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Designing the Applications

## Planning:

Analyse Requirements: I carefully reviewed the provided problem statement to understand the requirements for the full-stack web application.

Identify Features: I identified key features such as CRUD operations for articles, filtering articles, and implementing both backend and frontend components.

Architecture Planning: I determined the architecture of the applications, including the technology stack (Ruby on Rails, React, HTML), database design, and API design.

## Backend Application (Ruby on Rails):

Model Design: I designed the **Article** model with attributes: **title** (string), **body** (text), and **published** (boolean, default: false).

Migration and Validation: I created a migration file for the **Article** model to set up the database table and added validations to ensure data integrity.

Controller Implementation: I implemented controller actions for CRUD operations on articles, including GET all articles, GET by ID, POST, PUT, and DELETE.

Testing: I wrote unit tests for the **Article** model and controller actions using a testing framework like RSpec.

Frontend Application (React):

Component Development: I developed React components for various functionalities, including:

**Displaying Articles**: I created a component to render a list of articles fetched from the backend, displaying their titles, bodies, and publication status.

**Adding/Editing Articles**: I implemented forms for adding new articles and editing existing ones, allowing users to input titles, bodies, and publication status.

**Filtering Articles**: I designed a feature to filter articles based on their publication status, enabling users to toggle between viewing published and unpublished articles.

API Integration: I integrated the React client with the Ruby on Rails backend by making HTTP requests to the defined API endpoints.

Styling and UI Design: I designed the UI components using JSX and Tailwind, creating a user-friendly interface.

Testing: I wrote unit tests for React components using **Jest** and **React Testing Library**.

## HTML Client:

Form Development: I designed forms and UI elements for CRUD operations on articles using HTML and JavaScript.

HTTP Requests: I ensured that the HTML client makes appropriate HTTP requests to the backend API endpoints for each action.

Styling: I applied CSS styles to the HTML elements to enhance the visual presentation and usability.

Testing: I wrote tests to validate the HTML and JavaScript functionality using **Jest** again.

Testing and Integration

**Integration Testing**: I implemented integration tests to cover end-to-end scenarios for article creation, retrieval, updating, and deletion using a suitable testing framework: **Cypress**. These tests encompassed every aspect of the application's functionality, including:

**Article Creation**: Ensuring that articles could be successfully created and added to the database.

**Article Retrieval**: Verifying that articles could be retrieved from the backend and displayed accurately in the frontend.

**Article Updating**: Confirming that existing articles could be updated with new information or modifications.

**Article Deletion**: Validating the deletion process, ensuring that articles could be removed from the database without any errors.

**Unit Testing vs. Integration Testing**: Unit testing ensures individual components function correctly, catching bugs early and maintaining code quality. Integration testing validates interactions between components, ensuring seamless system workflows and reliability in production environments. Both are integral to software development, enhancing quality, reliability, and maintainability.

Deployment and Cloud Integration:

I used Docker to containerize the Ruby on Rails application, React client, and HTML client, creating portable and consistent deployment environments. With Docker Compose, I orchestrated the deployment of multiple containers as a unified application stack. A CD/CI pipeline using GitHub Actions automated the build, test, and deployment processes, ensuring easy integration with the AWS cloud platform. Finally, I provisioned an AWS EC2 instance to host the “Dockerised“ application, leveraging its scalability, reliability, and ease of management.