DEPLOYED WEB APPLICATION: https://nichole.alburo.ph/

GITHUB REPOSITORY: https://github.com/nicvhine/teacher-web

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IT 3202 - Software Quality Assurance

Final Project
CRUD Web Application Utilizing JSON Web Token

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UNIT TESTING: USER

Test Title: ***Adding User Functionality***

Test Steps:
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1. **Setup:**
    - Import required modules and mock dependencies.
    - Initialize the database connection pool.
2. **Test Case 1: Adding a new user with unique email**
    - Test Step 1: Mock the database query to return an empty result set (indicating no duplicate emails).
    - Test Step 2: Define a Jest mock callback function.
    - Test Step 3: Call addUser function with a unique email and password, passing the callback.
    - Test Step 4: Verify that the database was queried to check for existing emails.
    - Test Step 5: Verify that the database was queried to insert the new user.
    - Test Step 6: Verify that the callback was called without any error, and with an object argument.
3. **Test Case 2: Adding a user with a duplicate email**
    - Test Step 1: Mock the database query to return a result set containing a user with the same email.
    - Test Step 2: Define a Jest mock callback function.
    - Test Step 3: Call addUser function with an email that already exists and a password, passing the callback.
    - Test Step 4: Verify that the database was queried to check for existing emails.
    - Test Step 5: Verify that the callback was called with an error.
    - Test Step 6: Verify that the error object has a status code of 409 (Conflict).

Expected Outcomes:

- Test Case 1 should pass, indicating successful addition of a new user.
- Test Case 2 should pass, indicating proper handling of duplicate email errors.

Notes:

- Ensure that the mock implementation of the database query behaves as expected in each test case.
- Verify that the callback functions are invoked correctly with the expected arguments and error handling

Test Title: ***Fetching Users' Details Functionality***

Test Steps:

1. **Setup:**
    - Import required modules and mock dependencies.
    - Initialize the database connection pool.
2. **Test Case 1: Fetching users successfully**
    - Test Step 1: Mock the database query to return a list of mock users.
    - Test Step 2: Define a Jest mock callback function.
    - Test Step 3: Call getUsers function, passing the callback.
    - Test Step 4: Verify that the database was queried to fetch users.
    - Test Step 5: Verify that the callback was called without any error, and with the expected list of users.
3. **Test Case 2: Handling errors when fetching users**
    - Test Step 1: Mock the database query to simulate a database connection error.
    - Test Step 2: Define a Jest mock callback function.
    - Test Step 3: Call getUsers function, passing the callback.
    - Test Step 4: Verify that the database was queried to fetch users.
    - Test Step 5: Verify that the callback was called with an error object indicating the database connection error.

Expected Outcomes:

- Test Case 1 should pass, indicating successful retrieval of users.
- Test Case 2 should pass, indicating proper error handling when there's an issue with the database connection.

Notes:

- Ensure that the mock implementation of the database query behaves as expected in each test case.
- Verify that the callback functions are invoked correctly with the expected arguments and error handling.

UNIT TESTING: STUDENTS

Test Title: ***Adding Student Functionality***

Test Steps:

1. **Setup:**
    - Import required modules and mock dependencies.
    - Initialize Express app and mount the router.
    - Mock the database query and repository functions.
2. **Test Case 1: Adding a new student successfully**
    - Test Step 1: Mock the repository function to simulate successful addition of a student.
    - Test Step 2: Send a POST request to the endpoint with valid student data.
    - Test Step 3: Verify that the response status is 201 (Created).
    - Test Step 4: Verify that the response body contains a success message.
3. **Test Case 2: Handling missing name or email**
    - Test Step 1: Send a POST request to the endpoint with missing name or email.
    - Test Step 2: Verify that the response status is 400 (Bad Request).
    - Test Step 3: Verify that the response body contains an error message indicating missing name and email.
4. **Test Case 3: Handling duplicate email error**
    - Test Step 1: Mock the repository function to simulate a duplicate email error.
    - Test Step 2: Send a POST request to the endpoint with a duplicate email.
    - Test Step 3: Verify that the response status is 409 (Conflict).
    - Test Step 4: Verify that the response body contains an error message indicating the duplicate email error.
5. **Test Case 4: Handling database error**
    - Test Step 1: Mock the repository function to simulate a database error.
    - Test Step 2: Send a POST request to the endpoint.
    - Test Step 3: Verify that the response status is 500 (Internal Server Error).
    - Test Step 4: Verify that the response body contains an error message indicating the database error.

Expected Outcomes:

- Test Case 1 should pass, indicating successful addition of a new student.
- Test Case 2 should pass, indicating proper handling of missing name or email.
- Test Case 3 should pass, indicating proper handling of duplicate email error.
- Test Case 4 should pass, indicating proper handling of database errors.

Notes:

- Ensure that the mock implementations of repository functions behave as expected in each test case.
- Verify that the responses are correctly structured with the appropriate status codes and error messages.

Test Title: ***Fetching Students' Details Functionality***

Test Steps:

1. **Setup:**
    - Import required modules and mock dependencies.
    - Initialize Express app and mount the router.
    - Mock the database query and repository functions.
2. **Test Case 1: Adding a new student successfully**
    - Test Step 1: Mock the repository function to simulate successful addition of a student.
    - Test Step 2: Send a POST request to the endpoint with valid student data.
    - Test Step 3: Verify that the response status is 201 (Created).
    - Test Step 4: Verify that the response body contains a success message.
3. **Test Case 2: Handling missing name or email**
    - Test Step 1: Send a POST request to the endpoint with a missing name or email.
    - Test Step 2: Verify that the response status is 400 (Bad Request).
    - Test Step 3: Verify that the response body contains an error message indicating missing name and email.
4. **Test Case 3: Handling duplicate email error**
    - Test Step 1: Mock the repository function to simulate a duplicate email error.
    - Test Step 2: Send a POST request to the endpoint with a duplicate email.
    - Test Step 3: Verify that the response status is 409 (Conflict).
    - Test Step 4: Verify that the response body contains an error message indicating the duplicate email error.
5. **Test Case 4: Handling database error**
    - Test Step 1: Mock the repository function to simulate a database error.
    - Test Step 2: Send a POST request to the endpoint.
    - Test Step 3: Verify that the response status is 500 (Internal Server Error).
    - Test Step 4: Verify that the response body contains an error message indicating the database error.

Expected Outcomes:

- Test Case 1 should pass, indicating successful addition of a new student.
- Test Case 2 should pass, indicating proper handling of missing name or email.
- Test Case 3 should pass, indicating proper handling of duplicate email error.
- Test Case 4 should pass, indicating proper handling of database errors.

Notes:

- Ensure that the mock implementations of repository functions behave as expected in each test case.
- Verify that the responses are correctly structured with the appropriate status codes and error messages.

Test Title: ***Updating Student Details Functionality***

Test Steps:

1. **Setup:**
    - Import required modules and mock dependencies.
    - Initialize Express app and mount the router.
    - Mock the database query and repository functions.
2. **Test Case 1: Updating student status successfully**
    - Test Step 1: Clear all mocks to ensure a clean state.
    - Test Step 2: Mock the repository function to simulate successful update of student status.
    - Test Step 3: Send a PUT request to the endpoint with valid student status data.
    - Test Step 4: Verify that the response status is 200 (OK).
    - Test Step 5: Verify that the response body contains a success message.
3. **Test Case 2: Handling database error while updating student status**
    - Test Step 1: Clear all mocks to ensure a clean state.
    - Test Step 2: Mock the repository function to simulate a database error while updating student status.
    - Test Step 3: Send a PUT request to the endpoint.
    - Test Step 4: Verify that the response status is 500 (Internal Server Error).
    - Test Step 5: Verify that the response body contains an error message indicating the failure to update student status.
4. **Test Case 3: Handling missing status**
    - Test Step 1: Send a PUT request to the endpoint with missing status.
    - Test Step 2: Verify that the response status is 400 (Bad Request).

    - Test Step 3: Verify that the response body contains an error message indicating missing status.

Expected Outcomes:

- Test Case 1 should pass, indicating successful update of student status.
- Test Case 2 should pass, indicating proper handling of database errors while updating student status.
- Test Case 3 should pass, indicating proper handling of missing status.

Notes:

- Ensure that the mock implementations of repository functions behave as expected in each test case.
- Verify that the responses are correctly structured with the appropriate status codes and error messages.

UNIT TESTING: TASKS

Test Title: ***Adding Task Functionality***

Test Steps:

1. **Setup**:
    - Import required modules and mock dependencies.
    - Initialize Express app and mount the router.
    - Mock the database query and repository functions.
2. **Test Case 1: Adding a task successfully**
    - Test Step 1: Clear all mocks to ensure a clean state.
    - Test Step 2: Mock the repository function to simulate successful addition of a task.
    - Test Step 3: Send a POST request to the endpoint with valid task data.
    - Test Step 4: Verify that the response status is 201 (Created).
    - Test Step 5: Verify that the response body contains a success message.
3. **Test Case 2: Handling database error while adding a task**
    - Test Step 1: Clear all mocks to ensure a clean state.
    - Test Step 2: Mock the repository function to simulate a database error while adding a task.
    - Test Step 3: Send a POST request to the endpoint.
    - Test Step 4: Verify that the response status is 500 (Internal Server Error).

    - Test Step 5: Verify that the response body contains an error message indicating the failure to add a task.
4. **Test Case 3: Handling missing required fields**
    - Test Step 1: Send a POST request to the endpoint with missing required fields.
    - Test Step 2: Verify that the response status is 400 (Bad Request).
    - Test Step 3: Verify that the response body contains an error message indicating missing required fields.

Expected Outcomes:

- Test Case 1 should pass, indicating successful addition of a task.
- Test Case 2 should pass, indicating proper handling of database errors while adding a task.
- Test Case 3 should pass, indicating proper handling of missing required fields.

Notes:

- Ensure that the mock implementations of repository functions behave as expected in each test case.
- Verify that the responses are correctly structured with the appropriate status codes and error messages.

Test Title: ***Fetching Tasks' Details Functionality***

Test Steps:

1. **Setup:**
    - Import required modules and mock dependencies.
    - Initialize Express app and mount the router.
    - Mock the database query and repository functions.
2. **Test Case 1: Fetching tasks for the given class successfully**
    - Test Step 1: Mock the repository function to simulate successful fetching of tasks for the given class.
    - Test Step 2: Send a GET request to the endpoint with a valid class ID.
    - Test Step 3: Verify that the response status is 200 (OK).
    - Test Step 4: Verify that the response body contains the expected tasks.

3. **Test Case 2: Handling database error while fetching tasks**
    - Test Step 1: Mock the repository function to simulate a database error while fetching tasks.
    - Test Step 2: Send a GET request to the endpoint.
    - Test Step 3: Verify that the response status is 500 (Internal Server Error).
    - Test Step 4: Verify that the response body contains an error message indicating the failure to fetch tasks.

Expected Outcomes:

- Test Case 1 should pass, indicating successful fetching of tasks for the given class.
- Test Case 2 should pass, indicating proper handling of database errors while fetching tasks.

Notes:

- Ensure that the mock implementations of repository functions behave as expected in each test case.
- Verify that the responses are correctly structured with the appropriate status codes and error messages.

Test Title: ***Updating Task Details Functionality***

Test Steps:

1. **Setup:**
    - Import required modules and mock dependencies.
    - Initialize Express app and mount the router.
    - Mock the database query and repository functions.
2. **Test Case 1: Updating task status successfully**
    - Test Step 1: Mock the repository function to simulate successful update of task status.
    - Test Step 2: Send a PUT request to the endpoint with valid task status data.
    - Test Step 3: Verify that the response status is 200 (OK).
    - Test Step 4: Verify that the response body contains a success message.
3. **Test Case 2: Handling database error while updating task status**
    - Test Step 1: Mock the repository function to simulate a database error while updating task status.
    - Test Step 2: Send a PUT request to the endpoint.
    - Test Step 3: Verify that the response status is 500 (Internal Server Error).

    - Test Step 4: Verify that the response body contains an error message indicating the failure to update task status.
4. **Test Case 3: Handling missing status**
    - Test Step 1: Send a PUT request to the endpoint with missing status.
    - Test Step 2: Verify that the response status is 400 (Bad Request).
    - Test Step 3: Verify that the response body contains an error message indicating missing status.

Expected Outcomes:

- Test Case 1 should pass, indicating successful update of task status.
- Test Case 2 should pass, indicating proper handling of database errors while updating task status.
- Test Case 3 should pass, indicating proper handling of missing status.

Notes:

- Ensure that the mock implementations of repository functions behave as expected in each test case.
- Verify that the responses are correctly structured with the appropriate status codes and error messages.

AUTOMATION TESTING: REGISTER PAGE

Test 1: ***'displays form inputs and registers a user'***

- This test checks if the form inputs are displayed properly and if a user is successfully registered.
- Test Steps:
    - Type 'test@example.com' into the input field with type "email".
    - Type 'password123' into the input field with type "password".
    - Click on the submit button.
    - Check if a success message with the text 'User registered successfully!' is displayed.

Test 2: ***'displays error message when form is submitted with empty fields'***

- This test verifies if an error message is displayed when the form is submitted with empty fields.
- Test Steps:
    - Click on the submit button without filling any fields.
    - Check if an error message with the text 'Email and password cannot be empty.' is displayed.

Test 3: ***'displays error message when registration fails'***

- This test simulates a scenario where registration fails (e.g., due to an email already being taken).
- Test Steps:
    - Intercept the registration request and mock a response with a 409 status code (conflict) and an error message indicating that the email is already taken.
    - Type 'existinguser@example.com' into the input field with type "email".
    - Type 'password123' into the input field with type "password".
    - Click on the submit button.
    - Wait for the registration request to complete.
    - Check if an error message with the text 'This email is already registered. Please use a different email.' is displayed.

Test 4: ***'navigates to login page when "Login Here" link is clicked'***

- This test checks if clicking on the "Login Here" link navigates to the login page.
- Test Steps:
    - Click on the link containing the text 'Already registered?'.
    - Check if the URL includes '/' indicating navigation to the login page.

AUTOMATION TESTING: LOGIN

Test 1: '*displays form inputs and logs in a user'*

- This test verifies that the form inputs are displayed correctly and a user can successfully log in.
- Test Steps:
    - Visit the login page.
    - Type 'test@example.com' into the email input field.
    - Type 'password123' into the password input field.
    - Click on the submit button.
    - Check if the URL includes '/class', indicating successful login and navigation to the class page.

Test 2: *'displays error message when form is submitted with empty fields'*

- This test ensures that an error message is displayed when the form is submitted with empty fields.
- Test Steps:
    - Visit the login page.
    - Click on the submit button without filling any fields.
    - Check if an error message with the text 'Email and password cannot be empty.' is displayed.

Test 3: *'displays error message when login fails'*

- This test simulates a scenario where login fails due to incorrect credentials.
- Test Steps:
    - Intercept the login request and mock a response with a 401 status code (unauthorized) and an error message indicating invalid credentials.
    - Visit the login page.
    - Type 'invalid@example.com' into the email input field.
    - Type 'incorrectpassword' into the password input field.
    - Click on the submit button.
    - Wait for the login request to complete.
    - Check if an error message with the text 'Invalid credentials' is displayed.

Test 4: *'navigates to registration page when "Register Here" link is clicked'*

- This test confirms that clicking on the "Register Here" link navigates to the registration page.
- Test Steps:

    - Visit the login page.
    - Click on the link containing the text 'Haven't registered yet?'.
    - Check if the URL includes '/register', indicating navigation to the registration page.

AUTOMATION TESTING: CLASS PAGE

Test 1: 'displays form inputs and adds a class'

- This test checks if the form inputs are displayed properly and if a class is successfully added.
- Test Steps:
    - Type 'Test Class' into the input field with placeholder "Class Name".
    - Type 'This is a test class' into the textarea with placeholder "Description".
    - Type 'Test Group' into the textarea with placeholder "Group Number".
    - Type '2024' into the input field with placeholder "Start Year".
    - Type '2025' into the input field with placeholder "End Year".
    - Click on the submit button.
    - Check if a success message container with the text 'Class added successfully' is displayed.

Test 2: ***'displays error message when form is submitted with empty fields'***

- This test verifies if an error message is displayed when the form is submitted with empty fields.
- Test Steps:
    - Click on the submit button without filling any fields.
    - Check if an error message container with the text 'All fields are required' is displayed.

Test 3: ***'navigates to class details page when class item is clicked'***

- This test ensures that clicking on a class item navigates to the class details page.
- Test Steps:
    - Click on the first class item.
    - Check if the URL contains '/dashboard/' indicating navigation to the class details page.

AUTOMATION TESTING: DASHBOARD PAGE

Test 1: ***'displays class navigation links'***

- This test verifies that the class navigation links are displayed correctly.
- Test Steps:
    - Visit the dashboard page for class ID 1.
    - Check if the 'Dashboard', 'Student List', 'Task Management', 'Class Management', 'Class List', and 'Logout' links exist.

Test 2: ***'fetches class information when classId is provided'***

- This test ensures that class information is fetched and displayed when the class ID is provided.
- Test Steps:
    - Intercept the GET request to fetch class information and mock a response with class information from the server.
    - Visit the dashboard page for class ID 1.
    - Wait for the request to complete.
    - Verify if class information such as 'Class Name' and 'Teacher' are displayed in the dashboard container.

Test 3: ***'navigates to class list when "Class List" link is clicked'***

- This test checks if clicking on the "Class List" link navigates to the class list page.
- Test Steps:
    - Visit the dashboard page for class ID 1.
    - Click on the 'Class List' link.
    - Verify if the URL includes '/class', indicating navigation to the class list page.

AUTOMATION TESTING: STUDENT PAGE

Test 1: ***'displays form inputs and adds a new student'***

- This test verifies that the form inputs are displayed correctly and a new student can be added.
- Test Steps:
    - Visit the student list page.
    - Type 'John Doe' into the name input field.
    - Type 'john@example.com' into the email input field.
    - Submit the form.

    - Check if a success message with the text 'Student added successfully!' is displayed.

Test 2: ***'displays error message when form is submitted with empty fields'***

- This test ensures that an error message is displayed when the form is submitted with empty fields.
- Test Steps:
    - Visit the student list page.
    - Submit the form without filling out any inputs.
    - Check if an error message with the text 'Name and email cannot be empty.' is displayed.

Test 3: ***'filters students based on search query'***

- This test checks if students are filtered based on the search query.
- Test Steps:
    - Visit the student list page.
    - Type 'john' into the search input.
    - Verify if only matching students are displayed in the table body.

Test 4: ***'toggles student status when clicked'***

- This test verifies that the student status toggles when clicked.
- Test Steps:
    - Visit the student list page.
    - Assuming there's at least one student rendered with active status, find the status span of the first student.
    - Click on the status span.
    - Verify if the status toggles successfully by checking the color of the status span.

AUTOMATION TESTING: TASK PAGE

Test 1: ***'displays form inputs and adds a new task'***

- This test verifies that the form inputs are displayed correctly and a new task can be added.
- Test Steps:
    - Visit the task management page.
    - Type 'New Task' into the title input field.
    - Type 'This is a new task' into the description input field.

    - Type '2024-06-01' into the due date input field.
    - Click on the 'Add Task' button.
    - Check if a success message with the text 'Task added successfully' is displayed.

Test 2: ***'displays error message when form is submitted with empty fields'***

- This test ensures that an error message is displayed when the form is submitted with empty fields.
- Test Steps:
    - Visit the task management page.
    - Click on the 'Add Task' button without filling out any inputs.
    - Check if an error message with the text 'Fields cannot be empty.' is displayed.

Test 3: ***'filters tasks based on search query'***

- This test checks if tasks are filtered based on the search query.
- Test Steps:
    - Visit the task management page.
    - Type 'new' into the search input.
    - Verify if only matching tasks are displayed in the table body.

Test 4: ***'toggles task status when clicked'***

- This test verifies that the task status toggles when clicked.
- Test Steps:
    - Visit the task management page.
    - Assuming there's at least one task rendered with pending status, find the status span of the first task.
    - Click on the status span.
    - Verify if the status toggles successfully by checking the color of the status span.

AUTOMATION TESTING: CLASS MANAGEMENT PAGE

Test 1: ***'displays class details and updates them'***

- This test verifies that the class details are displayed correctly and can be updated.
- Test Steps:
    - Visit the settings page.
    - Clear and type 'New Class Name' into the name input field.
    - Clear and type 'New Class Description' into the description input field.
    - Clear and type '2024' into the start year input field.

    - Clear and type '2025' into the end year input field.
    - Click on the 'Update Class' button.
    - Check if a success message with the text 'Class updated successfully' is displayed.

Test 2: ***'displays error message when form is submitted with empty fields'***

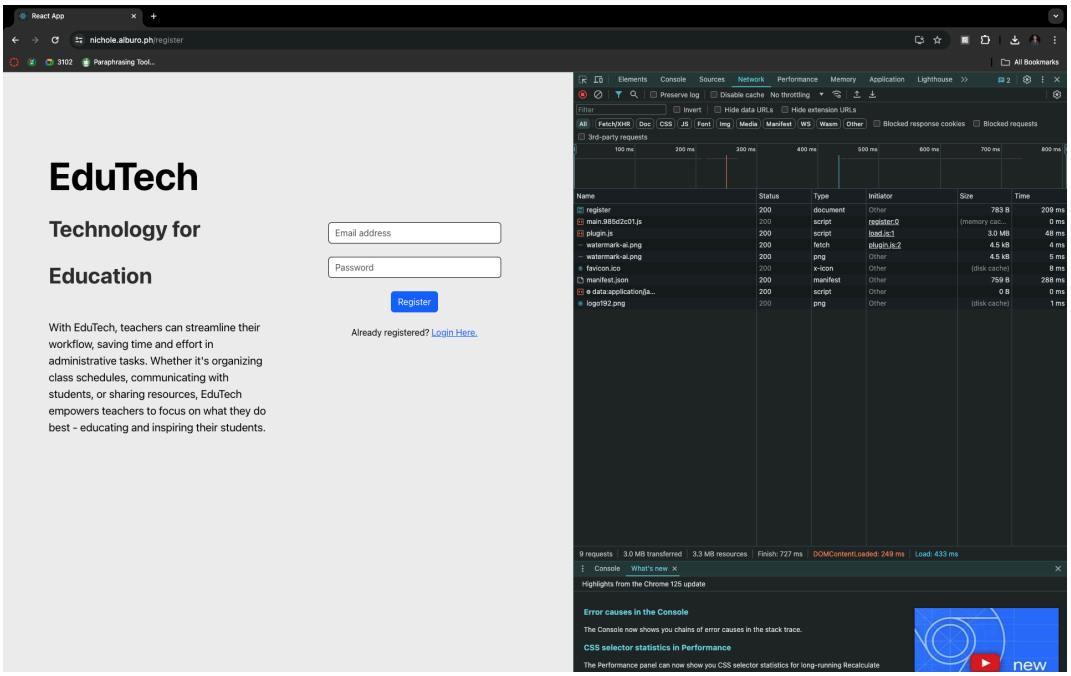
- This test ensures that an error message is displayed when the form is submitted with empty fields.
- Test Steps:
    - Visit the settings page.
    - Click on the 'Update Class' button without filling out any inputs.
    - Check if an error message with the text 'Fields cannot be empty.' is displayed.

Test 3: ***'deletes class when "Delete Class" button is clicked'***

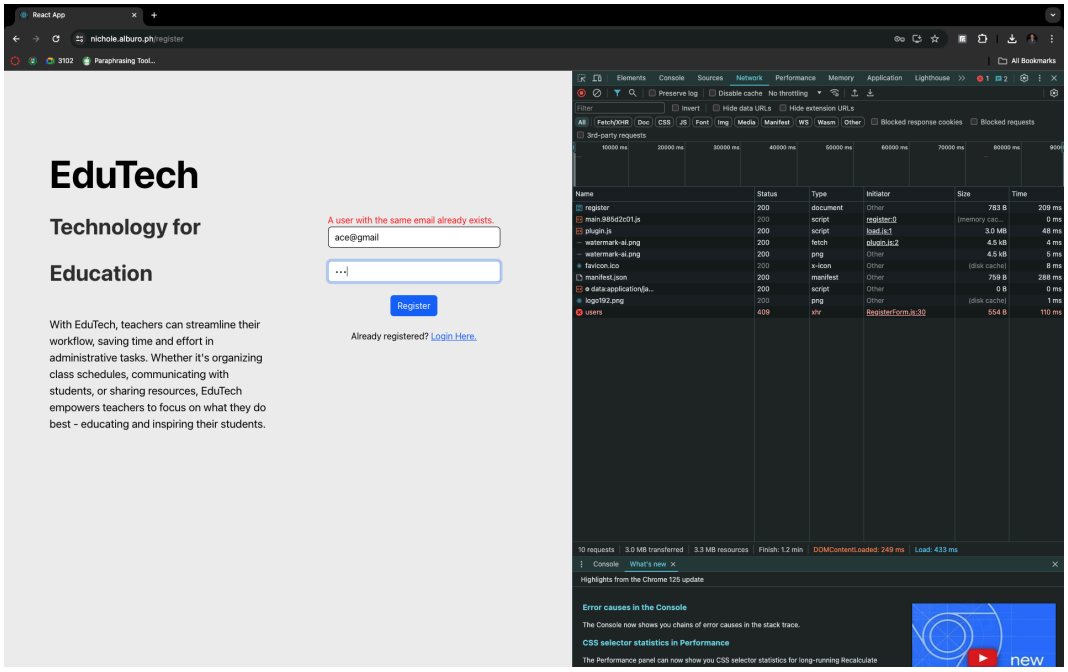
- This test checks if the class can be deleted when the "Delete Class" button is clicked.
- Test Steps:
    - Visit the settings page.
    - Click on the "Delete Class" button.
    - Assuming you have a confirmation dialog, handle it accordingly.
    - Verify if the class is deleted by checking if the URL changes to '/class'.

SCREEN CAPTURES FROM THE DEPLOYED APP

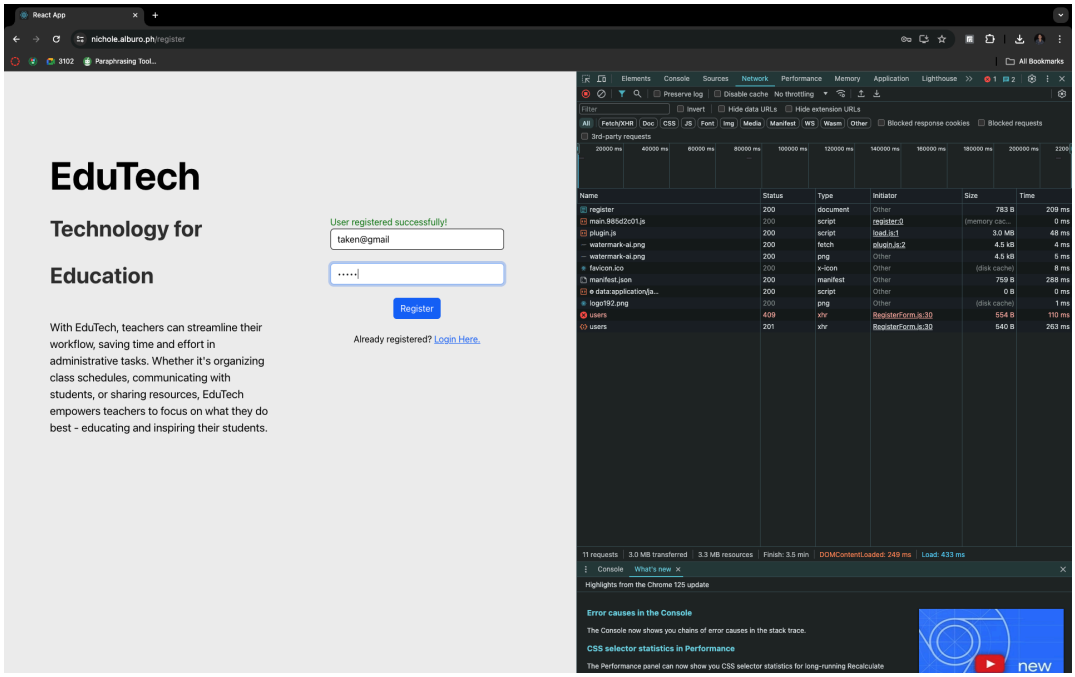
REGISTER PAGE



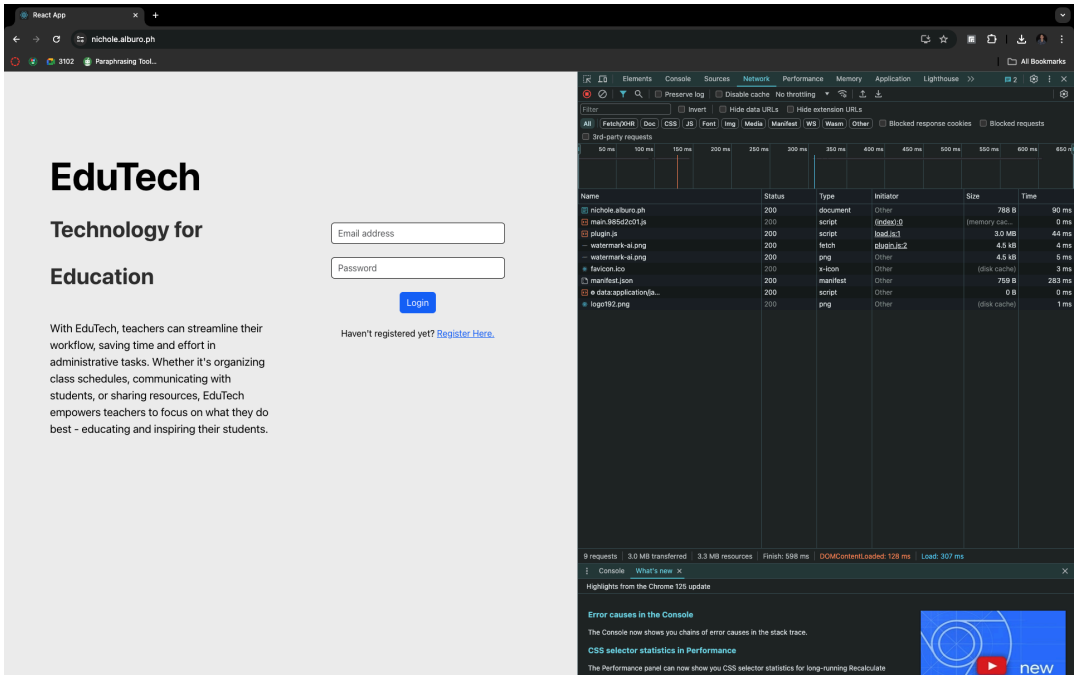
Placed email is already registered



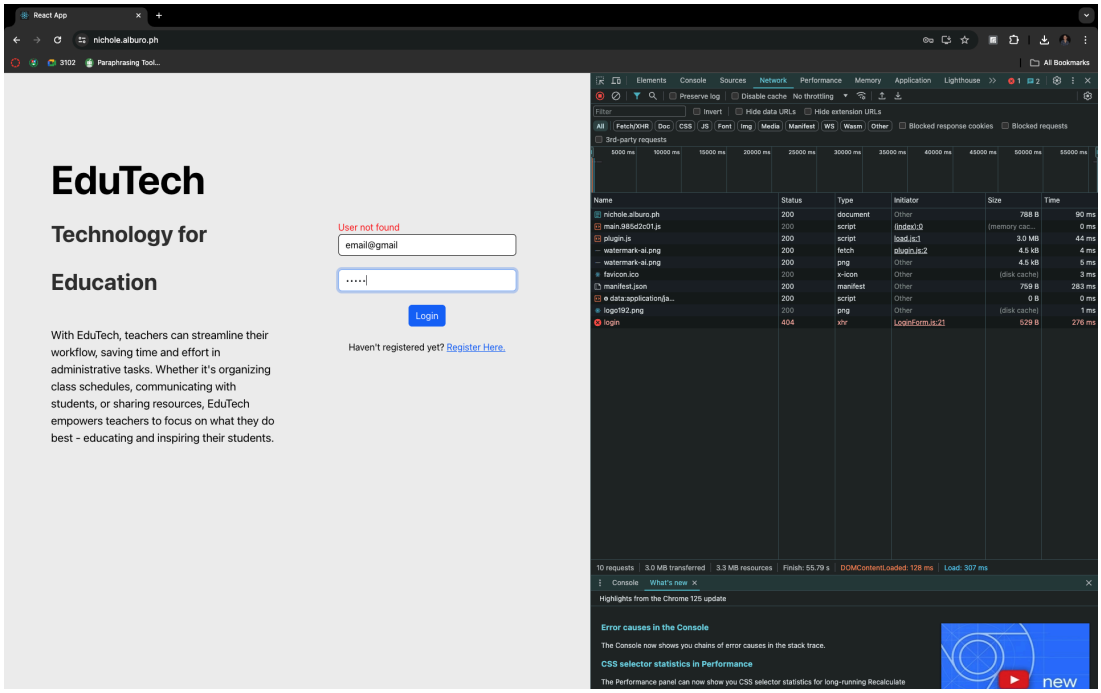
Successfully registered



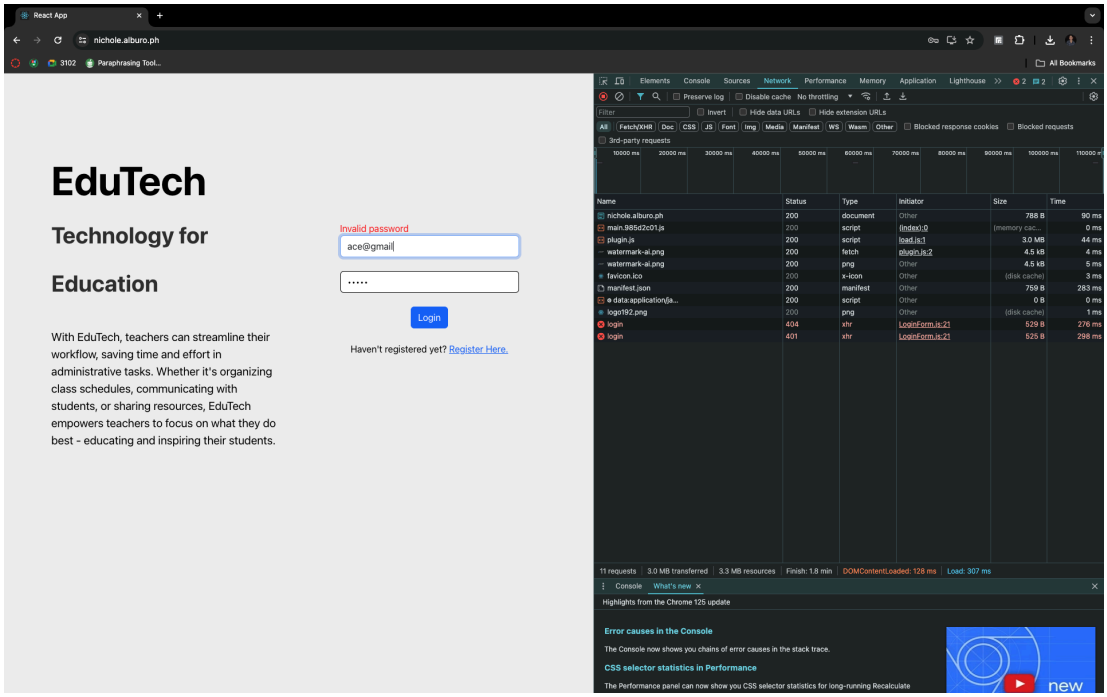
LOGIN PAGE



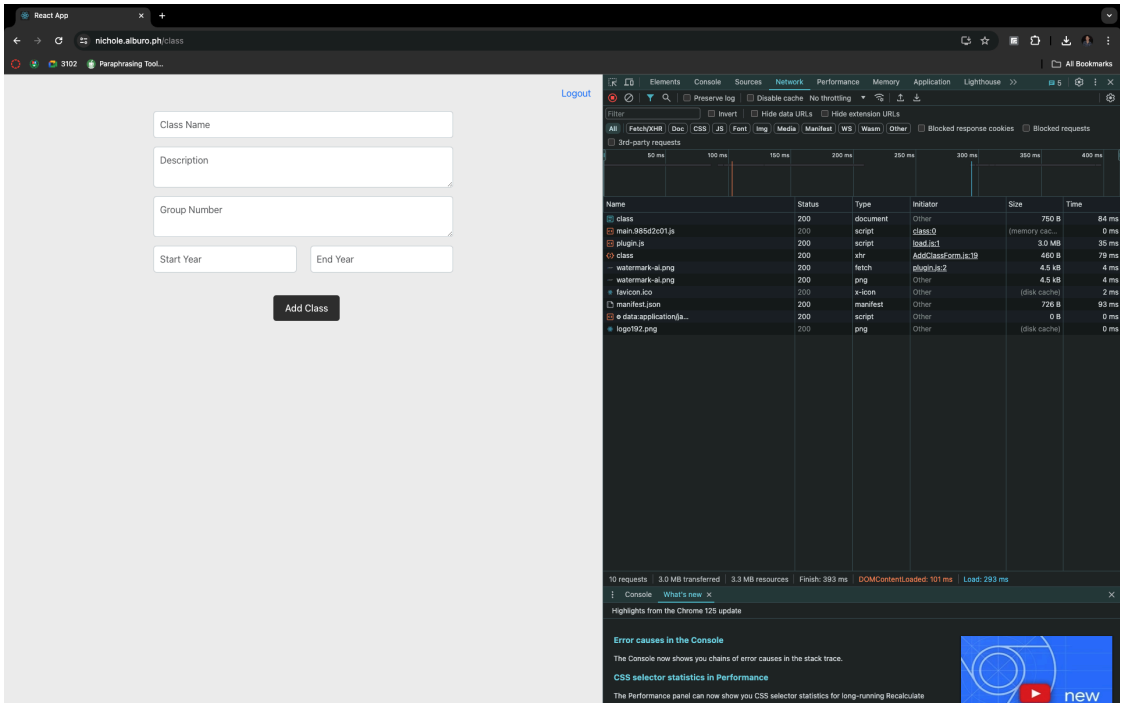
User is not found/registered



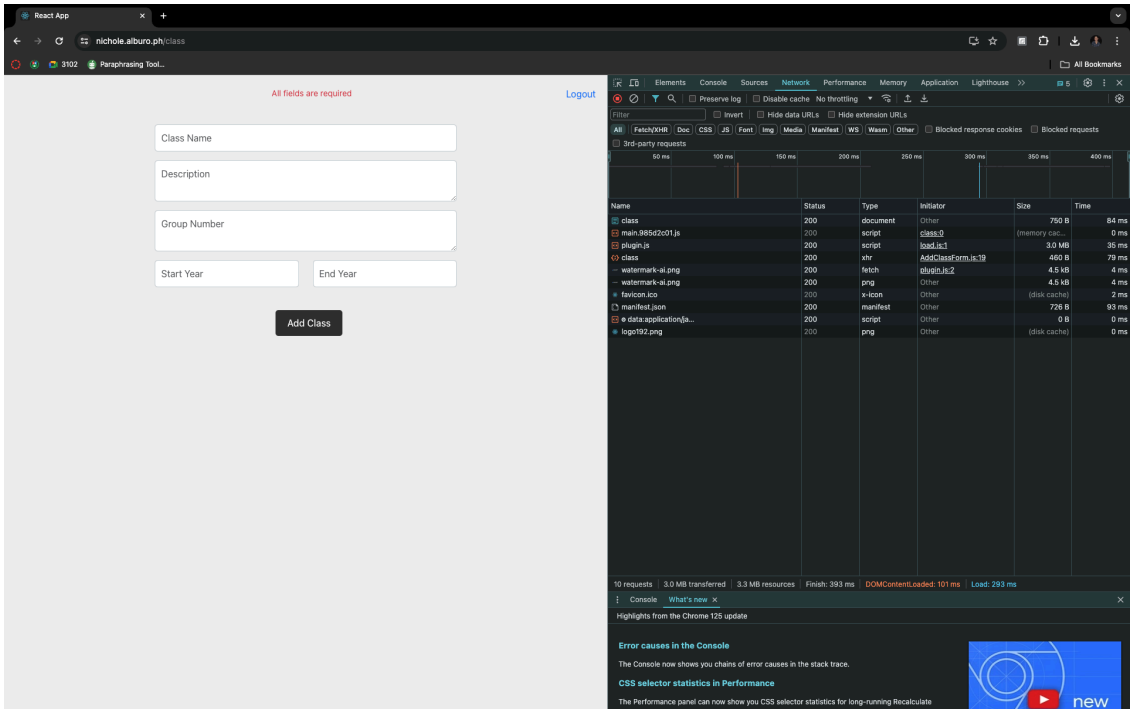
Placed password is incorrect



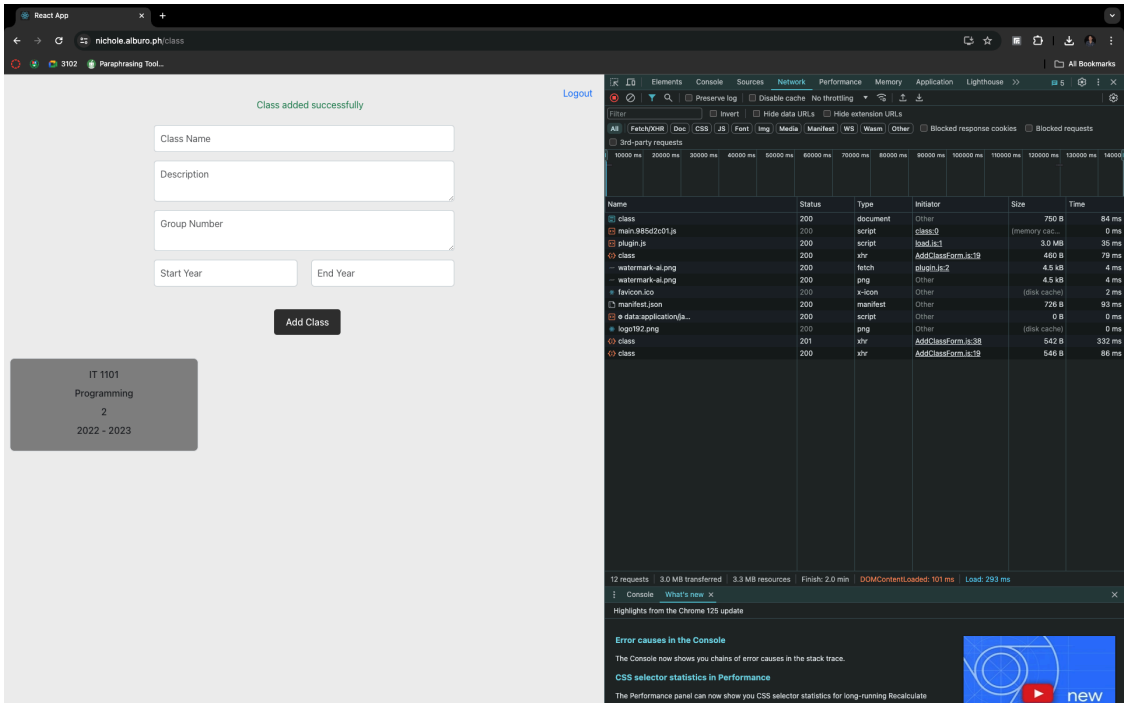
CLASS PAGE



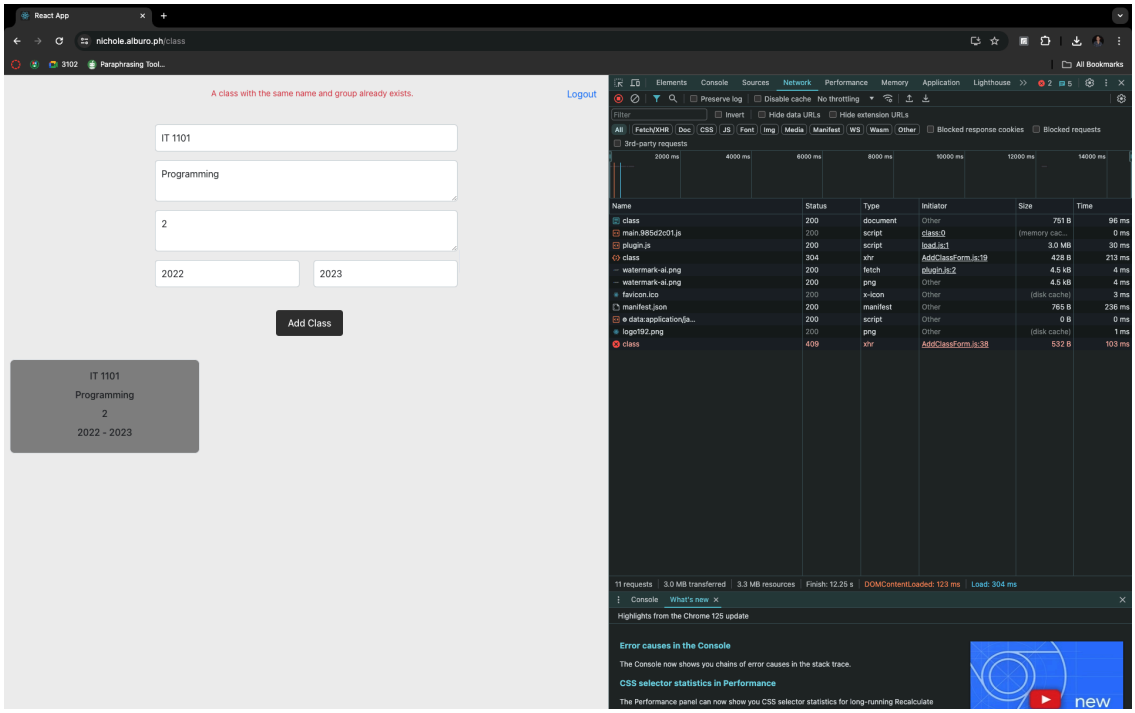
Field is empty



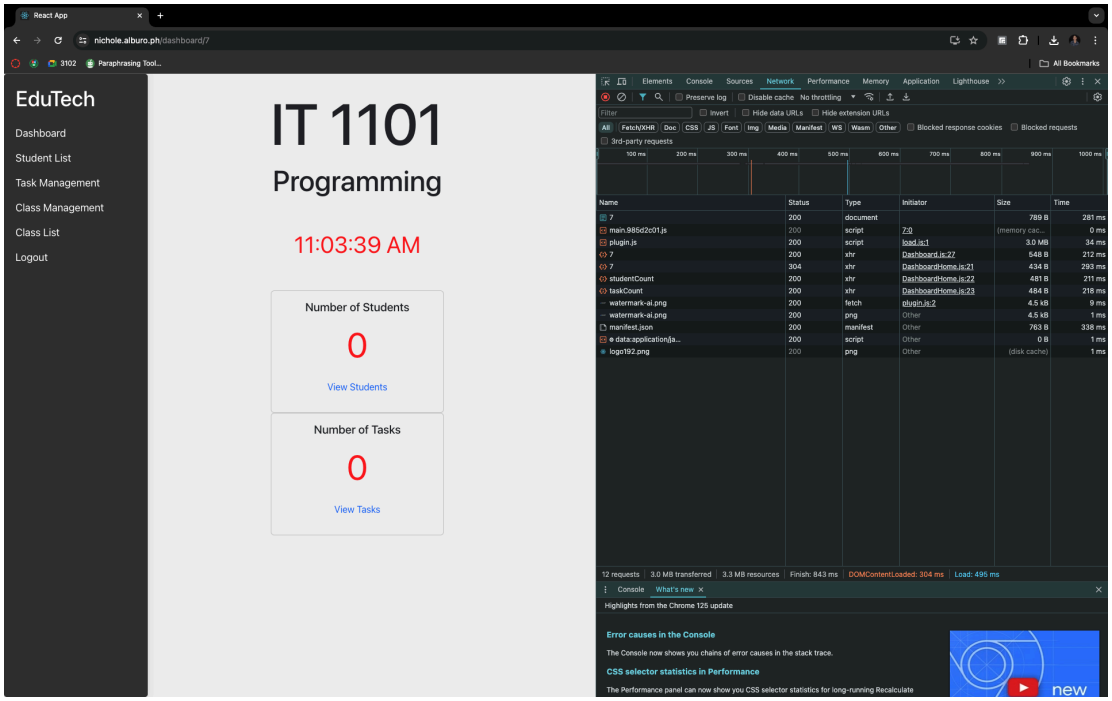
Class added successfully



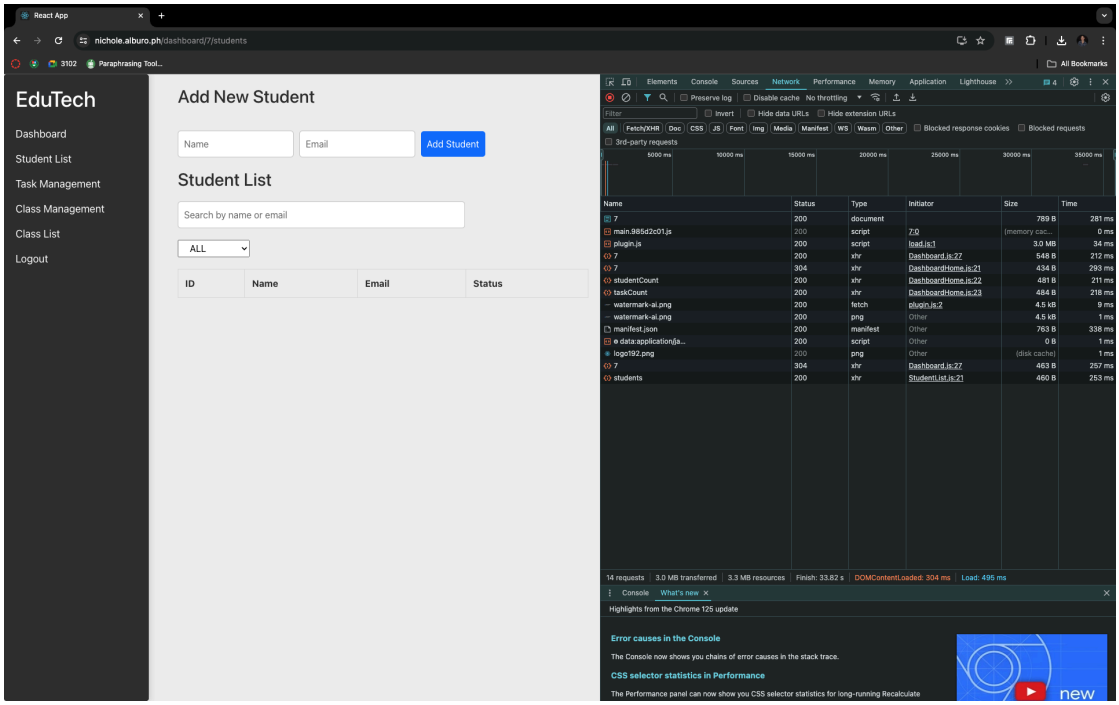
Duplicate details



DASHBOARD PAGE



STUDENT PAGE



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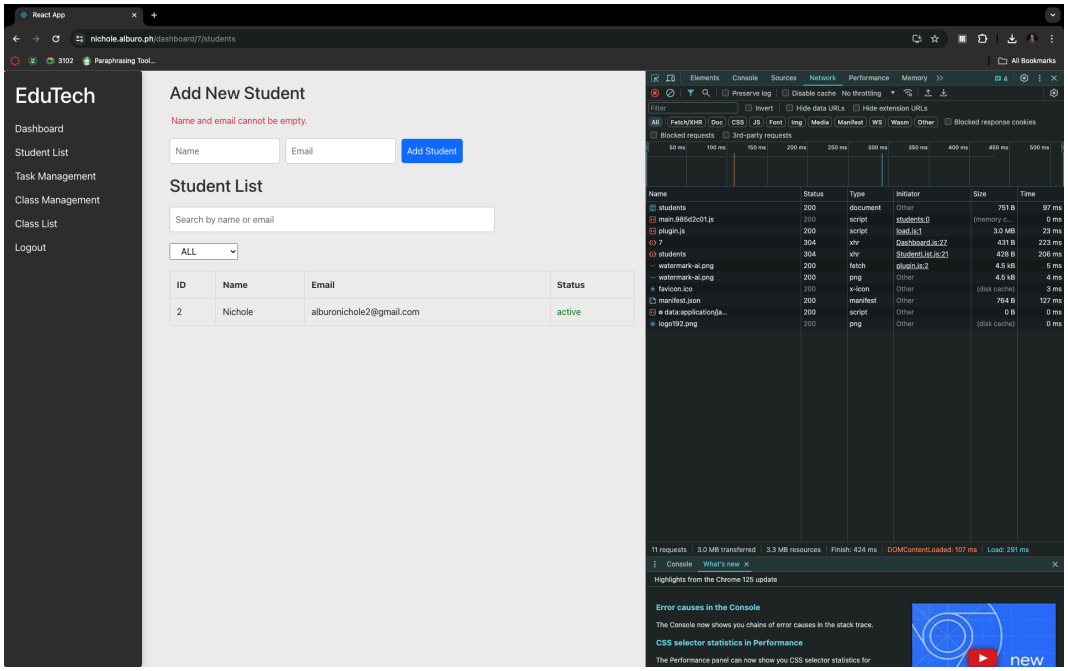

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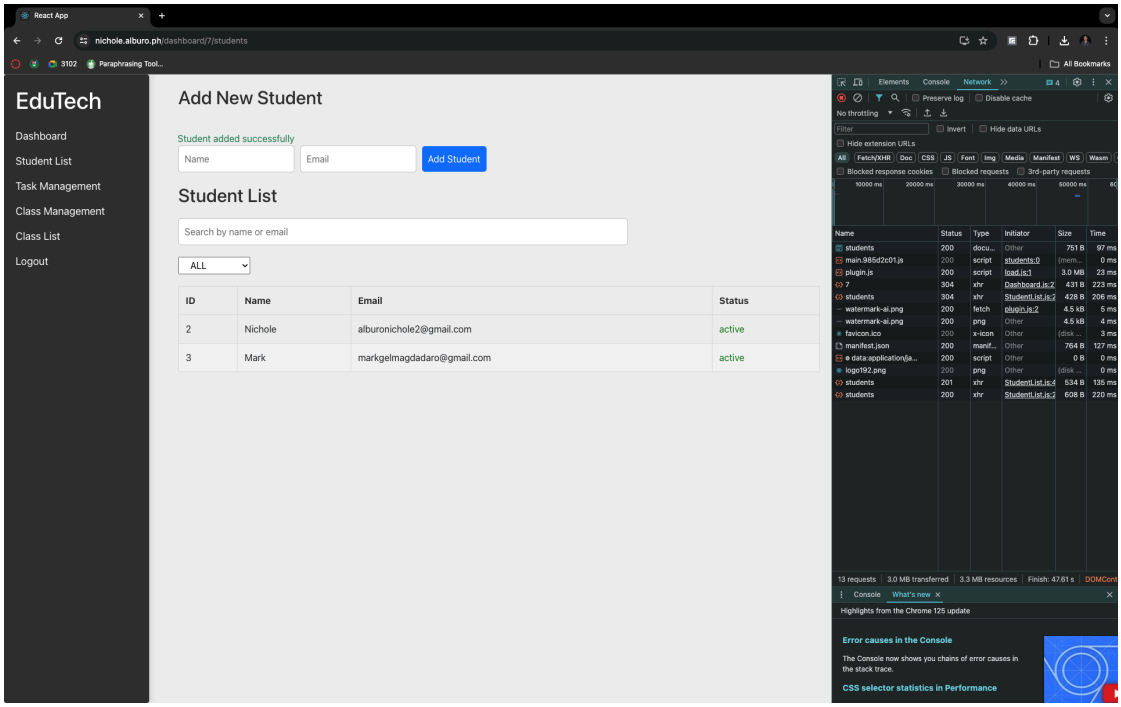
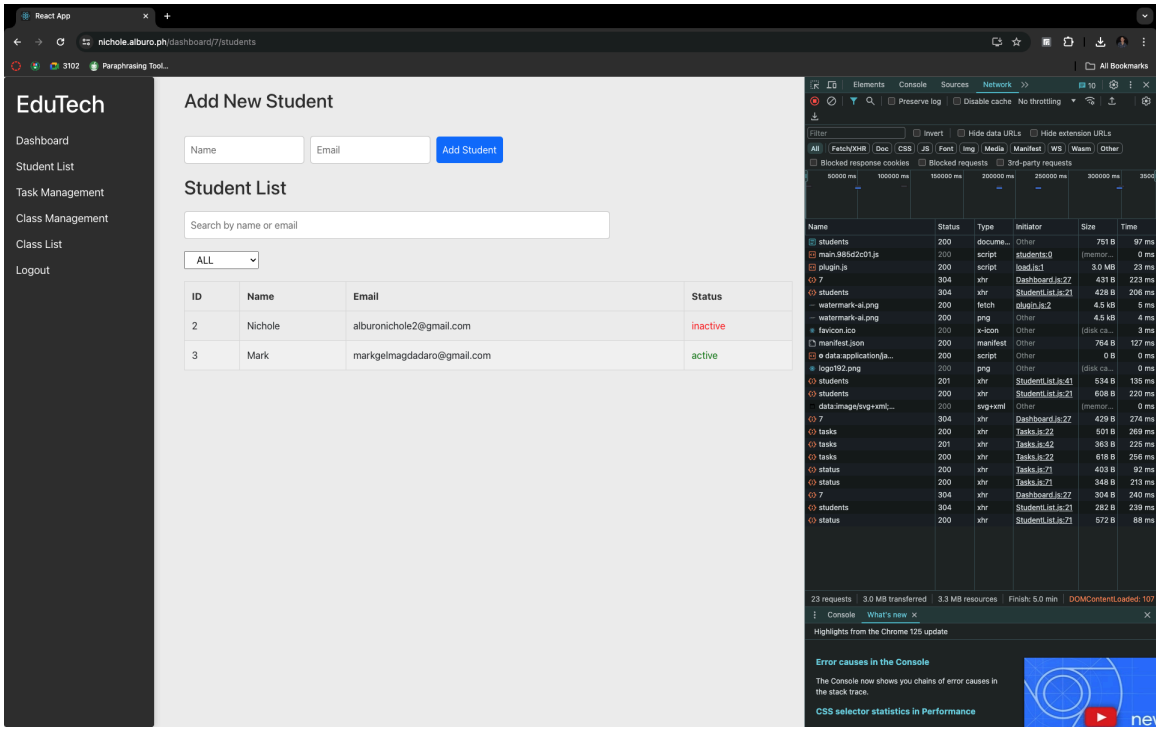
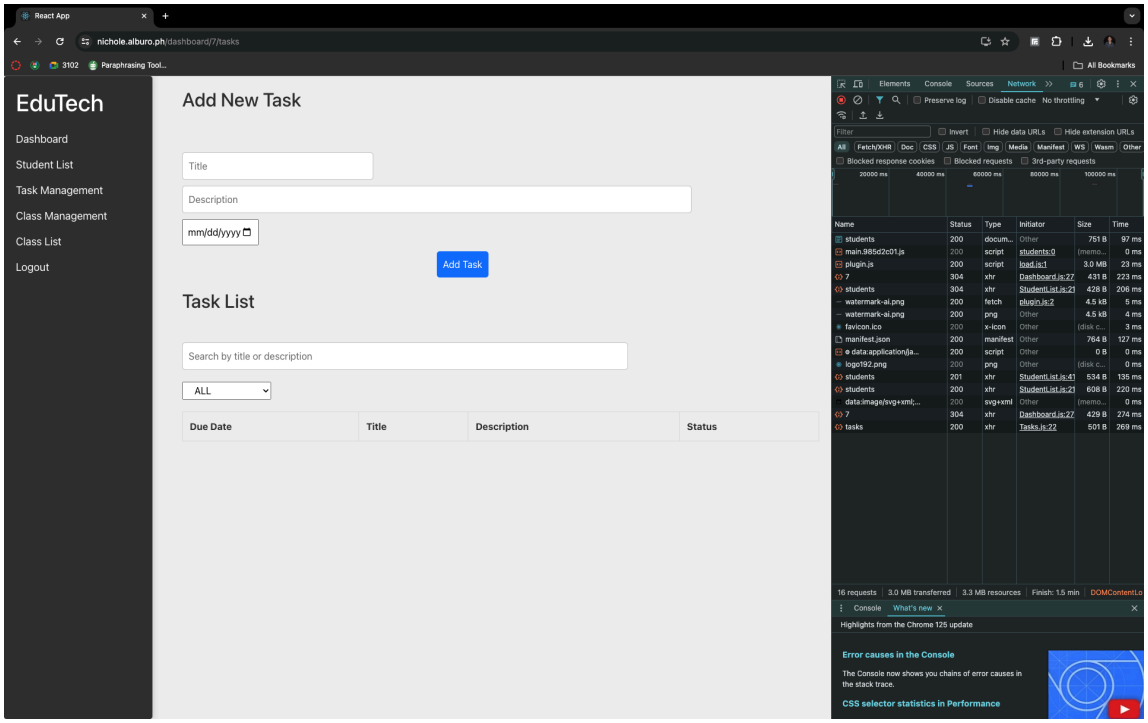


Switching of student's status



TASK PAGE



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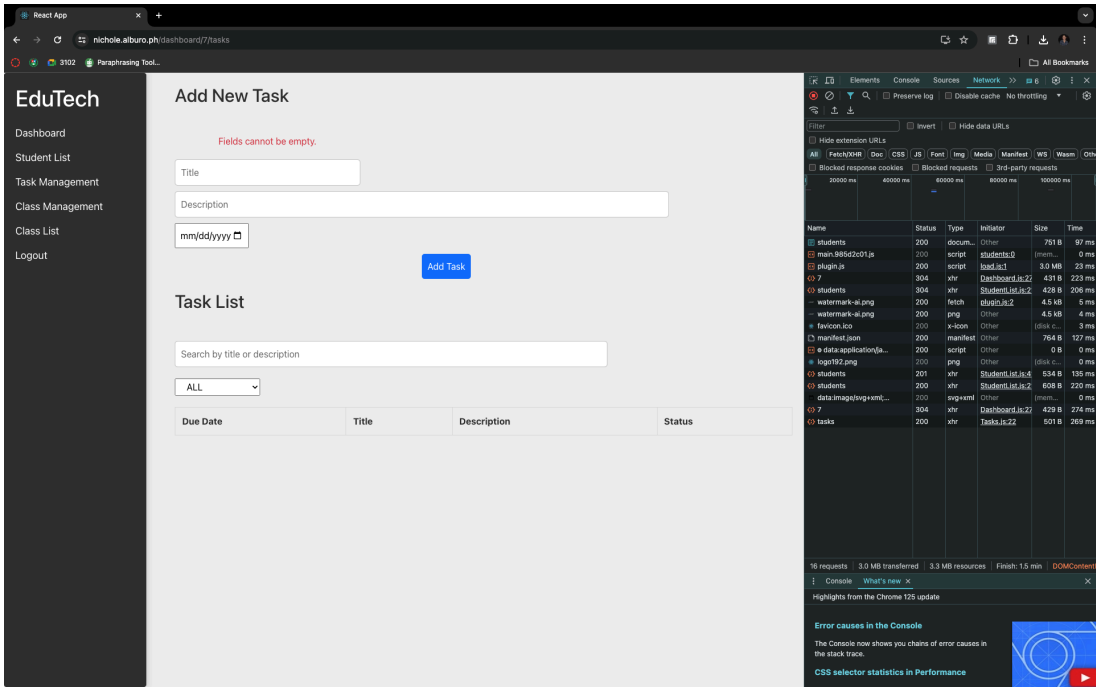

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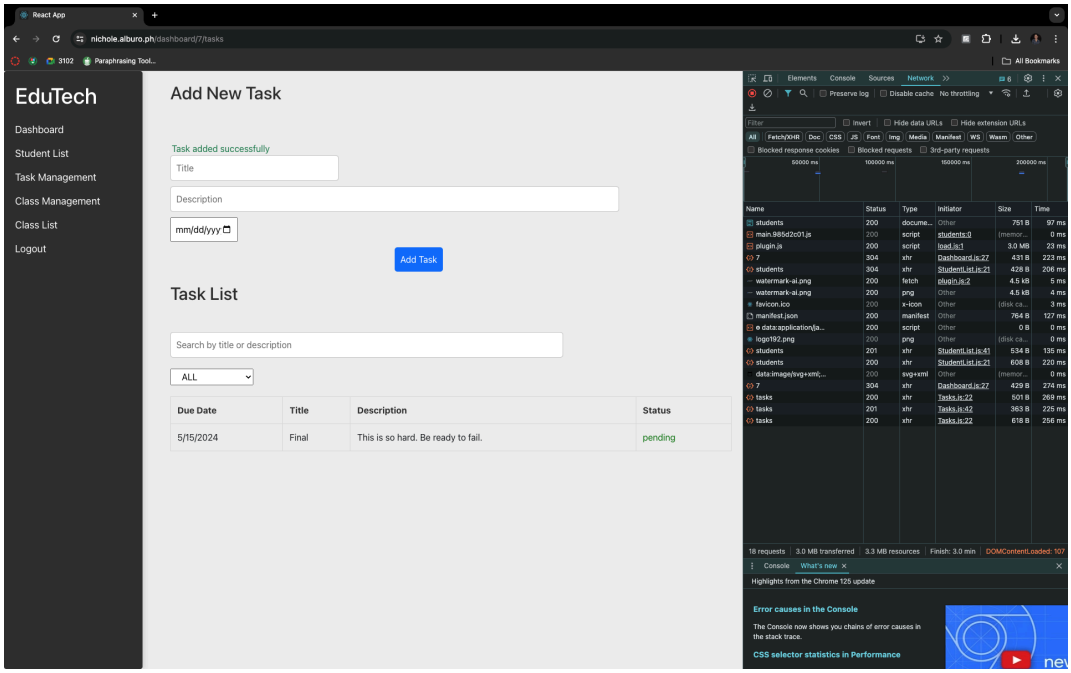

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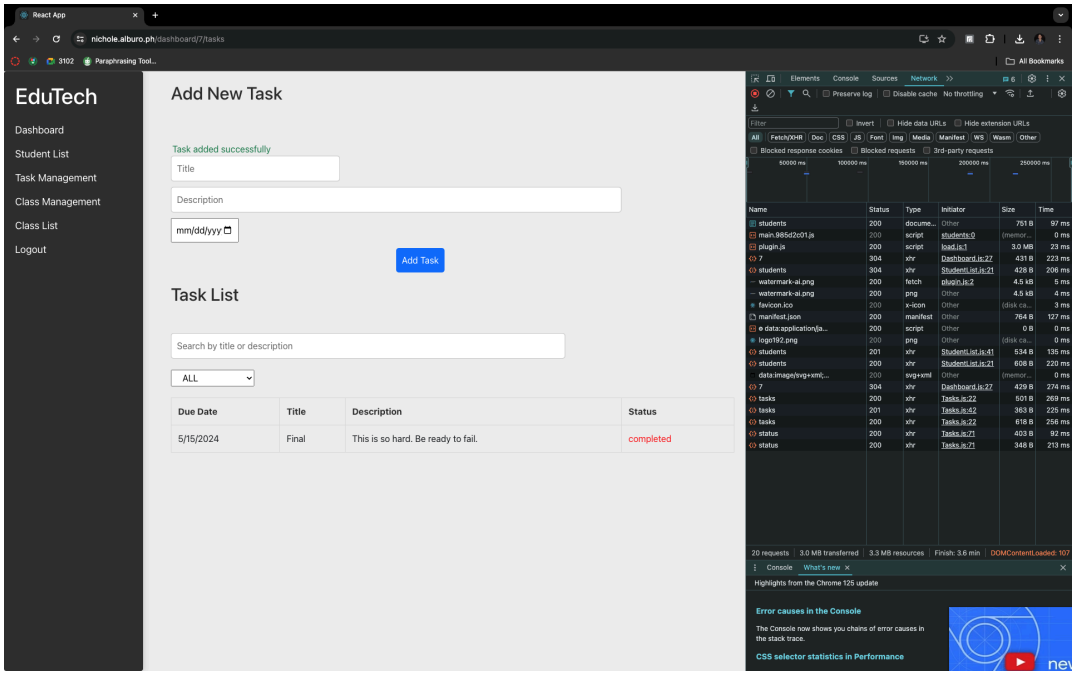
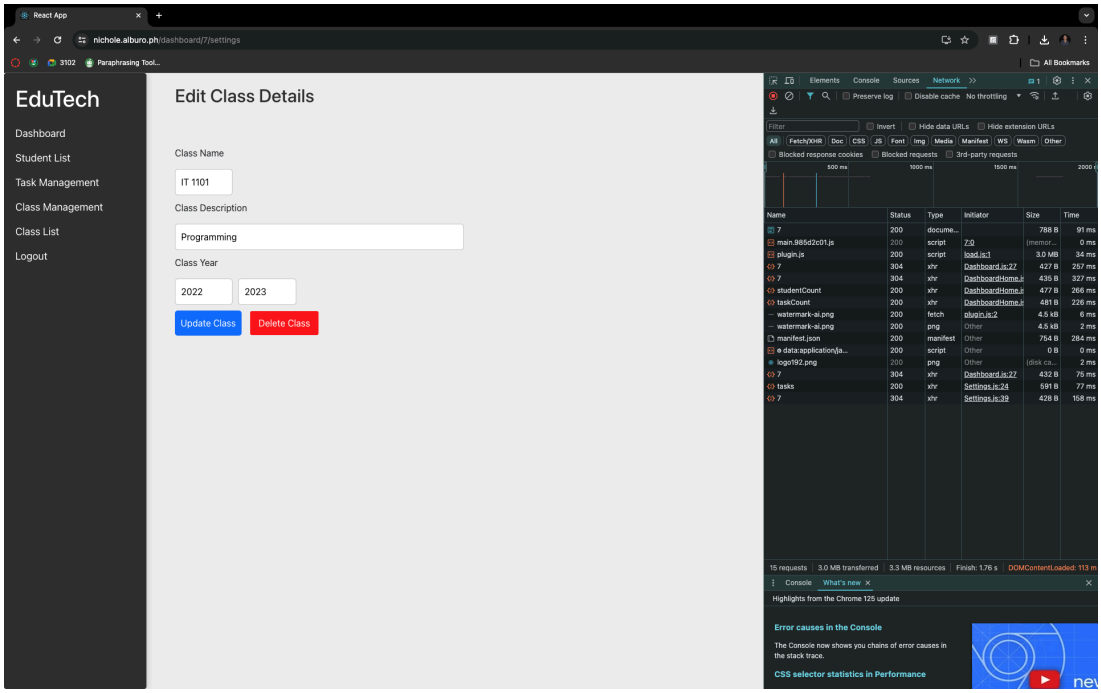


CLASS DETAILS PAGE



Class details updated