# Solution Architecture

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| Date | 20 Feb 2026 |
| Team ID | LTVIP2026TMIDS79402 |
| Project Name | Booknest : Where stories nestle |
| Maximum Marks | |

# BookNest Solution Architecture

## 1. User Interface (Frontend)

**Technology:** React.js, HTML5, CSS3 (Bootstrap / Tailwind CSS)

**Functionality:**

- Users can register and login securely
- Browse books by category
- Search books by title, author, or keyword
- View detailed book information (price, description, availability)
- Add books to cart
- Place orders through checkout
- Admin dashboard to manage books and orders

## 2. Backend Server (API Layer)

**Technology:** Node.js + Express.js

**Functionality:**

- Handles REST API routes:
  - `/api/users` → Registration & Login
  - `/api/books` → Book CRUD operations
  - `/api/orders` → Order placement & tracking
- Implements JWT authentication
- Encrypts passwords using bcrypt
- Validates user roles (Admin/User)
- Connects frontend with database
- Handles error responses and status codes

## 3. Database Layer

**Technology:** MongoDB + Mongoose

**Collections:**

- Users Collection
- Books Collection
- Orders Collection

**Functionality:**

- Stores user credentials securely
- Stores book details (title, author, category, price, stock)
- Stores order history and status
- Ensures data consistency and integrity

# 4. Application Flow (Data Pipeline)

1. User interacts with React frontend
2. Frontend sends API request to Express backend
3. Backend validates request and authenticates user
4. Backend interacts with MongoDB
5. Database sends response back to backend
6. Backend returns JSON response to frontend
7. Frontend updates UI dynamically

# 5. Deployment (Local / Cloud)

## Option 1: Local Deployment

- Install Node.js and MongoDB
- Run backend using:

```
npm run server
```

- Run frontend using:

```
npm start
```

- Access application at:

```
http://localhost:3000/
```

## Option 2: Cloud Deployment

- Backend hosted on:
  - Render
  - Railway
  - Heroku
- Frontend hosted on:
  - Vercel
  - Netlify
- MongoDB Atlas for cloud database

**Architecture Diagram:**