Full-Stack Development Program with Generative AI

Develop a Reliable Backend with Node and Express

Phase-End Project

Developing and Testing a Full-Stack Employee Management System

Objective

This project aims to consolidate the skills acquired during the course by designing, implementing, and testing a full-stack Employee Management System (EMS). The EMS will simulate real-world backend development tasks by incorporating route management, file handling, middleware integration, view rendering using EJS, and automated end-to-end testing with Cypress. The goal is to build a testable, modular, and maintainable system using industry-standard tools.

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Problem Statement and Motivation

Real-time scenario:
Human resource departments and startups often require internal tools to manage employee data effectively. Relying on spreadsheets can lead to data duplication, inconsistencies, and inefficiencies.

Solution:
The employee management system streamlines HR operations by allowing admin users to add, view, update, and delete employee records through a user-friendly web interface. It minimizes data duplication, improves information accuracy, and reduces manual effort. Using Node.js, Express.js, EJS, and the fs module, the application delivers a dynamic and functional backend experience. Automated testing with Postman and Cypress ensures system reliability, making the EMS a dependable tool for managing employee data efficiently.

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Industry Relevance

The following tools are widely used in the industry to design the backend of a web application:

1. **Node.js:** It is a popular server-side JavaScript runtime environment that allows developers to build scalable and high-performance applications. It enables non-blocking I/O operations and supports real-time features across platforms.

2. **Express.js**: It is a lightweight and flexible Node.js framework that simplifies the process of building robust APIs and web applications. It provides powerful routing, middleware integration, and easy request handling, making it a standard choice for backend development.

3. **EJS**: It is a templating engine used with Express.js to render dynamic HTML pages on the server side. It allows JavaScript logic to be embedded directly into HTML, enabling the creation of reusable views and templates.

Industry Relevance

4. **Cypress**: It is an end-to-end testing framework that helps developers write fast and reliable tests for web applications. It provides a visual test runner and powerful debugging capabilities, making it ideal for validating UI and backend workflows.

5. **fs Module**: It is a core Node.js module used for handling file system operations. It is commonly used to read from and write to files, which is essential for tasks like logging, data storage, and configuration management in backend projects.

6. **Postman**: It is a widely adopted tool for API development and testing. Developers use it to test endpoints, send different types of requests, analyze responses, and automate API testing, making it an essential part of modern backend workflows.

Tasks

The development of EMS can be broken down into the following tasks:

1. Set up a Node.js project using npm to initialize the backend application and manage all required dependencies

2. Use the fs module to read from and write to a JSON file for storing employee data without relying on a database

3. Install Express.js, EJS, and cookie parser to build server routes, render dynamic HTML pages, and manage client-side cookies

4. Implement CRUD API routes using Express.js to allow the creation, retrieval, updating, and deletion of employee records

5. Write Cypress test cases and run them in a visual environment to validate the application's functionality and ensure a smooth user experience

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Project References

Task 1: Lesson 2

Task 2: Lesson 4

Task 3: Lessons 8 and 9

Task 4: Lessons 7 and 9

Task 5: Lessons 12 and 13

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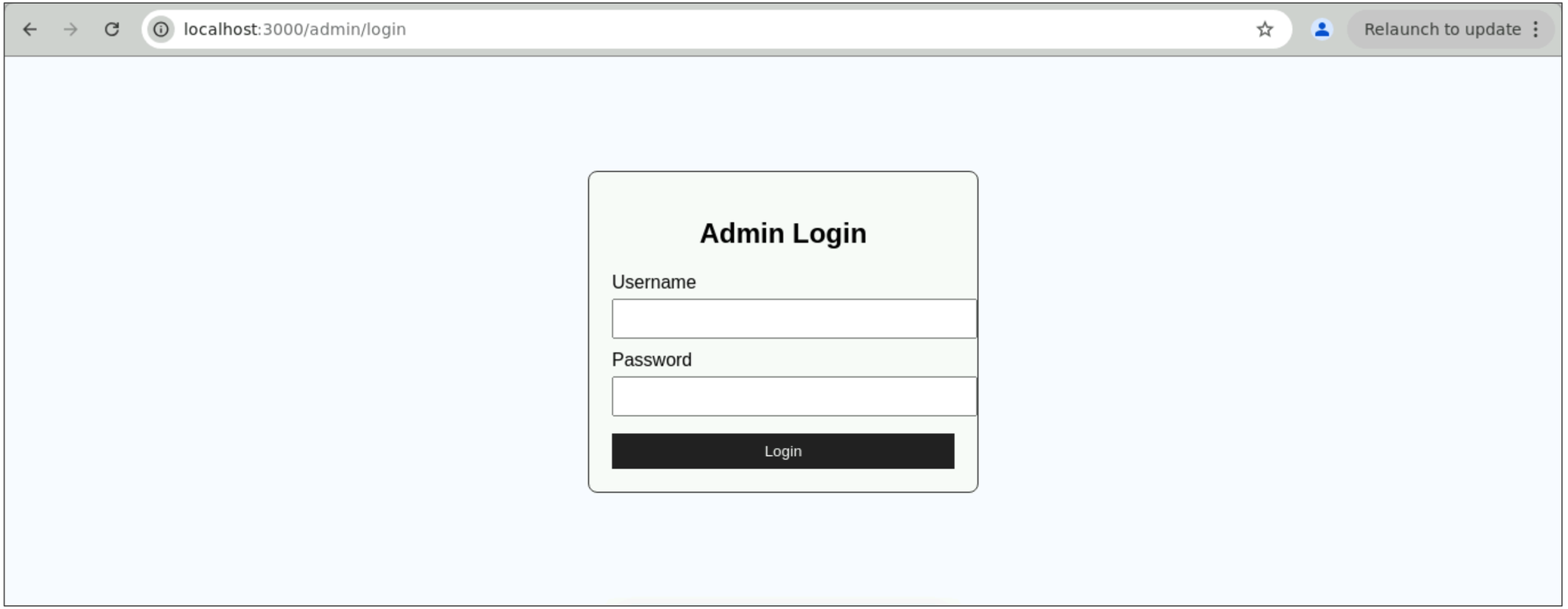
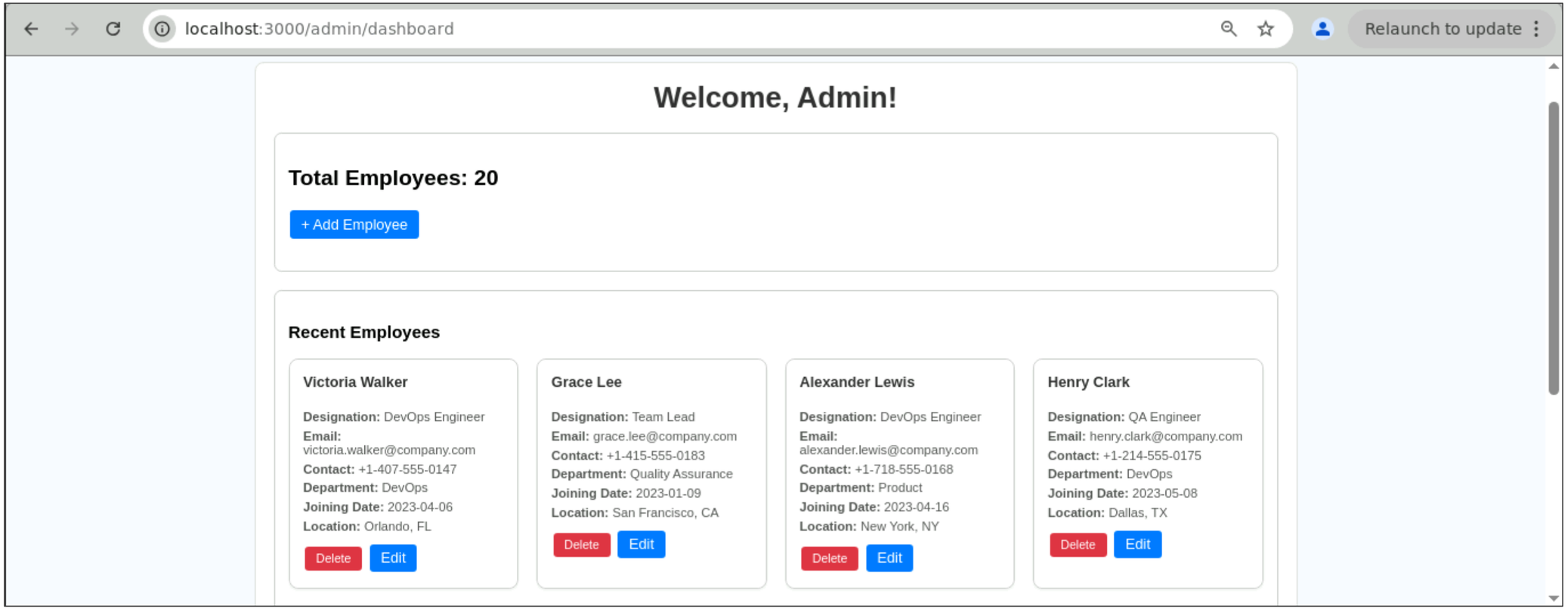
Output Screenshots

The Admin Login page serves as a secure gateway to authenticate users and provide access to the admin panel.



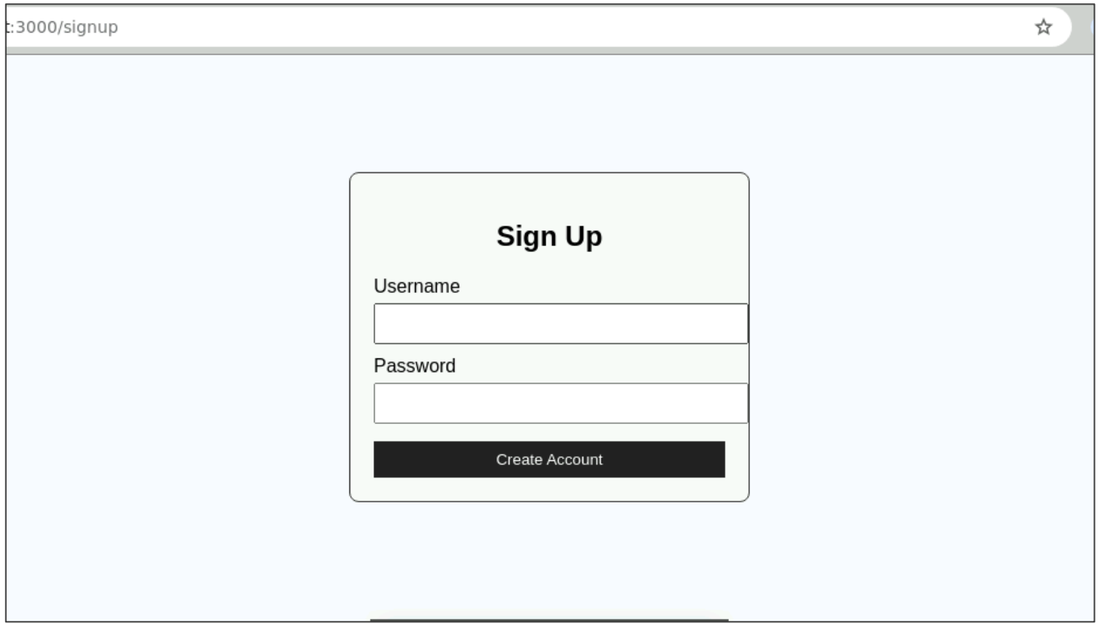
Output Screenshots

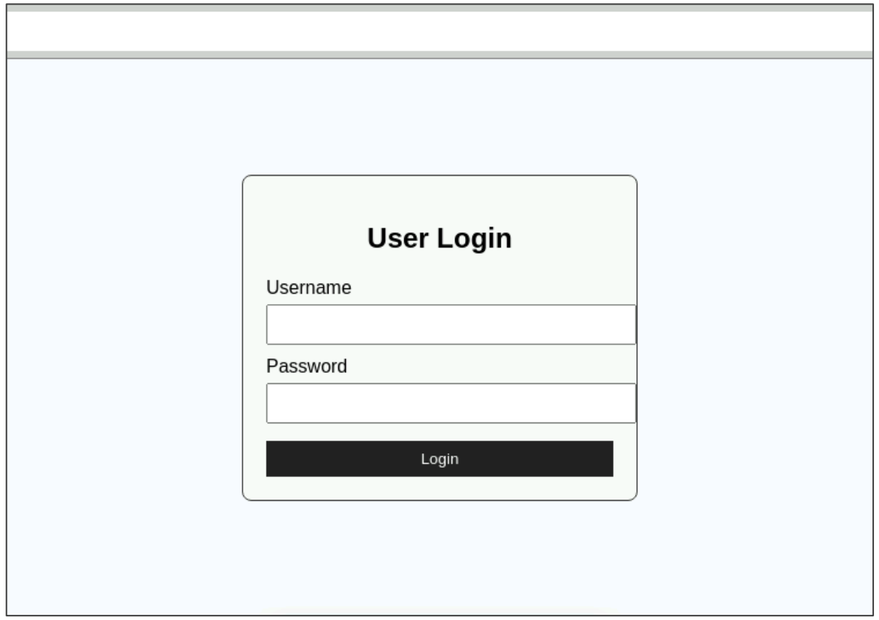
The Admin Dashboard provides a centralized view of all employee records, enabling easy access to key details and recent additions.



Output Screenshots

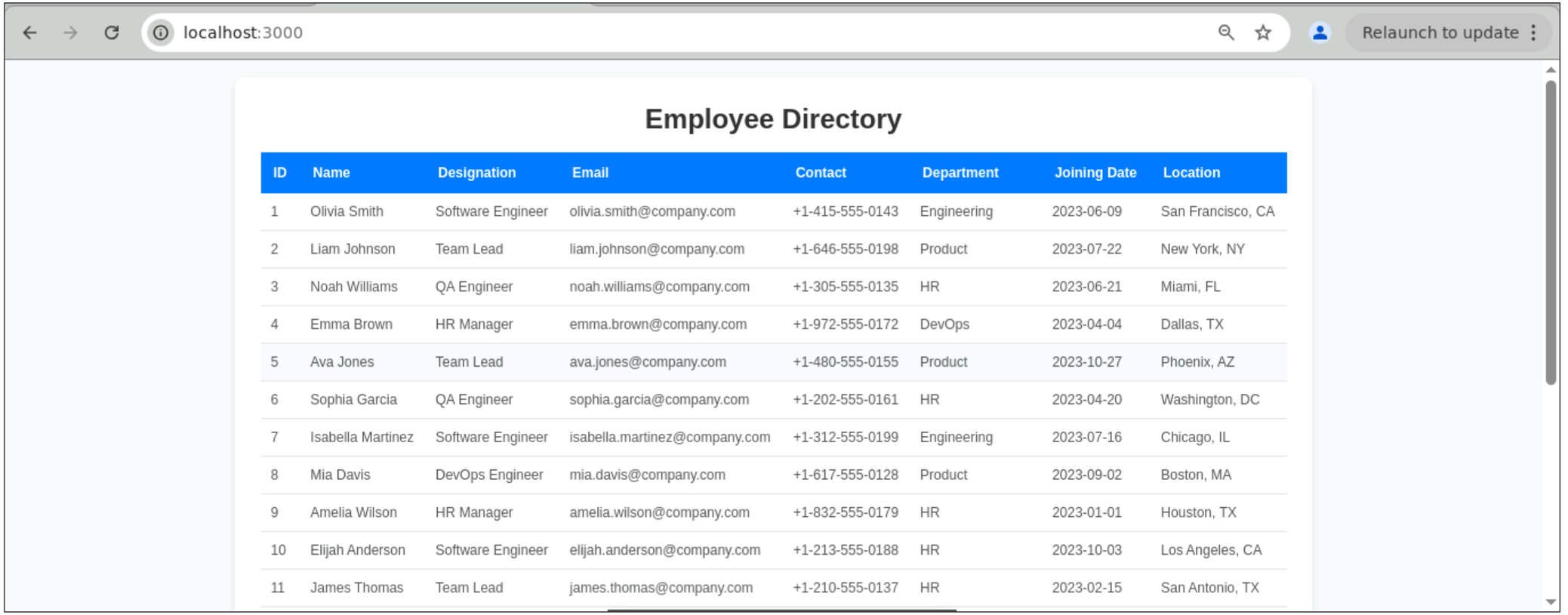
The Sign Up and Login pages enable new account creation and secure access to the portal through user authentication.





Output Screenshots

The user dashboard displays the Employee Directory, offering a comprehensive overview of all employees along with their contact and departmental details.



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Thank you