tech test

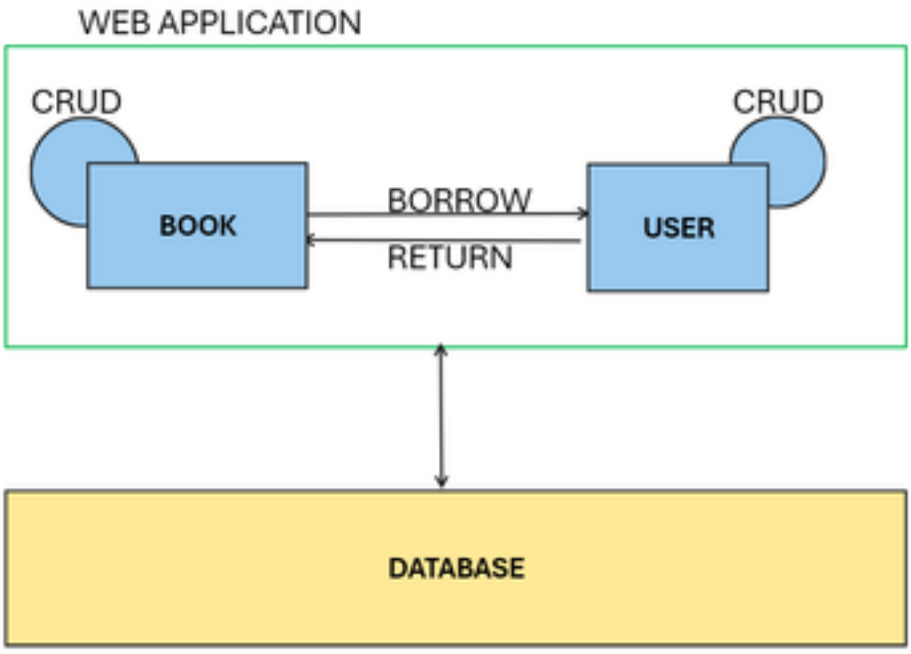
Objective

To assess the candidate’s ability to design a migration strategy for transitioning a monolithic system into a cloud-native architecture, and to implement a minimal component to demonstrate practical understanding.

Scenario

Your organization operates a monolithic **Library Management System (LMS)** that handles the following functionalities:

1. **Book Inventory**: Managing books (CRUD operations).
2. **User Management**: Managing library users (registration, profiles).
3. **Lending System**: Users borrow and return books.
4. **Reports**: Admins generate monthly reports on lending activity.



The system is built as a single application with a shared database. The organization plans to migrate to a **cloud-native architecture** for scalability and maintainability.

Part 1: System Design and Migration Plan

Task

Design a strategy to migrate the monolithic LMS into a cloud-native architecture. Describe:

- High-Level Architecture Diagram
- Migration Plan
- Cloud-Native Considerations
- Resilience and Scalability

Part 2: Simple Implementation

Task

Implement the first phase of the migration: **Extracting the Book Inventory service**.

Requirements:

1. Backend:
    - Develop a **Book Inventory microservice** using **C# (**http://ASP.NET **Core)**:
        - Expose RESTful endpoints for CRUD operations on books.
        - Store data in a dedicated **SQLite** database (mimicking a cloud database).
        - Implement **OpenAPI/Swagger** documentation for the API.
    - Include error handling (e.g., 404 for not found, 400 for invalid inputs).
2. Frontend:
    - Create a simple SPA (for example using **Vue.js** or **React)** that:
        - Displays a list of books by calling the Book Inventory API.
        - Allows adding a new book through a form.
    - Ensure the UI is responsive.
3. **Cloud-Native Features**:
    - Containerize the microservice using **Docker**.
4. **Testing**:
    - Include unit tests for the backend service.
    - Write one integration test simulating a CRUD operation.