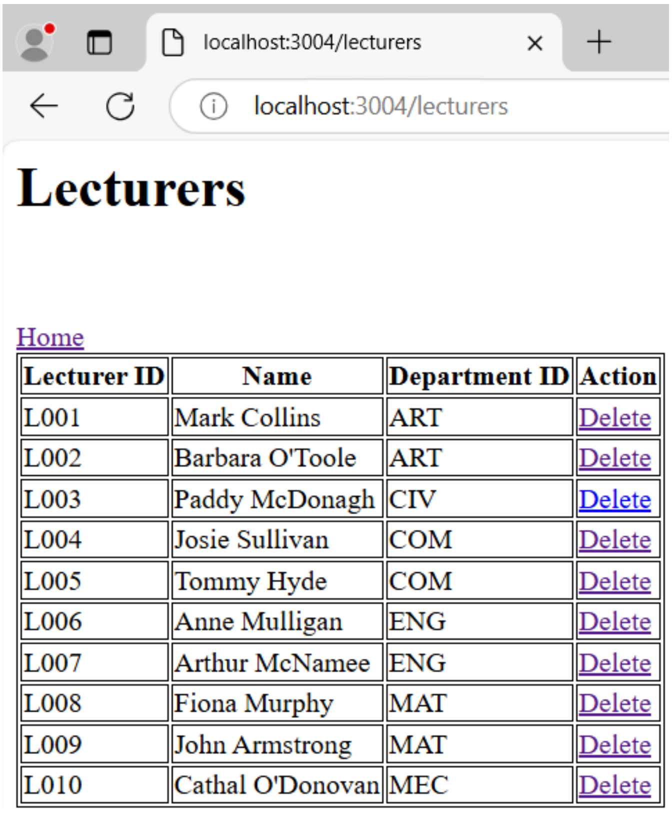
Lecturer ID	Name	Department ID	Action
L001	Mark Collins	ART	Delete
L002	Barbara O'Toole	ART	Delete
L003	Paddy McDonagh	CIV	Delete
L004	Josie Sullivan	COM	Delete
L005	Tommy Hyde	COM	Delete
L006	Anne Mulligan	ENG	Delete
L007	Arthur McNamee	ENG	Delete
L008	Fiona Murphy	MAT	Delete
L009	John Armstrong	MAT	Delete
L010	Cathal O'Donovan	MEC	Delete
L011	Fergus McMathuna	SOC	Delete

Figure 11 Lecturers (MongoDB)

GET /lecturers/delete/:lid

When the *Delete* link is clicked beside a lecturer, a GET request is sent to `/lecturers/delete/:lid`.

If the lecturer does not teach any modules, then he/she can be deleted from MongoDB, and the user returned to *Lecturers Page*.



localhost:3004/lecturers

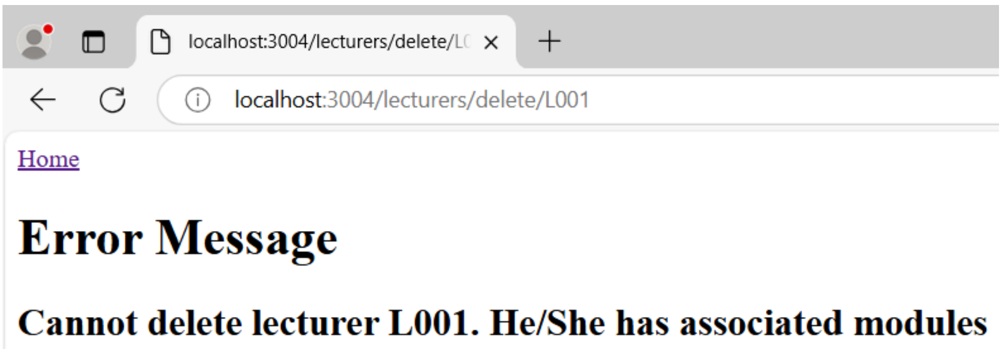
Lecturers

Home

Lecturer ID	Name	Department ID	Action
L001	Mark Collins	ART	Delete
L002	Barbara O'Toole	ART	Delete
L003	Paddy McDonagh	CIV	Delete
L004	Josie Sullivan	COM	Delete
L005	Tommy Hyde	COM	Delete
L006	Anne Mulligan	ENG	Delete
L007	Arthur McNamee	ENG	Delete
L008	Fiona Murphy	MAT	Delete
L009	John Armstrong	MAT	Delete
L010	Cathal O'Donovan	MEC	Delete

Figure 12 List of Lecturers after L011 has successfully been deleted

If the lecturer does teach a module, then an error message should be returned to the user, and the lecturer should not be deleted from MongoDB.



localhost:3004/lecturers/delete/L001

Home

Error Message

Cannot delete lecturer L001. He/She has associated modules

Figure 13 Cannot delete Lecturer L001 from MongoDB as he/she has associated modules.