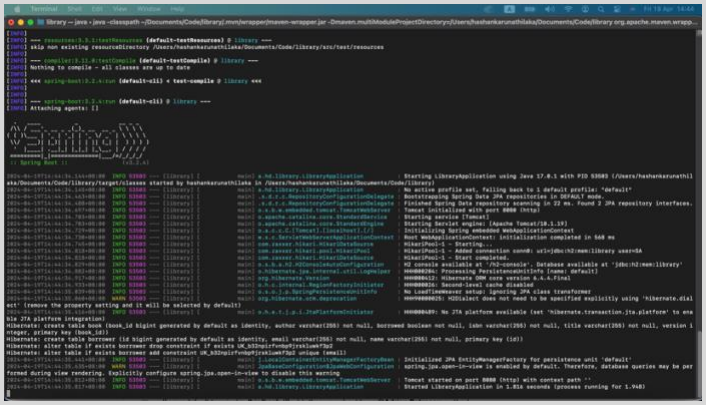
How to run the app:

1. Make sure java 17 is selected in the terminal. JAVA_HOME environment variable should be set to the path of jdk17 installation.

2. In the project root folder, run the command: **./mvnw spring-boot:run**

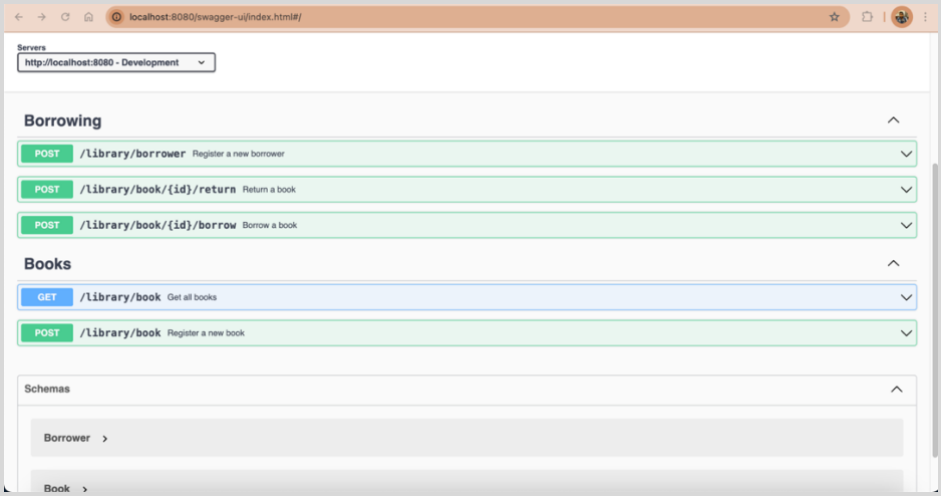
3. It will start the app. Please go to this swagger url to interact with the app. http://localhost:8080/swagger-ui/index.html#/



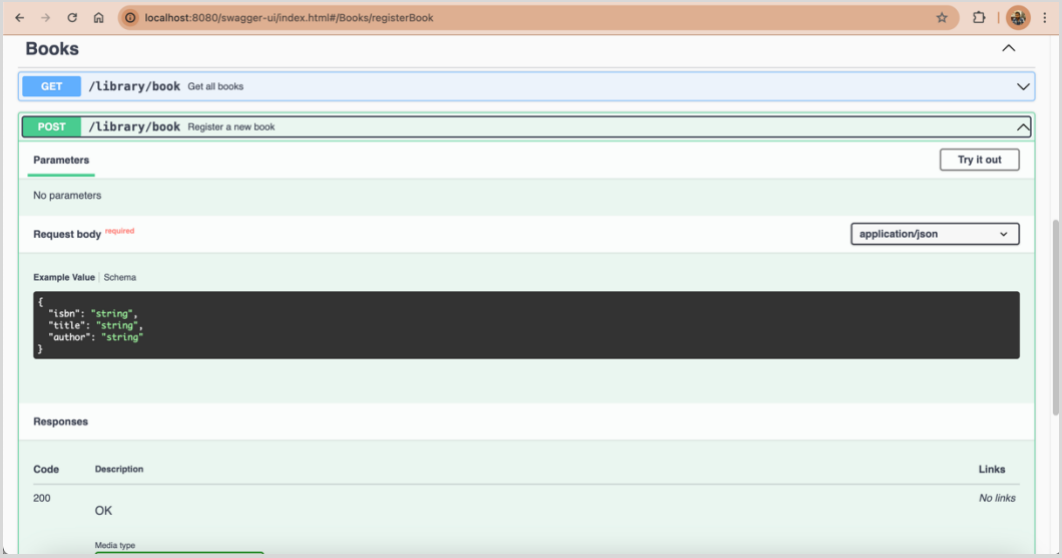
4. http://localhost:8080/swagger-ui/index.html#/ has the swagger UI with all endpoints and guidance to how to interact with the APIs. There are 5 endpoints provided.

    a. Register a new borrower.
    b. Get all books.
    c. Register a new book.
    d. Borrow a book of a provided book id.
    e. Return a book of a provided book id.

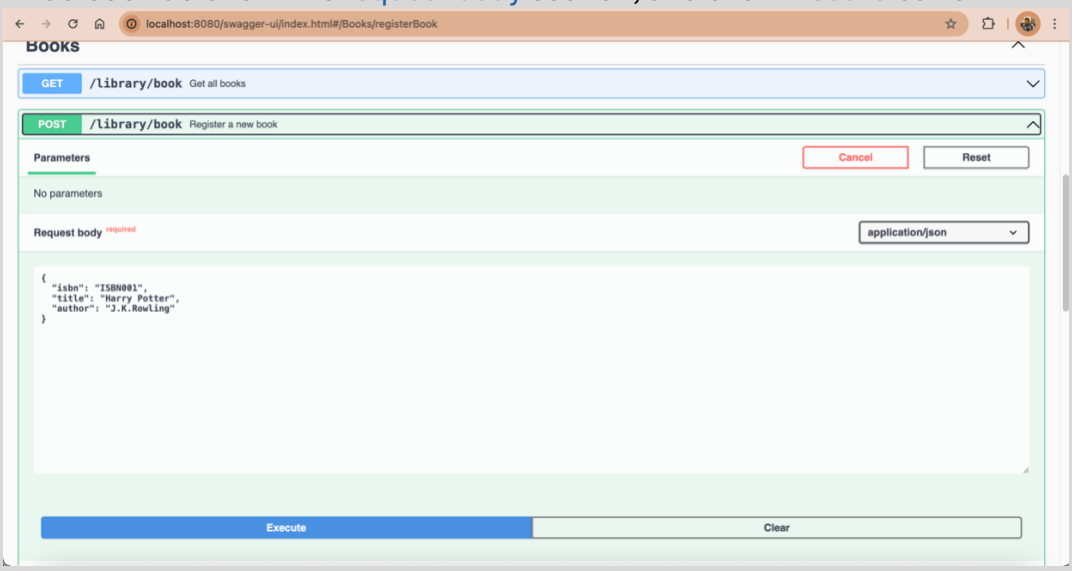
5. Sample steps:
    a. Open swagger url once the app is running after step 2 above.



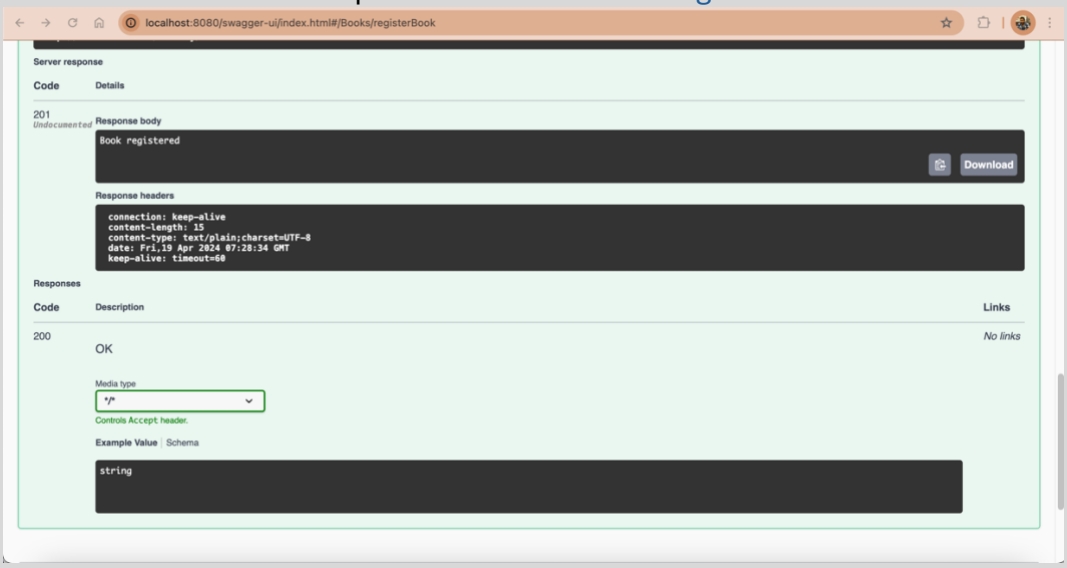
b. Expand POST /library/book and click "Try it out"



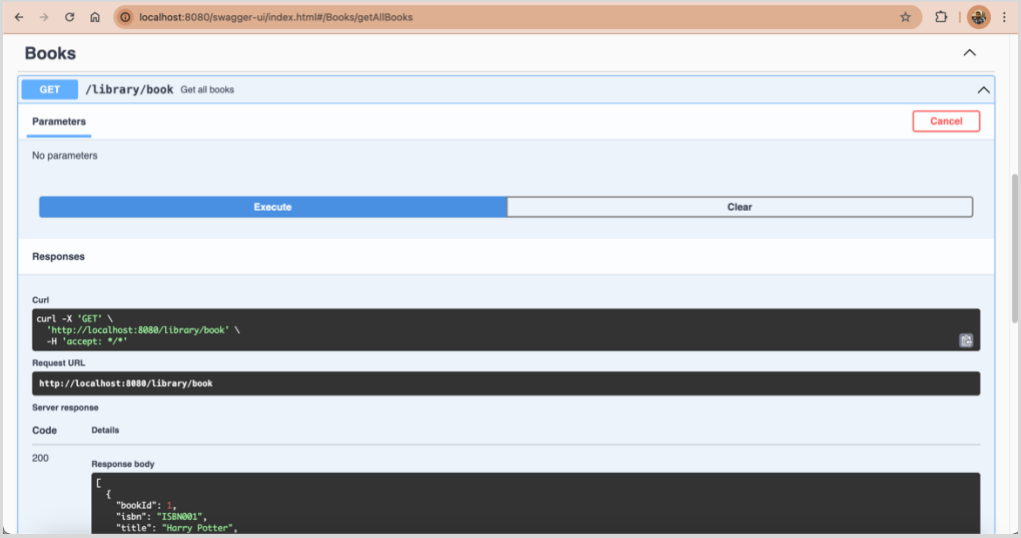
c. Add book details in the request body section, and click Execute button.



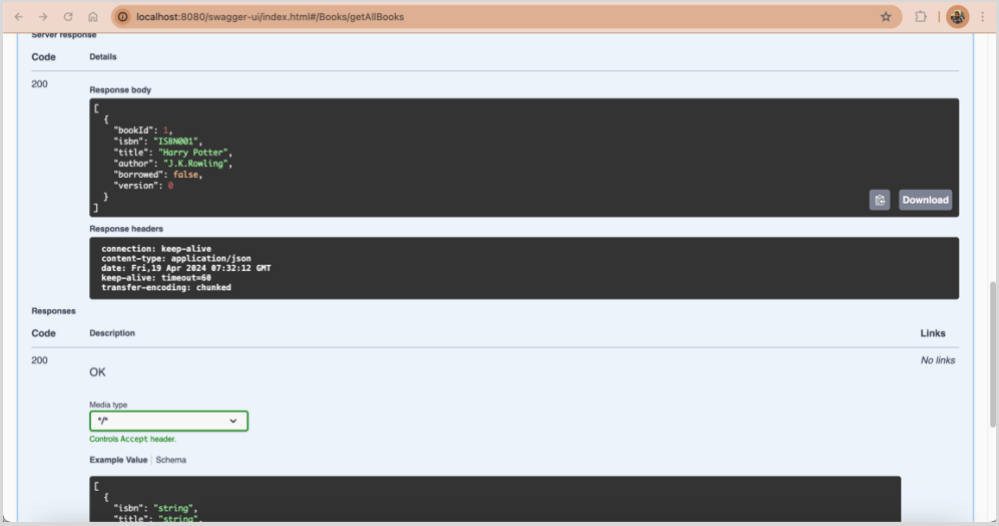
d. Scroll down to see the response. Here it is "Book registered"



e. Now go to GET /library/book section and click "Try it out". Then click execute. It will get all books in the system. Then scroll down to see the result.



f. We can see the newly added book.



g. Please follow similar way to test other endpoints.

Design decisions:

- In memory H2 database was selected as the database of this app to be able to run easily on other machines. However, the database can be easily switched by adding different drivers, dialect, and connection details.

- There are no data of books or borrowers preloaded into the database. For the testing, first have to add new books via book register endpoint.

- Since there were no mention about keeping data of which borrower borrowed a particular book, it is not implemented for the simplicity.

- The APIs will do the following validations to keep the data consistency in the database.
    - To borrow, a book should be available. (not borrowed already)
    - To return, a book should be already borrowed.
    - Optimistic locking is implemented to prevent multiple users requesting to borrow the same book concurrently.
    - When registering a new book, ISBN of previous books is checked to ensure, books with same ISBN have the same name and author.