Database Development and Class Registration

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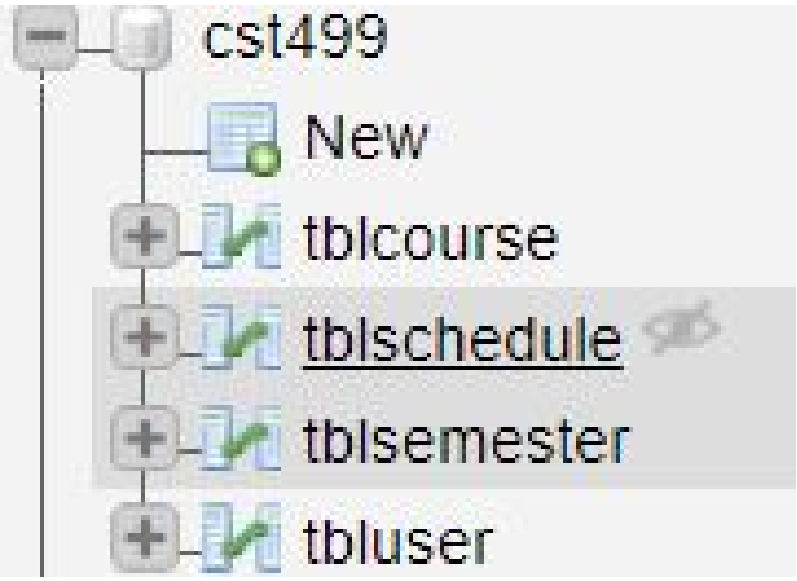
Database Development

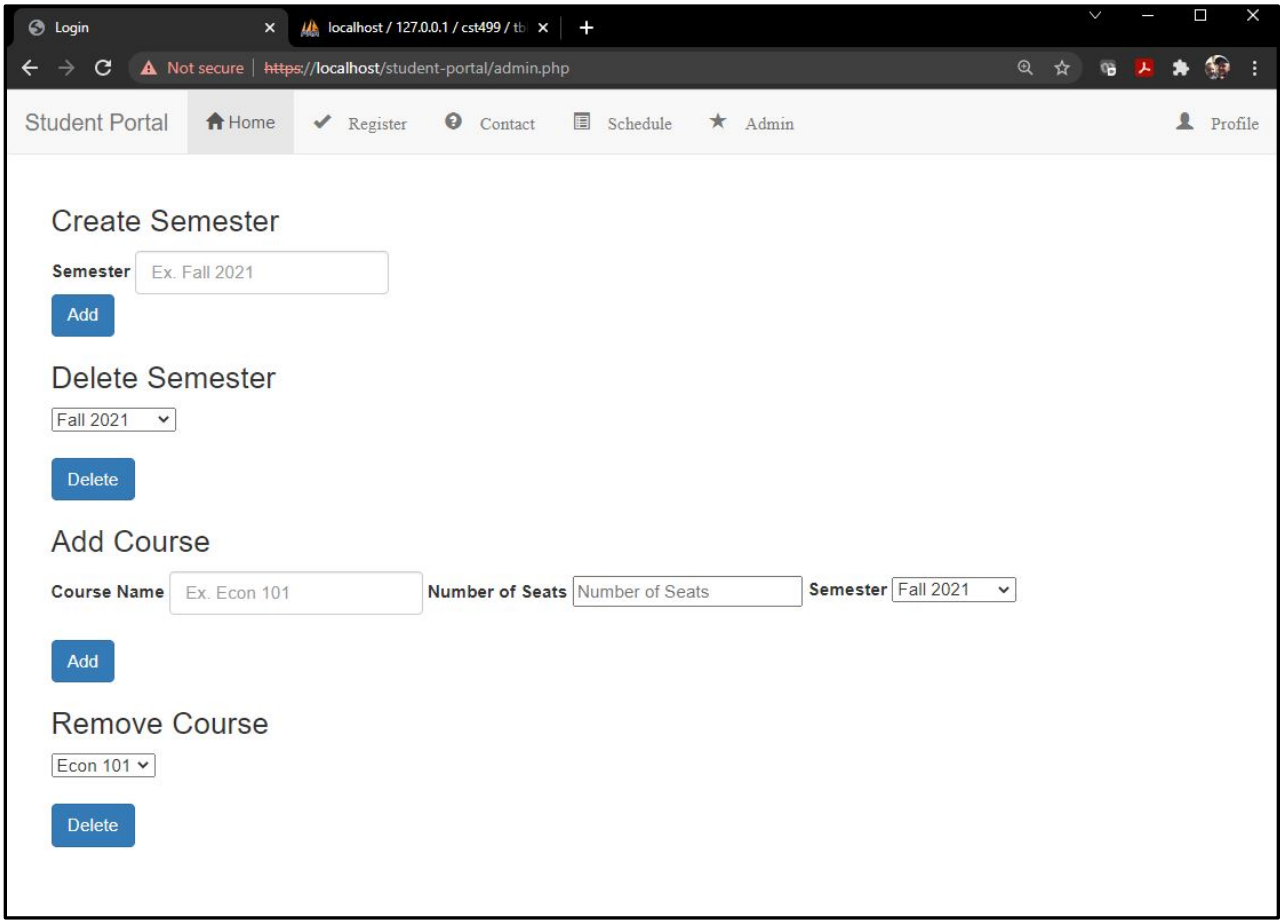
Relational Databases are efficient for storing a collection of data or related entities. The SQL engine of a database is mostly hidden from the user, but with SQL quires, users can join and create data that is needed. One of the biggest advantages of a relational database, is that it can be normalized to reduce the complexities of the data from the user. Users can access tables independently or use SQL queries to join tables together. An example would be the student portal registration system, that uses HTML, bootstrap to present the values from the MySQL database. Using PHP code, the values are returned, altered, and removed. (Coronel, Morris, 2019)

The database for this course registration website is built with four tables: tbluser, tblcourse, tblschulde and tblsemester. Respectively they keep track of user, course, schedule and semester data.

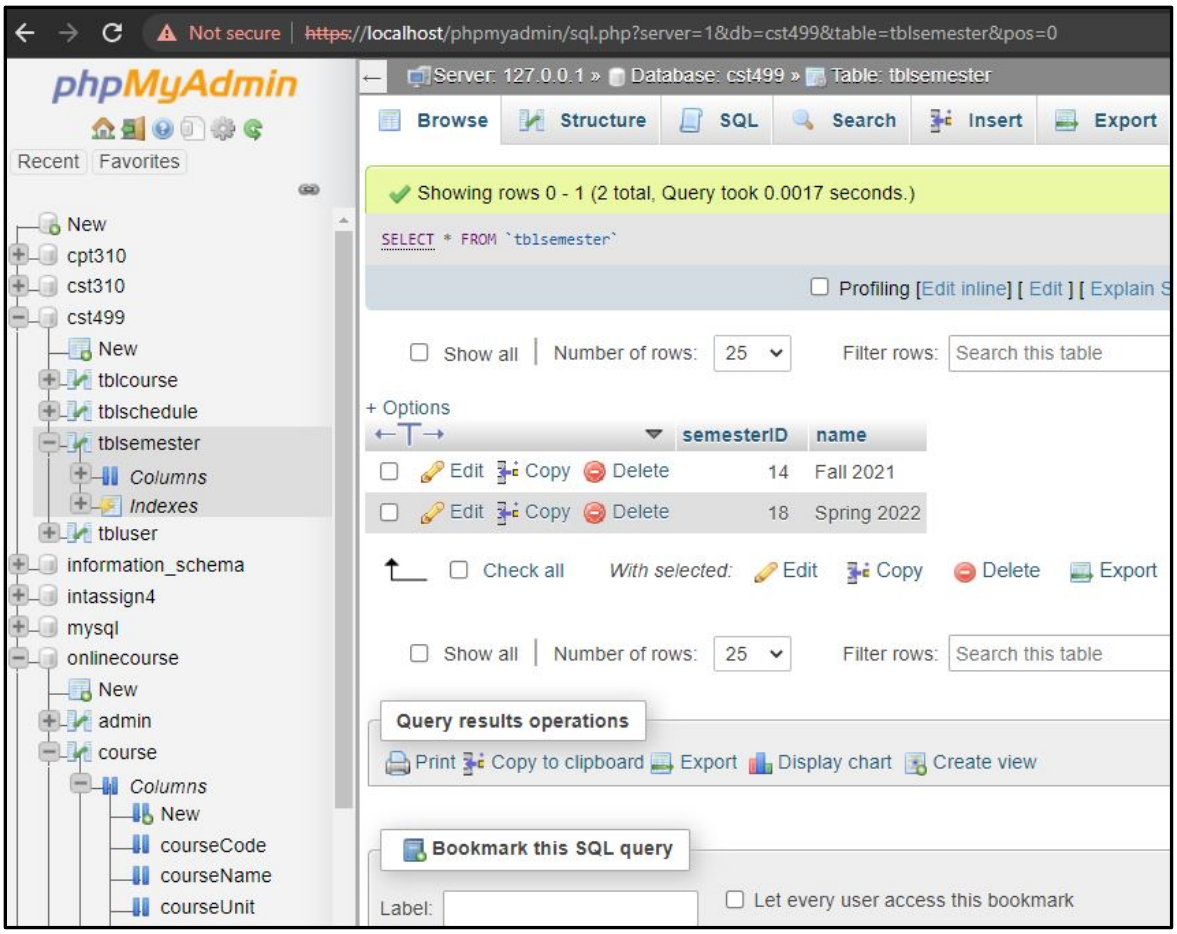


Registration Pages

Below is the layout of the admin page, which is a form that collects that allows administrators the ability to create semesters, delete semesters, add courses, and remove courses. This layout has been built using HTML, bootstrap and PHP.



When the administrator uses this form, data is sent and saved in a mySQL database. Using a session variable, this admin page is only available to administrator when they login. Regular users only have access to the home, register, contact, schedule, and profile tabs.



In a custom class called “connectDB”, mysqli_connect is used to create a connection to the database. This class also has a function called executeQuery that is used for inserting data into the database. executeQuery uses a connect_error function to validate the connection to the database.

```php
<?php

class connectDB {

  function executeSelectQuery($con,$sql){

    $result = mysqli_query($con, $sql);
    echo "<br>";
    echo "<table border='1'>";
    while ($row = mysqli_fetch_assoc($result)) {
        echo "<tr>";
        foreach ($row as $field => $value) {
            echo "<td>" . $value . "</td>";
        }
        echo "</tr>";
    }
    echo "</table>";

  }

  function executeQuery($con,$sql){

    if ($con->connect_error) {
        die("Connection failed: " . $con->connect_error);
    }

    if ($con->query($sql) === TRUE) {
      echo "New record created successfully";
    } else {
      echo "Error: " . $sql . "<br>" . $con->error;
    }

    $con->close();


  }
}
```

addcourse.php, removecourse.php, addsemester.php and removesemester all use this class with a require statement to execute queries to add and remove information from the database. Below is the addcourse.php that is called as an action from an HTML button to insert course's information into the database.

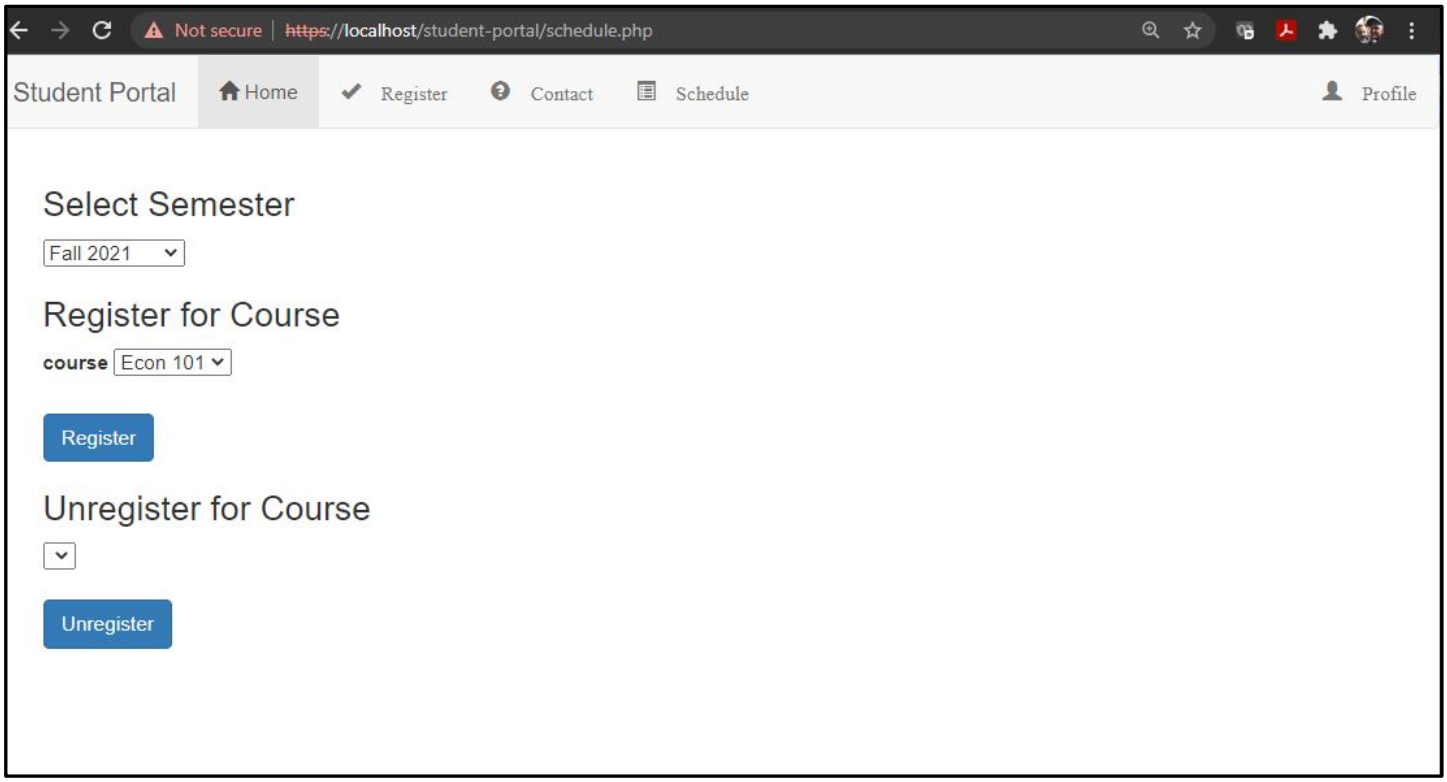
```php
<?php
require 'connectDB.php';

$connect1 = new connectDB();

require 'connectToDB.php';



  // Taking all 5 values from the form data(input)
  $name = $_POST['course'];
  $noofseats = $_POST['numseats'];
  $semester = $_POST['semester'];


  $sql = "INSERT INTO tblcourse (name, semesterID, noofSeats)
VALUES ('$name','$semester','$noofseats')";

$connect1->executeQuery($con,$sql);

header("Location: admin.php?course=added");
?>
```

Below is the code that is used in the form that the administrator interacts with to add a course to the database catalog.

```php
<div class="container">
      <h3>Add Course</h3>
    <form class="form-inline" action="addcourse.php" method="post">

    <div class="form-group">
      <label for="course">Course Name</label>
      <input type="course" name="course"class="form-control" id="course" placeholder="Ex. Econ 101">
    </div>

    <div class="form-group">
      <label for="numseats">Number of Seats</label>
      <input type="numseats" name="numseats"class="numseats" id="numseats" placeholder="Number of Seats">
    </div>

    <div class="form-group">
      <label for="numseats">Semester</label>
      <select name ="semester">
        <?php while($row1 = mysqli_fetch_array($semesterResult2)):; ?>
        <option value="<?php echo $row1[0];?>"><?php echo $row1[1];?></option>
        <?php endwhile;?>
      </select>
    </div>
    <br><br>
    <button type="submit" class="btn btn-primary">Add</button>


    </form>

    </div>
```

Schedule Page

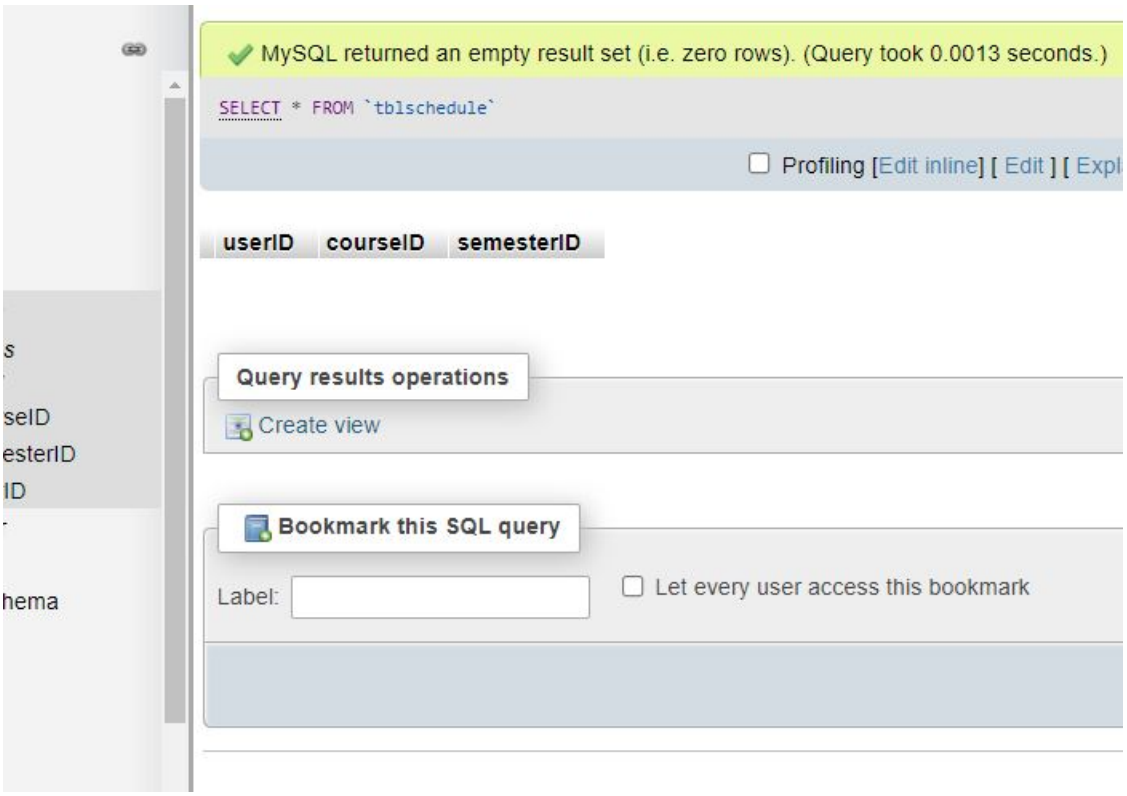
Below is the HTML, bootstrap layout of the schedule registration page. Users use this page to sign up for class based on semester and data is added and removed from the database using PHP. Users select the semester and course that they would like to register for. Once users are register for a course, they can unregister for a course. Also as seen in this image, regular users do not have access to the admin tab.

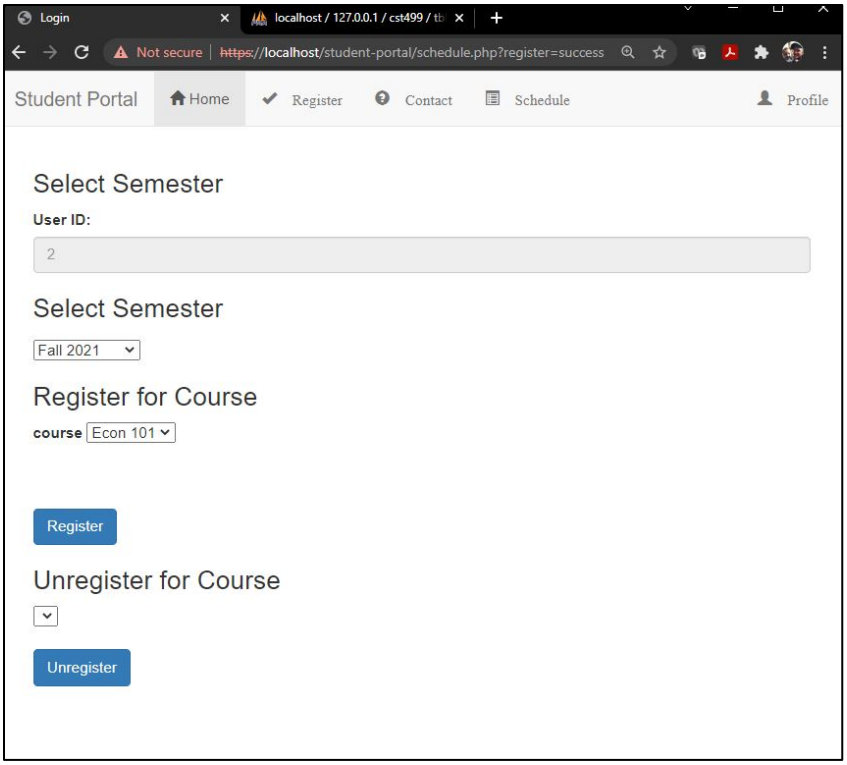


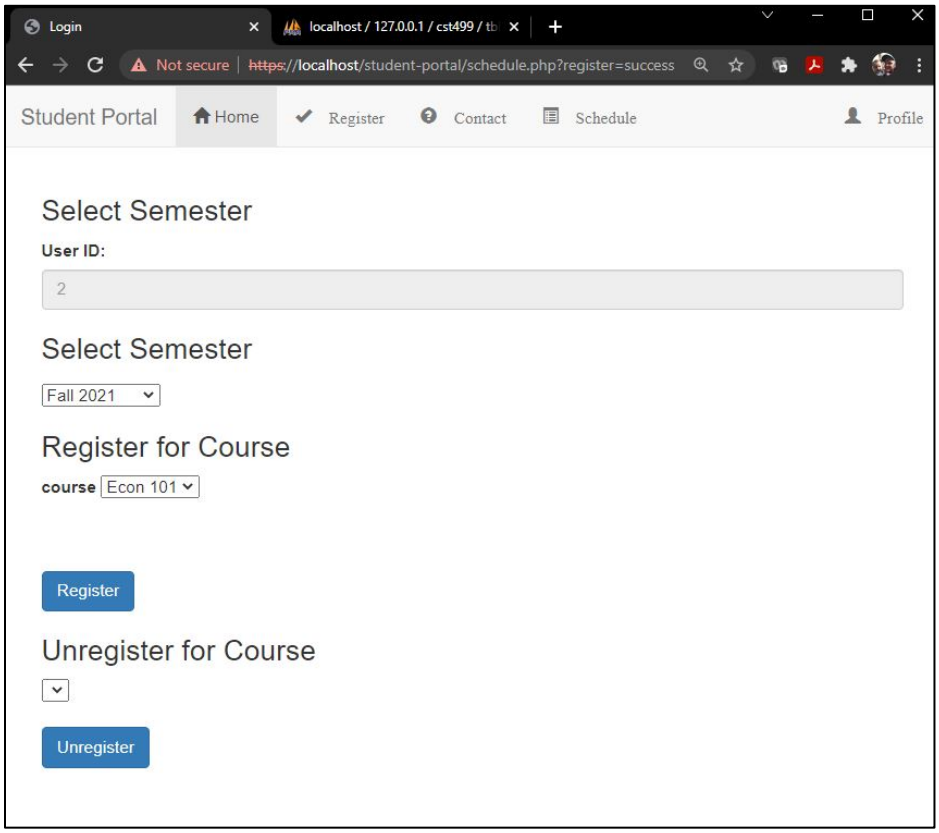
The logic behind this code is similar to that which was used for the admin tab. In the following image php code fetches course and semester values from the database that users can register for. Using the same class that was used for the admin page for connecting to the database, values are added and removed from the database using SQL queries through PHP.

```
<div class="container">
      <h3>Select Semester</h3>
    <form class="form-inline" action="" method="post">

    <div class="form-group">
      <select name ="activesemester">
        <?php while($row1 = mysqli_fetch_array($semesterResult)):; ?>
        <option value="<?php echo $row1[0];?>"><?php echo $row1[1];?></option>
        <?php
        //$id = $_POST[$row1[0]];

        endwhile;?>
      </select>

    </div>
    </form>

     </div>


<div class="container">
```

The following screen shots illustrate the process of registering for course with this application.




Login
localhost / 127.0.0.1 / cst499 / tb
Not secure
https://localhost/student-portal/schedule.php?register=success
Student Portal
Home
Register
Contact
Schedule
Profile
Select Semester
User ID:
2
Select Semester
Fall 2021
Register for Course
course
Econ 101
Register
Unregister for Course
Unregister


Login
localhost / 127.0.0.1 / cst499 / tb
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https://localhost/student-portal/schedule.php?register=success
Student Portal
Home
Register
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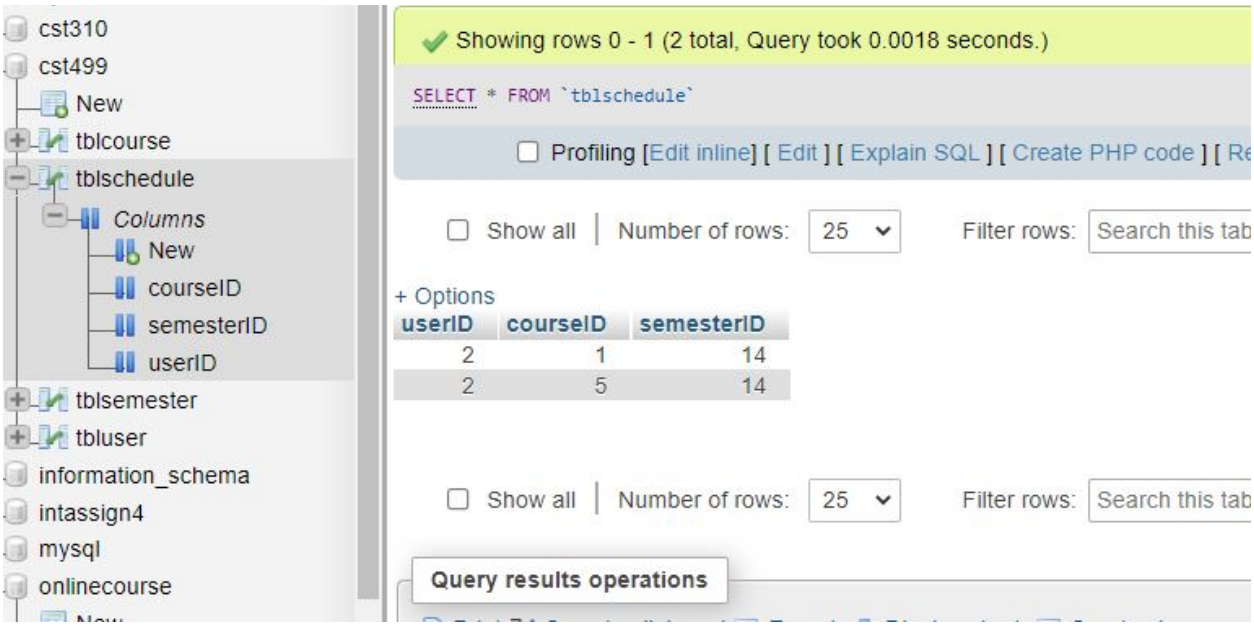
Profile
Select Semester
User ID:
2
Select Semester
Fall 2021
Register for Course
course
Econ 101
Register
Unregister for Course
Unregister



In summary, the process of implementing the design of the web application was strait forward. It took me the most time to figure out the syntax in php to alter the database. There are still a few features that I would try like to add, like limiting the number of users that can register for a course and waitlisting them.

References

Coronel, C., & Morris, S. (2019). Database systems: Design, implementation, and management (13th ed.). Retrieved from https://www.vitalsource.com

Sommerville, I. (2018). *Software Engineering*. Hallbergmoos/Germany: Pearson.