1. Technology Stack

Backend

• Technology: ASP.NET Core (C#)

• Framework: .NET Framework/Core

• API Communication: RESTful APIs

Frontend

• Technology: HTML, CSS, JavaScript, and some React.js

• UI Framework: Bootstrap, Material-UI

• State Management: Vanilla JavaScript

• Client-Side Routing: JavaScript or React Router

Database

• Database Engine: Microsoft SQL Server

• ORM: Entity Framework Core

• Stored Procedures & Triggers: For automation and data consistency

2. Deployment Diagram

Hardware Components:

1. Client Devices: Users access the system through browsers (PCs, tablets, mobile phones)

2. Web Server: Hosts the frontend application (HTML, CSS, JavaScript, React.js)

3. Application Server: Hosts backend APIs built with ASP.NET Core

4. Database Server: Hosts Microsoft SQL Server for storing library records

Deployment Architecture:

• Client Devices → Web Server → Application Server → Database Server

• Hosting: Can be deployed on on-premise servers or cloud platforms (Azure/AWS)

• Load Balancer for high availability and performance

• Reverse Proxy (e.g., Nginx) for managing traffic

• CI/CD Pipeline for automated deployment

3. Component Diagram

User Interface (Frontend):

• HTML, CSS, JavaScript, and some React.js UI

• Communicates with the backend via RESTful APIs

Business Logic Layer (Backend):

• ASP.NET Core API

• Controllers, Services, and Repositories handle requests and business logic

• Authentication & Authorization (JWT)

Database Layer:

• Microsoft SQL Server

• Entity Framework for database interactions

• Data Models and Migrations