Project Title: Advanced Library Management System using Repository Pattern, EF Core, and AJAX

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1. Introduction

- **Brief description of the project:**
  Implements a Library Management System in ASP.NET Core MVC with proper separation of concerns using the **Repository Pattern** and **Entity Framework Core** for database operations. AJAX and Bootstrap modals are used to provide a smooth, dynamic user interface.
- **Purpose:**
  To allow users to manage books (Create, Read, Update, Delete) efficiently with a clean architecture and modern UI experience.

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2. Tools and Technologies

- **ASP.NET Core MVC**
- **Entity Framework Core (Code-First)**
- **SQL Server / SQLite (for DB)**
- **Visual Studio 2022**
- **C#**
- **AJAX (fetch API) + Bootstrap modal for dynamic UI**

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3. Project Structure

- **Controllers:** BooksController.cs
- **Models:** Book.cs (Entity), IBookRepository.cs, BookRepository.cs
- **Data:** AppDbContext.cs
- **Views/Books:**
  - Index.cshtml (Main page with AJAX integration)
  - _BookTable.cshtml (Partial view for table)
  - _BookForm.cshtml (Partial view for form modal)
- **Startup/Program.cs** (Service registration + DB connection)

Screenshot of Project Structure (example):

```
Controllers/
  BooksController.cs
Models/
  Book.cs
  IBookRepository.cs
  BookRepository.cs
Data/
  AppDbContext.cs
Views/
  Books/
    Index.cshtml
    _BookTable.cshtml
    _BookForm.cshtml
```

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4. Implementation Details

4.1 Repository Pattern

- IBookRepository defines CRUD methods.
- BookRepository implements database logic using EF Core.
- Registered in **Program.cs** with Dependency Injection:
- builder.Services.AddScoped<IBookRepository, BookRepository>();

4.2 CRUD Operations with EF Core

- **Create:** Add a new book via modal form.
- **Read:** Load all books into a table (partial view).
- **Update:** Edit existing book in modal, updated via AJAX.
- **Delete:** Remove a book record dynamically.

4.3 AJAX + Bootstrap Modal

- **AJAX fetch()** used to dynamically update book list without page reload.

- **Bootstrap modal** shows Create/Edit forms.
- Partial views _BookTable.cshtml and _BookForm.cshtml are loaded asynchronously.

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5. Views

5.1 Index Page (Index.cshtml)

- Displays **Books Table** and **Add Book** button.
- Uses AJAX to refresh table without reloading page.

5.2 Book Table (_BookTable.cshtml)

- Partial view showing list of books in table format.
- Dynamically refreshed after every CRUD operation.

5.3 Book Form (_BookForm.cshtml)

- Partial view containing **Create/Edit Book Form**.
- Loaded inside Bootstrap modal.

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6. Sample Input & Output

Input (Create Book):

- Title: *C# Basics*
- Author: *John Doe*
- Year: *2023*

Output:

- Table updates dynamically with the new book:
- 1   C# Basics   John Doe   2023

Input (Update Book):

- Change title to *Advanced C#*

Output:

- Updated entry visible immediately in table without full reload.

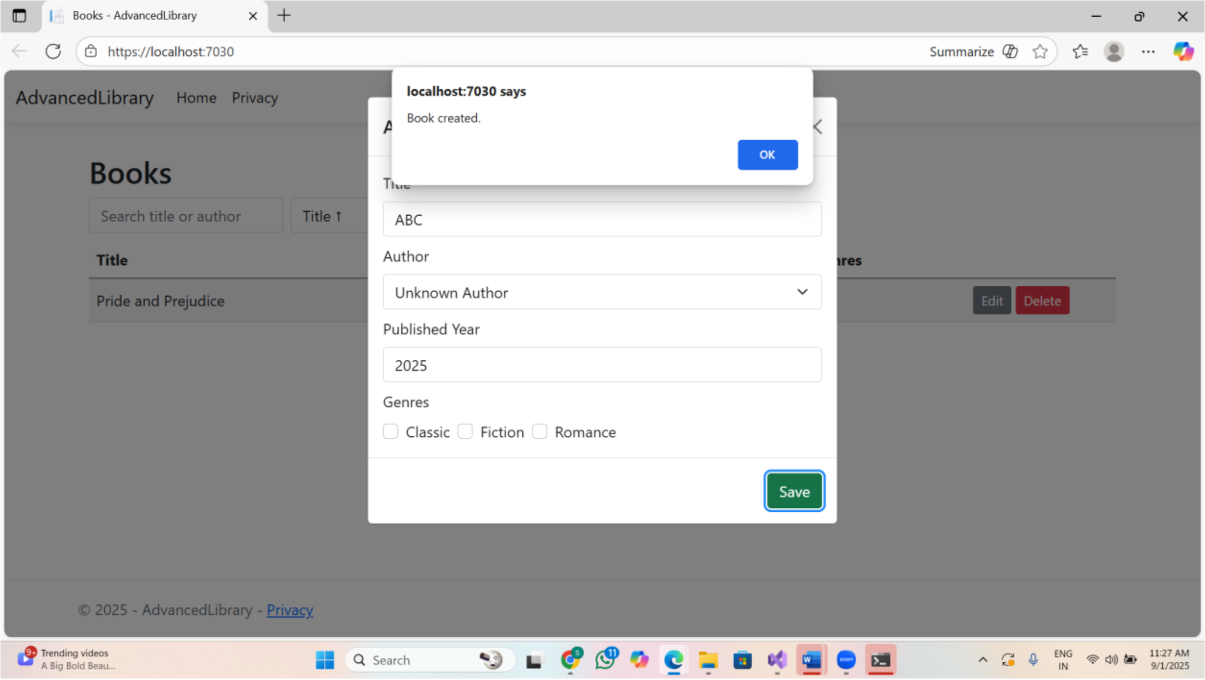
Input (Delete Book):

- Delete selected book.

Output:

- Book row disappears dynamically from table.

Screenshot of Outputs:



localhost:7030 says

Book created.

Title: ABC

Author: Unknown Author

Published Year: 2025

Genres: □ Classic □ Fiction □ Romance

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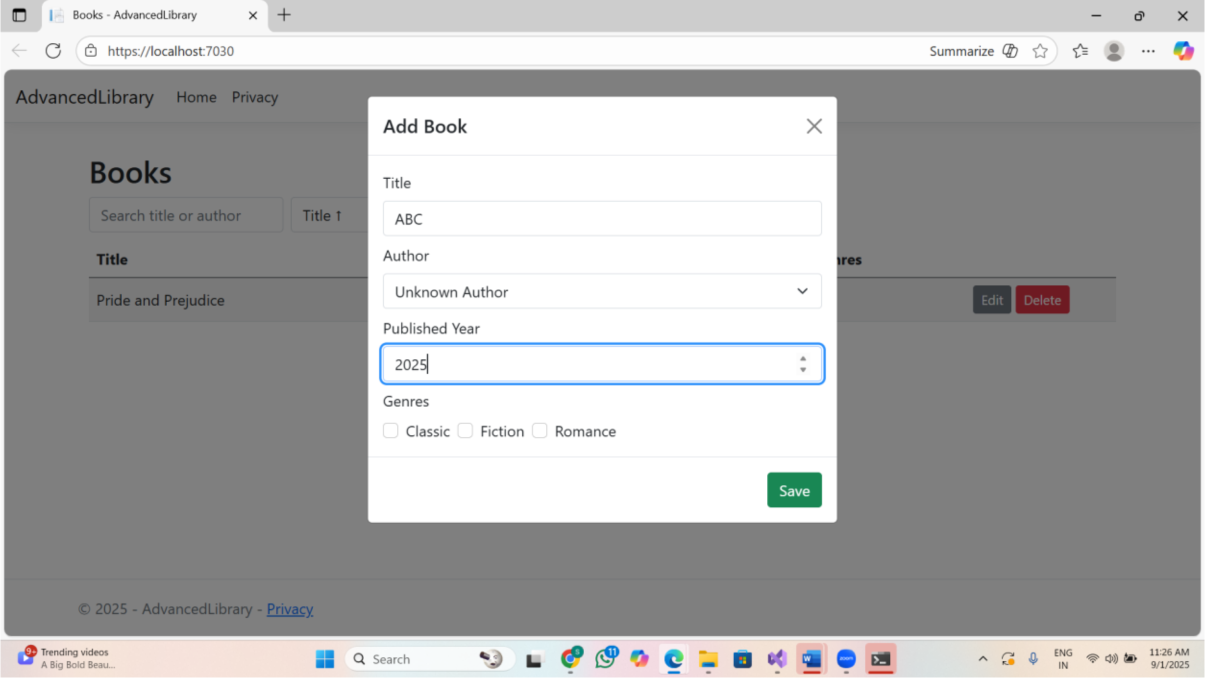

Add Book

Title: ABC

Author: Unknown Author

Published Year: 2025

Genres: □ Classic □ Fiction □ Romance

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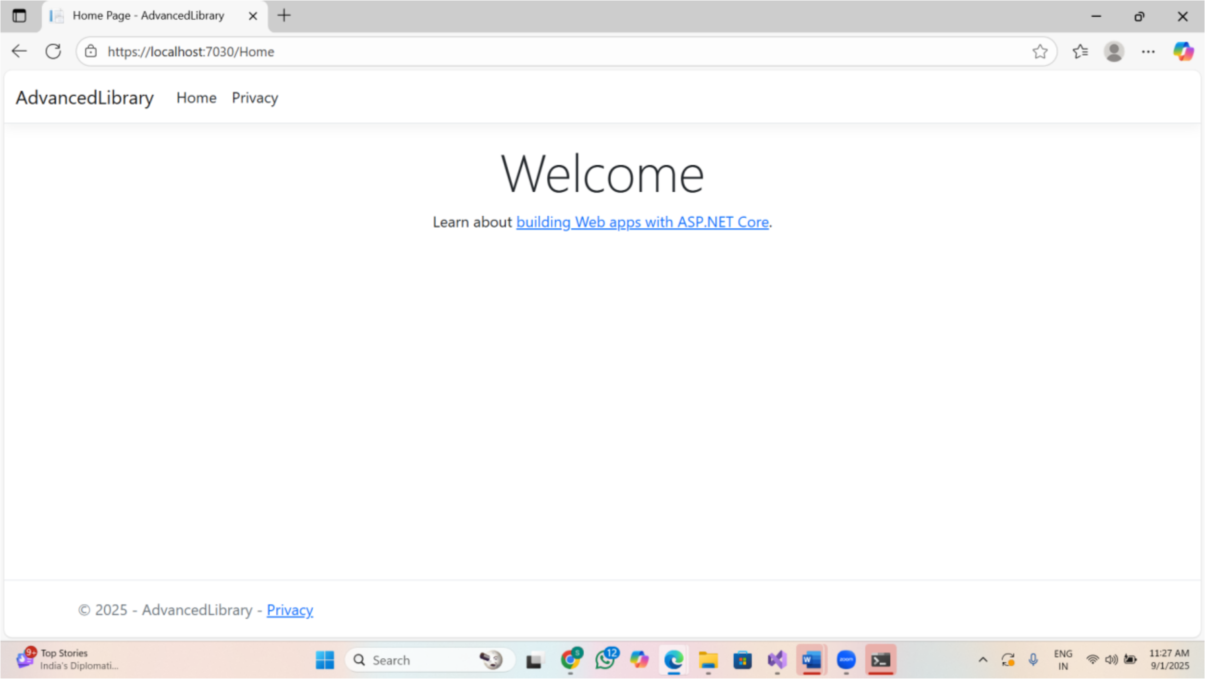

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Welcome

Learn about building Web apps with ASP.NET Core.

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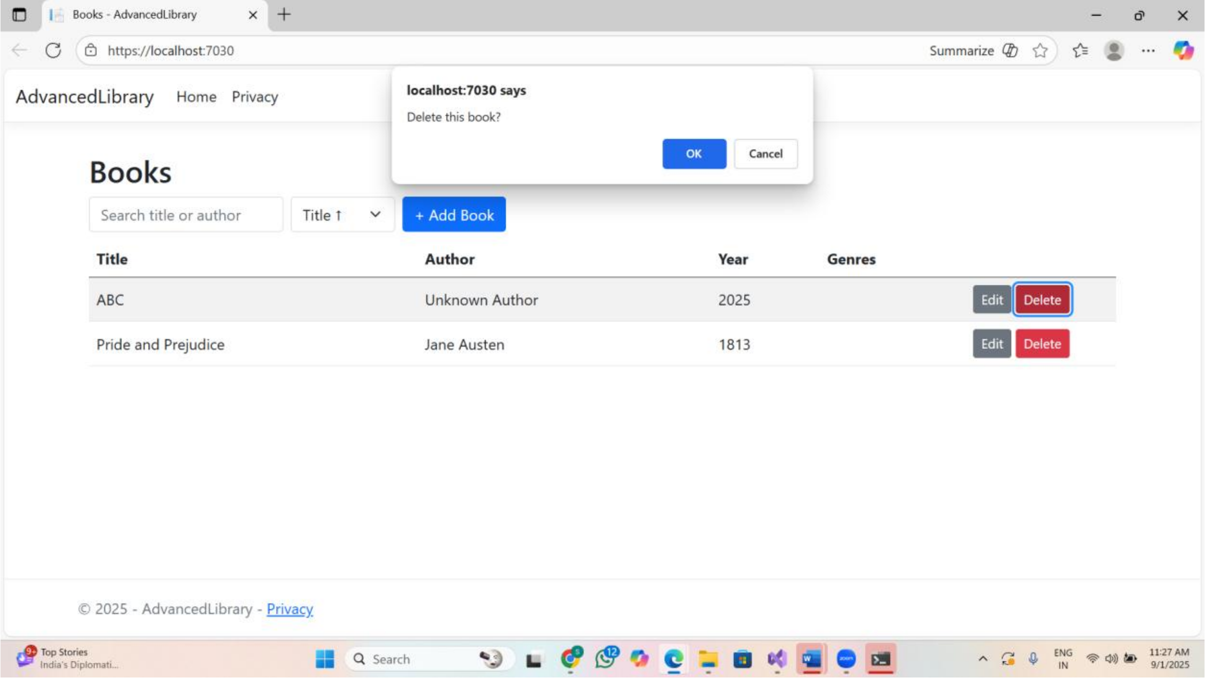

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localhost:7030 says

Delete this book?

OK Cancel

Books

Search title or author | Title ↑ | + Add Book

Title	Author	Year	Genres	
ABC	Unknown Author	2025		Edit Delete
Pride and Prejudice	Jane Austen	1813		Edit Delete

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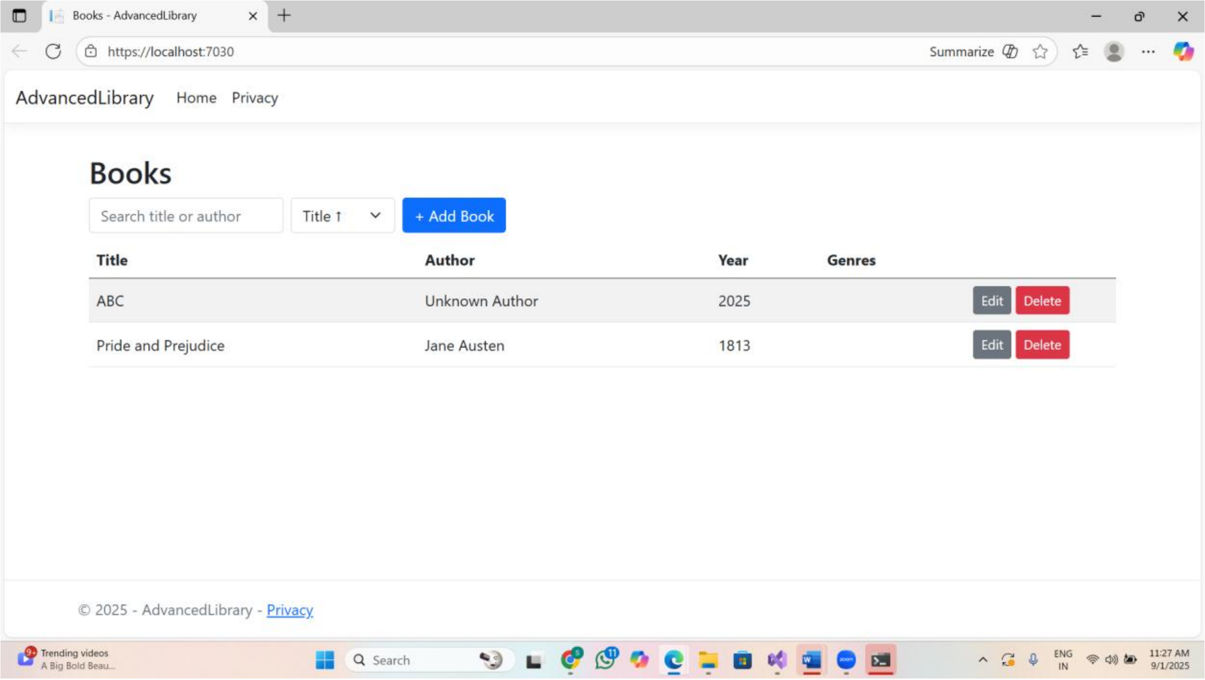

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Books

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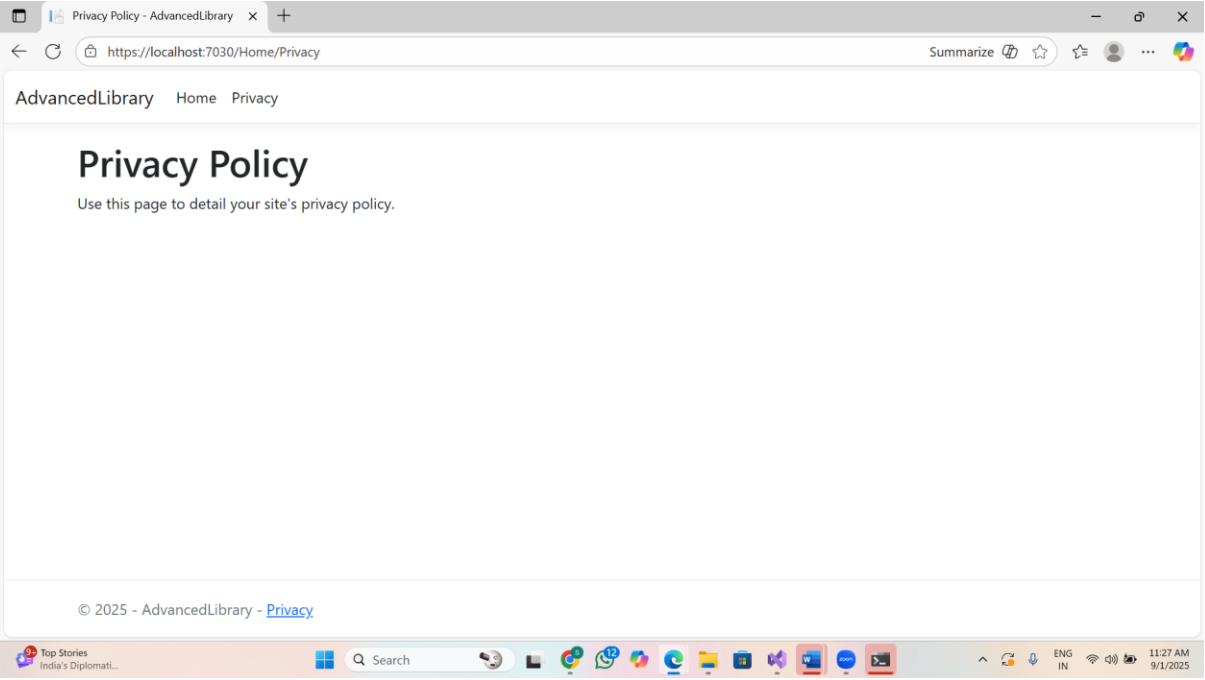
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7. Conclusion

- Successfully implemented a **Library Management System** with Repository Pattern and EF Core.
- Achieved dynamic updates with **AJAX + Bootstrap modals**.
- Ensured clean architecture (Separation of Concerns).

- Learned key concepts of **Repository Pattern, EF Core, Dependency Injection, and AJAX integration**.