COM1025 Web and Database Systems

Coursework Assignment

[Database for Judo Society]

URN	6812077
Username	sk02594
Date	3rd of January 2024

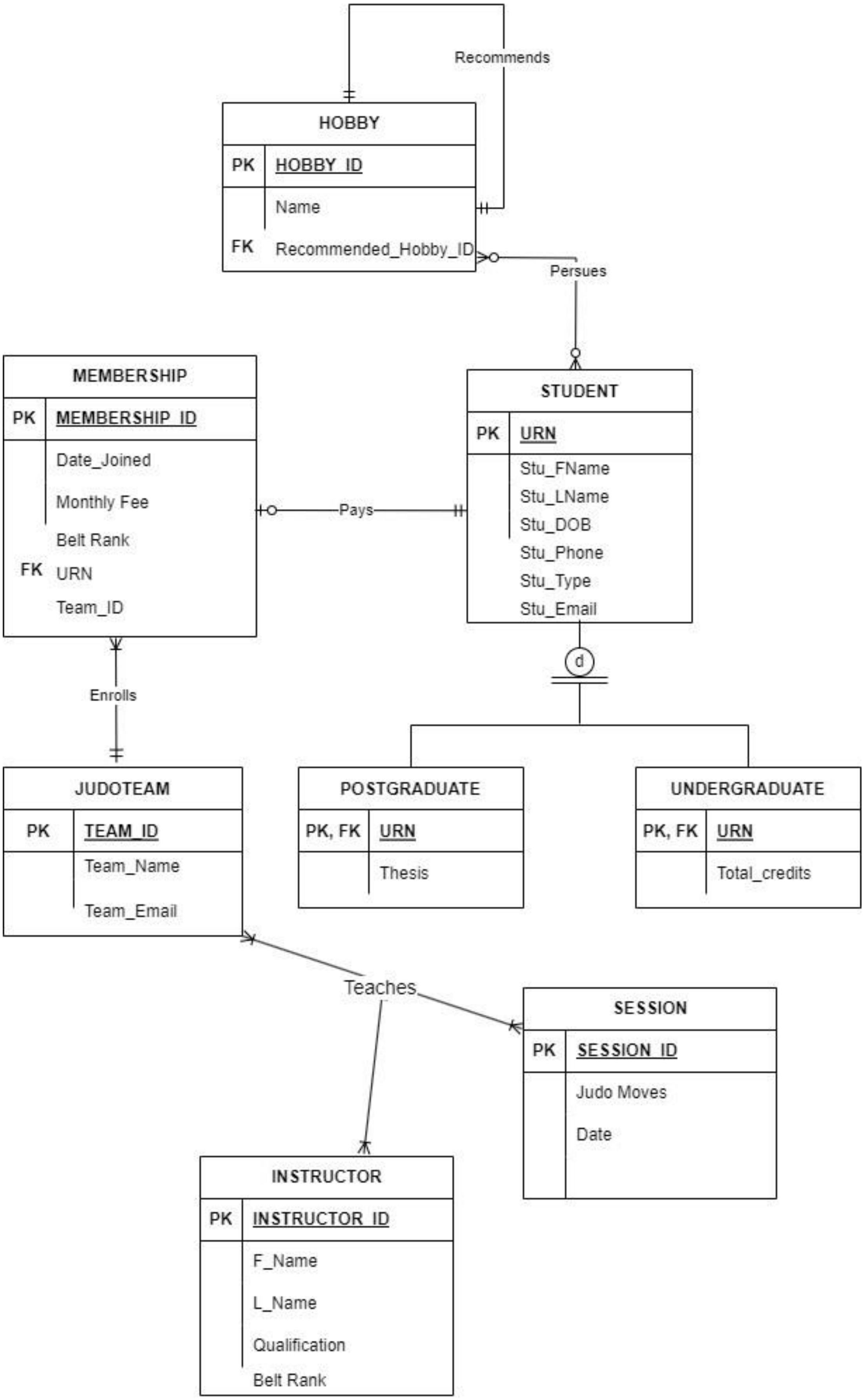
1 Business Rules

1. Student Undergraduate/ Postgraduate.
    a. The university needs to store the following details about each student: name, date of birth, a phone number, and student email.
    b. A student must be a postgraduate or an undergraduate, but they cannot be both at the same time.
2. Student – Hobby.
    a. A student can have no hobbies or can have many hobbies.
    b. A hobby can be related to no student or to many students.
    c. The current list of hobbies include reading, hiking, chess, Taichi, ballroom dancing, football, Tennis, Rugby, climbing, rowing, judo, karate, Kung fu, and karate.
3. Student- Membership.
    a. A student can have no membership or one membership.
    b. Each membership is associated with one student. If there is no student associated with the membership, then there is no membership.
    c. The member's date joined, belt rank, monthly fee, and student URN will all be stored.
4. Membership – Judo Team.
    a. Many members can join one judo team.
    b. One judo team has one or more members.
    c. Each judo team has a team name, team email, and team ID.
5. Judo Team – Instructor- Session.
    a. An instructor's first name, last name, belt rank, and qualifications are all stored. The instructor's qualifications is multivalued therefore, multiple qualifications cane be shown.
    b. A session shows the moves learned and the date the session took place.
    c. An instructor can lead a team in a session on a specific date thus, any instructor can teach any team in a session depending on who is available at that session.
6. Hobby.
    a. A hobby can recommend another hobby based on the similarity.

Assumptions

- Instructors can have one or more qualifications.
- Students only have one phone number.
- An instructor can be associated with multiple teams and sessions, a team can be associated with multiple instructors and sessions, and a session can involve multiple instructors and teams.
- Only students can be a member.

2 Extended Entity Relationship Diagram (EERD)



3 Logical Relational Database Schema

Student(URN, Stu_FName, Stu_LName, Stu_DOB, Stu_Phone, Stu_Type, stu_Email)

PRIMARY KEY: URN
FOREIGN KEY: Stu_Membership REFERENCES **Membership**(Membership_ID)

Postgraduate(URN, Thesis)

PRIMARY KEY: URN
FOREIGN KEY: URN REFERENCES **Student**(URN)

Undergraduate(URN, Total_credits)

PRIMARY KEY: URN
FOREIGN KEY: URN REFERENCES **Student**(URN)

Membership(Membership_ID, Date_Joined, Monthly_Fee, Belt_Rank, Student_ID, Team_ID)

PRIMARY KEY: Membership _ID
FOREIGN KEY: Student_ID REFERENCES **Student**(URN)
FOREIGN KEY: Team_ID REFERENCES **JudoTeam**(Team_ID)

JudoTeam(Team_ID, Team_Name, Team_Email)

PRIMARY KEY: Team_ID

Session(Session_ID, Judo_Moves, Date)

PRIMARY KEY: Session_ID

Instructor(Instructor_ID, F_Name, L_Name, Belt_Rank)

PRIMARY KEY: Instructor_ID

InstructorQualifications(Instructor_ID, Qualifications)
FOREIGN KEY: Instructor_ID REFERENCES **Instructor**(Instructor_ID)

Class(Class_ID, Instructor_ID, Team_ID, Session_ID)

PRIMARY KEY: Class_ID
FOREIGN KEY: Instructor_ID REFERENCES **Instructor**(Instructor_ID)
FOREIGN KEY: Team_ID REFERENCES **JudoTeam**(Team_ID)
FOREIGN KEY: Session_ID REFERENCES **Session**(Session_ID)

Hobby(Hobby_ID, Hobby_Name, Recommended_Hobby_ID)

PRIMARY KEY: Hobby_ID
FOREIGN KEY: Recommended_Hobby_ID REFERENCES **Hobby**(Hobby_ID)

StudentHobby(URN, Hobby_ID)

PRIMARY KEY: URN, Hobby_ID
FOREIGN KEY: Hobby_ID REFERENCES **Hobby**(Hobby_ID)
FOREIGN KEY: URN REFERENCES **Student**(URN)

4 Website Working with MySQL Database

- main.css

This file is a CSS stylesheet used to style the web page. It defines the appearance and layout of HTML elements on the page.

- index.js:

This is the main server file in an Express.js application.
It sets up the server and establishes database connections. It defines routes (URL paths) that the server will respond to and what should happen when those routes are accessed. This includes rendering EJS templates, handling form submissions, querying the database, etc.

- member_list.ejs:

An EJS file that is used to display a list of members.
it includes a HTML table where each row or item represents a member. It shows member details like name, date joined, belt rank, etc. It includes links for actions like adding, viewing, editing, or deleting a member.

- member_edit.ejs:

An EJS file for editing a member's information.

- member_view.ejs:

This EJS file is for viewing detailed information about a single member.
It displays various attributes of the member, like name, belt rank, and other relevant data.
This view is typically accessed by clicking a "View" link in the member list.

- member_add.ejs:

A file for adding a new member to the club.
Contains a form where you can input the new member's details.
The form data is sent to the server to create a new member record in the database.

- index.ejs:

This is the homepage of the web application.
It displays summaries like the total number of members, instructors, etc.
Also, contains navigation links to other parts of the application, like the member list, instructor list, etc.

- session_list.ejs:

An EJS file that is used to display a list of sessions.

- team_list.ejs:

An EJS file that is used to display a list of judo teams.

- instructor_list.ejs:

An EJS file that is used to display a list of judo instructors.

- navbar.ejs:

An ejs file that provides a way to navigate between different pages of the website.

5 Advanced Tasks

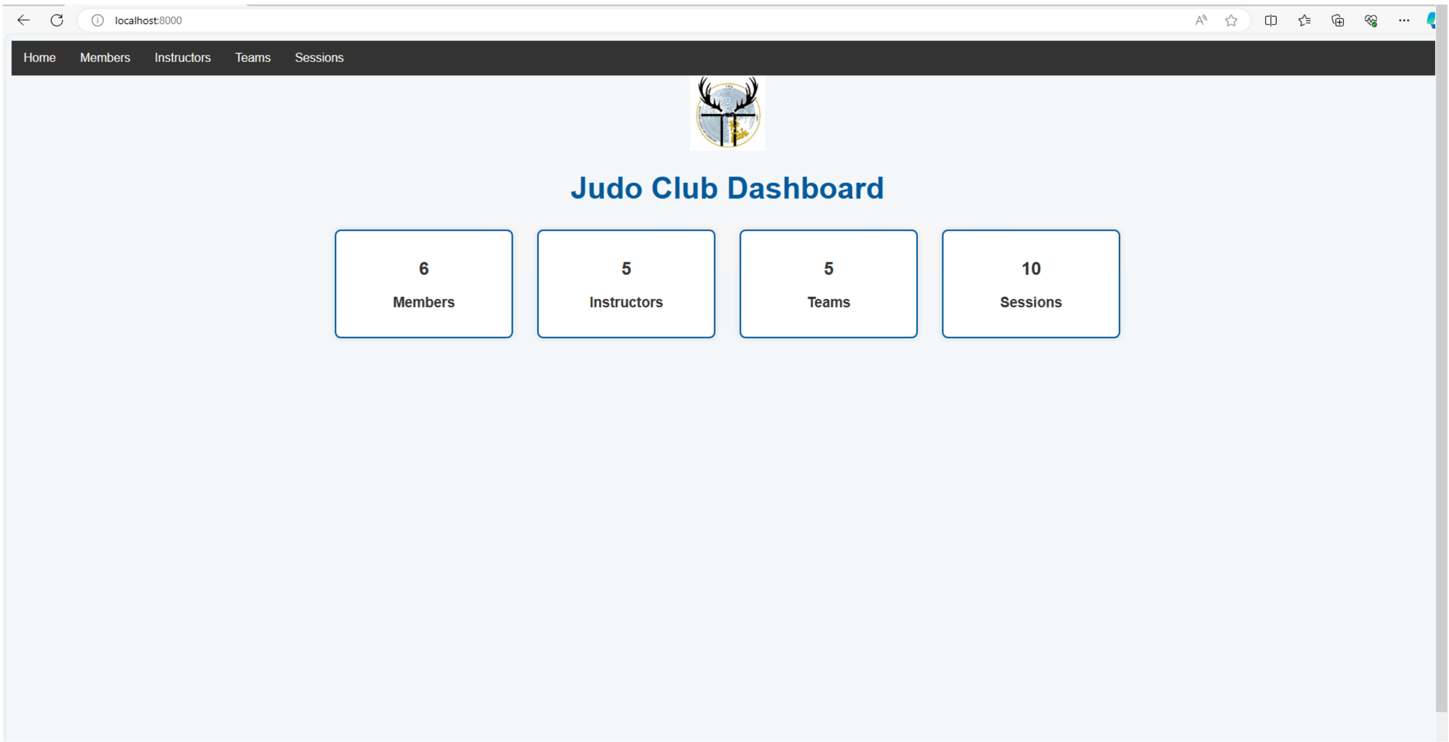
- Established a Ternary Relationship (Instructor, Team and Session)
- 2 more complex SQL queries (Found in the SQL query file)
- The functionality to create new rows of data for members.
- The functionality to delete rows of data for members.
- The functionality to search for data in the members table.

6 References

1. GitHub.(Joe,Appleton). WEB-AND-DATABASE-SYSTEMS/week-10/solutions/exercise_4_3/public/main.css at master · joeappleton18/WEB-AND-DATABASE-SYSTEMS. [online] Available at: https://github.com/joeappleton18/WEB-AND-DATABASE-SYSTEMS/blob/master/week-10/solutions/exercise_4_3/public/main.css [Accessed 2 Jan. 2024].

7 Appendix: Screenshots of Website

1. Home Page:



Judo Club Dashboard

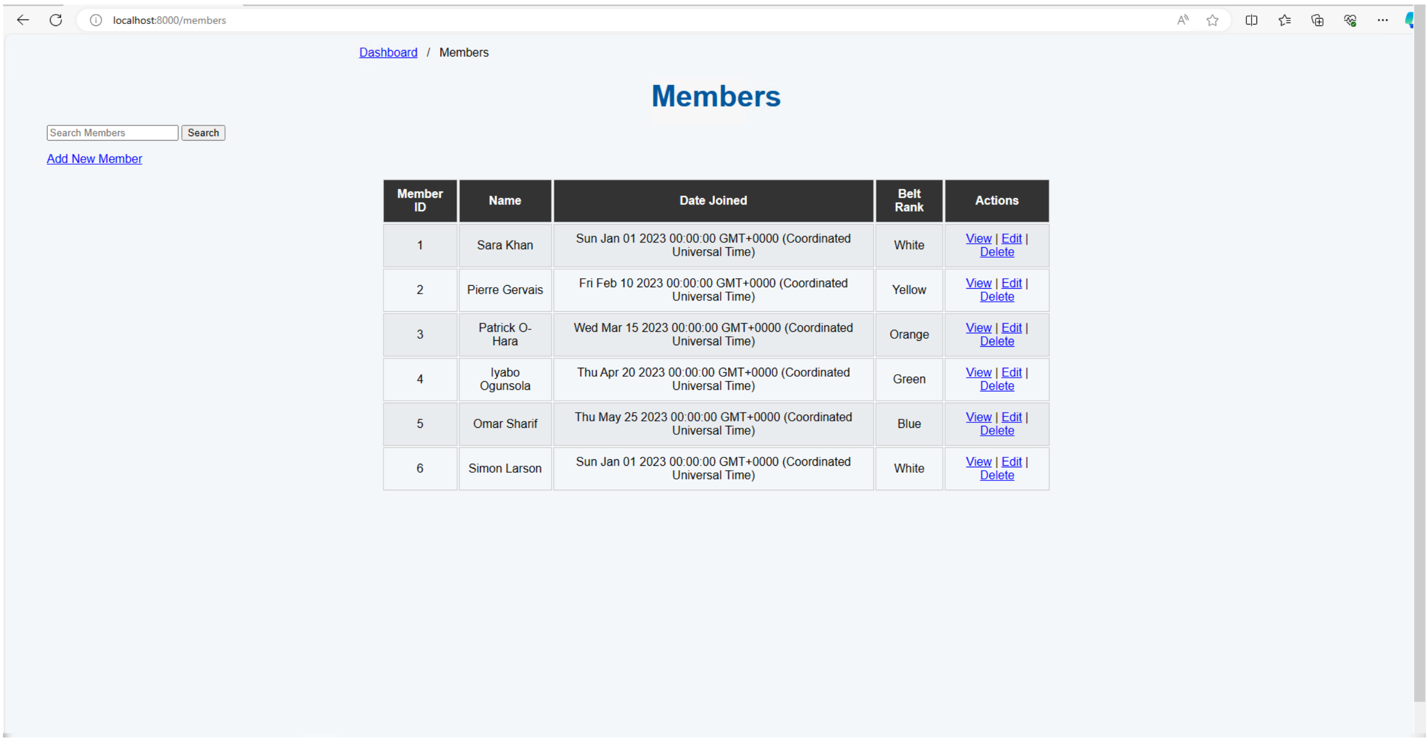
6 Members

5 Instructors

5 Teams

10 Sessions

2. Member List Page:

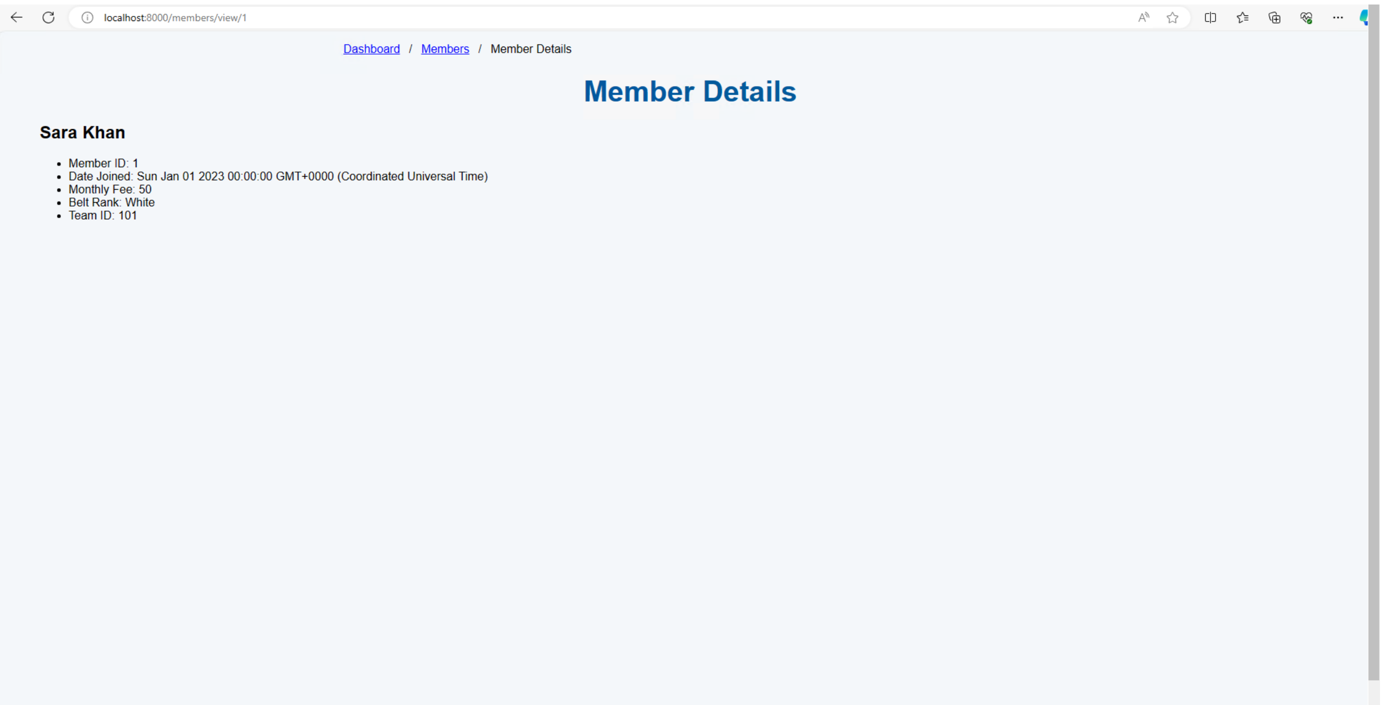


Members

Add New Member

Member ID	Name	Date Joined	Belt Rank	Actions
1	Sara Khan	Sun Jan 01 2023 00:00:00 GMT+0000 (Coordinated Universal Time)	White	View | Edit | Delete
2	Pierre Gervais	Fri Feb 10 2023 00:00:00 GMT+0000 (Coordinated Universal Time)	Yellow	View | Edit | Delete
3	Patrick O-Hara	Wed Mar 15 2023 00:00:00 GMT+0000 (Coordinated Universal Time)	Orange	View | Edit | Delete
4	Iyabo Ogunsola	Thu Apr 20 2023 00:00:00 GMT+0000 (Coordinated Universal Time)	Green	View | Edit | Delete
5	Omar Sharif	Thu May 25 2023 00:00:00 GMT+0000 (Coordinated Universal Time)	Blue	View | Edit | Delete
6	Simon Larson	Sun Jan 01 2023 00:00:00 GMT+0000 (Coordinated Universal Time)	White	View | Edit | Delete

3. Member View Page:



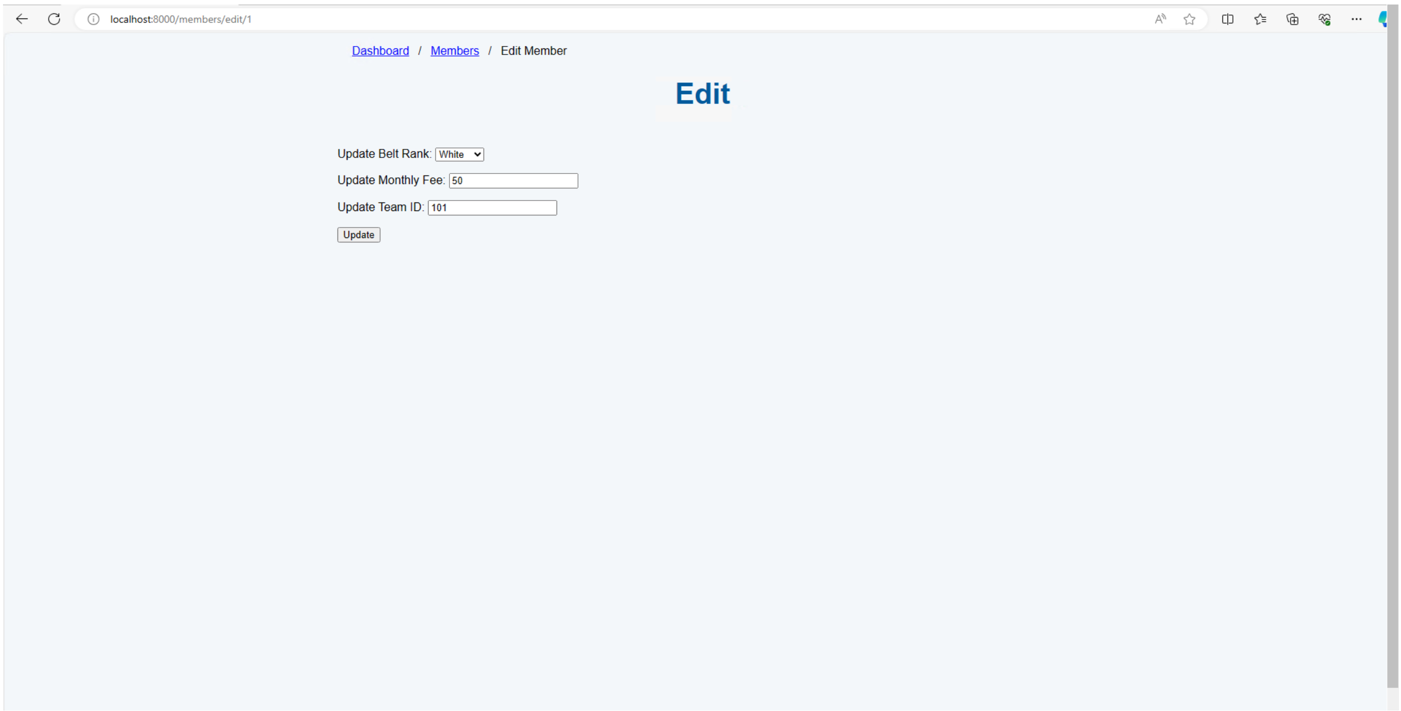
Dashboard / Members / Member Details

Member Details

Sara Khan

- Member ID: 1
- Date Joined: Sun Jan 01 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
- Monthly Fee: 50
- Belt Rank: White
- Team ID: 101

4. Member edit page:



Dashboard / Members / Edit Member

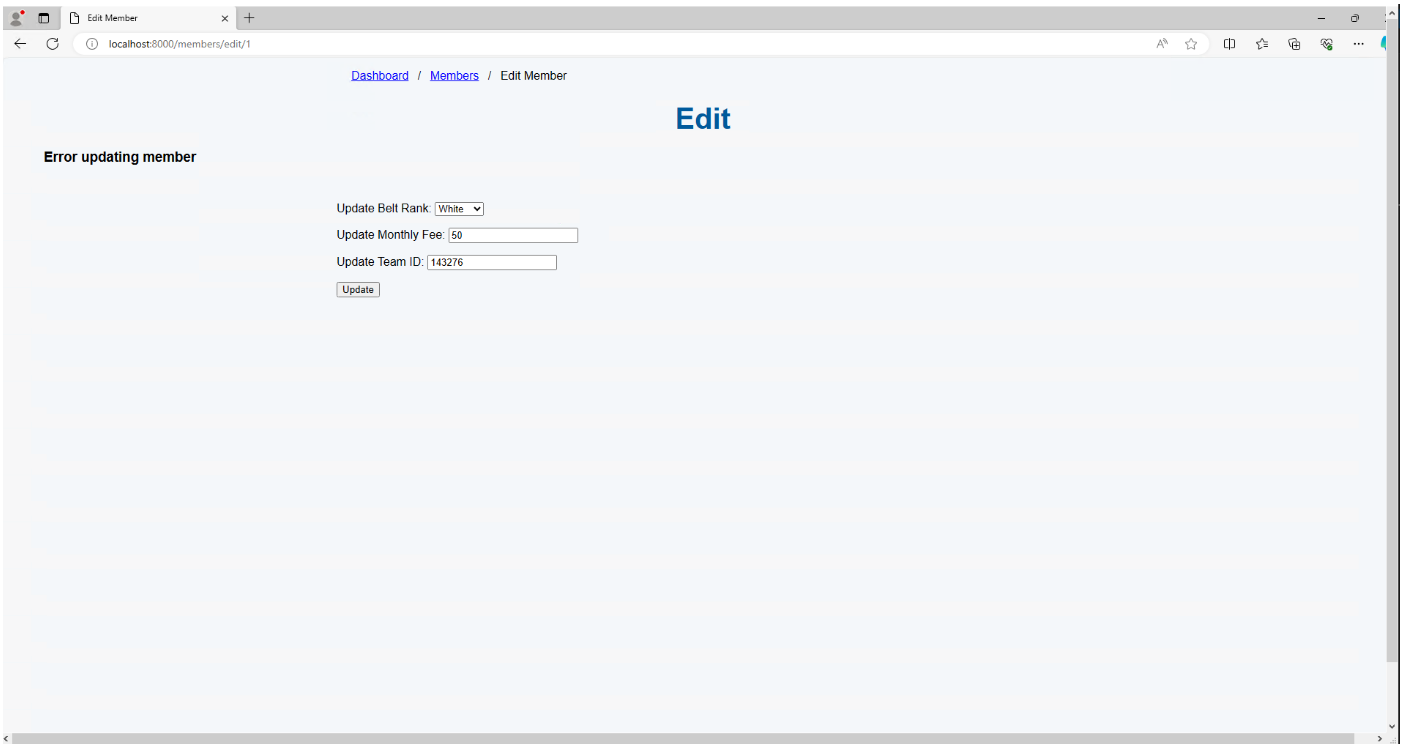
Edit

Update Belt Rank: White

Update Monthly Fee: 50

Update Team ID: 101

5. Member add Constraint:



Edit Member
localhost:8000/members/edit/1
Dashboard / Members / Edit Member

Edit

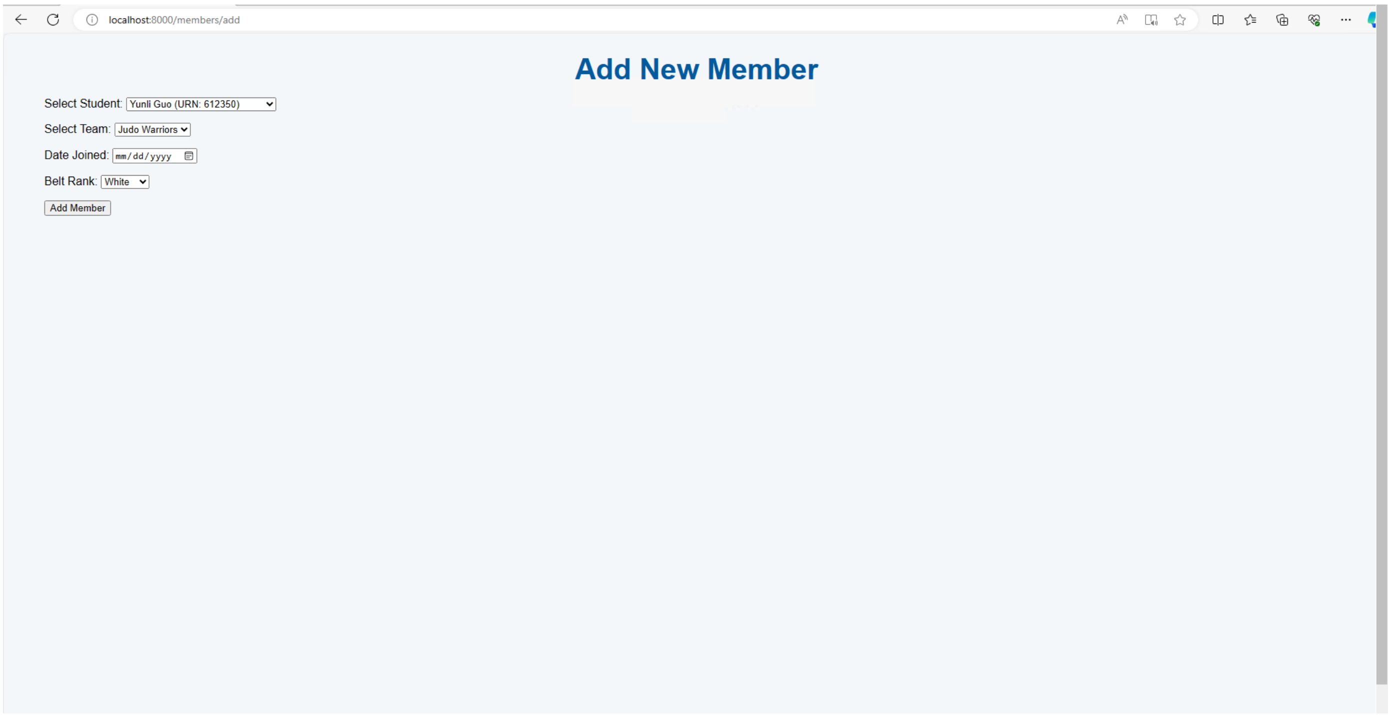
Error updating member

Update Belt Rank: White

Update Monthly Fee: 50

Update Team ID: 143276

6. Member Add Page:



Add New Member

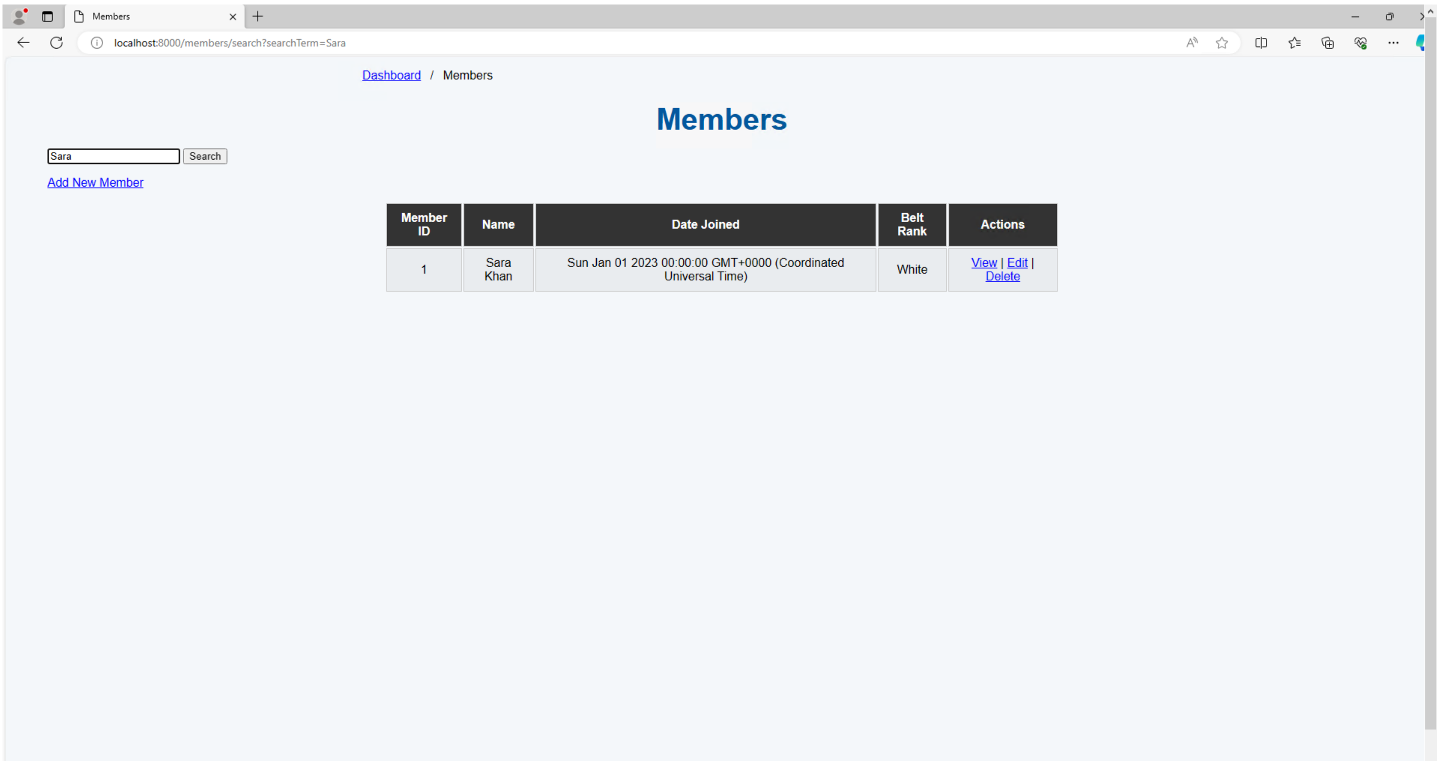
Select Student: Yunli Guo (URN: 612350)

Select Team: Judo Warriors

Date Joined: mm/dd/yyyy

Belt Rank: White

7. Member Search:



[Dashboard](#) / Members

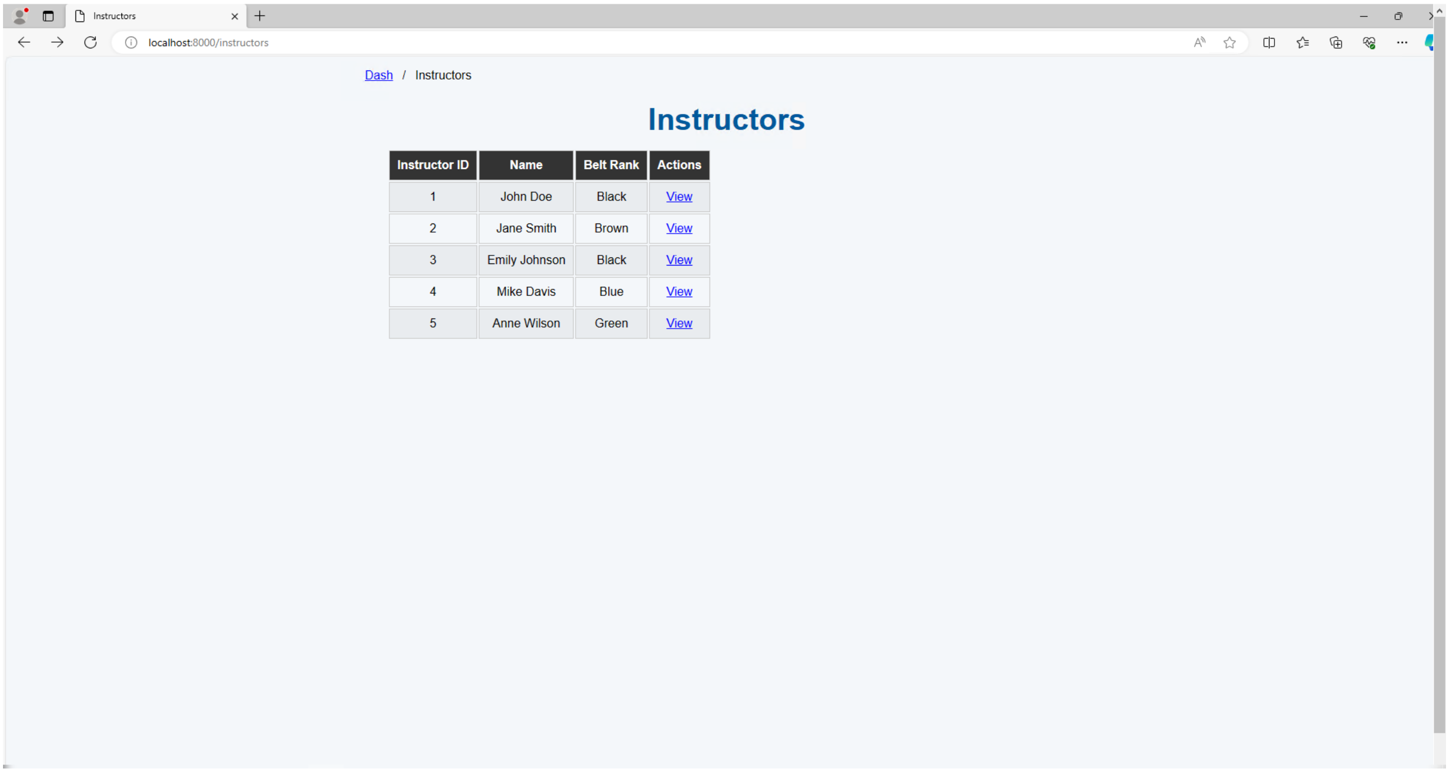
Members

Sara Search

[Add New Member](#)

Member ID	Name	Date Joined	Belt Rank	Actions
1	Sara Khan	Sun Jan 01 2023 00:00:00 GMT+0000 (Coordinated Universal Time)	White	View | Edit | Delete

8. Instructor List Page:

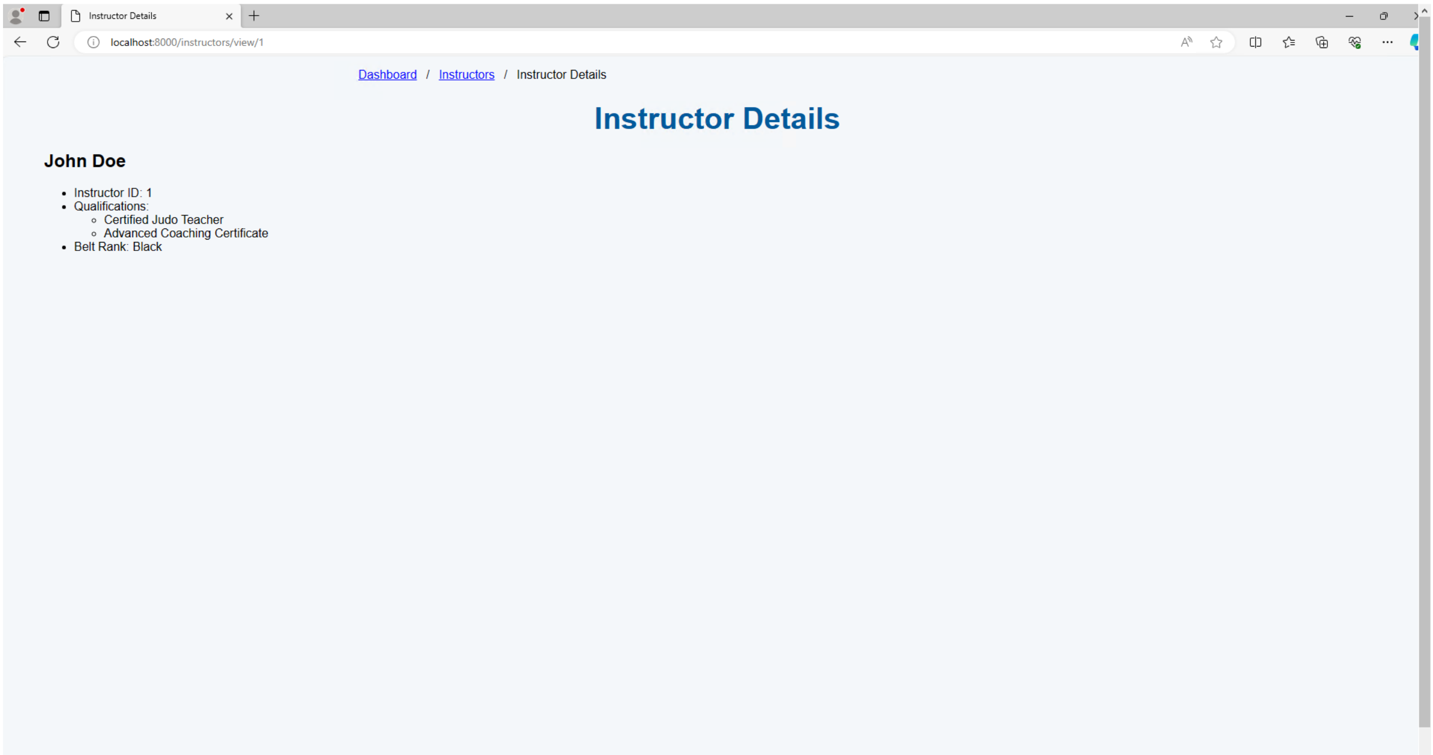


[Dash](#) / Instructors

Instructors

Instructor ID	Name	Belt Rank	Actions
1	John Doe	Black	View
2	Jane Smith	Brown	View
3	Emily Johnson	Black	View
4	Mike Davis	Blue	View
5	Anne Wilson	Green	View

9. Instructor View Page:



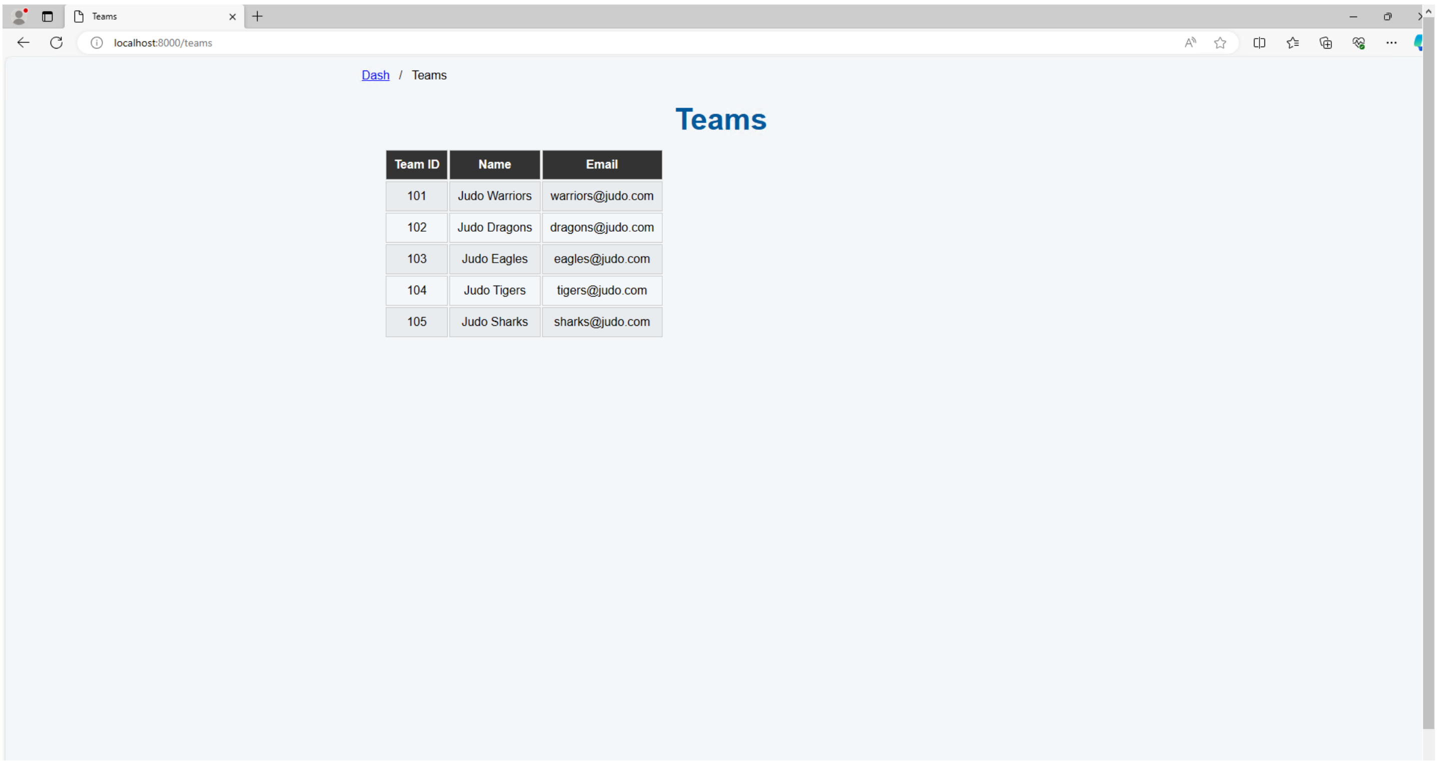
Dashboard / Instructors / Instructor Details

Instructor Details

John Doe

- Instructor ID: 1
- Qualifications:
  - Certified Judo Teacher
  - Advanced Coaching Certificate
- Belt Rank: Black

10. Team List Page:

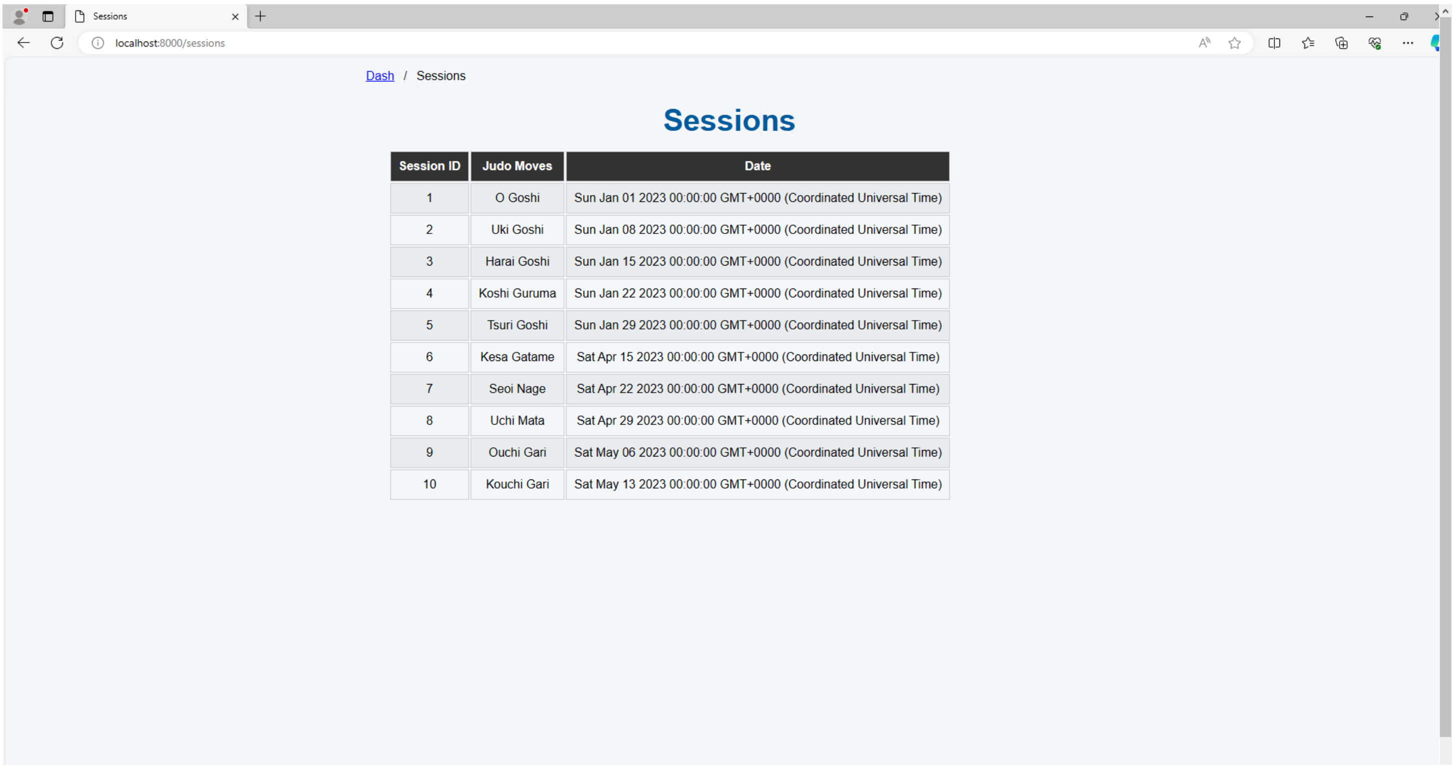


Dash / Teams

Teams

Team ID	Name	Email
101	Judo Warriors	warriors@judo.com
102	Judo Dragons	dragons@judo.com
103	Judo Eagles	eagles@judo.com
104	Judo Tigers	tigers@judo.com
105	Judo Sharks	sharks@judo.com

11. Session List Page:



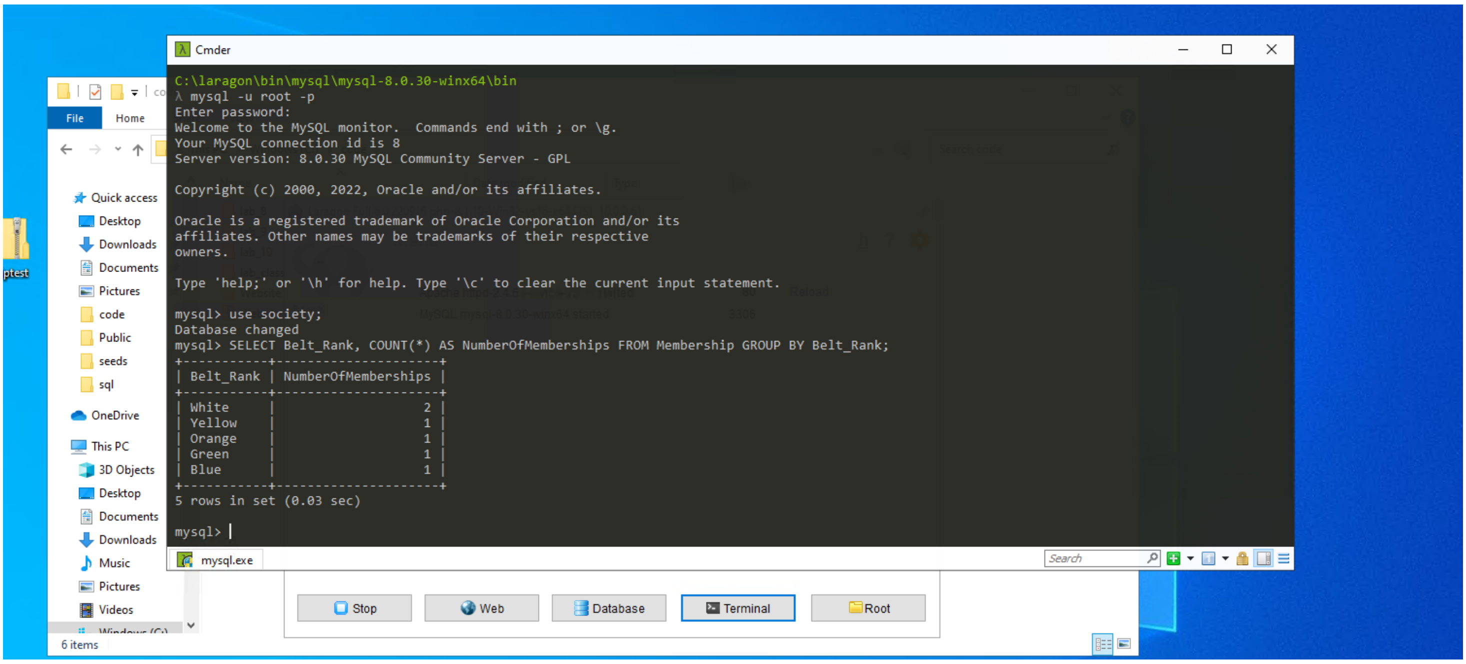
Dash / Sessions

Sessions

Session ID	Judo Moves	Date
1	O Goshi	Sun Jan 01 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
2	Uki Goshi	Sun Jan 08 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
3	Harai Goshi	Sun Jan 15 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
4	Koshi Guruma	Sun Jan 22 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
5	Tsuri Goshi	Sun Jan 29 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
6	Kesa Gatame	Sat Apr 15 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
7	Seoi Nage	Sat Apr 22 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
8	Uchi Mata	Sat Apr 29 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
9	Ouchi Gari	Sat May 06 2023 00:00:00 GMT+0000 (Coordinated Universal Time)
10	Kouchi Gari	Sat May 13 2023 00:00:00 GMT+0000 (Coordinated Universal Time)

SQL Query Appendix:

12. Query 5.1



```
C:\laragon\bin\mysql\mysql-8.0.30-winx64\bin
λ mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.30 MySQL Community Server - GPL

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> use society;
Database changed
mysql> SELECT Belt_Rank, COUNT(*) AS NumberOfMemberships FROM Membership GROUP BY Belt_Rank;
+-----------+---------------------+
| Belt_Rank | NumberOfMemberships |
+-----------+---------------------+
| White     |                   2 |
| Yellow    |                   1 |
| Orange    |                   1 |
| Green     |                   1 |
| Blue      |                   1 |
+-----------+---------------------+
5 rows in set (0.03 sec)

mysql> |
```
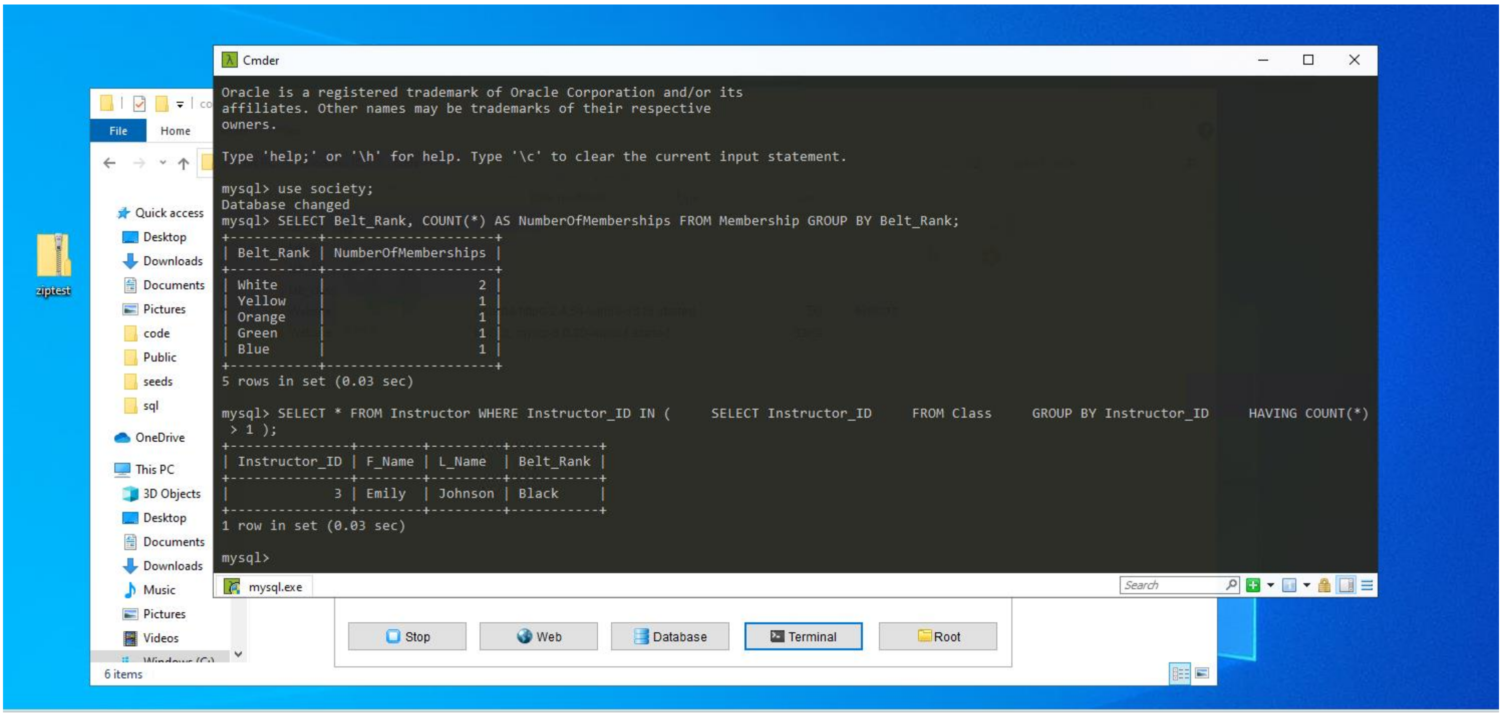

13. Query 5.2



```
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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> use society;
Database changed
mysql> SELECT Belt_Rank, COUNT(*) AS NumberOfMemberships FROM Membership GROUP BY Belt_Rank;
+-----------+---------------------+
| Belt_Rank | NumberOfMemberships |
+-----------+---------------------+
| White     |                   2 |
| Yellow    |                   1 |
| Orange    |                   1 |
| Green     |                   1 |
| Blue      |                   1 |
+-----------+---------------------+
5 rows in set (0.03 sec)

mysql> SELECT * FROM Instructor WHERE Instructor_ID IN (     SELECT Instructor_ID     FROM Class     GROUP BY Instructor_ID     HAVING COUNT(*)
 > 1 );
+---------------+--------+---------+-----------+
| Instructor_ID | F_Name | L_Name  | Belt_Rank |
+---------------+--------+---------+-----------+
|             3 | Emily  | Johnson | Black     |
+---------------+--------+---------+-----------+
1 row in set (0.03 sec)

mysql>
```
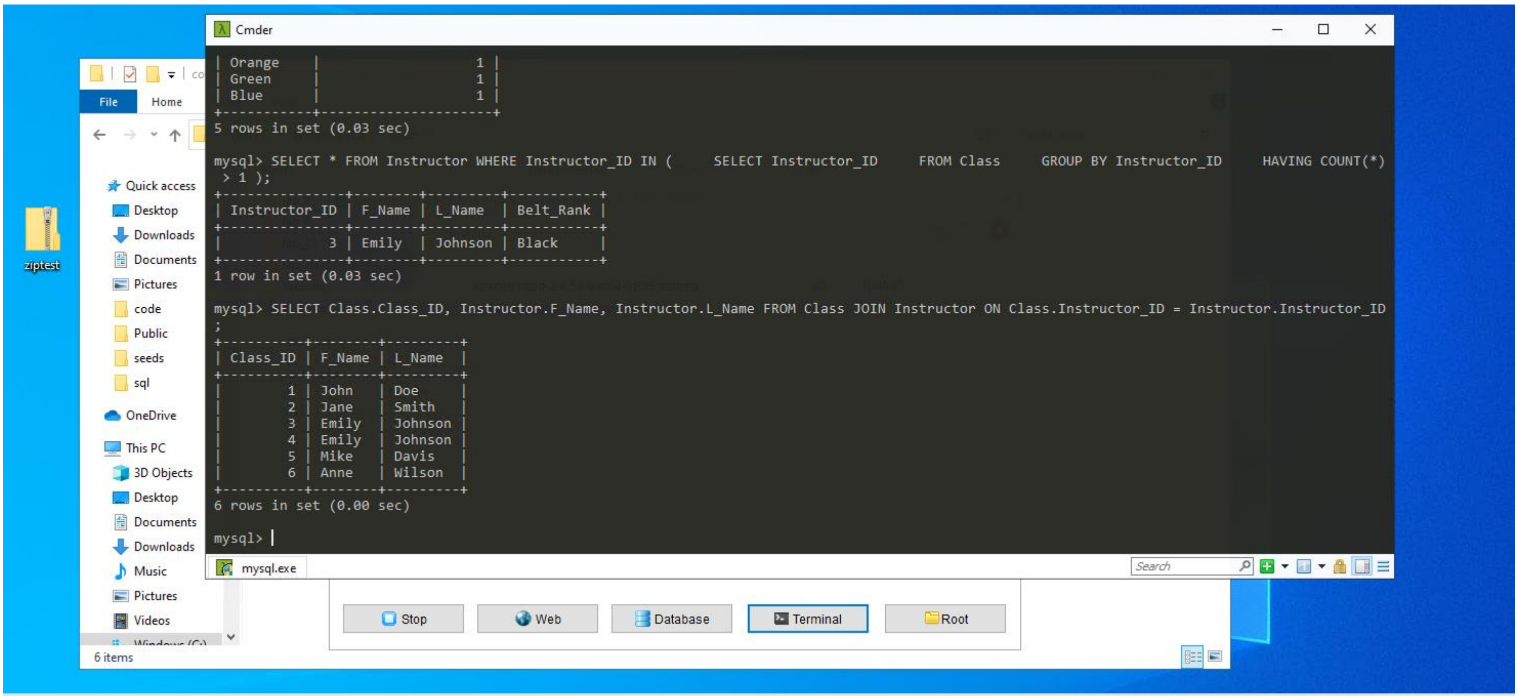
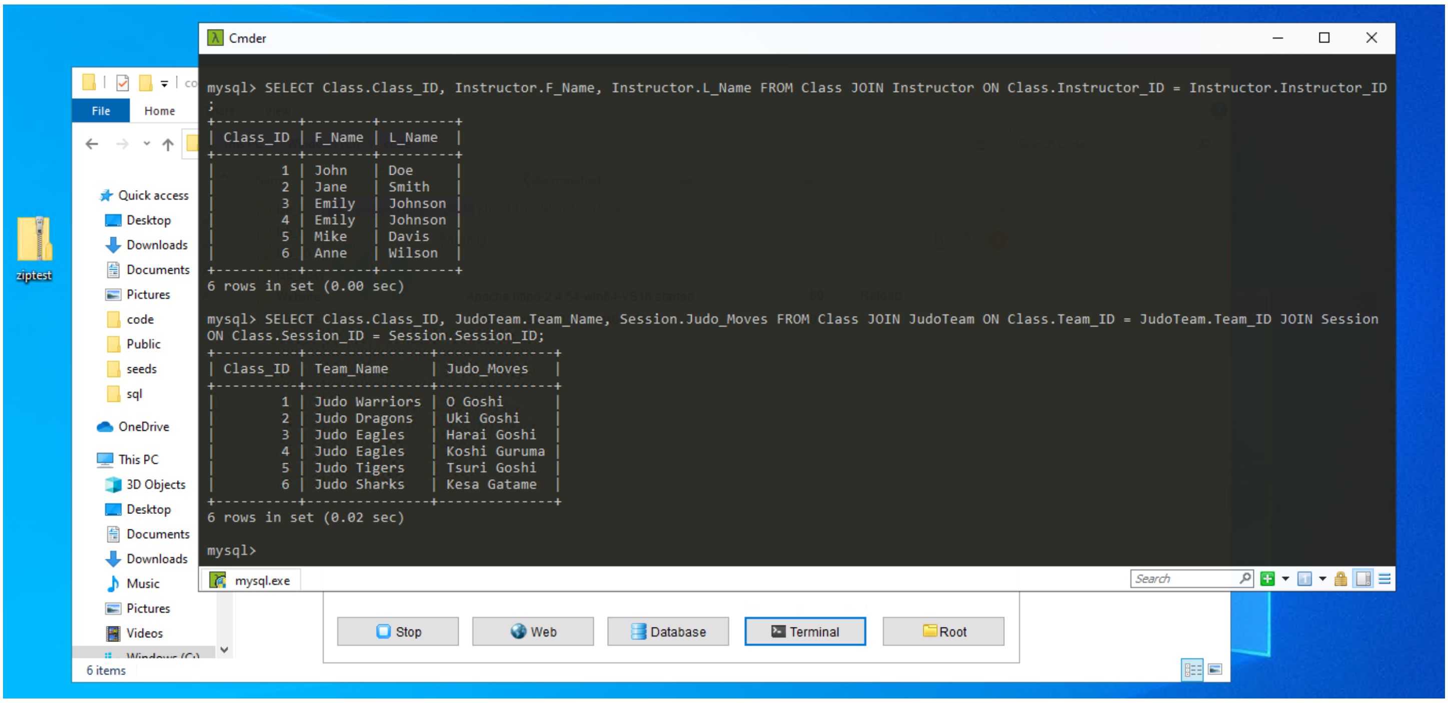

14. Query 5.3



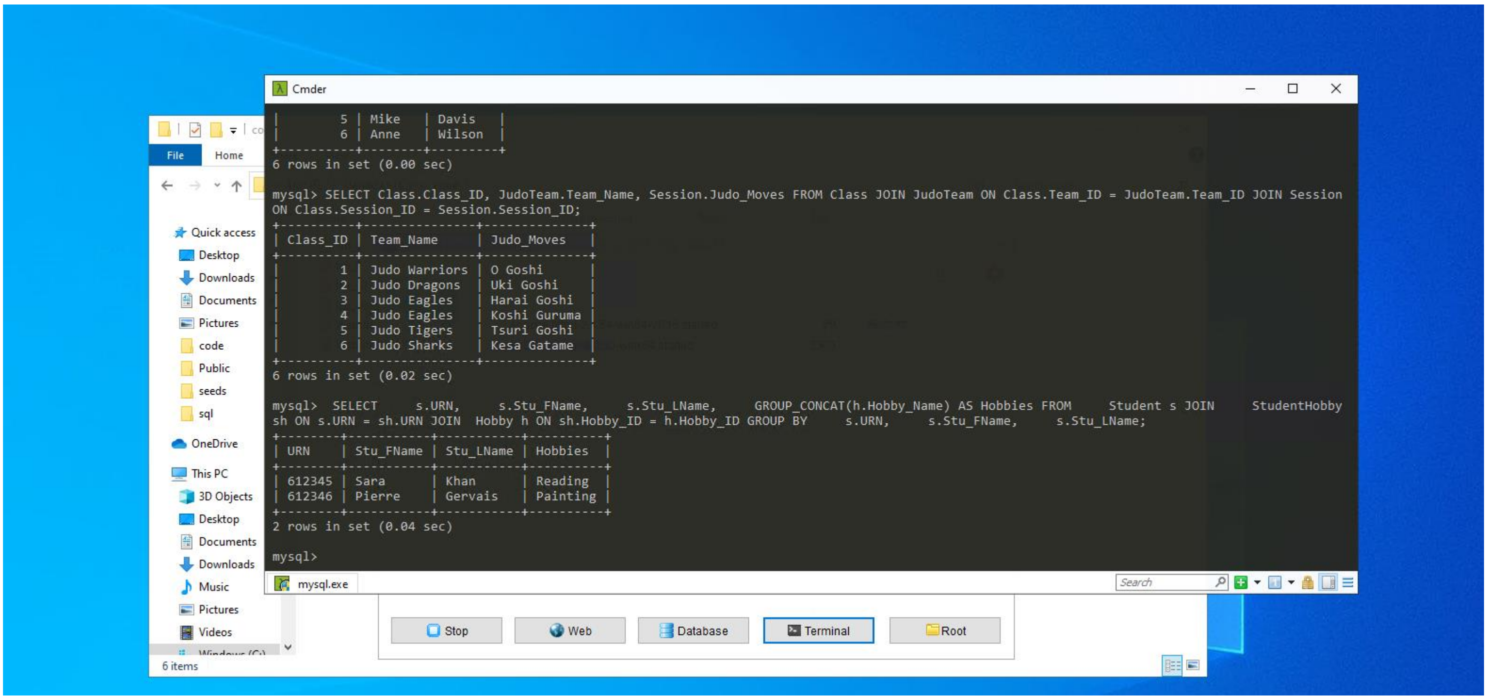
```
| Orange    |                   1 |
| Green     |                   1 |
| Blue      |                   1 |
+-----------+---------------------+
5 rows in set (0.03 sec)

mysql> SELECT * FROM Instructor WHERE Instructor_ID IN (     SELECT Instructor_ID     FROM Class     GROUP BY Instructor_ID     HAVING COUNT(*)
 > 1 );
+---------------+--------+---------+-----------+
| Instructor_ID | F_Name | L_Name  | Belt_Rank |
+---------------+--------+---------+-----------+
|             3 | Emily  | Johnson | Black     |
+---------------+--------+---------+-----------+
1 row in set (0.03 sec)

mysql> SELECT Class.Class_ID, Instructor.F_Name, Instructor.L_Name FROM Class JOIN Instructor ON Class.Instructor_ID = Instructor.Instructor_ID
;
+----------+--------+---------+
| Class_ID | F_Name | L_Name  |
+----------+--------+---------+
|        1 | John   | Doe     |
|        2 | Jane   | Smith   |
|        3 | Emily  | Johnson |
|        4 | Emily  | Johnson |
|        5 | Mike   | Davis   |
|        6 | Anne   | Wilson  |
+----------+--------+---------+
6 rows in set (0.00 sec)

mysql>
```

15. Query 5.4



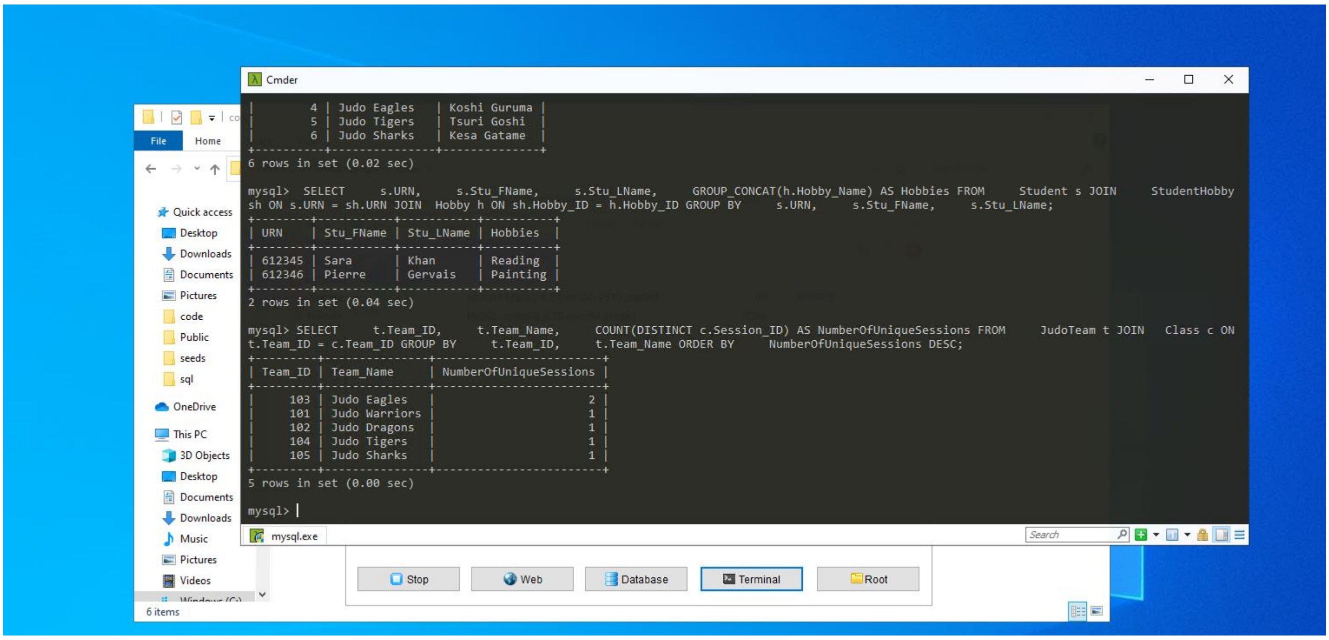
```
mysql> SELECT Class.Class_ID, Instructor.F_Name, Instructor.L_Name FROM Class JOIN Instructor ON Class.Instructor_ID = Instructor.Instructor_ID
;
+----------+--------+---------+
| Class_ID | F_Name | L_Name  |
+----------+--------+---------+
|        1 | John   | Doe     |
|        2 | Jane   | Smith   |
|        3 | Emily  | Johnson |
|        4 | Emily  | Johnson |
|        5 | Mike   | Davis   |
|        6 | Anne   | Wilson  |
+----------+--------+---------+
6 rows in set (0.00 sec)

mysql> SELECT Class.Class_ID, JudoTeam.Team_Name, Session.Judo_Moves FROM Class JOIN JudoTeam ON Class.Team_ID = JudoTeam.Team_ID JOIN Session
ON Class.Session_ID = Session.Session_ID;
+----------+---------------+--------------+
| Class_ID | Team_Name     | Judo_Moves   |
+----------+---------------+--------------+
|        1 | Judo Warriors | O Goshi      |
|        2 | Judo Dragons  | Uki Goshi    |
|        3 | Judo Eagles   | Harai Goshi  |
|        4 | Judo Eagles   | Koshi Guruma |
|        5 | Judo Tigers   | Tsuri Goshi  |
|        6 | Judo Sharks   | Kesa Gatame  |
+----------+---------------+--------------+
6 rows in set (0.02 sec)

mysql>
```

16. Query Advanced Task 1



```
|        5 | Mike   | Davis   |
|        6 | Anne   | Wilson  |
+----------+--------+---------+
6 rows in set (0.00 sec)

mysql> SELECT Class.Class_ID, JudoTeam.Team_Name, Session.Judo_Moves FROM Class JOIN JudoTeam ON Class.Team_ID = JudoTeam.Team_ID JOIN Session
ON Class.Session_ID = Session.Session_ID;
+----------+---------------+--------------+
| Class_ID | Team_Name     | Judo_Moves   |
+----------+---------------+--------------+
|        1 | Judo Warriors | O Goshi      |
|        2 | Judo Dragons  | Uki Goshi    |
|        3 | Judo Eagles   | Harai Goshi  |
|        4 | Judo Eagles   | Koshi Guruma |
|        5 | Judo Tigers   | Tsuri Goshi  |
|        6 | Judo Sharks   | Kesa Gatame  |
+----------+---------------+--------------+
6 rows in set (0.02 sec)

mysql>  SELECT     s.URN,     s.Stu_FName,     s.Stu_LName,     GROUP_CONCAT(h.Hobby_Name) AS Hobbies FROM     Student s JOIN     StudentHobby
sh ON s.URN = sh.URN JOIN  Hobby h ON sh.Hobby_ID = h.Hobby_ID GROUP BY     s.URN,     s.Stu_FName,     s.Stu_LName;
+--------+-----------+-----------+----------+
| URN    | Stu_FName | Stu_LName | Hobbies  |
+--------+-----------+-----------+----------+
| 612345 | Sara      | Khan      | Reading  |
| 612346 | Pierre    | Gervais   | Painting |
+--------+-----------+-----------+----------+
2 rows in set (0.04 sec)

mysql>
```

17. Query Advanced Task 2



```
|        4 | Judo Eagles    | Koshi Guruma |
|        5 | Judo Tigers    | Tsuri Goshi  |
|        6 | Judo Sharks    | Kesa Gatame  |
+----------+----------------+--------------+
6 rows in set (0.02 sec)

mysql>  SELECT     s.URN,     s.Stu_FName,     s.Stu_LName,     GROUP_CONCAT(h.Hobby_Name) AS Hobbies FROM     Student s JOIN     StudentHobby
sh ON s.URN = sh.URN JOIN  Hobby h ON sh.Hobby_ID = h.Hobby_ID GROUP BY     s.URN,     s.Stu_FName,     s.Stu_LName;
+--------+-----------+-----------+----------+
| URN    | Stu_FName | Stu_LName | Hobbies  |
+--------+-----------+-----------+----------+
| 612345 | Sara      | Khan      | Reading  |
| 612346 | Pierre    | Gervais   | Painting |
+--------+-----------+-----------+----------+
2 rows in set (0.04 sec)

mysql> SELECT     t.Team_ID,     t.Team_Name,     COUNT(DISTINCT c.Session_ID) AS NumberOfUniqueSessions FROM     JudoTeam t JOIN   Class c ON
t.Team_ID = c.Team_ID GROUP BY     t.Team_ID,     t.Team_Name ORDER BY     NumberOfUniqueSessions DESC;
+---------+---------------+------------------------+
| Team_ID | Team_Name     | NumberOfUniqueSessions |
+---------+---------------+------------------------+
|     103 | Judo Eagles   |                      2 |
|     101 | Judo Warriors |                      1 |
|     102 | Judo Dragons  |                      1 |
|     104 | Judo Tigers   |                      1 |
|     105 | Judo Sharks   |                      1 |
+---------+---------------+------------------------+
5 rows in set (0.00 sec)

mysql>
```