

Project Documentation

Group: 3

Library Management System

by

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## Abstract

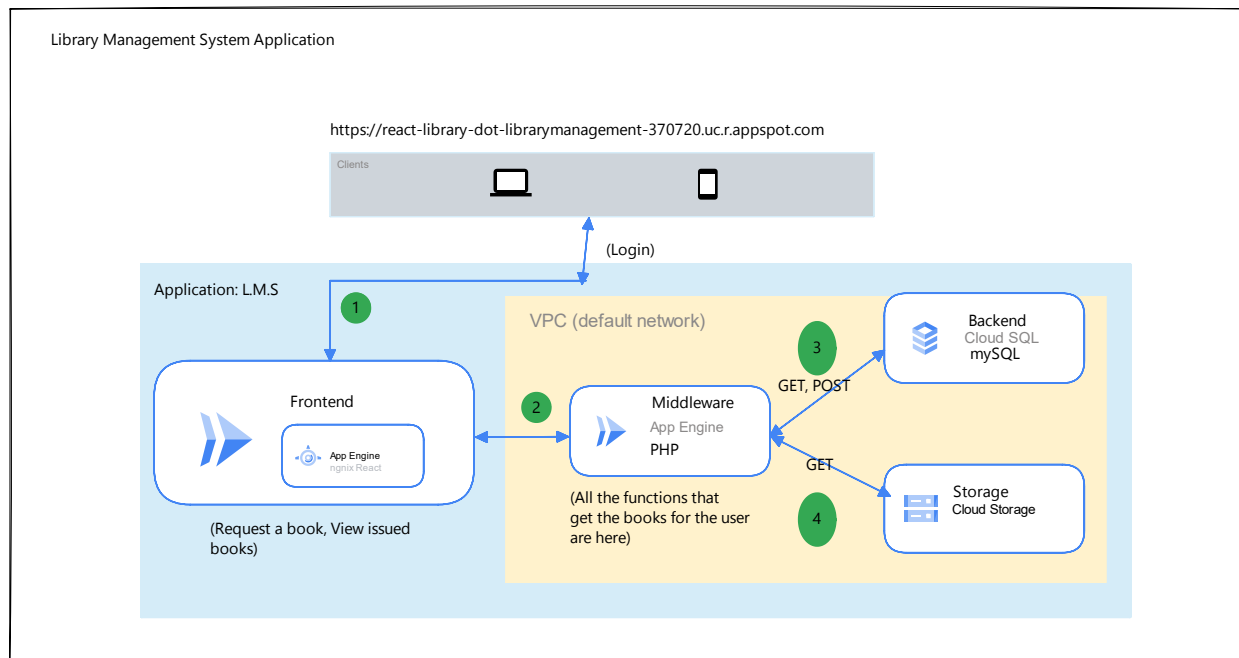
The Library Management System Website is an online system designed to help library staff manage their library's collections and patrons. It allows users to search for library materials, check out materials, and perform various other library-related tasks. The website provides access to an extensive catalog of library materials, including books, magazines and more. It also allows staff to manage patron accounts and track library usage. The website also enables librarians to add/remove books and issue a book if requested. The website used Google Cloud Components such as Google Cloud SQL, Google App Engine and Google Cloud Storage to store and manage the data. The website also used HTML, CSS, JavaScript, ReactJS and PHP to create the user interface and to interact with the database.

## Features

The features of our application are as follows:

- Users, typically students and faculty alike can login/create accounts.
- Users can access the list of books available.
- Users can issue books from the library.
- Admin/Librarian can issue books to students who requested the book.

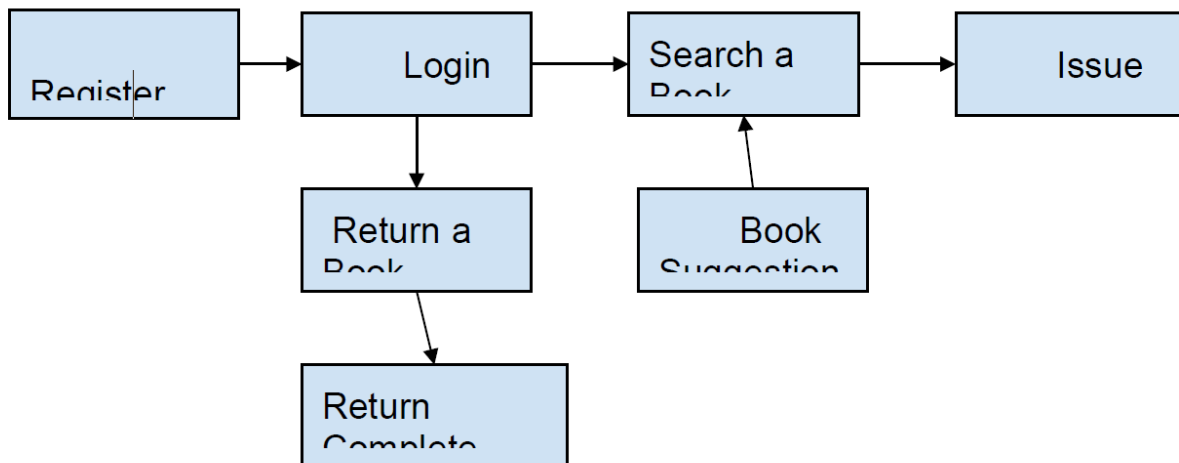
# System Architecture



This app can be used from anywhere, the desktop or the mobile as it was designed for dynamic use. We used Google App Engine to run the PHP as well as the React Web Application. We used Google Cloud Storage as storage unit. Finally, we used Google Cloud SQL for a MySQL queries onto the database.

## Workflow

1. The user goes to the website, and logs in as an admin/user and will be redirected to the respective homepages.
2. The user can be able to view the books that are available or can search for books he wants. He can then request the book he needs; He can also view what all books he currently issued.
3. The admin will be able to view what books are requested by what user and depending on the user, he issues or rejects the request.



## Technologies

- Google Cloud
- Git
- ReactJS
- PHP

## Google Cloud Components

The components used for this application are:

- Google App Engine
- Google Cloud SQL
- Google Cloud Storage

Google App Engine:

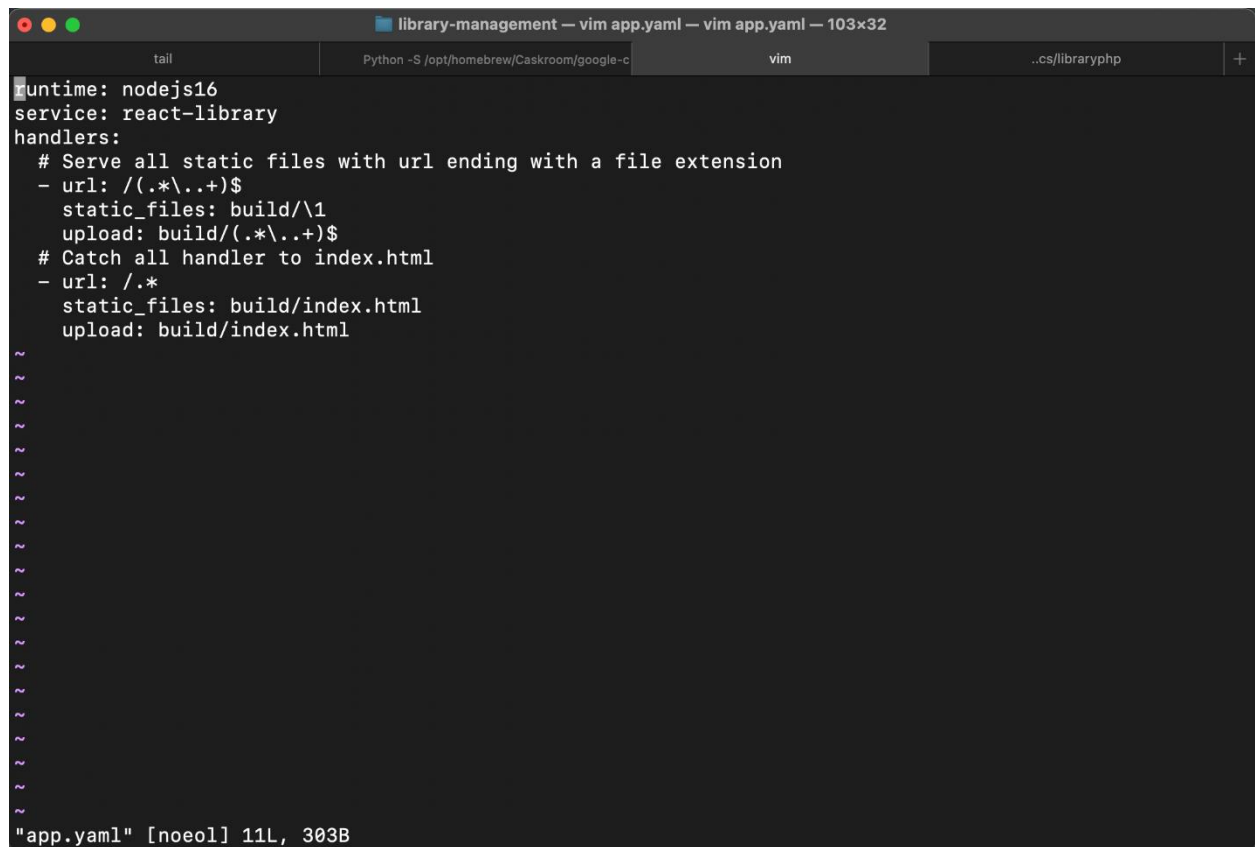
Google App Engine is a powerful platform for building scalable and reliable web applications and mobile backends. It is a fully managed service that makes it easy to build, deploy, and maintain applications on Google's infrastructure.

Google App Engine should be used because it provides an easy to use, powerful and reliable environment for developing, hosting, and managing web-based applications with minimal effort. It also offers cost effective scalability, high availability, and robust security. Additionally, it enables developers to quickly and easily build applications on the same infrastructure used by Google's own products such as Gmail, YouTube, and more. Finally, Google App Engine is integrated with Google Cloud Platform services, giving developers access to a variety of services and tools, allowing them to create applications that are tailored to their specific needs.

We deployed our PHP and ReactJS project code on the Google App Engine by creating an 'app.yaml' file.

The app.yaml file stores configuration information for an application running on Google App Engine. This file defines how the application is deployed on the platform and how the App Engine should manage its resources. The file contains important configuration settings such as the application's service name, the version of the runtime environment to use, the instance class to be used, and more. Without the app.yaml file, applications cannot be deployed on Google App Engine.

Below are attached screenshots of our app.yaml files for Frontend and Middleware:



The image shows a vim editor window with the title bar "library-management - vim app.yml - vim app.yml - 103x32". The editor is displaying a Dockerfile for a ReactJS application. The content of the Dockerfile is as follows:

```
runtime: nodejs16
service: react-library
handlers:
  # Serve all static files with url ending with a file extension
  - url: /(.*\..+)$
    static_files: build/\1
    upload: build/(.*\..+)$
  # Catch all handler to index.html
  - url: /*
    static_files: build/index.html
    upload: build/index.html
```

The editor shows a cursor at the end of the first line. The status bar at the bottom indicates the file is "app.yml" and the cursor is at line 11, column 30.

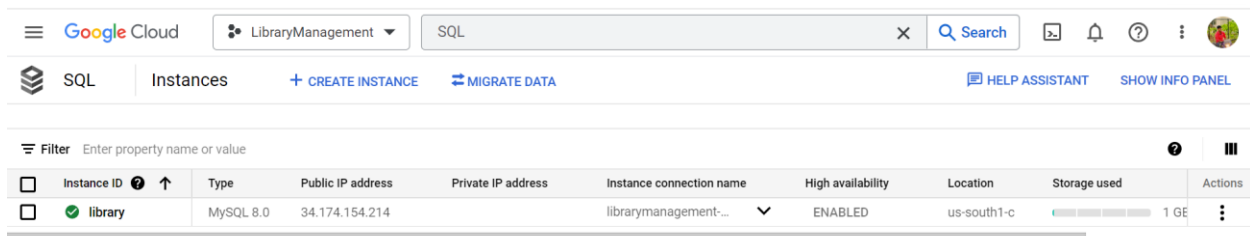
This is for the ReactJS application.



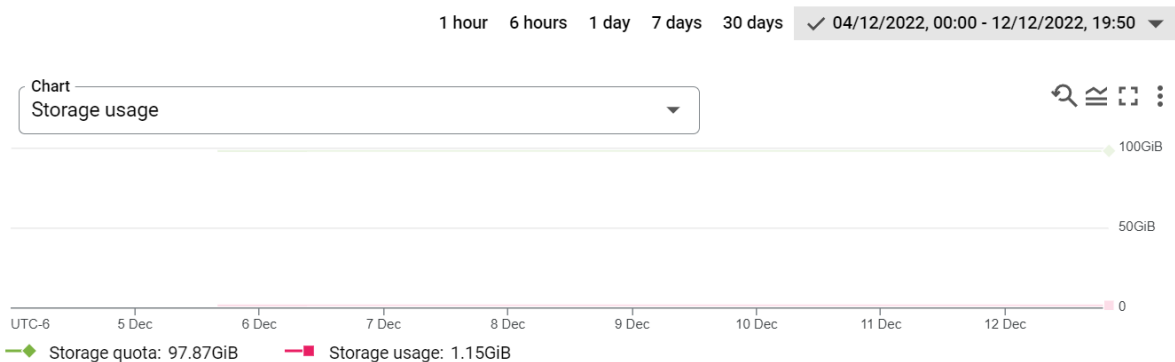


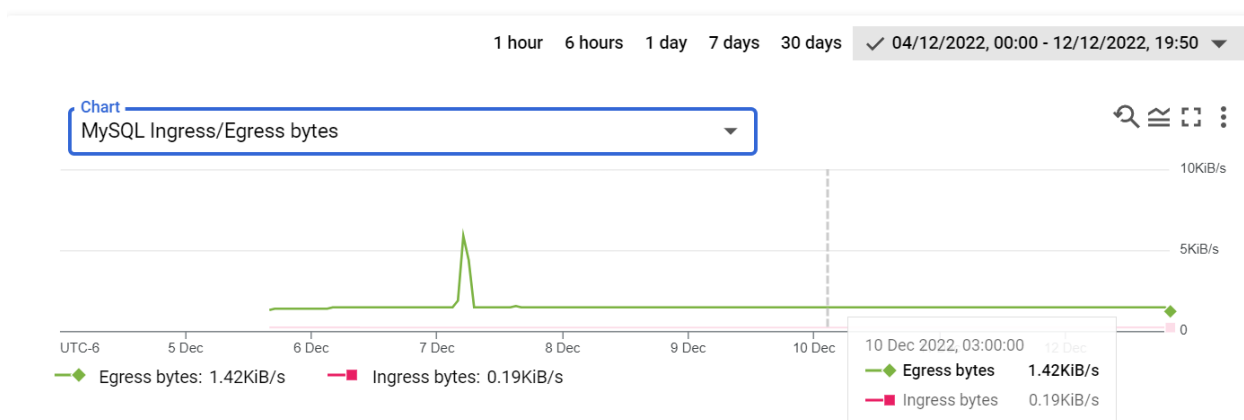
## Google Cloud SQL:

Google Cloud SQL is an ideal choice for small application deployments because of its scalability, cost-efficiency, and ease of use. The Cloud SQL platform offers an easy-to-use web interface for quickly and easily setting up databases, as well as advanced features such as automatic backups, high-availability, and access control. Furthermore, the platform is designed to scale up or down depending on your application's needs, helping to keep costs low. Google Cloud SQL also provides a secure and reliable environment for hosting your data and applications, ensuring that any sensitive information is securely stored and managed.



Instance ID	Type	Public IP address	Private IP address	Instance connection name	High availability	Location	Storage used	Actions
library	MySQL 8.0	34.174.154.214		librarymanagement-...	ENABLED	us-south1-c	1 GB	





## Google Cloud Storage:





Google Cloud Storage is an effective, reliable, and secure cloud storage service offered by Google. It enables businesses and individuals to store and access data in the cloud. Google Cloud Storage offers a wide range of features and benefits that make it an attractive option for data storage.

One of the primary benefits of Google Cloud Storage is its scalability. With its flexible pricing plans, businesses can scale their storage capacity and usage up or down, depending on their needs. This means that businesses can purchase and use only the storage capacity they need and can easily scale up or down as their storage requirements change. Additionally, Google Cloud Storage is highly reliable and secure, ensuring that all stored data remains safe and secure. It also comes with a wide range of advanced security features, such as encryption, data backups, and access control, which help protect against data loss and unauthorized access.

Google Cloud Storage also offers a range of features that make it a powerful and cost-effective cloud storage solution. For example, its powerful API allows developers to quickly and easily integrate their applications with the Google Cloud Storage platform. Additionally, its pricing plans are designed to provide businesses with cost-effective storage solutions that meet their specific budget and needs. Finally, Google Cloud Storage is simple to use.







break in service (\$12.32 credit and 83 days left in your trial).

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LibraryManagement Cloud St  Search    

Buckets [CREATE](#) [REFRESH](#) [HELP ASSISTANT](#) [LEARN](#)

Filter Filter buckets

<input type="checkbox"/>	Name 	Created	Location type	Location	Default storage class 	Last modified
<input type="checkbox"/>	<a href="#">librarymanagement-370720.appspot...</a>	7 Dec 2022, 04:17:40	Multi-region	us	Standard	7 Dec 2022 
<input type="checkbox"/>	<a href="#">sql-dumps-library</a>	7 Dec 2022, 03:29:28	Multi-region	us	Standard	7 Dec 2022 
<input type="checkbox"/>	<a href="#">staging.librarymanagement-370720.a...</a>	7 Dec 2022, 04:17:39	Multi-region	us	Standard	7 Dec 2022 
<input type="checkbox"/>	<a href="#">us.artifacts.librarymanagement-3707...</a>	7 Dec 2022, 04:41:24	Multi-region	us	Standard	7 Dec 2022 

# Deployment

The deployment is done in two phases:

## 1. Deployment of PHP

```
libraryphp — maniaditya@Manis-MacBook-Air — zsh — 103x32
c1833a7cf
Step #2: 2022/12/07 20:51:40 pushed blob sha256:e31658d2ba2cd0080dab86ab600a912837342c5c05cbd75e407c094
838096a59
Step #2: 2022/12/07 20:51:40 pushed blob sha256:909442bbdbf7e6559c39a317fe5be5827e5847ca63d2f3382cdad65
754a75a85
Step #2: 2022/12/07 20:51:40 pushed blob sha256:ed106d6c9900819d174d4e5e52d9008c92b02b0a54bbb112aabb754
31e3ec988
Step #2: 2022/12/07 20:51:40 pushed blob sha256:4c4057d418ad8d041f51cddfe09c1dad2ba7dcb0486f4b860bb4e21
447f33967
Step #2: 2022/12/07 20:51:41 pushed blob sha256:238df585bd7d16e03dc82cd7c25a7e6da0ba7fb17efc980ca291790
43d4281a3
Step #2: 2022/12/07 20:51:41 us.gcr.io/librarymanagement-370720/appengine/default.20221207t144957:lates
t: digest: sha256:ff77746b27f1f5802ce9daf6f1f916b20d9d00a72542bb97075fcee1295627d size: 4318
Finished Step #2
PUSH
DONE
Updating service [default] (this may take several minutes)...done.
Setting traffic split for service [default]...done.
Stopping version [librarymanagement-370720/default/20221207t140118].
Sent request to stop version [librarymanagement-370720/default/20221207t140118]. This operation may tak
e some time to complete. If you would like to verify that it succeeded, run:
$ gcloud app versions describe -s default 20221207t140118
until it shows that the version has stopped.
Deployed service [default] to [https://librarymanagement-370720.uc.r.appspot.com]
You can stream logs from the command line by running:
$ gcloud app logs tail -s default
To view your application in the web browser run:
$ gcloud app browse
➔ libraryphp
```

## 2. Deployment of ReactJS Application

```
library-management — maniaditya@Manis-MacBook-Air — zsh — 103x32
To view your application in the web browser run:
$ gcloud app browse -s react-library
➔ library-management git:(main) ✕ gcloud app deploy
Services to deploy:

descriptor:      [/Users/maniaditya/Documents/CC/library-management/app.yaml]
source:          [/Users/maniaditya/Documents/CC/library-management]
target project:  [librarymanagement-370720]
target service:  [react-library]
target version:  [20221207t145719]
target url:      [https://react-library-dot-librarymanagement-370720.uc.r.appspot.com]
target service account: [App Engine default service account]

Do you want to continue (Y/n)? y
Beginning deployment of service [react-library]...
- Uploading 2 files to Google Cloud Storage
File upload done.
Updating service [react-library]...done.
Setting traffic split for service [react-library]...done.
Deployed service [react-library] to [https://react-library-dot-librarymanagement-370720.uc.r.appspot.co
m]
You can stream logs from the command line by running:
$ gcloud app logs tail -s react-library
To view your application in the web browser run:
$ gcloud app browse -s react-library
➔ library-management git:(main) ✕
```

gcloud app deploy:

The 'gcloud app deploy' command is a powerful tool used to deploy applications to the Google App Engine. This command allows developers to easily deploy their applications to Google's cloud platform in a matter of minutes. This command takes the application code and configuration files, packages them in the appropriate format, and then deploys them to the App Engine. It is a great way for developers to quickly and easily deploy their applications to the Google App Engine. This command allows developers to easily customize their applications and configure them for the App Engine. This command also allows developers to take advantage of advanced features like scalability, performance optimization, and automatic scaling. With this command, developers can quickly and easily deploy applications to the App Engine without needing to manually configure and deploy the application.

## Final Application

The PHP file is on the App Engine which handles all the user request and is a bridge between the front end of the application created using ReactJS framework and the Google Cloud SQL and Google Cloud Storage.

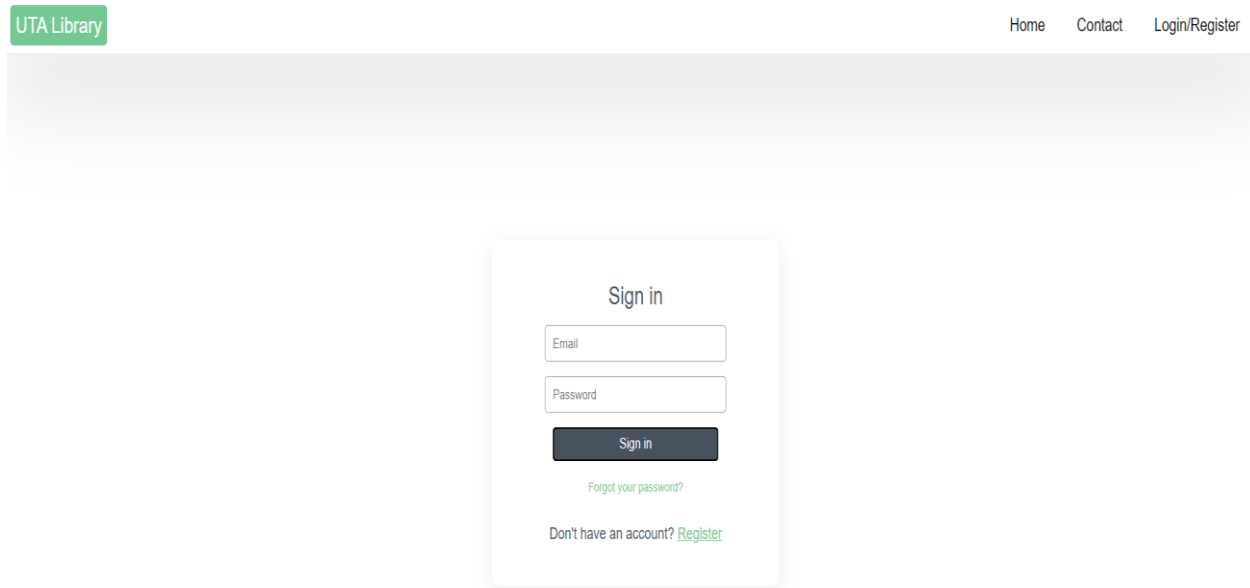
To access the website, click on the below link:

[Library Management System](#)

The following are the screen shots of our project.

## Home Page:

This is the default page everyone comes to when clicked on the website link. If you already have an account, you can login or else, we can click register and register yourself.



UTA Library

Home Contact Login/Register

Sign in

Email

Password

Sign in

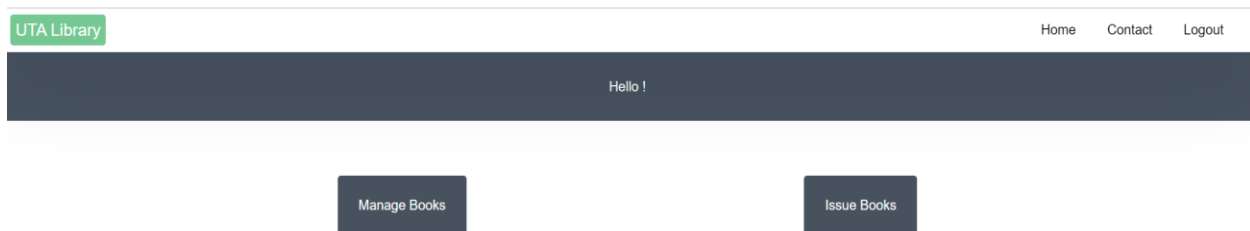
[Forgot your password?](#)

Don't have an account? [Register](#)

## Admin page:

This is the page the admin is redirected to when he logs in. He will have two options:

- Manage Books
- Issue Books



UTA Library

Home Contact Logout

Hello !

Manage Books

Issue Books

## Manage Books:

UTA Library

Home Contact Logout

Add Books

Add Book

Remove Books

Book Name	No. of pages	Actions
Harry Potter	1025	Delete
chronicles of Narnia	543	Delete
The great Gatsby	398	Delete
cloud computing basics	598	Delete
cloud native	289	Delete

## Issue Books:

Manage Books Issue Books

Remove Books

Userid	Bookid	Actions
aditya	Harry Potter	Issue

## User Home Page:

This is the homepage for any user, be it student or faculty. They can do one of two things:

- See a list of books already issued
- Request New Books

Home

Your Books Request Books



## Future Scope

We want to predict when the book would be available making space for more availability of the service provided.

## Links

[Cloud Project Demo Screen Recording](#)

[Github Code Repository](#)

## Teammate Evaluation

Manikanta Aditya worked on the ReactJS and PHP part of the project and made sure that the project was completely running on the local server. He was very dedicated to his work and was always available to help the team whenever needed. He was very knowledgeable and was able to answer all the queries related to ReactJS and PHP.

Radha Yashwanth worked on the google cloud deployment of the project and made sure that the project was completely deployed on the cloud. He was also very dedicated to his work and was always available to help the team whenever needed. He was knowledgeable and was able to answer all the queries related to Google Cloud deployment.

The project was completed on time and all the features were implemented as per the requirements. The team worked together to ensure that the project was completed with the highest quality and within the given timeline. The team also worked together to ensure that the project was tested thoroughly, and all the bugs were fixed before the final release.

Overall, the teamwork was great, and everyone was able to contribute to the project in their own way. The project was a success, and it was a great learning experience for all the team members.