**Introduction**

This week’s lab focused on building RESTful APIs using the Express framework, handling dynamic routes, working with JSON files, and developing an HTML-based form for data submission. The exercises combined server-side programming with data management and client interaction, aiming to provide a comprehensive understanding of backend web development.

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**Tasks Completed**

1. **Creating Routes with Express:**
   * Developed an Express application (index.js) that defined multiple routes, including:
     + A basic GET route (/) for a welcome message.
     + A route with parameters (/users/:userId/books/:bookId) to dynamically handle user and book data.
     + A route to serve an HTML file (/studentinfo) containing a student enrollment form.
2. **Dynamic JSON Handling:**
   * Created a route (/GetStudents) to read and display all student data stored in a JSON file (Student.json).
   * Developed a route (/GetStudentid/:id) to search for a specific student using their ID and return the corresponding details.
3. **HTML Form Integration:**
   * Designed an HTML form (StudentInfo.html) to collect user input, including name, age, gender, and qualifications.
   * Configured a POST route (/submit-data) in the Express app to process and respond to the submitted form data.
4. **File Operations and Middleware Usage:**
   * Utilized the fs module to read JSON files and parse their content.
   * Integrated body-parser middleware to handle form submissions and extract POST request data.

**Reflection**

**RESTful API Development**

The creation of dynamic routes and endpoints using Express enhanced my understanding of REST API principles. Implementing parameterized routes demonstrated how APIs can be designed to handle diverse client requests efficiently.

* **What I Learned:**  
  I now appreciate the flexibility of Express in building APIs that adapt to user input through route parameters. This skill is essential for creating scalable and interactive web applications.

**Data Handling with JSON**

Interacting with the Student.json file allowed me to understand how to manage structured data in backend systems. By developing routes to search and retrieve specific records, I learned the importance of efficient data querying.

* **What I Learned:**  
  Working with JSON files taught me how to handle data persistence on the server side, which is a foundational skill in backend development.

**HTML Form and Data Submission**

Designing the student enrollment form provided insight into how client-side input is processed by the server. Integrating form submission with the Express POST route demonstrated how user data flows from the frontend to the backend.

* **What I Learned:**  
  This exercise highlighted the importance of middleware, like body-parser, in simplifying data parsing and improving server-side functionality. It also reinforced the need for clear communication between the client and server.

**Node.js Modules**

Using the fs module to handle file operations strengthened my understanding of Node.js core functionality. This task demonstrated how backend servers interact with file systems to read and manipulate data.

* **What I Learned:**  
  I gained practical experience with server-side file handling, which is crucial for data-driven applications.

**Conclusion**

This week’s lab provided a hands-on introduction to REST API development, JSON file operations, and HTML form integration. The exercises bridged the gap between server-side programming and client interaction, equipping me with practical skills for building dynamic web applications. Moving forward, I aim to refine these skills and explore more advanced features of Express and Node.js.