BOOKSTORE WEB APP

GLORY KANDA

What is the Book Store Web App about?

This application is a complete full-stack CRUD (Create, Read, Update, Delete) system for managing books. It utilizes Node.js, Express.js, MongoDB, React, and Tailwind CSS to offer an intuitive interface for users to manage their book collection.

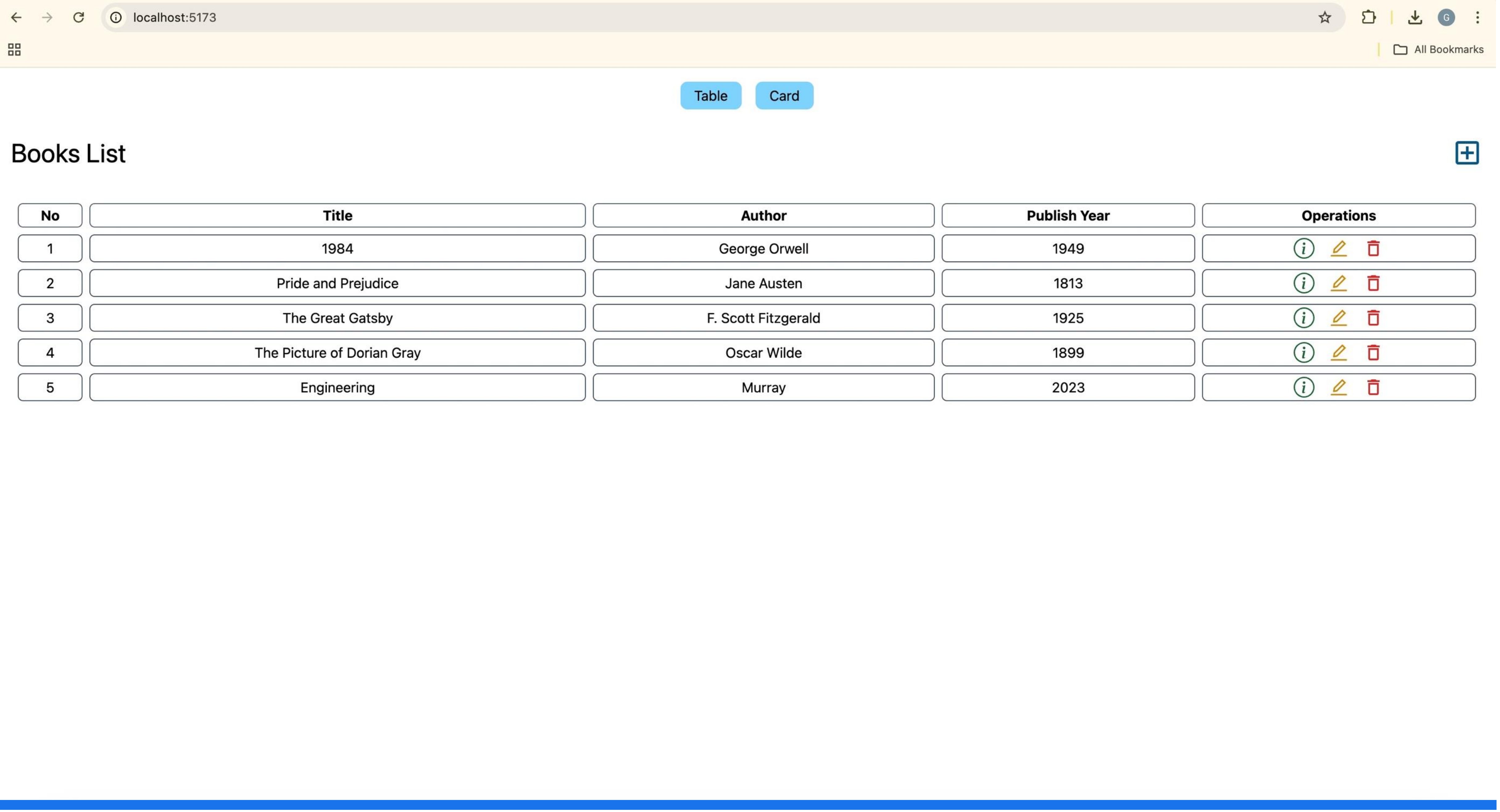
Data Structures and Algorithms

- BST: Used to maintain a structured collection of book IDs that allows for efficient searching, insertion, and traversal of IDs.
- Stack: Used to implement the "undo" functionality by storing book entries before they are saved, so users can revert to the last saved state.
- Hash Table: Used for fast lookups of book details, allowing you to quickly fetch or edit book information using unique book IDs as keys.
- Array: Used in the state management to store and display book details dynamically in the front-end of the application.
- Queue: Used to handle sequential operations, specifically managing multiple delete requests in a first-in, first-out manner, ensuring that book deletions are processed one at a time.

Implementation of DSA

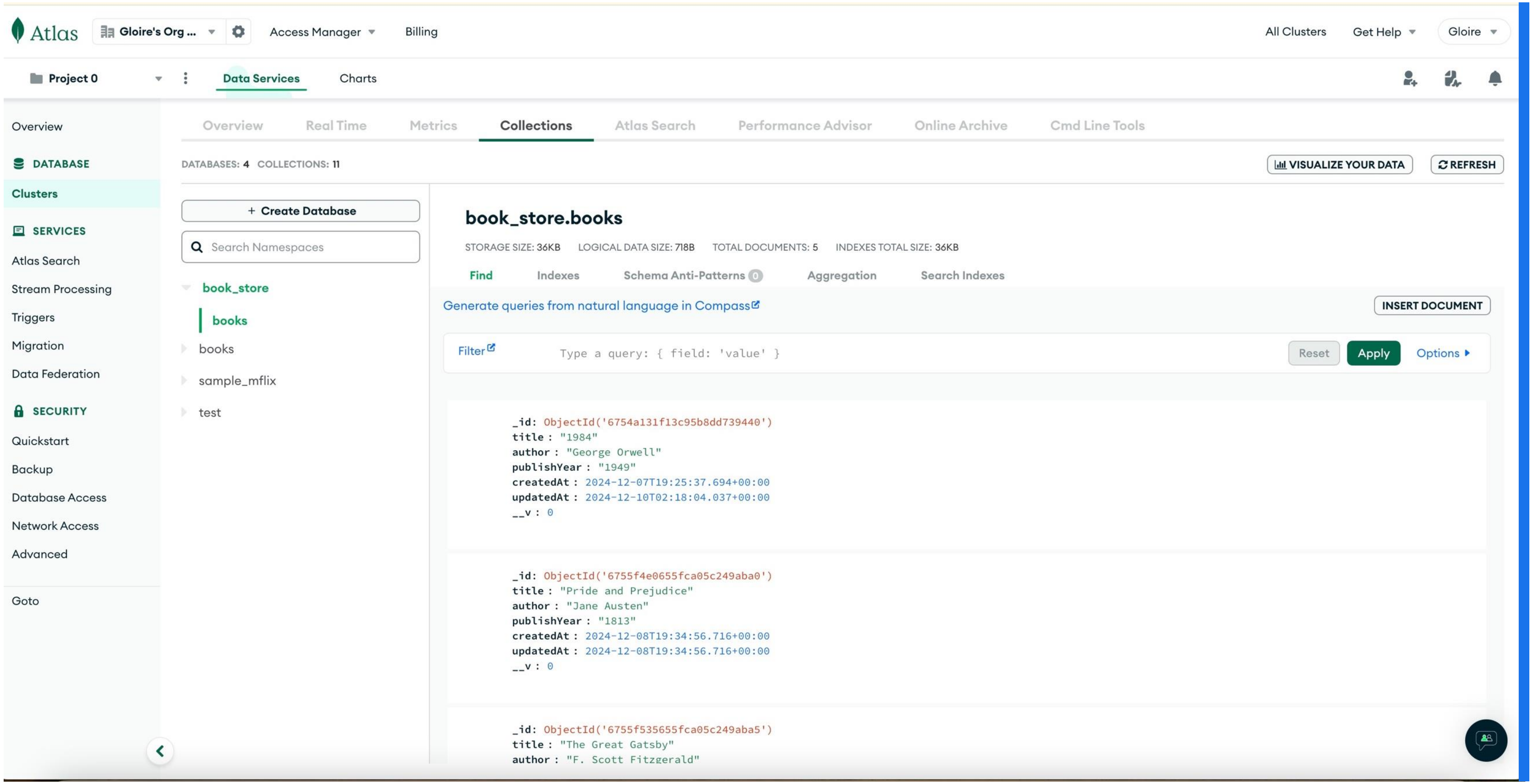
- All the data structure implementations can be found in the page folder.
- The CreateBooks component uses a custom **Stack** data structure to track and manage the history of book entries. When a book is saved, its details (title, author, and publish year) are added to the stack, and the "Undo" button allows users to revert to the last saved book by removing the most recent entry from the stack. This stack-based approach ensures efficient "undo" functionality with minimal complexity. It integrates smoothly with React using useState for state management and provides user feedback through snackbar notifications.
- The DeleteBook component uses a **Queue** data structure to manage delete tasks in a First In, First Out (FIFO) order. When a book is deleted, its ID is added to the queue, and the processQueue function handles the deletion one task at a time. This ensures that multiple delete requests are processed in the correct order without overlap. The queue is simple to use, with methods to add tasks (enqueue), remove them (dequeue), and check if it's empty. This structure ensures smooth task management, even if there are multiple delete actions.

- The EditBook component is used to edit details of a book by fetching and updating its data via an API. It uses a Map as a hashmap-like structure to store book details (title, author, and publishYear). On component load, it fetches book data based on the id from the URL, stores it in the Map, and displays it in input fields. Users can edit the fields, and changes are saved using the Map.set method. On submitting, the data is sent to the server via an API call. Error and success messages are displayed using a snackbar. The component also includes a spinner to indicate loading states.
- The ShowBook component uses a **Binary Search Tree (BST)** to manage and display book IDs efficiently. When a book is fetched from the server, its ID is inserted into the BST, ensuring the IDs are always stored in sorted order. The inorderTraversal method of the BST is used to retrieve and display these IDs in ascending order. This approach simplifies organizing and searching through book IDs dynamically as data is fetched.



Books List

No	Title	Author	Publish Year	Operations
1	1984	George Orwell	1949	ⓘ ✎ 🗑
2	Pride and Prejudice	Jane Austen	1813	ⓘ ✎ 🗑
3	The Great Gatsby	F. Scott Fitzgerald	1925	ⓘ ✎ 🗑
4	The Picture of Dorian Gray	Oscar Wilde	1899	ⓘ ✎ 🗑
5	Engineering	Murray	2023	ⓘ ✎ 🗑



DATABASES: 4 COLLECTIONS: 11

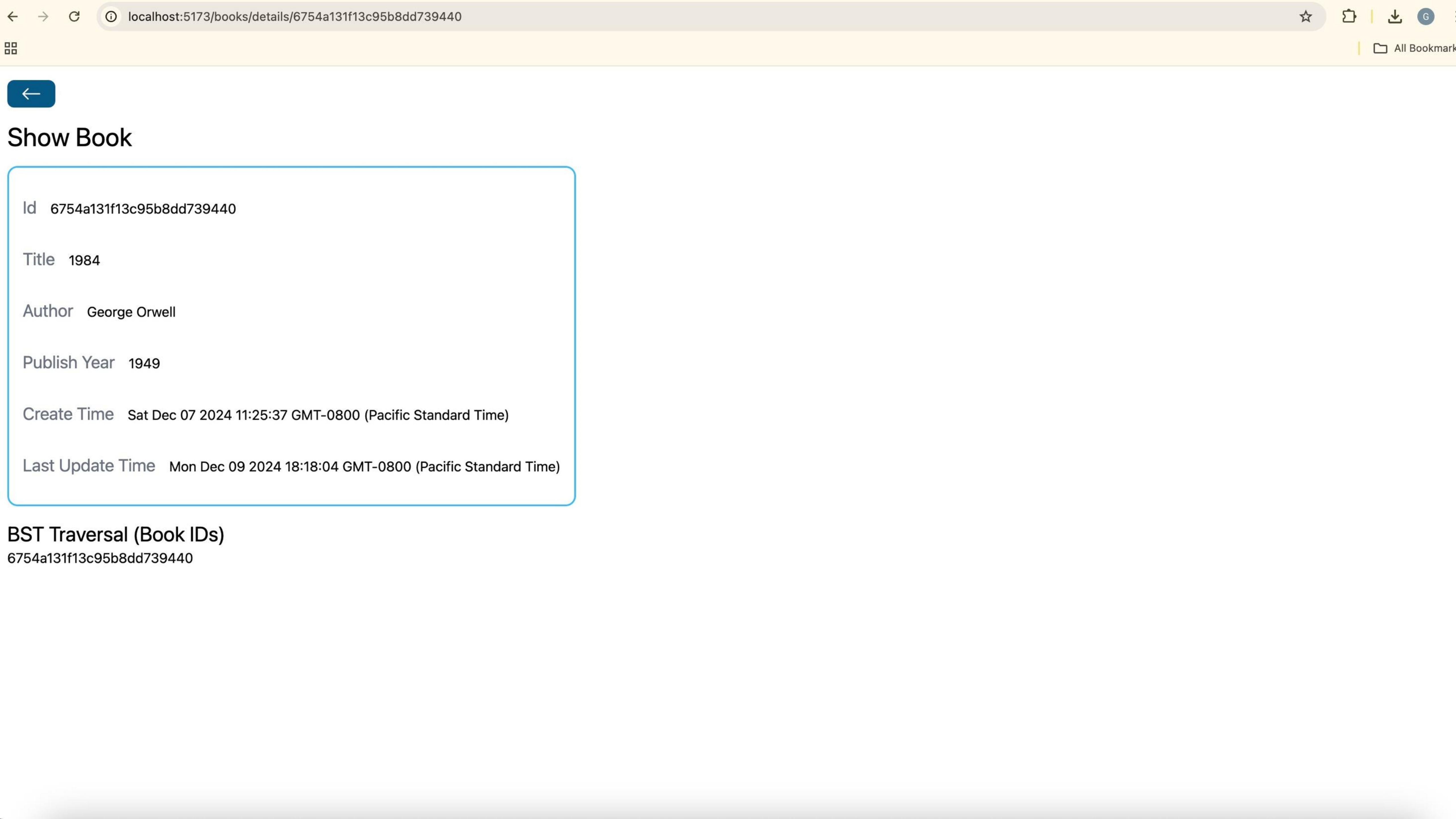
book_store.books

STORAGE SIZE: 36KB LOGICAL DATA SIZE: 718B TOTAL DOCUMENTS: 5 INDEXES TOTAL SIZE: 36KB

```
_id: ObjectId('6754a131f13c95b8dd739440')
title : "1984"
author : "George Orwell"
publishYear : "1949"
createdAt : 2024-12-07T19:25:37.694+00:00
updatedAt : 2024-12-10T02:18:04.037+00:00
__v : 0

_id: ObjectId('6755f4e0655fca05c249aba0')
title : "Pride and Prejudice"
author : "Jane Austen"
publishYear : "1813"
createdAt : 2024-12-08T19:34:56.716+00:00
updatedAt : 2024-12-08T19:34:56.716+00:00
__v : 0

_id: ObjectId('6755f535655fca05c249aba5')
title : "The Great Gatsby"
author : "F. Scott Fitzgerald"
```

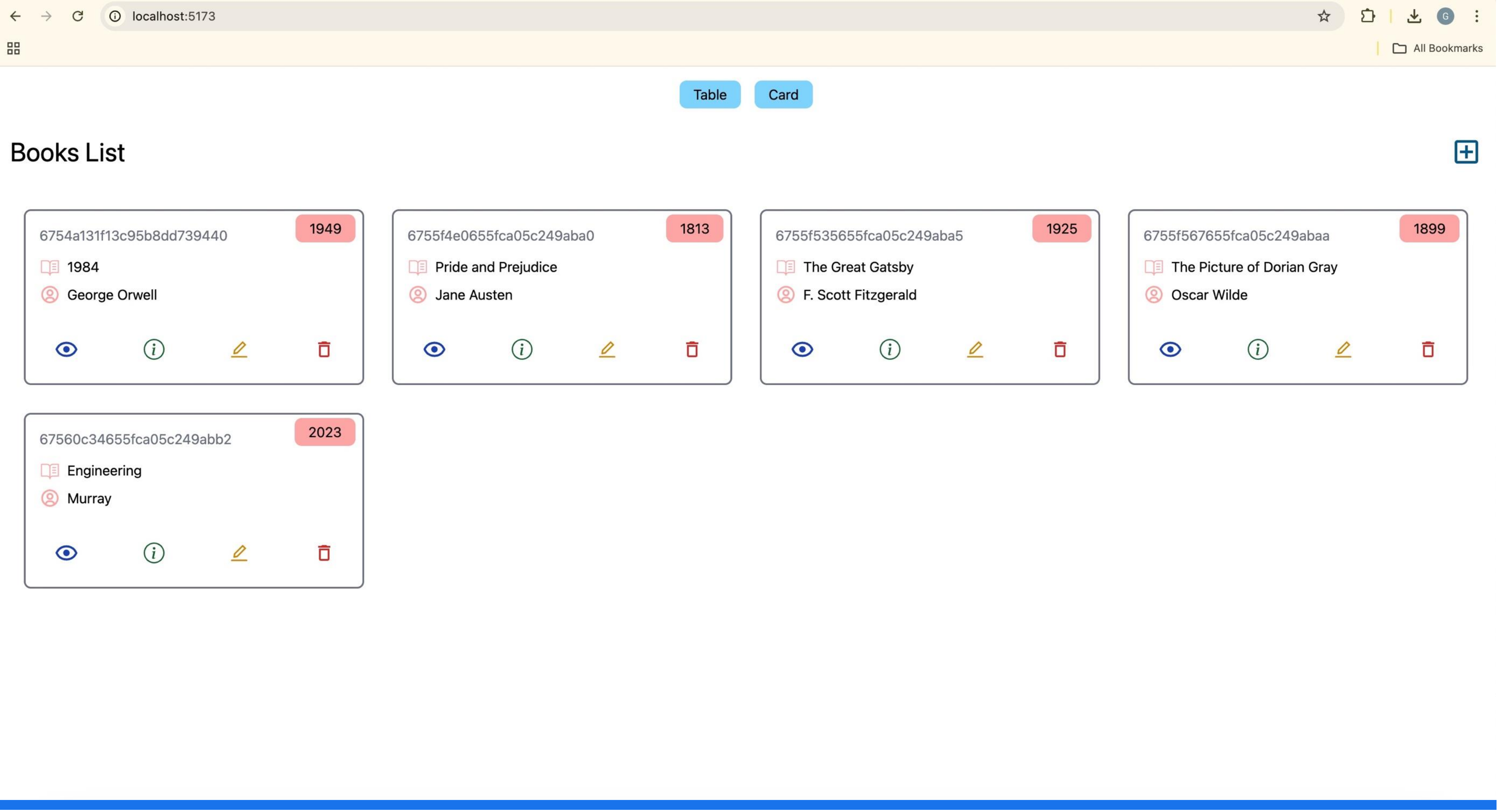


Show Book

Id	6754a131f13c95b8dd739440
Title	1984
Author	George Orwell
Publish Year	1949
Create Time	Sat Dec 07 2024 11:25:37 GMT-0800 (Pacific Standard Time)
Last Update Time	Mon Dec 09 2024 18:18:04 GMT-0800 (Pacific Standard Time)

BST Traversal (Book IDs)

6754a131f13c95b8dd739440



localhost:5173

All Bookmarks

Table Card

Books List

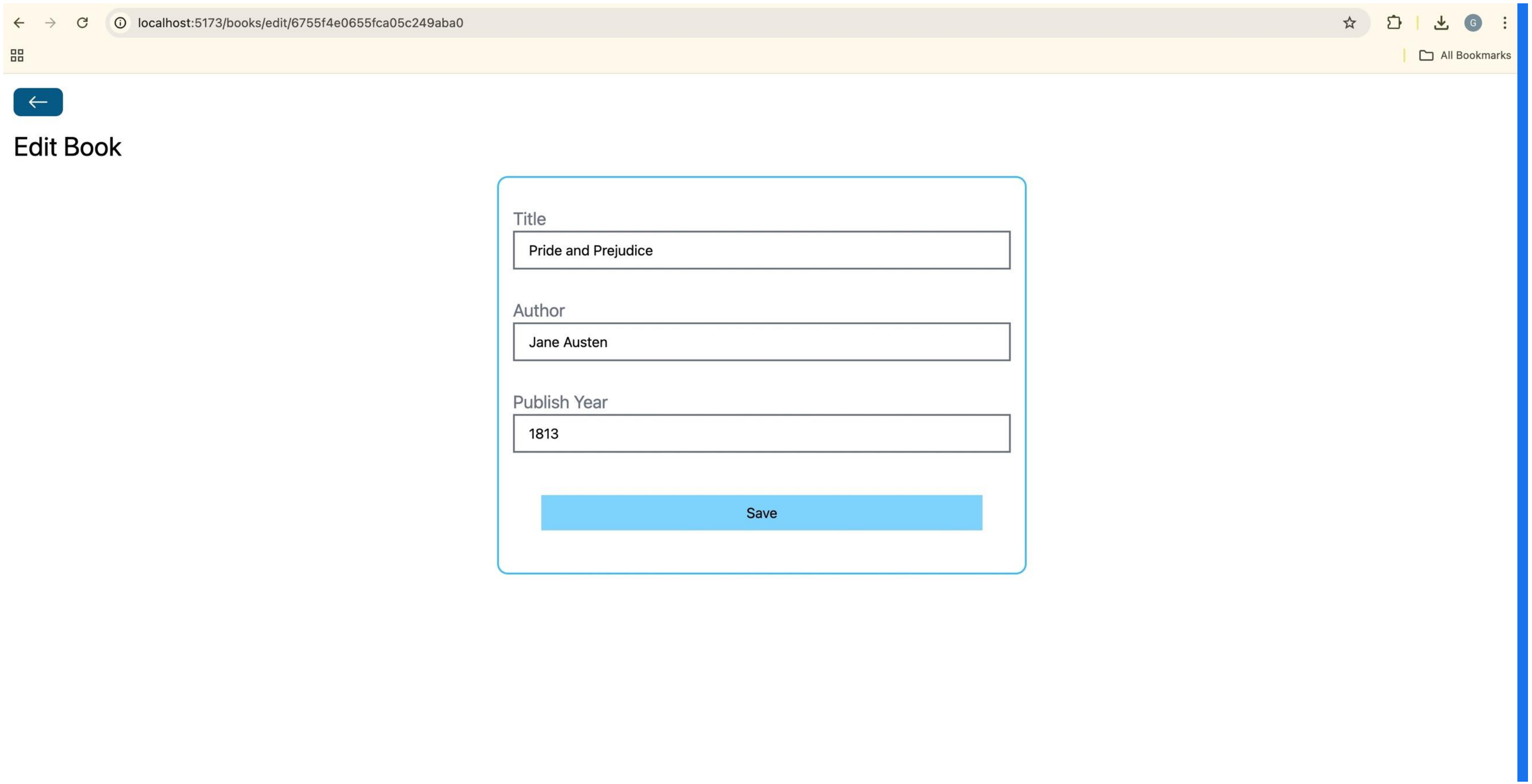
6754a131f13c95b8dd739440 1949
1984
George Orwell

6755f4e0655fca05c249aba0 1813
Pride and Prejudice
Jane Austen

6755f535655fca05c249aba5 1925
The Great Gatsby
F. Scott Fitzgerald

6755f567655fca05c249abaa 1899
The Picture of Dorian Gray
Oscar Wilde

67560c34655fca05c249abb2 2023
Engineering
Murray

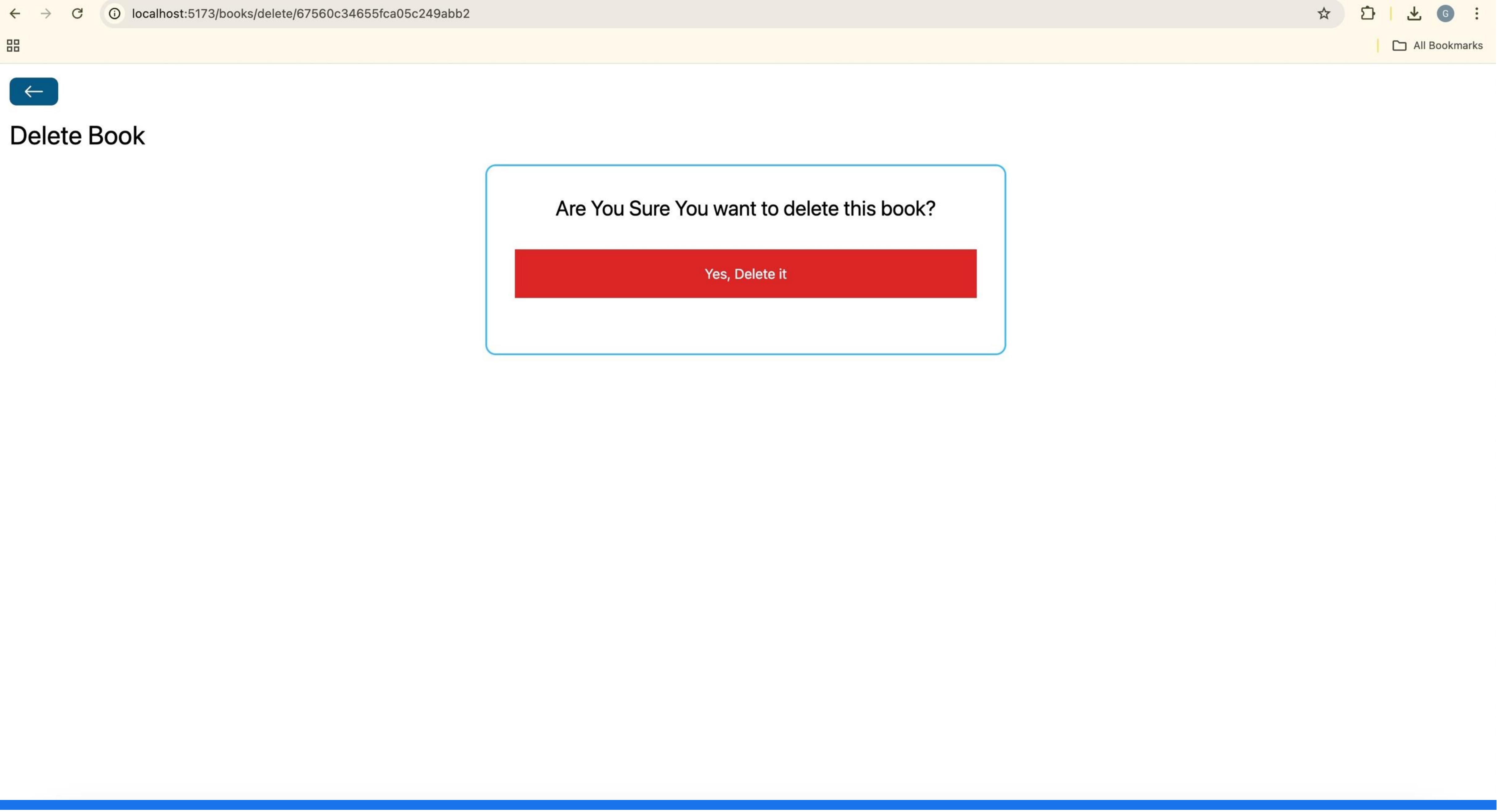


Edit Book

Title: Pride and Prejudice

Author: Jane Austen

Publish Year: 1813



localhost:5173/books/delete/67560c34655fca05c249abb2

Delete Book

Are You Sure You want to delete this book?