

# **MID LAB**



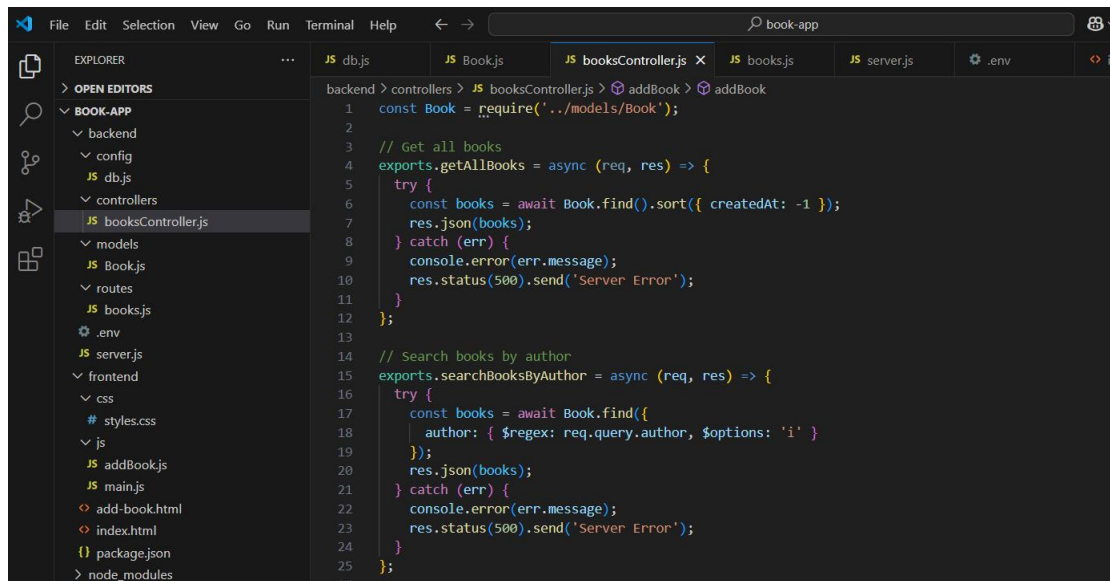
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**Registration No: SP22-BSE-006**

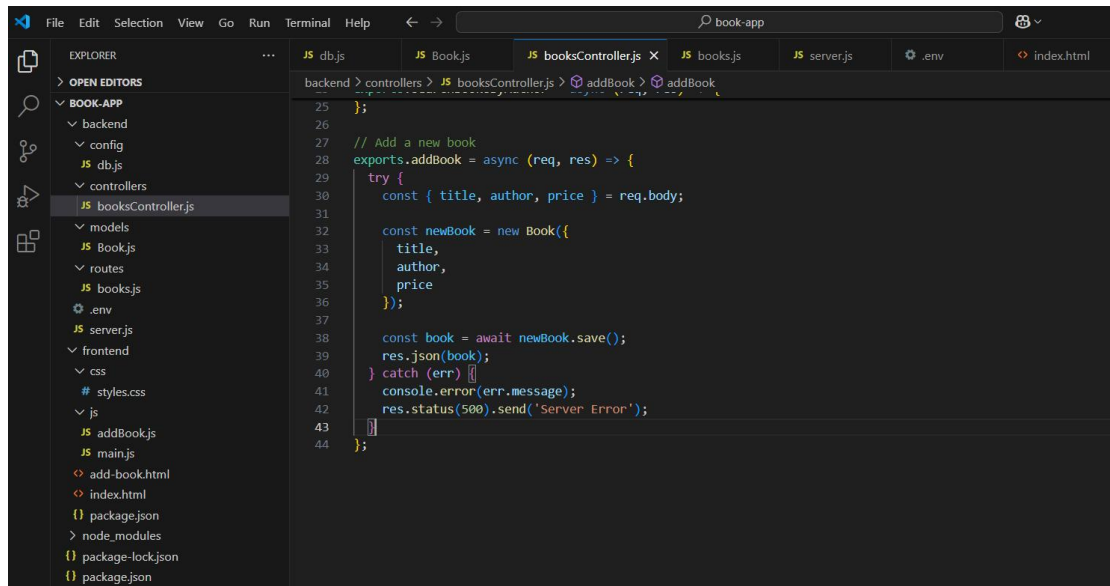
**Course title: Advance Web Technology**  
**Department Name: Computer Science**

**COMSATS UNIVERSITY ISLAMABAD,**  
**VEHARI CAMPUS**

# Backend:



```
1  const Book = require('../models/Book');
2
3  // Get all books
4  exports.getAllBooks = async (req, res) => {
5    try {
6      const books = await Book.find().sort({ createdAt: -1 });
7      res.json(books);
8    } catch (err) {
9      console.error(err.message);
10     res.status(500).send('Server Error');
11   }
12 };
13
14 // Search books by author
15 exports.searchBooksByAuthor = async (req, res) => {
16   try {
17     const books = await Book.find({
18       | author: { $regex: req.query.author, $options: 'i' }
19     });
20     res.json(books);
21   } catch (err) {
22     console.error(err.message);
23     res.status(500).send('Server Error');
24   }
25 };
```



```
25 };
26
27 // Add a new book
28 exports.addBook = async (req, res) => {
29   try {
30     const { title, author, price } = req.body;
31
32     const newBook = new Book({
33       title,
34       author,
35       price
36     });
37
38     const book = await newBook.save();
39     res.json(book);
40   } catch (err) {
41     console.error(err.message);
42     res.status(500).send('Server Error');
43   }
44 };
```

This screenshot shows the VS Code editor with the `Book.js` file open. The Explorer sidebar on the left shows the project structure, with `Book.js` selected under the `models` directory. The main editor area displays the following code:

```
backend > models > JS Bookjs > ...
1  const mongoose = require('mongoose');
2
3  const BookSchema = new mongoose.Schema({
4    title: {
5      type: String,
6      required: true
7    },
8    author: {
9      type: String,
10     required: true
11   },
12   price: {
13     type: Number,
14     required: true
15   },
16   createdAt: {
17     type: Date,
18     default: Date.now
19   }
20 });
21
22 module.exports = mongoose.model('Book', BookSchema);
```

This screenshot shows the VS Code editor with the `books.js` file open. The Explorer sidebar on the left shows the project structure, with `books.js` selected under the `routes` directory. The main editor area displays the following code:

```
backend > routes > JS booksjs > ...
1  const express = require('express');
2  const router = express.Router();
3  const booksController = require('../controllers/bookscontroller');
4
5  // @route   GET api/books
6  // @desc    Get all books
7  router.get('/', booksController.getAllBooks);
8
9  // @route   GET api/books/search
10 // @desc    Search books by author
11 router.get('/search', booksController.searchBooksByAuthor);
12
13 // @route   POST api/books
14 // @desc    Add a new book
15 router.post('/', booksController.addBook);
16
17 module.exports = router;
```

```
backend > JS server.js > ...
1  const express = require('express');
2  const connectDB = require('./config/db');
3  const cors = require('cors');
4  require('dotenv').config();
5
6  // Initialize Express
7  const app = express();
8
9  // Connect Database
10 connectDB();
11
12 // Middleware
13 app.use(cors());
14 app.use(express.json());
15
16 // Define Routes
17 app.use('/api/books', require('./routes/books'));
18
19 const PORT = process.env.PORT || 5000;
20
21 app.listen(PORT, () => {
22   console.log('Server is running');
23   console.log('Access URLs:');
24   console.log('-----');
25   console.log('  Local: http://localhost:${PORT}');
26   console.log('-----');
27   console.log('API Endpoints:');
28   console.log('  - GET Books: http://localhost:${PORT}/api/books');
29   console.log('  - Search Books: http://localhost:${PORT}/api/books/search?author={author}');
30   console.log('  - POST Add Book: http://localhost:${PORT}/api/books');
31 });
```

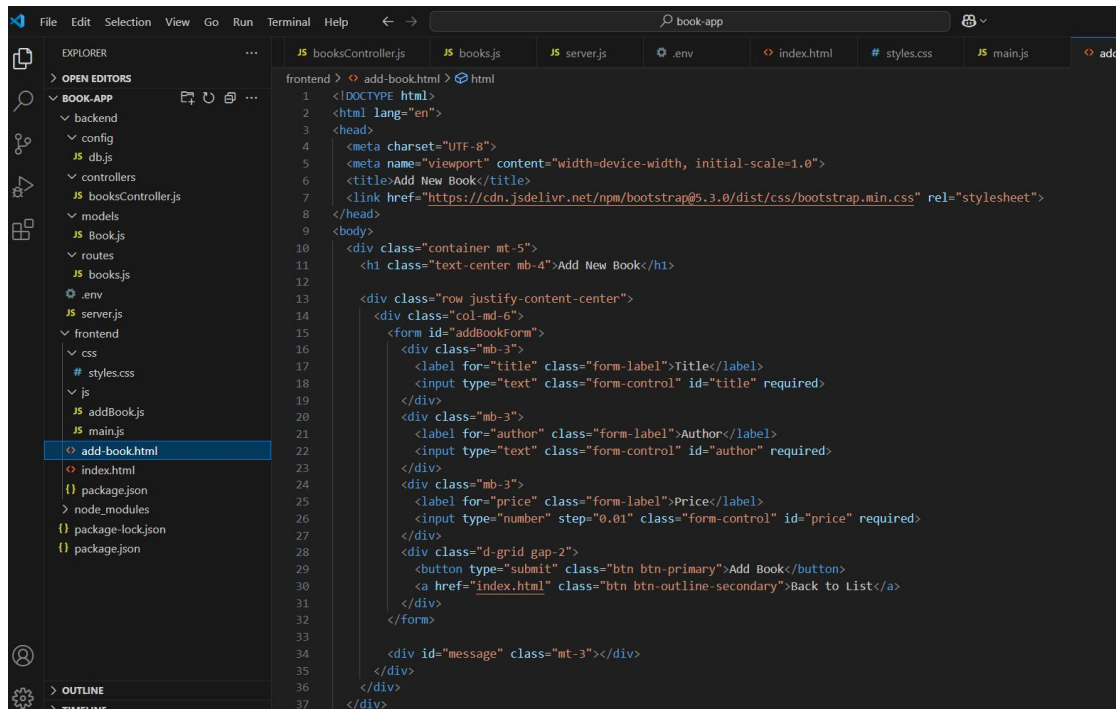
```
backend > config > JS db.js > ...
1  const mongoose = require('mongoose');
2
3  const connectDB = async () => {
4    try {
5      await mongoose.connect(process.env.MONGODB_URI, {
6        useNewUrlParser: true,
7        useUnifiedTopology: true
8      });
9      console.log('MongoDB Connected...');
10    } catch (err) {
11      console.error(err.message);
12      process.exit(1);
13    }
14  };
15
16 module.exports = connectDB;
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

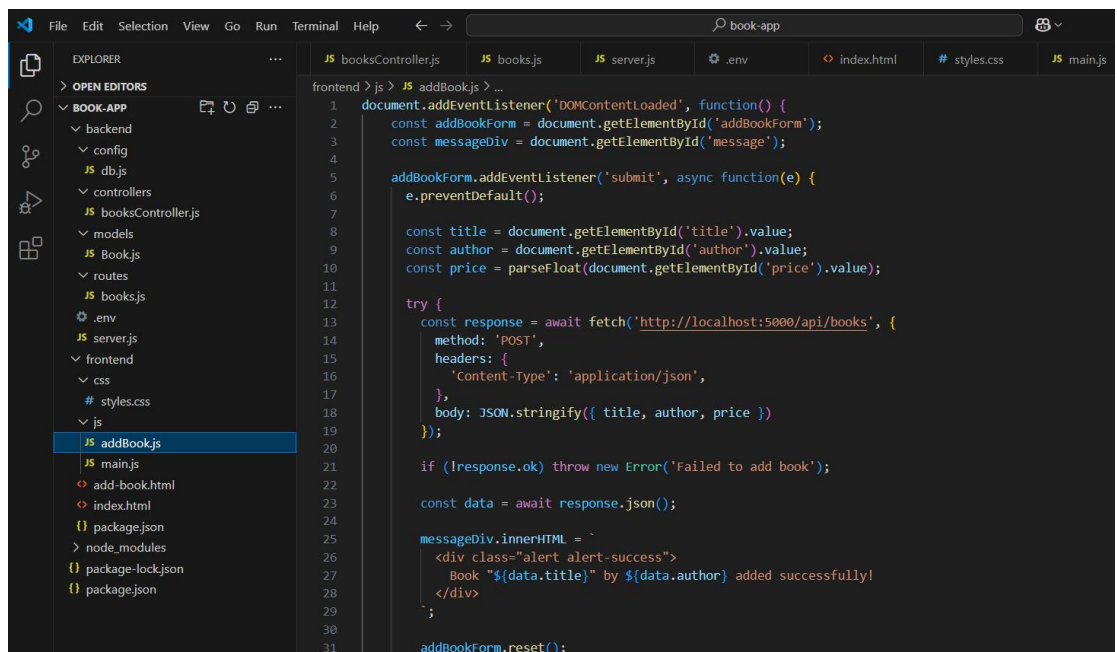
```
- Search Books: http://localhost:5000/api/books/search?author={author}
POST Add Book: http://localhost:5000/api/books
```

```
backend > .env
1  MONGODB_URI=mongodb://localhost:27017/book_management
2  PORT=5000
```

# Frontend:



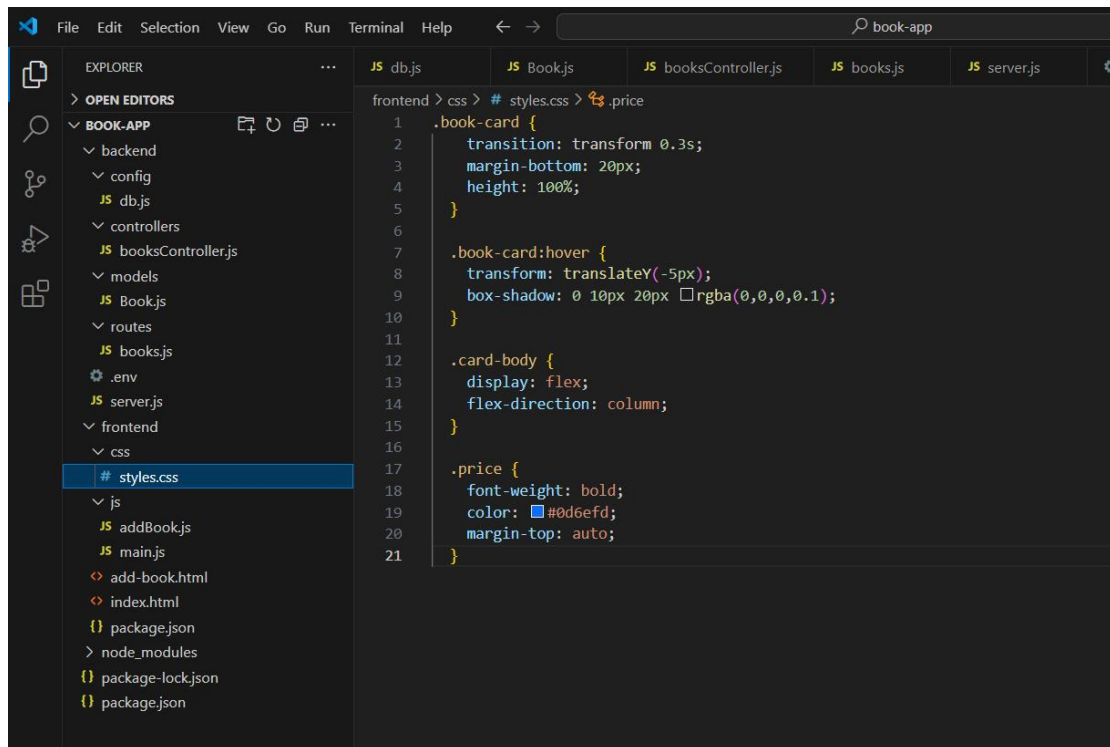
```
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, initial-scale=1.0">
6   <title>Add New Book</title>
7   <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet">
8 </head>
9 <body>
10   <div class="container mt-5">
11     <h1 class="text-center mb-4">Add New Book</h1>
12
13     <div class="row justify-content-center">
14       <div class="col-md-6">
15         <form id="addBookForm">
16           <div class="mb-3">
17             <label for="title" class="form-label">Title</label>
18             <input type="text" class="form-control" id="title" required>
19           </div>
20           <div class="mb-3">
21             <label for="author" class="form-label">Author</label>
22             <input type="text" class="form-control" id="author" required>
23           </div>
24           <div class="mb-3">
25             <label for="price" class="form-label">Price</label>
26             <input type="number" step="0.01" class="form-control" id="price" required>
27           </div>
28           <div class="d-grid gap-2">
29             <button type="submit" class="btn btn-primary">Add Book</button>
30             <a href="index.html" class="btn btn-outline-secondary">Back to List</a>
31           </div>
32         </form>
33
34         <div id="message" class="mt-3"></div>
35       </div>
36     </div>
37   </div>
```



```
1 document.addEventListener('DOMContentLoaded', function() {
2   const addBookForm = document.getElementById('addBookForm');
3   const messageDiv = document.getElementById('message');
4
5   addBookForm.addEventListener('submit', async function(e) {
6     e.preventDefault();
7
8     const title = document.getElementById('title').value;
9     const author = document.getElementById('author').value;
10    const price = parseFloat(document.getElementById('price').value);
11
12    try {
13      const response = await fetch('http://localhost:5000/api/books', {
14        method: 'POST',
15        headers: {
16          'Content-Type': 'application/json',
17        },
18        body: JSON.stringify({ title, author, price })
19      });
20
21      if (!response.ok) throw new Error('Failed to add book');
22
23      const data = await response.json();
24
25      messageDiv.innerHTML = `
26        <div class="alert alert-success">
27          Book "${data.title}" by ${data.author} added successfully!
28        </div>
29      `;
30
31      addBookForm.reset();
32    }
33  });
34 }
```

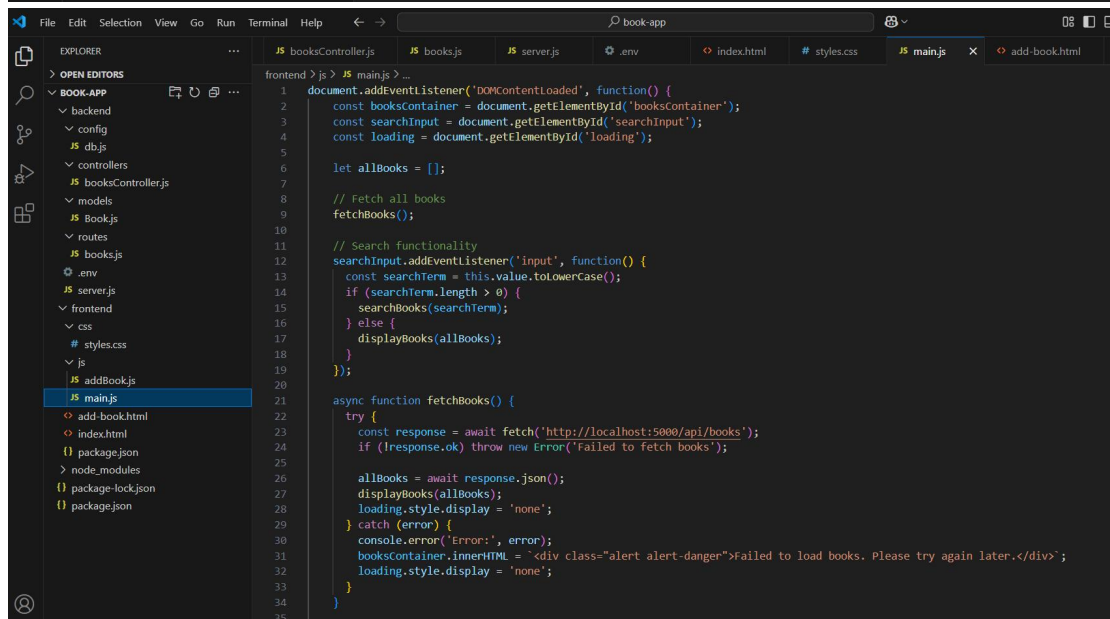






VS Code editor showing the Explorer and Editor views. The Explorer view on the left shows a project structure for 'BOOK-APP' with folders like backend, config, controllers, models, routes, and frontend. The 'styles.css' file is selected in the Explorer. The Editor view on the right shows the content of 'styles.css', which includes CSS rules for .book-card, .book-card:hover, .card-body, and .price.

```
1 .book-card {
2   transition: transform 0.3s;
3   margin-bottom: 20px;
4   height: 100%;
5 }
6
7 .book-card:hover {
8   transform: translateY(-5px);
9   box-shadow: 0 10px 20px rgba(0,0,0,0.1);
10 }
11
12 .card-body {
13   display: flex;
14   flex-direction: column;
15 }
16
17 .price {
18   font-weight: bold;
19   color: #0d6efd;
20   margin-top: auto;
21 }
```



VS Code editor showing the Explorer and Editor views. The Explorer view on the left shows the same project structure as the first screenshot, but with 'main.js' selected. The Editor view on the right shows the content of 'main.js', which includes JavaScript code for document.addEventListener, fetchBooks, and search functionality.

```
1 document.addEventListener('DOMContentLoaded', function() {
2   const booksContainer = document.getElementById('booksContainer');
3   const searchInput = document.getElementById('searchInput');
4   const loading = document.getElementById('loading');
5
6   let allBooks = [];
7
8   // Fetch all books
9   fetchBooks();
10
11   // Search functionality
12   searchInput.addEventListener('input', function() {
13     const searchTerm = this.value.toLowerCase();
14     if (searchTerm.length > 0) {
15       searchBooks(searchTerm);
16     } else {
17       displayBooks(allBooks);
18     }
19   });
20
21   async function fetchBooks() {
22     try {
23       const response = await fetch('http://localhost:5000/api/books');
24       if (!response.ok) throw new Error('Failed to fetch books');
25
26       allBooks = await response.json();
27       displayBooks(allBooks);
28       loading.style.display = 'none';
29     } catch (error) {
30       console.error('Error:', error);
31       booksContainer.innerHTML = `<div class="alert alert-danger">Failed to load books. Please try again later.</div>`;
32       loading.style.display = 'none';
33     }
34   }
35 }
```

The screenshot shows a VS Code editor with the following details:

- Explorer Sidebar:**
  - EXPLORED
  - OPEN EDITORS
  - BOOK-APP
    - backend
    - config
    - db.js
    - controllers
    - booksController.js
    - models
    - Books.js
    - routes
    - books.js
    - .env
    - server.js
    - frontend
    - css
    - styles.css
    - js
    - addBook.js
    - main.js** (selected)
    - add-book.html
    - index.html
    - package.json
    - node\_modules
    - package-lock.json
    - package.json
  - OUTLINE
- Main Editor:**
  - File Explorer: book-app
  - File: main.js
  - Code:
 

```

1 document.addEventListener('DOMContentLoaded', function() {
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540   // ...
541   // ...
542   // ...
```

The screenshot shows the VS Code interface with the Explorer view on the left and the Editor view on the right. The Explorer view shows the file structure of a project named 'BOOK-APP'. The Editor view shows the content of 'package.json'.

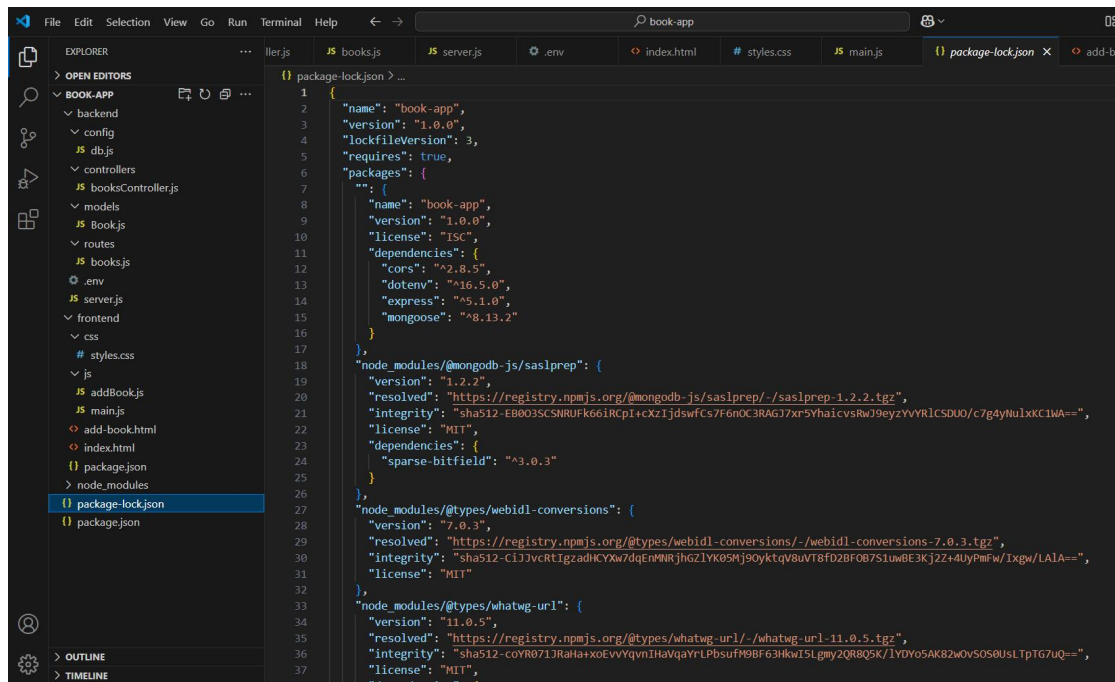
**Explorer View (Left):**

- BOOK-APP
  - backend
    - config
    - db.js
    - controllers
      - booksController.js
    - models
    - Book.js
    - routes
      - books.js
    - .env
    - server.js
  - frontend
    - css
    - styles.css
    - js
      - addBook.js
      - main.js
    - add-book.html
    - index.html
    - package.json
    - node\_modules
    - package-lock.json
    - package.json

**Editor View (Right):**

```
{ package.json > ...
1  {
2    "name": "book-app",
3    "version": "1.0.0",
4    "main": "index.js",
5    "scripts": {
6      "test": "echo \"Error: no test specified\" && exit 1"
7    },
8    "keywords": [],
9    "author": "",
10   "license": "ISC",
11   "description": "",
12   "dependencies": {
13     "cors": "^2.8.5",
14     "dotenv": "^16.5.0",
15     "express": "^5.1.0",
16     "mongoose": "^8.13.2"
17   }
18 }
19
```





## MongoDB:

The screenshot shows the MongoDB Compass web interface. On the left sidebar, the 'connections' list shows 'localhost:27017' with a tree view containing 'Advance\_Web', 'admin', 'book\_management', and 'books' (which is selected). The main panel shows the 'books' collection in the 'book\_management' database. The top navigation bar has tabs for 'Documents' (selected), 'Aggregations', 'Schema', 'Indexes', and 'Validation'. Below this, there's a search bar with the placeholder 'Type a query: { field: 'value' } or Generate query'. To the right of the search bar are buttons for 'Explain', 'Reset', and 'Find'. Below the search bar, there are buttons for 'ADD DATA', 'EXPORT DATA', 'UPDATE', and 'DELETE'. The main area displays a list of documents in the 'books' collection. The first document is:
 

```
{
  "_id": "John Smith",
  "price": 10.99,
  "createdAt": "2025-04-21T06:32:12.375+00:00",
  "__v": 0
}
```

 The second document is:
 

```
{
  "_id": ObjectId('6805ec714a756a6ed37c3bba'),
  "title": "OR",
  "author": "A.Taha",
  "price": 119.01,
  "createdAt": "2025-04-21T06:57:53.491+00:00",
  "__v": 0
}
```

 The third document is:
 

```
{
  "_id": ObjectId('6805eea44a756a6ed37c3bbf'),
  "title": "OS",
  "author": "Albert ",
  "price": 110,
  "createdAt": "2025-04-21T07:07:16.111+00:00",
  "__v": 0
}
```

 The fourth document is:
 

```
{
  "_id": ObjectId('6805eed04a756a6ed37c3bcl'),
  "title": "Linear Algebra",
  "author": "Albert ",
  "price": 200,
  "createdAt": "2025-04-21T07:08:00.902+00:00",
  "__v": 0
}
```

# Methods:

The screenshot shows the Postman interface with a workspace named 'Farah's Workspace'. A collection named 'localhost:5000' is expanded, showing three requests: 'POST /api/books/', 'GET /api/books/search', and 'GET /api/books'. The 'GET /api/books' request is selected. The URL is 'http://localhost:5000/api/books/'. The request method is 'GET'. The response status is '200 OK' with a response time of '14 ms' and a body size of '796 B'. The response body is a JSON array with two objects. The first object has fields: 'title' (OR), 'author' (A.Taha), and 'price' (119.01). The second object has fields: '\_id' (6805eed04a756a6ed37c3bc1), 'title' (Linear Algebra), 'author' (Albert), 'price' (200), 'createdAt' (2025-04-21T07:08:00.902Z), and '\_\_v' (0).

```
1 {
2   "title": "OR",
3   "author": "A.Taha",
4   "price": 119.01
5 }
6
```

```
1 [
2   {
3     "_id": "6805eed04a756a6ed37c3bc1",
4     "title": "Linear Algebra",
5     "author": "Albert ",
6     "price": 200,
7     "createdAt": "2025-04-21T07:08:00.902Z",
8     "__v": 0
9   },
10  {
11    "_id": "6805eea44a756a6ed37c3bbf",
12    "title": "OS",

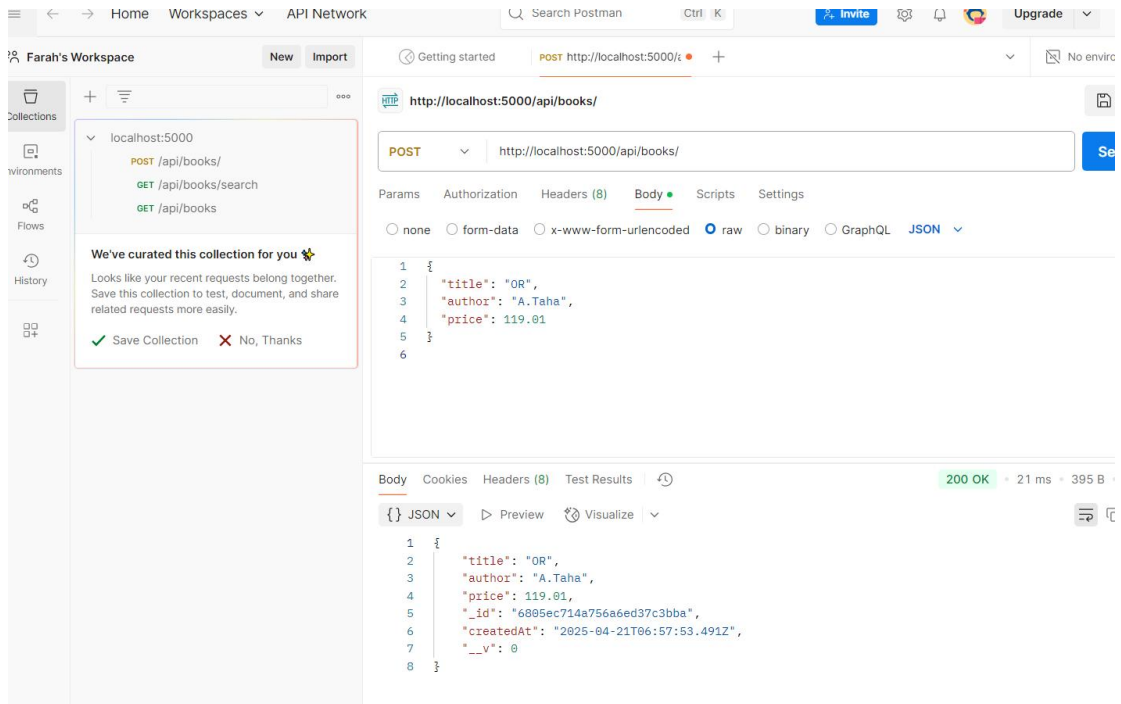
```

The screenshot shows the Postman interface with a workspace named 'Farah's Workspace'. A collection named 'localhost:5000' is expanded, showing three requests: 'GET /api/books/search', 'POST /api/books/', and 'GET /api/books'. The 'GET /api/books/search' request is selected. The URL is 'http://localhost:5000/api/books/search?author=Albert'. The request method is 'GET'. The response status is '200 OK' with a response time of '11 ms' and a body size of '534 B'. The response body is a JSON array with one object. The object has fields: '\_id' (6805eea44a756a6ed37c3bbf), 'title' (OS), 'author' (Albert), 'price' (119), 'createdAt' (2025-04-21T07:07:16.111Z), and '\_\_v' (0).

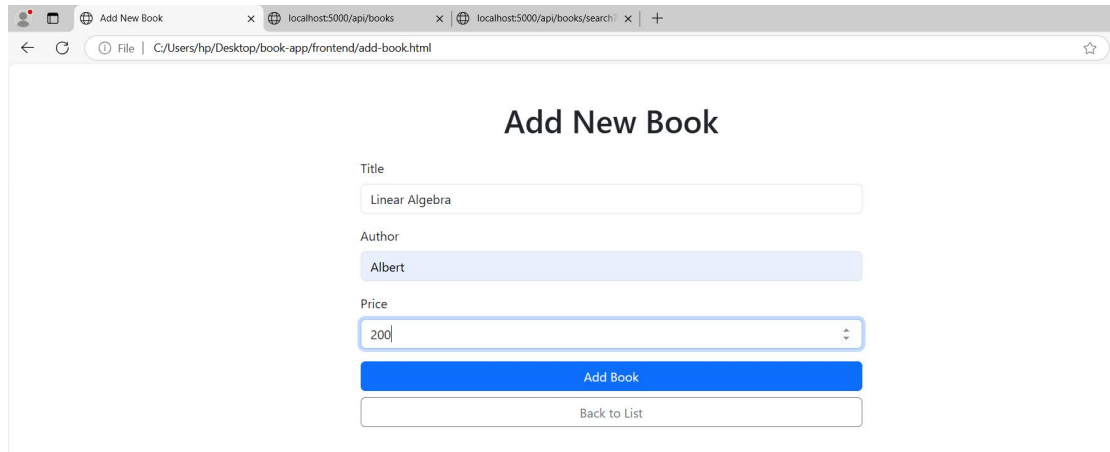
```
1 {
2   "title": "OR",
3   "author": "A.Taha",
4   "price": 119.01
5 }
6
```

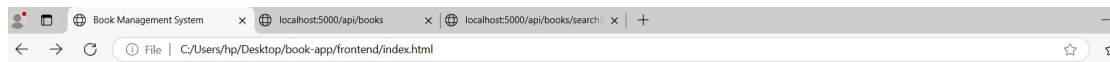
```
1 [
2   {
3     "_id": "6805eea44a756a6ed37c3bbf",
4     "title": "OS",
5     "author": "Albert ",
6     "price": 119,
7     "createdAt": "2025-04-21T07:07:16.111Z",
8     "__v": 0
9   },
10  ]

```



## Output:





## Book Management System

Search by author...

Add New Book

OR

by A.Taha

\$119.01

Maths

by John Smith

\$10.99



## Book Management System

Albert

Add New Book

OS

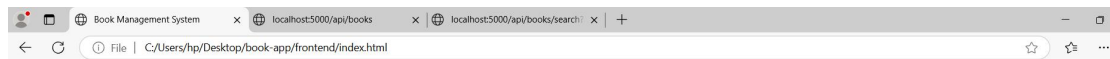
by Albert

\$110.00

Linear Algebra

by Albert

\$200.00



## Book Management System

Search by author...

Add New Book

Linear Algebra

by Albert

\$200.00

OS

by Albert

\$110.00

OR

by A.Taha

\$119.01

Maths

by John Smith

\$10.99