The scenario:

Library Management System

A university library management system helps students **borrow** and **return** books. Students register online, browse the catalog, and **request** books. When a student places a book request, the system checks its **availability**. If the book is available, it **reserves** the book for the student. If not, the student is put on a **waitlist**. Once a book is issued, the system tracks **the due dat**e and sends reminders for **returns**. Librarians manage the inventory, including adding new books and updating book statuses. The system also **tracks overdue books and calculates fines.**

Key Details:

- Actors: Students, Librarians, and the System.
- Processes:
- Student registration.
- Book search and request.
- Book issue and return.
- Overdue fine calculation.
- Inventory management by librarians.

System Behavior:

- Books transition through states: Available → Reserved → Issued → Returned.
- Sends notifications for due dates and fines.

Technical Setup:

- Student and librarian portals.
- Backend system with database for user accounts, book inventory, and transactions.

This scenario provides sufficient detail for students to create:

1. A State Machine Diagram for the lifecycle of a book (represents the difference a book can be in during its use within the system).
2. A Data Flow Diagram to show data movement for book requests, issues, and returns.
3. A Deployment Diagram to represent the system's architecture (e.g., web server, database, user devices).

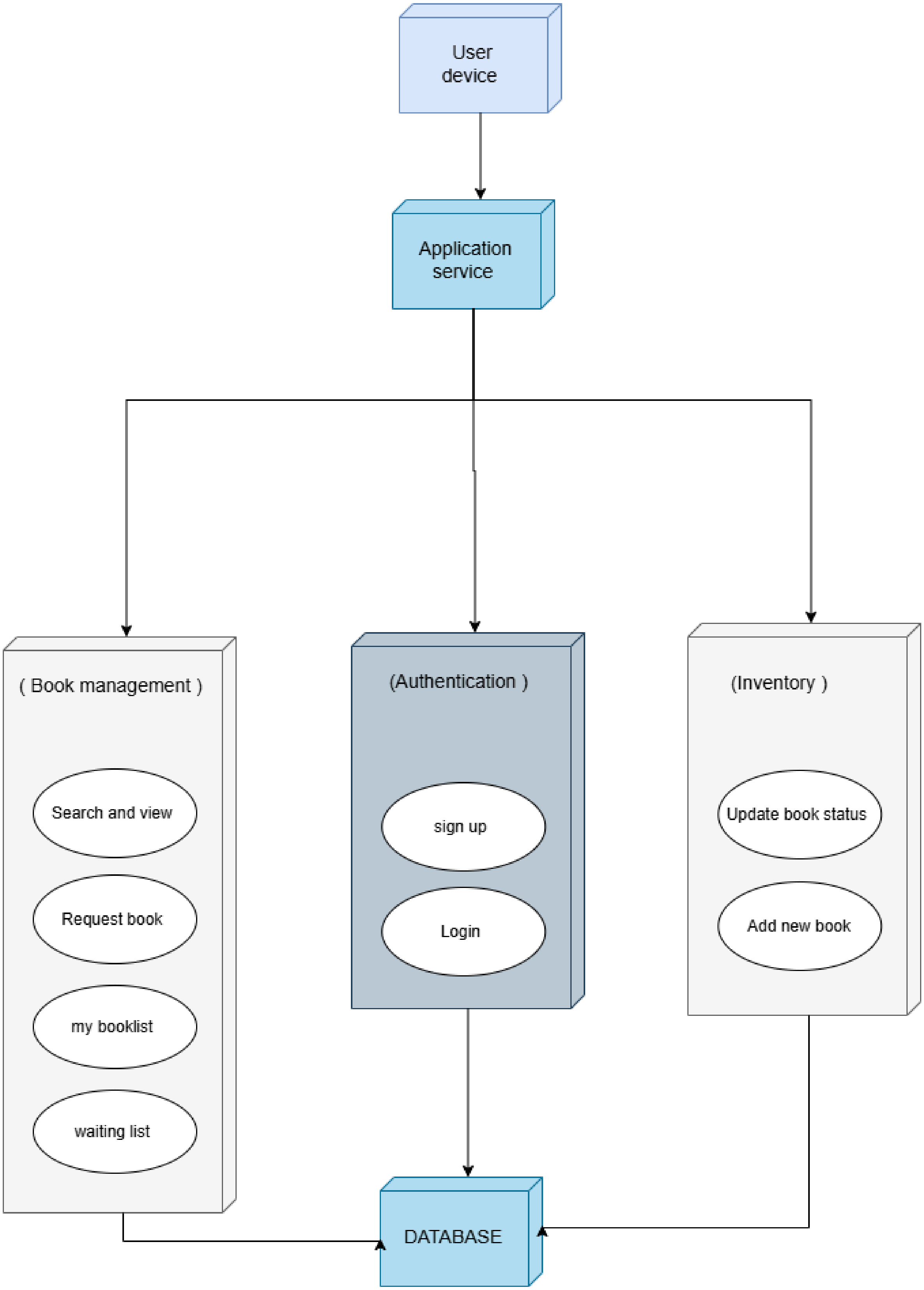
Modules :

- Authentication (registration , login)
- Book management (borrow, return , request , waiting)
- Inventory management (add new book, updating book status)

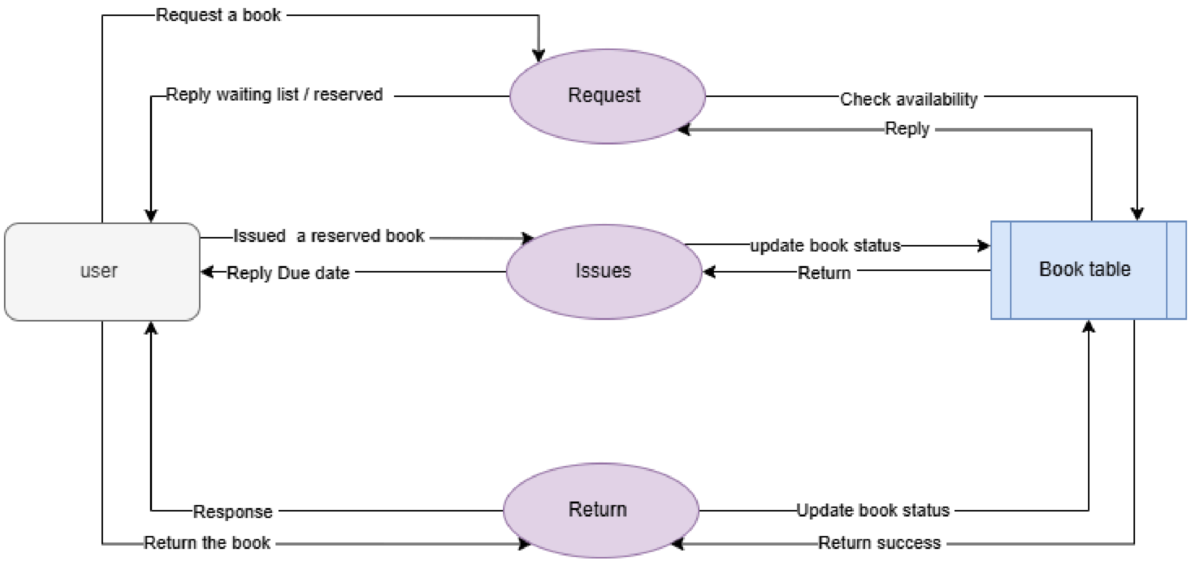
State machine diagram :
Only for a book lifecycle :

- borrow <> return
- request -> availability
- reserved <> waiting
- borrow <> reminder
- Overdue <> calculate fine.

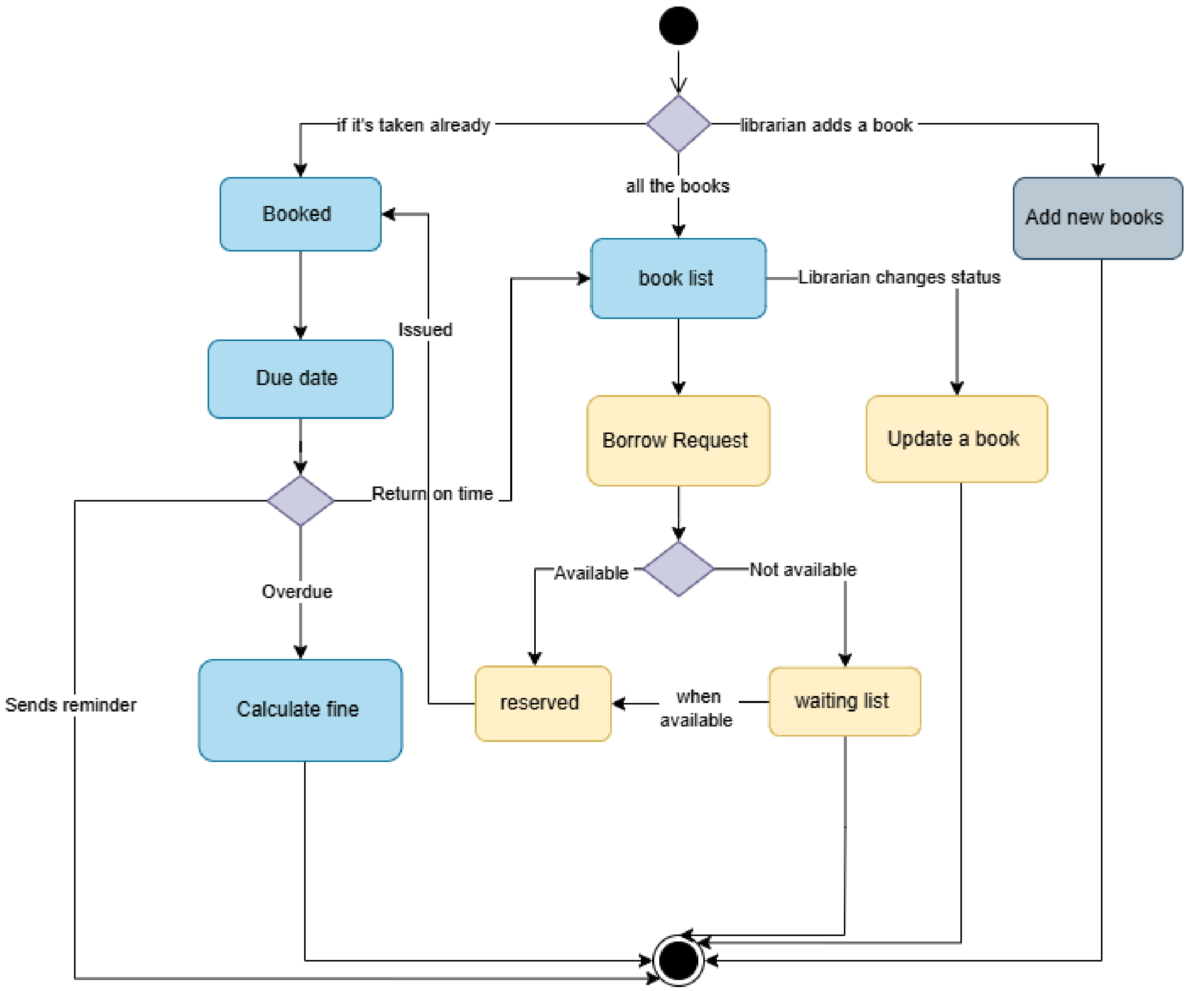
Deployment diagram



DFD - BOOK (request, issues, return)



State machine diagram for a book


if it's taken already
librarian adds a book
all the books
Booked
Add new books
book list
Librarian changes status
Issued
Due date
Borrow Request
Update a book
Return on time
Available
Not available
Overdue
Sends reminder
Calculate fine
reserved
when
available
waiting list