**Week 3 Lab Report**

**Introduction**

This week’s lab focused on developing foundational skills in backend web development using Node.js and Express.js. The objectives were to understand the principles of REST API development, handle data dynamically using middleware, and work with JSON files and Node.js core modules.

**Tasks Completed**

1. **Express Framework and REST API Development:**
   * Created an Express web application in Node.js.
   * Used the GET method to define REST API endpoints, both with and without parameters.
   * Implemented routes that dynamically read and respond to client requests using req.param and req.params.id.
2. **Middleware Integration:**
   * Integrated the body-parser middleware to handle form data submissions.
   * Parsed incoming JSON data to enable efficient data handling on the server.
3. **JSON File Operations:**
   * Created a JSON file for data storage and implemented server-side functionality to search its contents.
   * Read and manipulated JSON files using the fs module in Express.
4. **Node.js Core Modules:**
   * Explored the os module to retrieve system information, including CPU details, memory usage, and uptime.
   * Used the util module to format and display complex system data.

**Learning Outcomes**

* **RESTful API Development:**  
  Gained hands-on experience in setting up RESTful routes and understanding the principles of resource-based APIs. This enhanced my ability to structure and build scalable web applications.
* **Dynamic Parameter Handling:**  
  Learned how to dynamically access and process parameters passed in URLs using req.param and req.params.id. This provided insight into customizing API responses based on user input.
* **Middleware Usage:**  
  The integration of body-parser clarified the role of middleware in simplifying common tasks like parsing JSON and handling form submissions. This highlighted middleware’s importance in web application efficiency.
* **JSON Data Management:**  
  Working with JSON files deepened my understanding of how structured data is stored, retrieved, and manipulated in backend systems. This will be crucial in future data-driven applications.
* **Node.js Core Modules:**  
  Exploring modules like os and util demonstrated Node.js's versatility in accessing and interacting with system resources. This broadened my perspective on how JavaScript can be applied to areas beyond web development.

**Conclusion**

The lab provided a comprehensive understanding of REST API development and Node.js capabilities. It strengthened my skills in backend development, middleware usage, and data handling while offering practical experience in system-level programming with Node.js core modules. These skills are critical for building robust, scalable, and efficient web applications in the future.