College of Electrical & Mechanical Engineering, NUST

Department of Computer Engineering

DATABASE ENGINEERING (EC-240)

Project Report: Book Review Website

Course Instructor: Prof Dr Farooque Azam

Made by:
Faizan Ejaz

Submitted to:
Prof Dr Farooque Azam

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Introduction:

This project required us to create a comprehensive web app utilizing software tools and integrating a database within it. We will analyze the requirements of the project, how our team implemented those requirements and the overall goals that we achieved.

Requirement Analysis:

Project Statement and Requirements:

The project asked for a 3-tiered web application of any kind, with enough complexity at the backend level to justify it. It was open-ended enough that we could choose whatever we wanted to make. Our team decided on a simple book reviewing website, with some quality of life features such as favoriting and account creation.

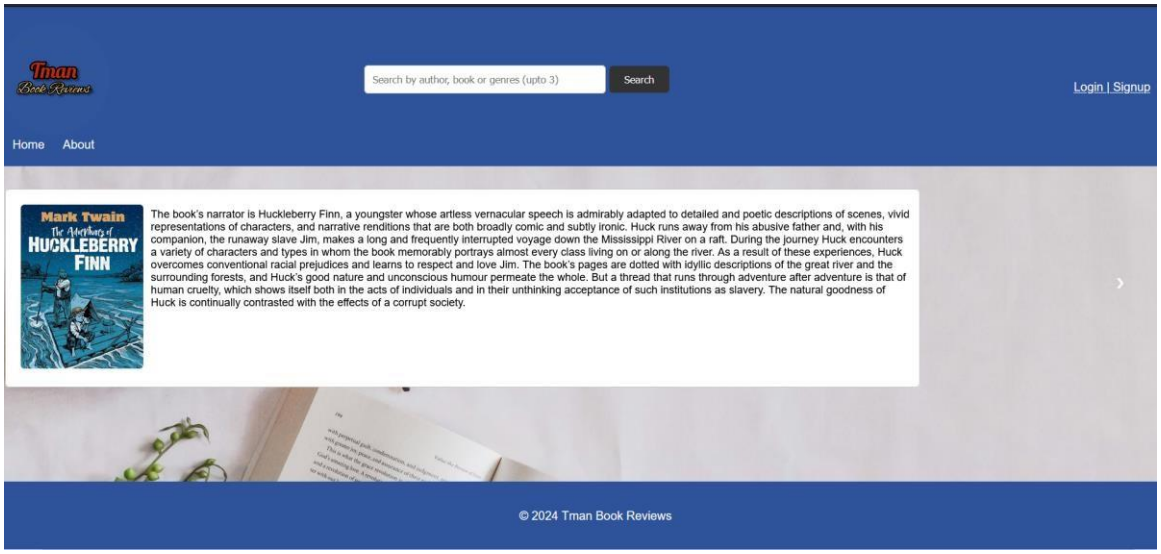

Fig. 1 Main page of the website

Potential Challenges:

We have not integrated a database into a complete web-based application before. This was one of our major challenges. We also needed to find a software to host both the website and the database, and integrate all three layers of the project well enough that it wouldn't cause issues.

Objectives and Scope:

Our 3-tiered application would use the following software:

- phpmyadmin was used for the backend, for creating and editing the mySQL database.
- html for creating web pages for the application.
- XAMPP to host both the database and the website at once.

Our goals with this project were to implement searching of books and novels by their names, their authors or their genre. We also wanted to make a sign up feature for account creation so we could track users' details. We wanted only signed in users to be able to write reviews for a book. We also wanted the capability of being able to favourite books, and check the reviews that a user has written from their profile.

The only way to add books to the site would be through the backend, as we did not want to give users the capability of flooding the database with books without verification.

Roles:

Taimoor Azam handled the design and integration of the backend with the website.

Faizan Ejaz created the entire frontend of the website and helped with integration as well.

Muhammad Aamir Aziz designed the business logic of the database and how it was to be integrated with the website.

Backend Design:

The backend of the book review website was made to be as simple as possible, with room for expansion later on if required. It consists of only 5 entities, but each of them plays a major role in the running of the website. The complete logical breakdown is described below.

Logical Design:

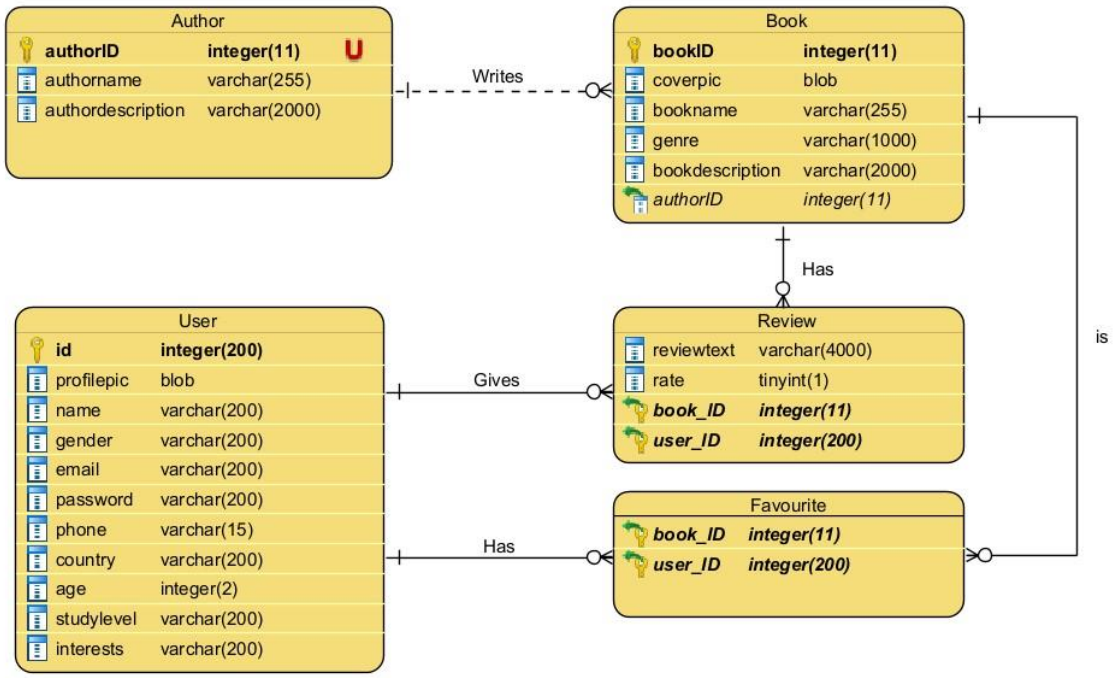

Fig. 2 Logical Design of the System

The overall architecture of the application relies on books and users being stored in the backend. These make up the majority of the data stored in the database. In total, there are five entities, which are:

- Authors
- Books
- Users
- Reviews
- Favourites

As said above, the main components of the website are the users and the books. Books are stored in the database along with their genre, author IDs, names, description etc. These are displayed on the main page of the website, and can be searched for through the search bar built into the website, as shown below.

Fig. 3 Search bar as given on the website.

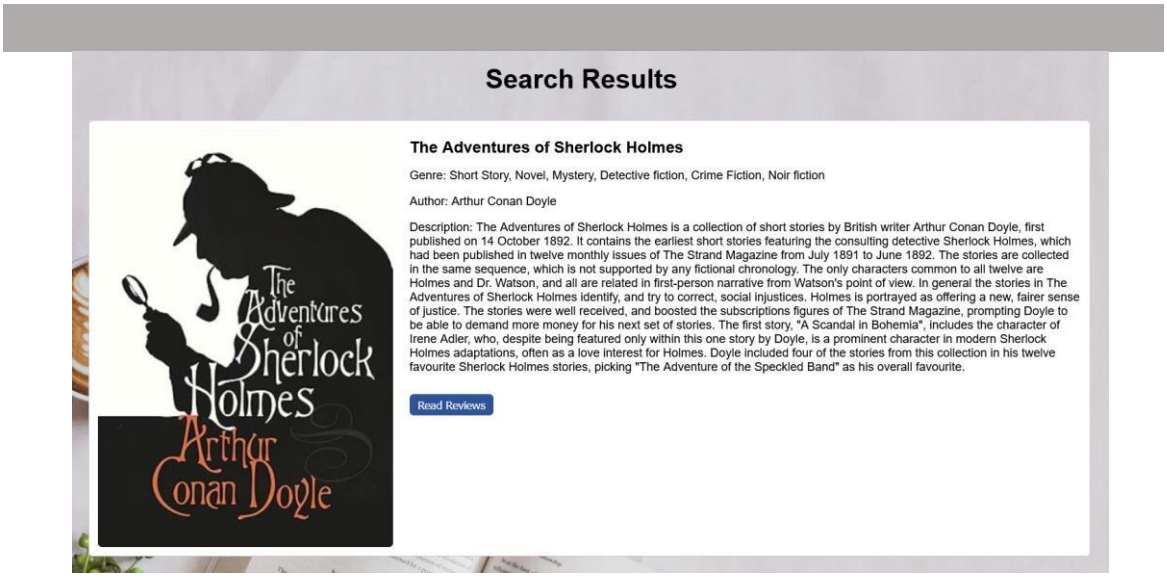

Fig. 4 Result of the search.

Users can sign up to the site to access the books they've favourited, along with being able to leave reviews. Otherwise, those who have not logged in can only browse books and read the reviews of others.

Physical Design:

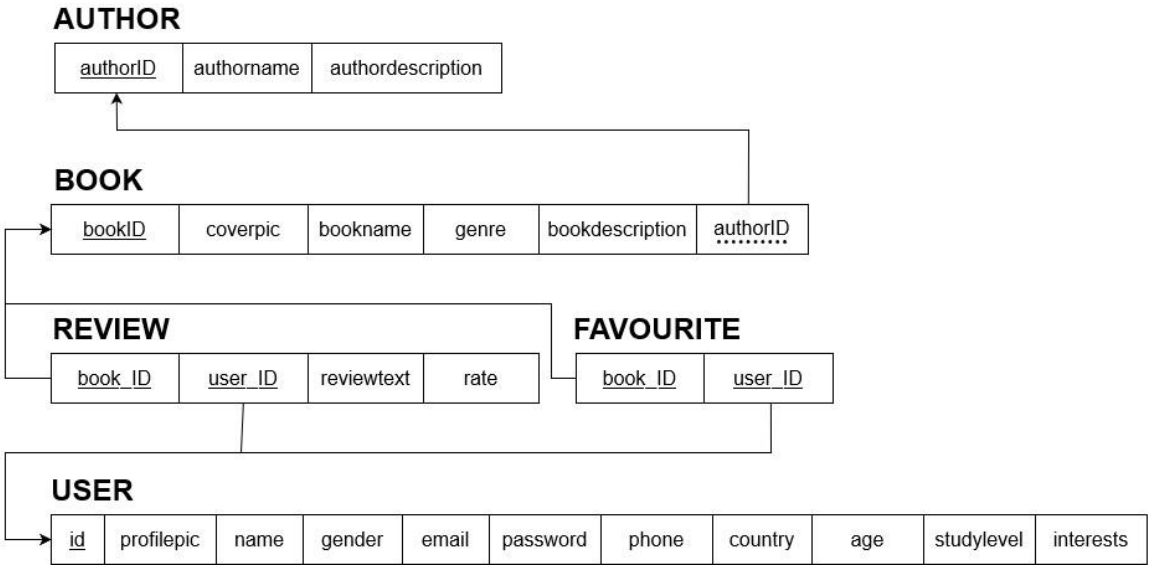

Fig. 5 Relational Schema

Above is the physical design of the database given in the form of a relational schema. Favourites and Reviews are separated, even though the REVIEW table has all of the attributes of the FAVOURITE table. This is because a user may leave a review for one kind of book, but favour another.

Consistency, Scalability and Performance:

There is some de-normalization for the sake of speeding up queries. The **genre** attribute of BOOK and the **interests** attribute of USER are a single string with multiple values. If these were normalized into separate entities, then it would take a separate query to select each user's interests and find each book's genres.

Instead, we simply use string manipulation to get these values out of the attributes.

The database can easily scale to accommodate thousands of users and books, due to its relative simplicity and denormalization. If we were to normalize **genres** and **interests** a book would have to compare with thousands of entries to find the right ID, whereas here it is given.

Business Logic — Middle-Tier Design:

Structural Design:

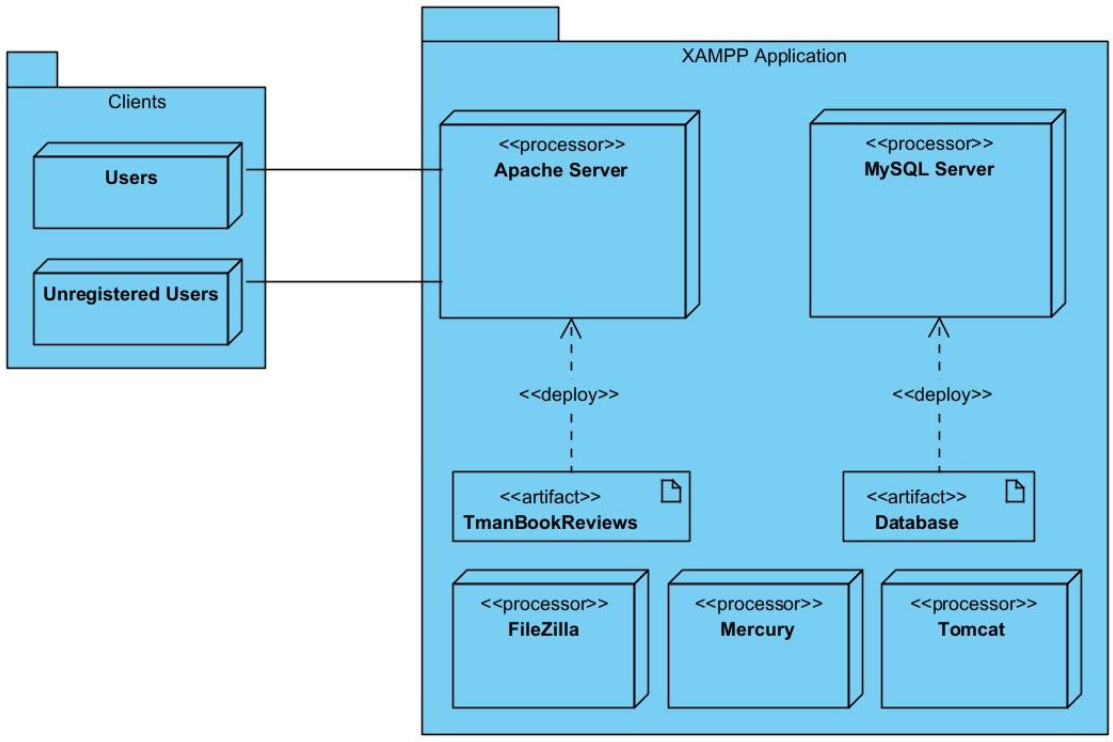

Fig. 6 Structure of TmanBookReviews

The 3-tiered application here has XAMPP as its main core. There are two servers hosted on XAMPP, one for the database which is made in phpMyAdmin, and a second Apache server for running the website itself.

XAMPP hosts both of these servers on the local network and anyone within the network can access the site, make an account and browse the books.

Frontend Design:

The website was written using php programming language, with html tags for the web page itself. This language allows directly embedding code into the web page and easily accommodates the phpmyadmin database. It was designed to be used with the software, making it easy to integrate.

The user interface was made to be as easy on the eyes as possible. CSS was used to style the different web pages, and the colours were kept plain and simple. Blue colours and a consistent banner appear throughout the different web pages, giving it a recognizable look.

There are several different kinds of web pages created for the site, some of which include:

- Home Page

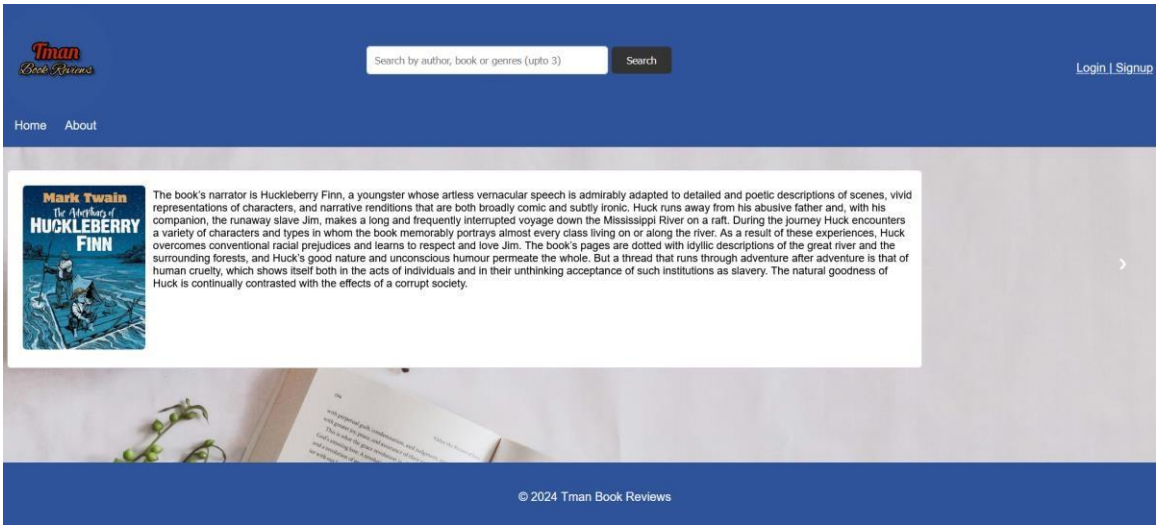

Fig. 7 Home Page

- Search Results

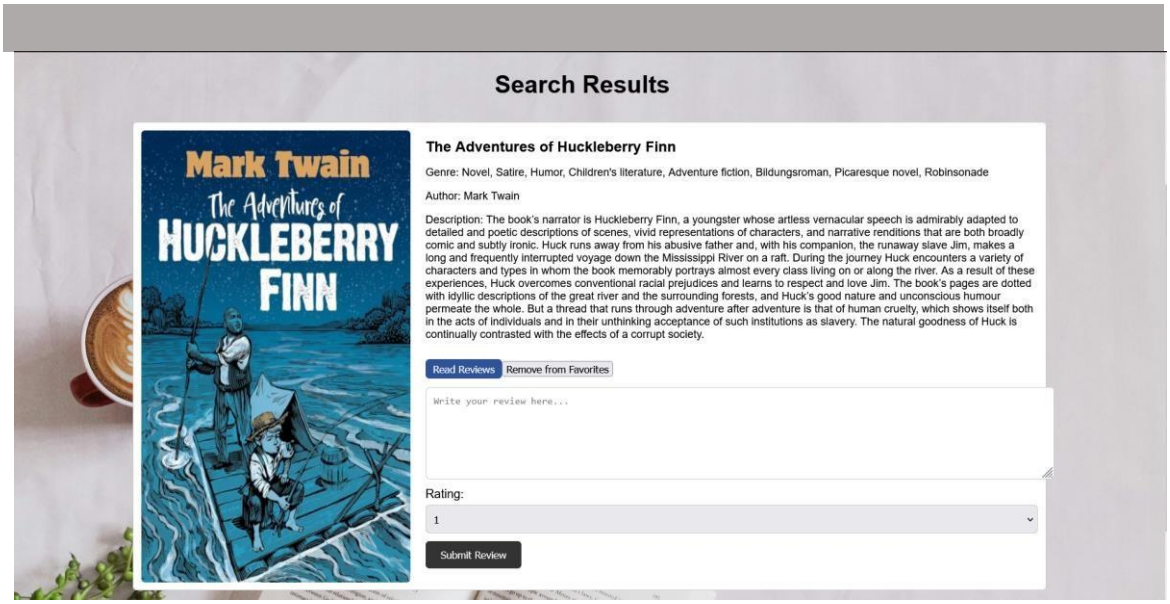

Fig. 8 Search Results

- Reviews

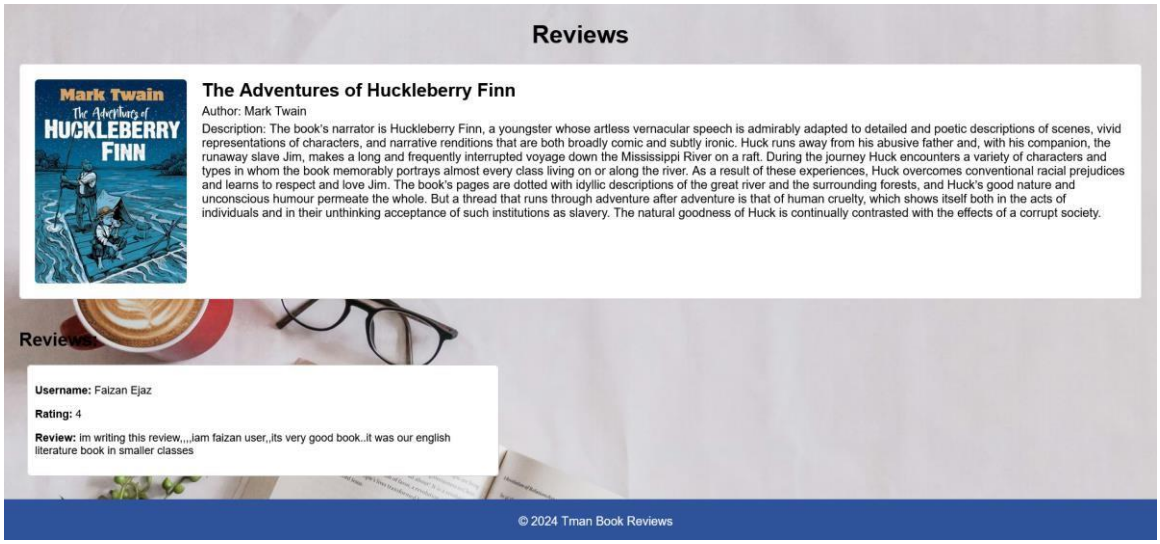

Fig. 9 Reviews

- About Page

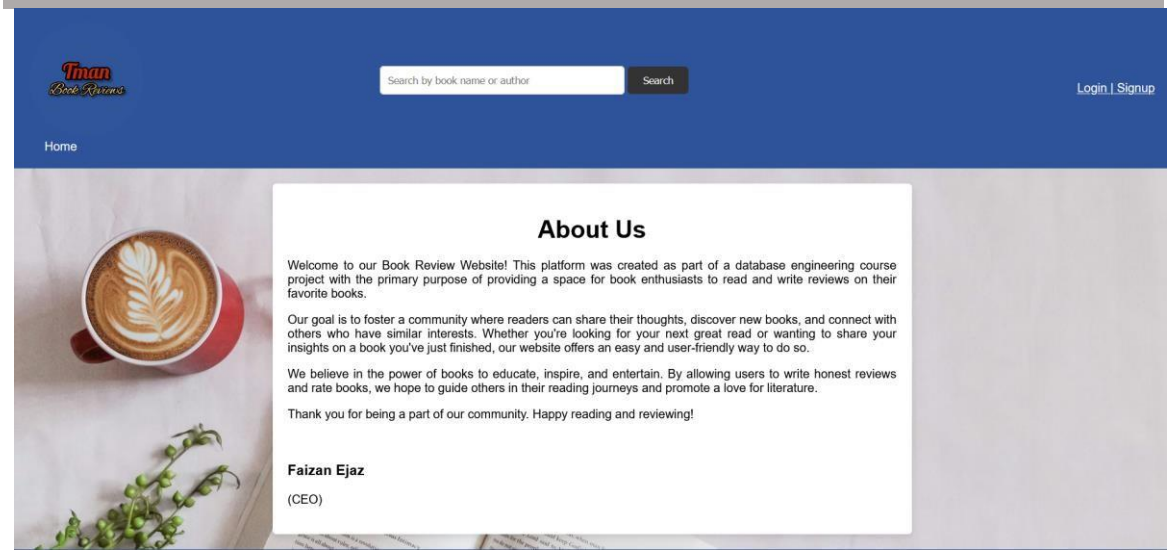

Fig. 10 About Page

- Login

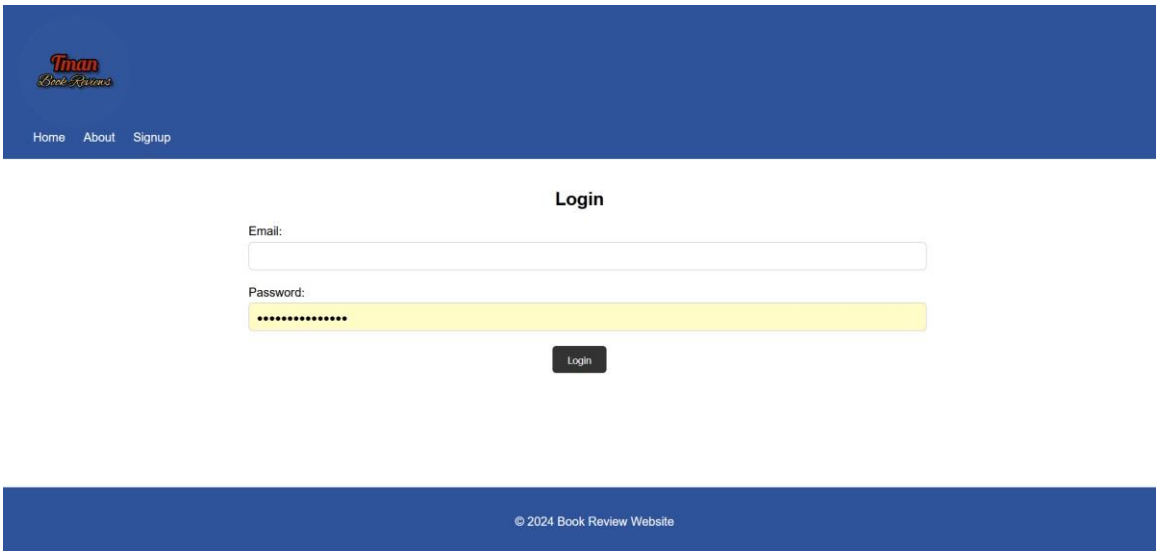

Fig. 11 Login Page

- Signup Page

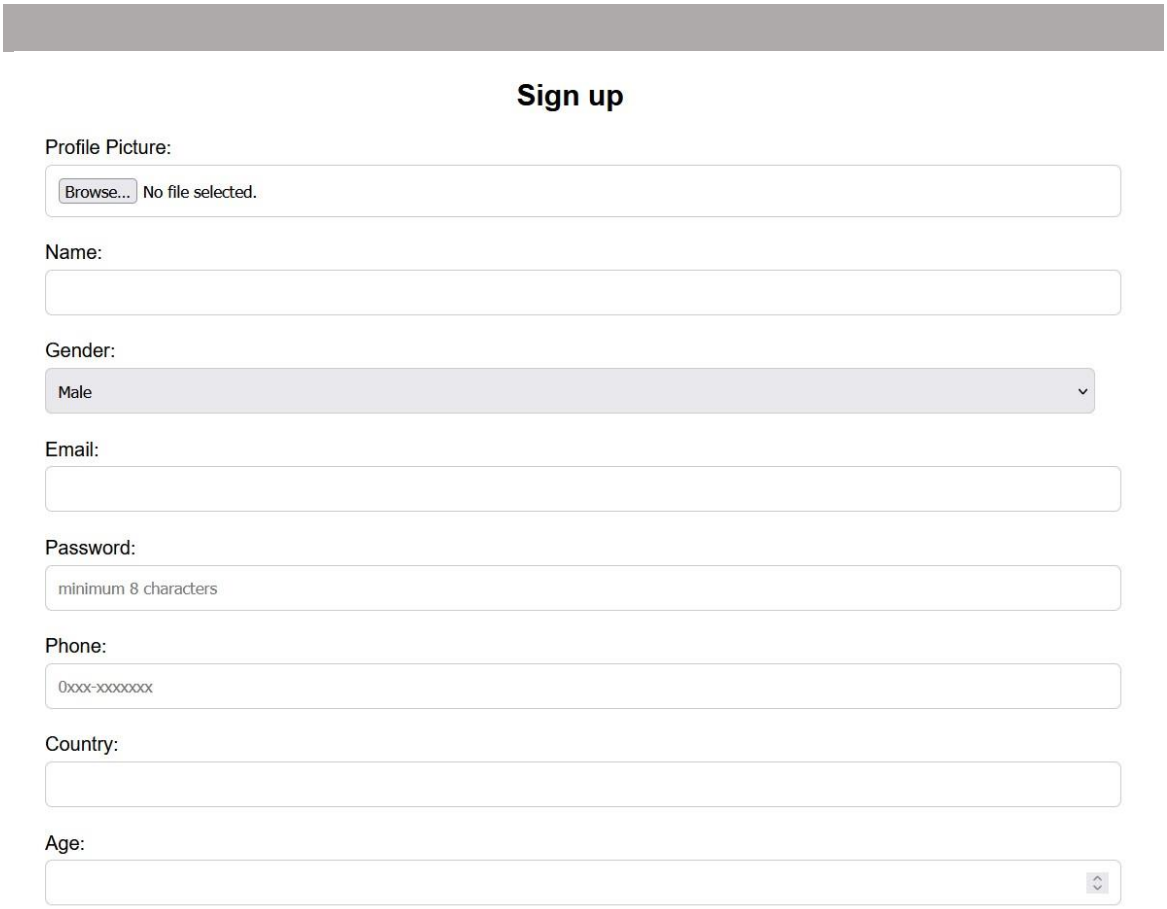

Fig. 12 Signup Form

- Favourites

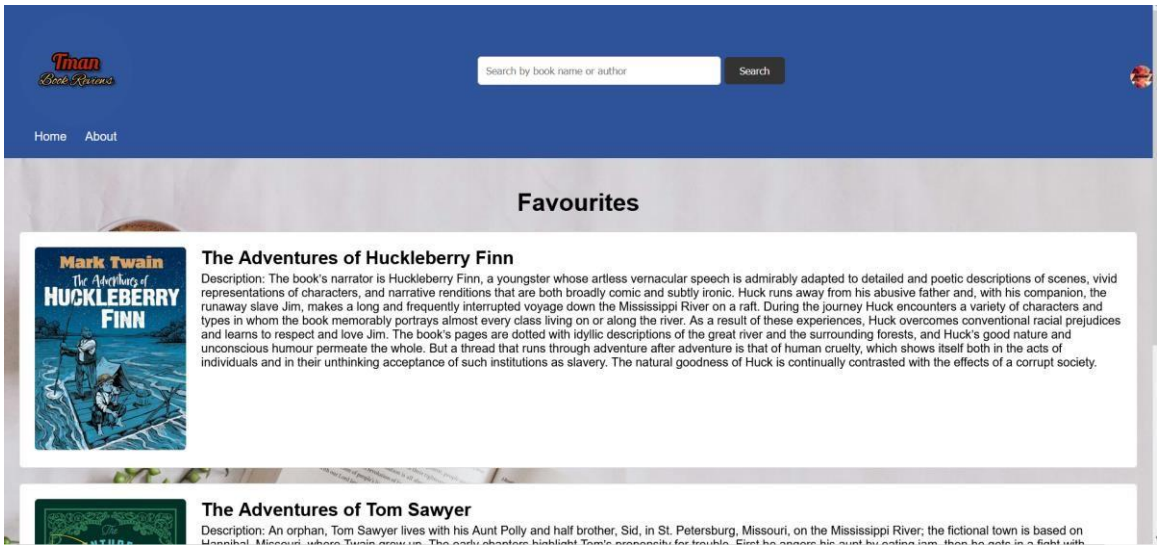

Fig. 13 Favourites

These are most of the web pages that were created for the site itself. The styling and design of the web pages was done entirely by Faizan Ejaz. Much work was done to

accommodate the mobile version of the web pages as well, shown in the following images:

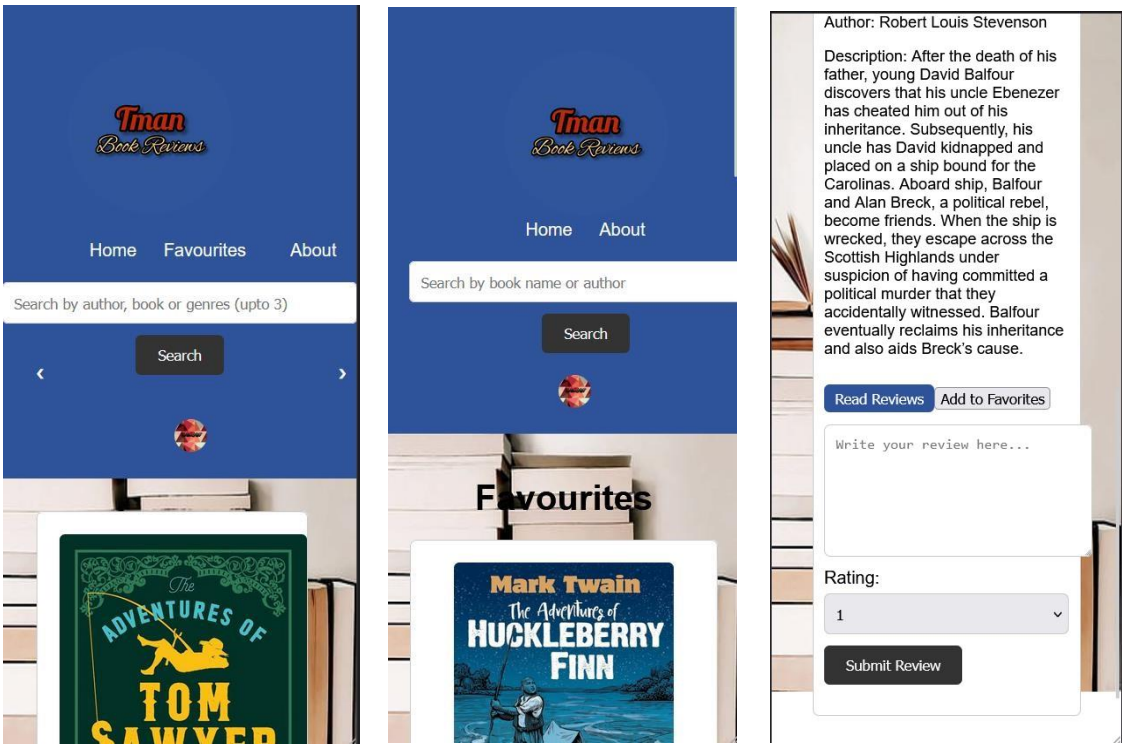

Fig. 14 Mobile view of several pages.

Conclusion:

From the design and conceptualization of the book review website, we have learned a lot about how websites are designed and how we can best implement them.

We faced some difficulty in creating the website and finding the proper syntax to use for specific commands, but were ultimately able to accomplish all the goals set out at the start. The review system, logging in, favouriting and searching were all implemented to our best efforts and the site has minimal errors.