American International University-Bangladesh (AIUB)

Department of Computer Science

Faculty of Science &Technology (FST)

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LIBRARY MANAGEMENT SYSTEM

Software Requirement Engineering

Sec: **A**

Project submitted By:

NAME	ID	PROGRAM
MD. SAKIB HASAN MUBIN	19-40715-1	BSc CSE
SARMIN AKTER LIPSY	19-40700-1	BSc CSE
MOHAMMAD TANVIR	19-39417-1	BSc CSE
MOHAMMAD YEASIN UDDIN CHOWDHURI	19-41073-2	BSc CSE

Under the supervision of

Abhijit Bhowmik

Associate Professor & Special Assistant [OSA]
Department of Computer Science
Faculty of Science & Technology
American International University-Bangladesh

Checked By Industry Personnel

Name: Md. Shajahan Islam Sani

Designation: Project Coordinator

Company: Brain Station 23 Ltd.

Sign:

Date: 11-12-2022

Md. Shajahan Islam Sani
Project Coordinator

Brain Station 23 Ltd.
2 Mohakhali C/A
Dhaka-1212 Bangladesh

+8801785207668
shajahan.islam@brainstation-23.com
Skype : live :.cid.a61737d48df5162a

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1. PROBLEM DOMAIN

1.1 Background to the Problem

In our university Library, we can see that we do not have any modern system where we can see the booklist and quantity of books. Moreover, if any student wants to discover desired books, he has to do it manually. It will be beneficial for students to use a self-centered system while discovering his/her desired books.

1.2 Solution to the Problem

We want to build a system where a student can see the booklist and the number of books in the library by using the system and a student can borrow or return the book by using the self-centered system. If a student delay returning the borrowed book a punishment amount automatically will be added to the student after the deadline.

2. SOLUTION DESCRIPTION

2.1 System Features

Our system is used by three types of users. Each user performs a different type of role. For each user, there is a distinct set of requirements.

- Administrator/ Admin
- Student/Other users
- Librarian

2.1.1 Features for all users:

1. **Login**

Every user can login to their system.

2. **Registration**

Every user must have to register then you can login to their system.

2.1.2 Features for Administrator/Admin:

1. **Login**
   Admin can login to their system.

2. **Verify user information**
   Admin can verify user information.

3. **Access to user information**
   Admin can access user information's if required.

4. **Change user information**
   Information can be edited by the admin if required.

5. **View total users**
   Admin can view all users.

6. **View user reports**
   Admin can view all user's reports.

7. **Remove User**
   Admin can remove any users and if requires they can also take a legal step.

2.1.3 Features for Student/ Other users:

1. **Login**
   Users can login to their system.

2. **View Booklist**
   Users can view the booklist and book information.

3. **Edit/Update Information**
   If users need to update their profile information, they can do so as well.

4. **Recover Password**
   If any of our users face a situation where they have forgotten their password, then they could be retrieved through email verification.

5. **Search Book**
   Users can search books if users need.

6. **Select Book**
   Users can select any books from the booklist.

7. **View Suggestion**
   Users can see the suggested book.

8. **Recommend Book**
   Users can recommend any new book to the Librarian.

2.1.4 Features for Librarian:

1. **Login**
Librarians can login to their system.

2. **View Booklist**
Librarians can view the booklist and book information.

3. **Edit/Update Information**
If librarians need to update their profile information, they can do so as well.

4. **Recover Password**
If any of our Librarians face a situation where they have forgotten their password, then they could be retrieved through email verification.

5. **Book details**
Librarians can give book details if needed.

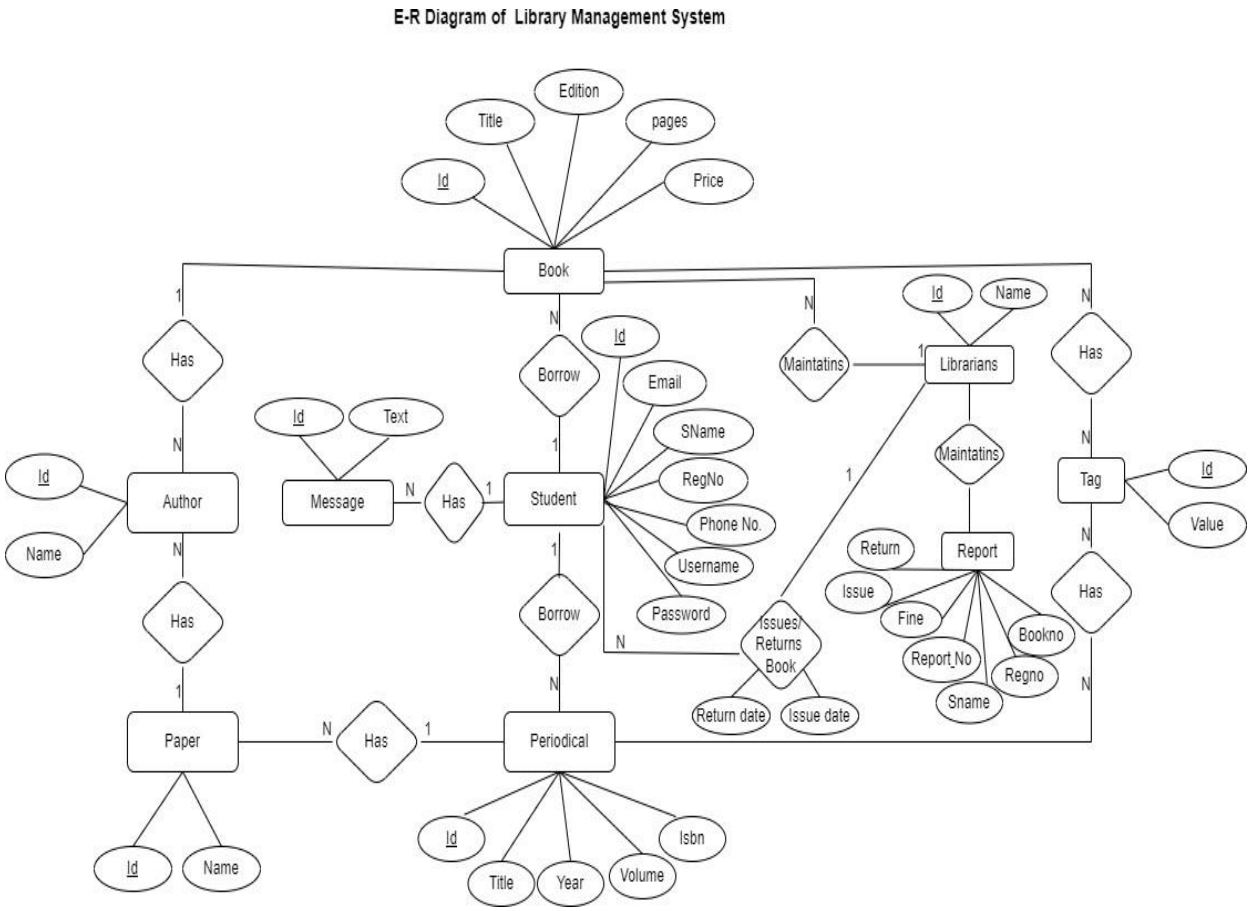
6. **Provide Offer**
Librarians provide offers on some specific books.

7. **View Recommendation**
Librarians can see the recommended books list from the users.

8. **Book item availability**
Librarians can see stock details and based on that can update in the status.

2.2 UML Diagrams

2.2.1 ER Diagram



The system keeps track of the staff with a single point authentication system comprising login Id and password.

Librarian maintains the report with the report_no and other attributes as shown in ERD.

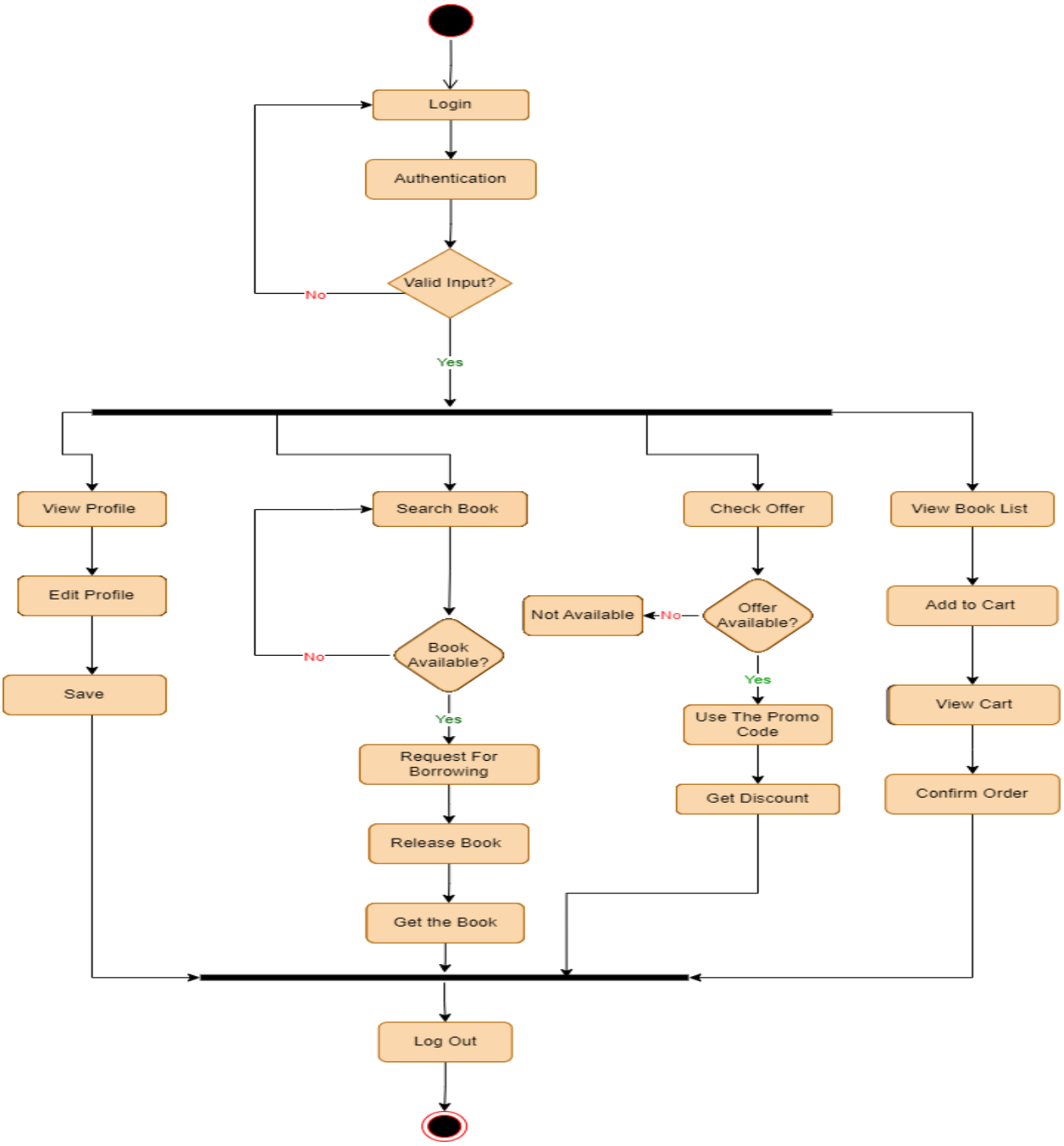
An author has author Id, name, paper id and paper name.

Students are registered with their student_id, email, name, Phone no (multiple entries allowed). The librarian keeps track of students.

Students can borrow books that stamps with issue date and return date.

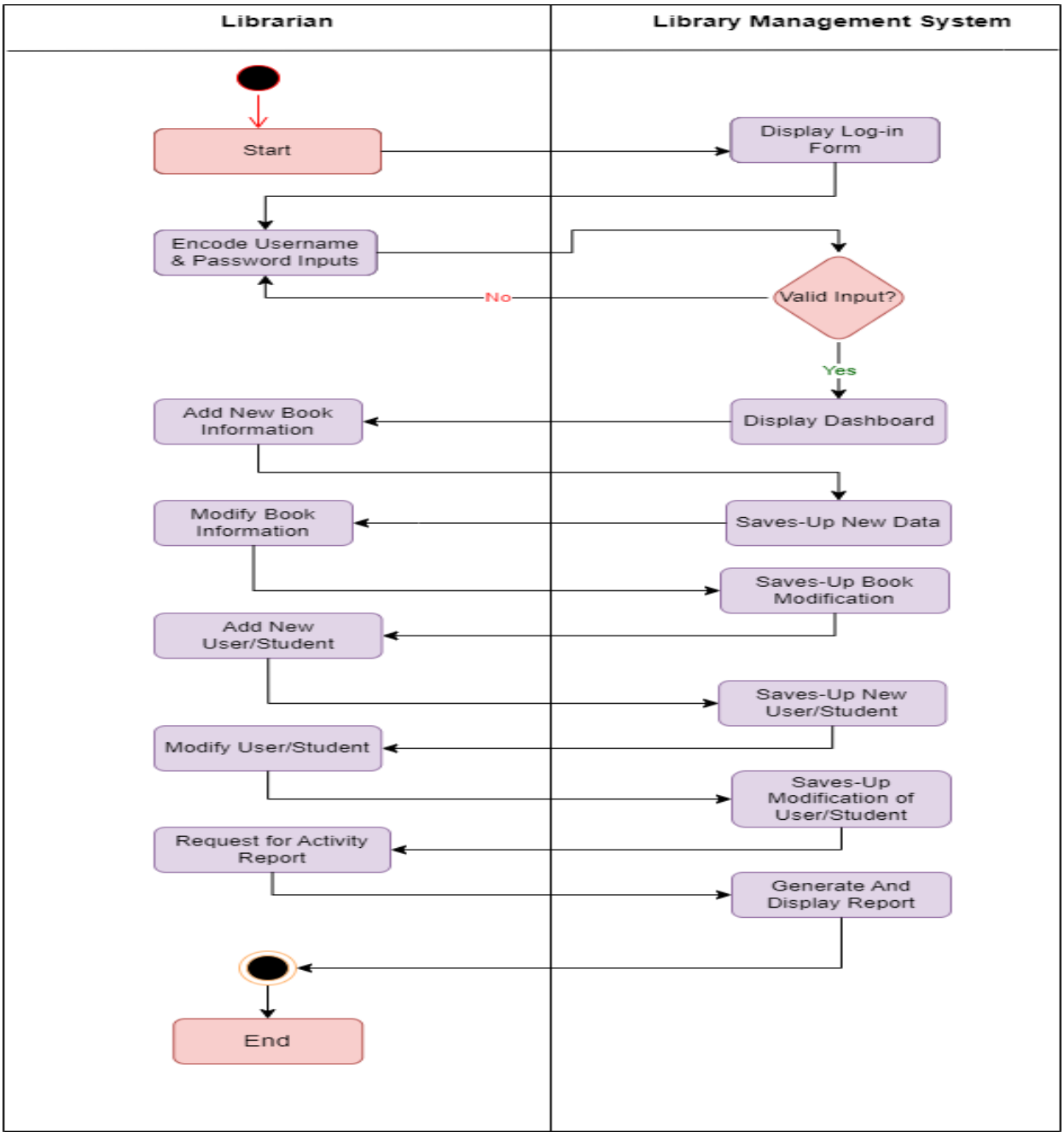
Librarian also generate reports that has students id, registration no of report, book no and return/issue info.

2.2.2 Activity Diagram of User



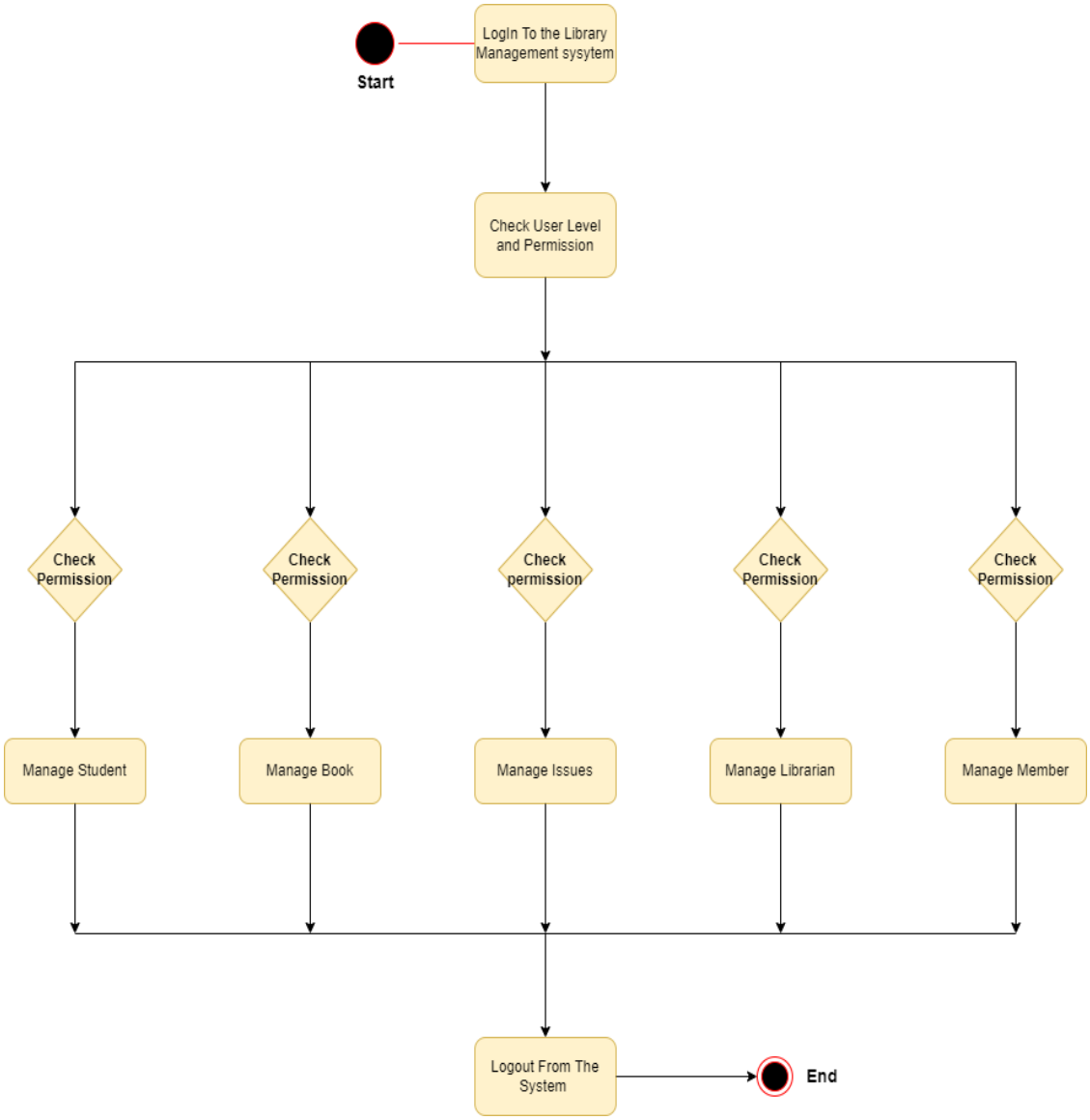
This is the User Activity Diagram of Library Management System, which shows the flows of Login Activity, where user will be able to login using their username and password. After successful login, user can view the profile, search book check offer and view the book list.. The diagram demonstrates how the activity of student page works in a Library Management System. The various objects in the Address, Issues, Librarian, Student, and Books page-interact over the course of the Activity, and user will not be able to access this page without verifying their identity.

2.2.3 Activity Diagram of Librarian



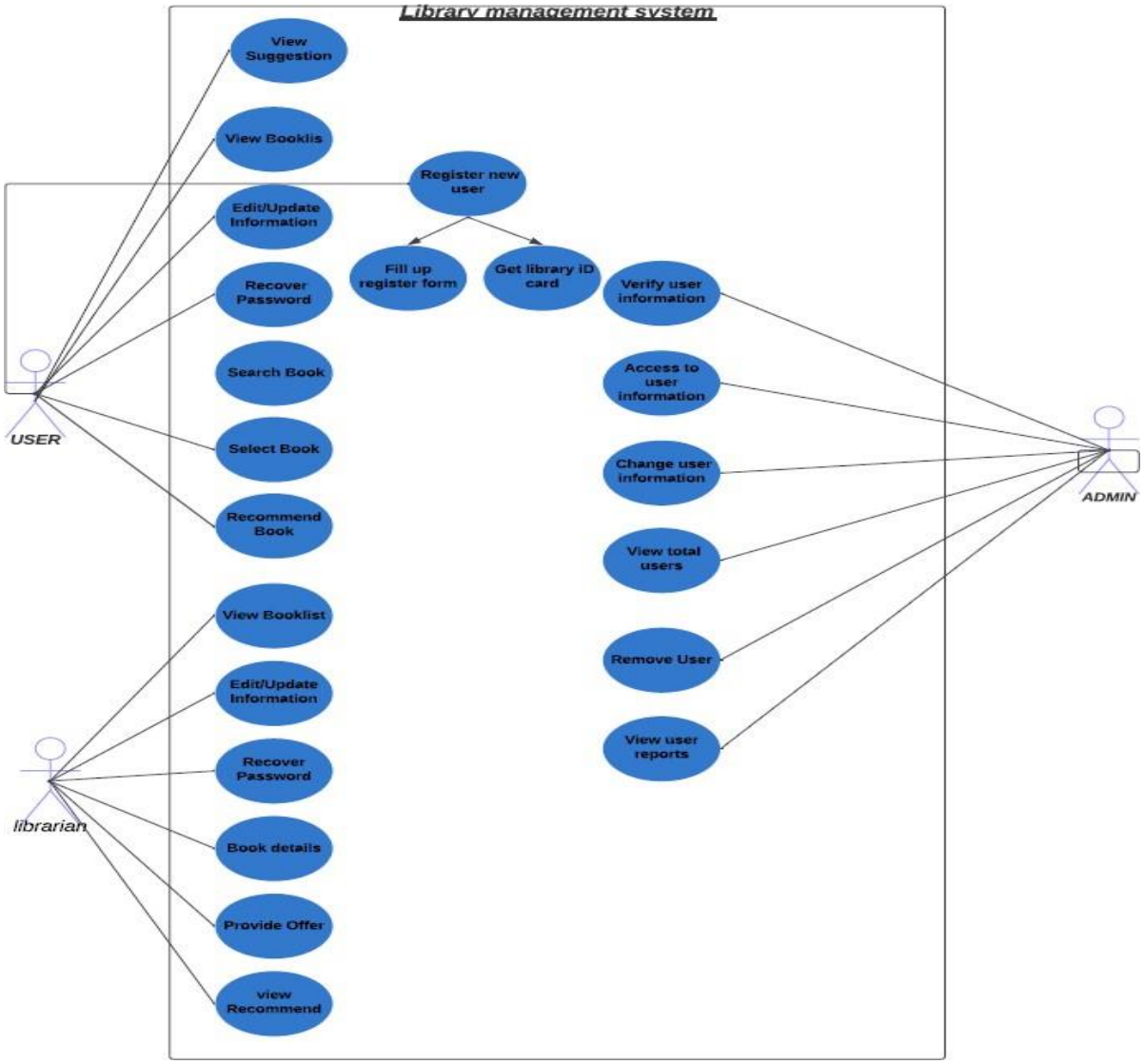
This is the Librarian Activity Diagram of Library Management System, where librarian able to access to pages through using their username and password. After login Librarian, who can add Book, modify the book information, add new student, generate the report and can make the issue late fine to the student.

2.2.4 Activity Diagram of Admin



This is the Login Activity Diagram of Library Management System, which shows the flows of Login Activity, where admin will be able to login using their username and password. After login Admin can manage all the operations on Issues, Librarian, Student, Address, Books. All the pages such as Student, Address, Books are secure, and user can access this page after login.

2.2.5 Use Case Diagram



User who registers himself as a new user initially is regarded as student for the library system. For the user to get registered as a new user, registration forms are available that is needed to be fulfilled by the user. After registration, a library card is issued to the user by the librarian. On the library card, an ID is assigned to the user. After getting the library card, users can have the following options: view suggestion, view booklist, edit information, recover password, search book, select book and recommend book. When a new book is selected, the requested book is reserved by the user that means no other user can request for that book. The user can search for books in the system, and view information about them. Moreover, users can edit information

Librarian has a key role in this system. Librarian can view information about specific books, including details such as the book's title, author, and summary. Librarian can view booklist where it shows the status of requests for books, including when the book is expected to be available for checkout. Moreover, they can provide offer including discounts and vouchers. Librarian also gave the feature to edit information.

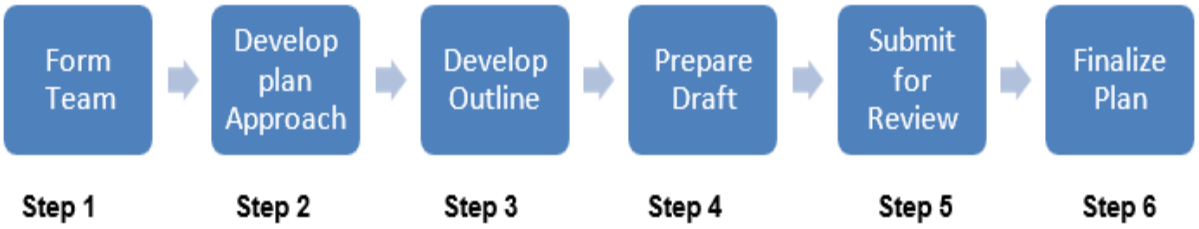
An **admin** would be responsible for verifying user accounts in the system. They can user information and modify them. An admin can view the total registered users in the system and has the access to remove the. An admin would be responsible for viewing user reports, such as the number of books borrowed, the number of overdue books, and the amount of discount received.

3. Social Impact

The project will create a great impact as soon as it gets implemented. It will solve the problem of a library managing manual system to a modern system. The system allows everyone to see the booklist and quantity of books in the library. It will be beneficial for users to use a self-centered system while discovering their desired books. It makes everyone's life easier to get the modern services of a library.

4. Development Plan with Project Schedule

4.1 Development Plan



There are six steps associated with the development of an SDP. These six steps are:

Step 1: Form Team: Gather the subject matter experts you will need to develop the SDP.

Step 2: Develop Plan Approach: Figure out how you are going to write the plan and who is responsible for each section.

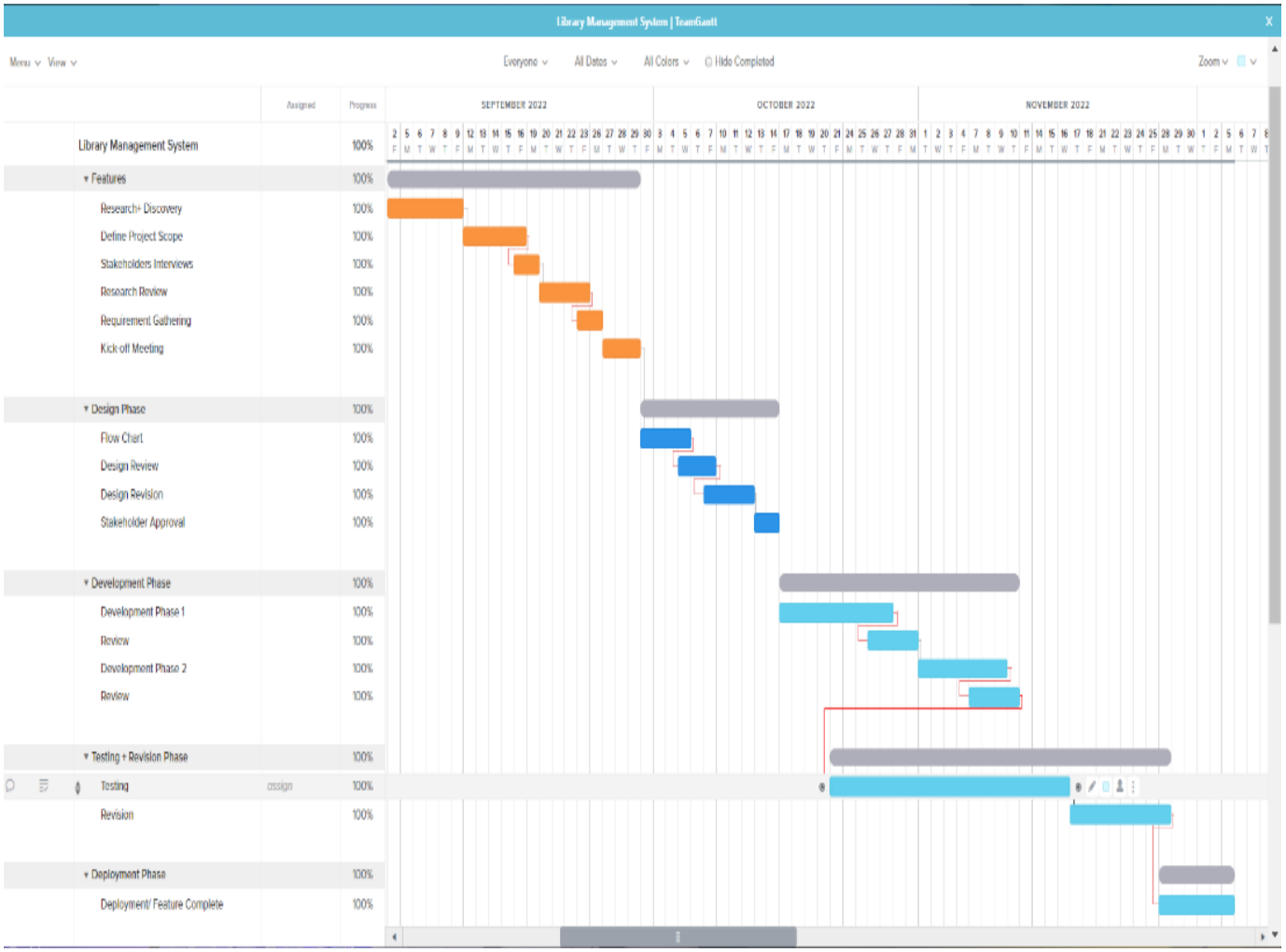
Step 3: Develop Outline: Start with an outline or a template. This step needs to ensure all required information is addressed in the SDP.

Step 4: Prepare Draft: Write the first draft of the SDP.

Step 5: Submit for Review: Submit the first draft to all team members that will utilize the plan for their feedback.

Step 6: Finalize SDP: Submit the final SDP to the team.

4.2 Project Schedule



Project Schedule

5. Marketing Plan

Initially, we can advertise more and more using the University's official website where all the features would provide through videos and images so that we can reach the targeted audiences. In addition, we can keep the option for some discount/incentives for new users for a specific amount of time and also we can give incentives for inviting new users through reference and for their usage of the website. Email marketing is a surefire way to directly reach many of your patrons when they're not in the library. That's how the website will get more users and more usage of the site. The incentive-giving plan can be the initial plan before we get a good amount of users. So many other occasional offers can make attract the users more to use the website. AUGMENTED REALITY, ARTIFICIAL INTELLIGENCE, and BLOCKCHAIN TECHNOLOGY, 3D PRINTERS, ROBOT, DRONES AND MOBILE APPS are just a few of the emerging technologies that can be used in libraries. Technology is a great way to create new and interesting services for the public at a time where the libraries have to adapt to the constantly changing needs of the users.

6. Cost and Profit Analysis

6.1 Effort Estimation

Our project is to develop an application named "Online Doctor Services".
Software project type: Organic
Coefficient<Effort Factor> = 2.4
So, **P** = 1.05 and **T** = 0.38
SLOC = 2000 Lines

Persons-months, PM = Coefficient<Effort Factor> * (SLOC/1000) ^P
= 2.4 * (2000/1000) ^1.05
= 4.96

Development time, DM = 2.50 * (PM)^T
= 2.50 * (4.96) ^0.38
= 4.29 = 4 months
= 4*4 = 16 weeks
= (16*5*8) = 680 Working hours

Required number of people, ST = PM/DM
= 4.96/4
= 1.24 = 2 people

Development Time = 3 Months Required

6.2 Budget & Profit Estimation

Employee's salary is = 1200 Taka
Total Salary = (1200*680) Taka
= 768000 Taka

Expense	Amount	Total Amount
Salary for 4 employees		768000 Taka
3 months' office rent	3*15000	45000 Taka
Electricity and other costs	3*5000	15000 Taka
3 months' Maintenance cost	3*4*5000	60000 Taka
Travel Cost	3*10000	30000 Taka
Total Cost		918000 Taka
25% of the total cost(profit)		229500 Taka

Reference

1. Software Requirement Engineering PowerPoint slide
2. PM Tool (TRELLO): https://trello.com/b/DoruEan7/library-management-sytem
3. Draw.io: https://app.diagrams.net/
4. Lucid Chart: https://app.diagrams.net/