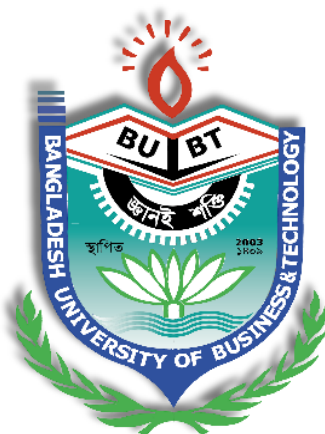# SYSTEM ANALYSIS AND DESIGN OF LIBRARY MANAGEMENT SYSTEM

PROJECT REPORT

BUBT | Bangladesh University of Business and Technology

Department of Computer Science and Engineering

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CHAPTER-01

System Overview

1.1 Introduction

System Name: BUBT Library Management System (LMS)

Organization Name: Bangladesh University of Business and Technology

Organization Type: Education

Bangladesh University of Business and Technology Library is the heart of the University. It always helps the Students / Faculty members / Scholars to get more information. It takes care of its users to build up the power of knowledge. The Library Management System Application keeps track of all the information about the books in the library, their cost, their complete details, and the total number of books available in the Library. As an academic library, it preserves Books, Journals, and Audio-visual materials on the course curriculum of the University. It also preserves more relevant Books, Journals, Reference books, Seminar papers, Reports, Newspaper clippings, and other Non-books materials; which assist to fulfill the academic needs of the users. The user will find it easy in this automated system rather than using the manual writing system. The system contains a database where all the information will be stored safely. The system is user-friendly and error-free.

1.2 Reason For Choosing LMS

The reason to choose Library Management System is that it has fulfill the maximum point of view of system analysis and design. Library Management System organizes and saves books' information electronically to meet the needs of students. Both students and library managers benefit from the system, which allows them to keep track of all of the books available in the library at all times. It allows both the administrator and the student to look for the book they want. Universities must now keep a constant eye on the books they issue and return, as well as the transaction records. If this operation is completed manually, it will be time-consuming and prone to errors. Enabling the system to maintain track of information including the date or borrowing, the date or book return, and even detailed book information eliminates the manual recording of this information and most importantly it reduced the risk of errors. As a result, this method greatly lowers manual effort and allows for a seamless flow of library activities by eliminating the possibility of errors in the details.

CHAPTER-02

Analysis of the System

2.1 Organizational Hierarchy of Library Management System
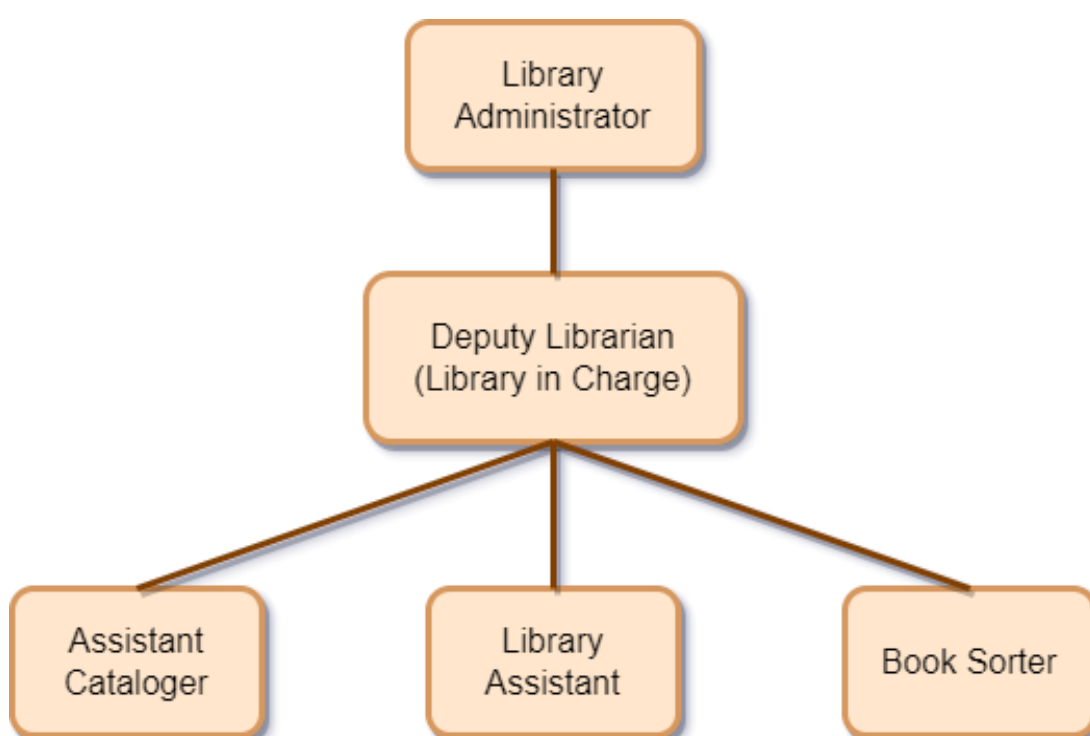
Figure: Organizational Hierarchy of Library Management System

The librarian or library administrator is responsible for the management of the Bangladesh University of Business and Technology (BUBT) Library services, reporting to the University Executive. Under the overall direction of the librarian or library administrator, it is the responsibility of library staff to provide appropriate services and safeguard the library and its contents.

2.2 Management Information

2.2.1 Strategic Information:

- Whether to make an android/IO-based LMS app.
- Methods of financing for maintaining the system.
- Takes decisions based on various planning and observations.

2.2.2 Tactical Information:

- Measure performance of the current system to check if it's working smoothly or not.
- Adding new features to the system.
- Find out the best plan from operational reports.
- Making decisions in emergency conditions.
- Update books lists.

### 2.2.3 Operational Information:

- Student registration
- Book return
- New Book issue
- Keeping records of each book.
- Generate reports.
- Handle requests for internal systems and software.

2.3 Brief Description of Data Flow Diagram

A data flow diagram shows the way information flows through a process or system. It includes data inputs and outputs, data stores, and the various subprocesses the data moves through. Here we briefly narrate the data flow diagram of the organization we working with.

2.3.1 Context Flow Diagram of Library Management System

Context data flow diagram (CFD) is the summarized overview of the whole system. It helps to understand the details and boundaries of the system to be designed in a project. CFD points out the flow of information between the system and external components.
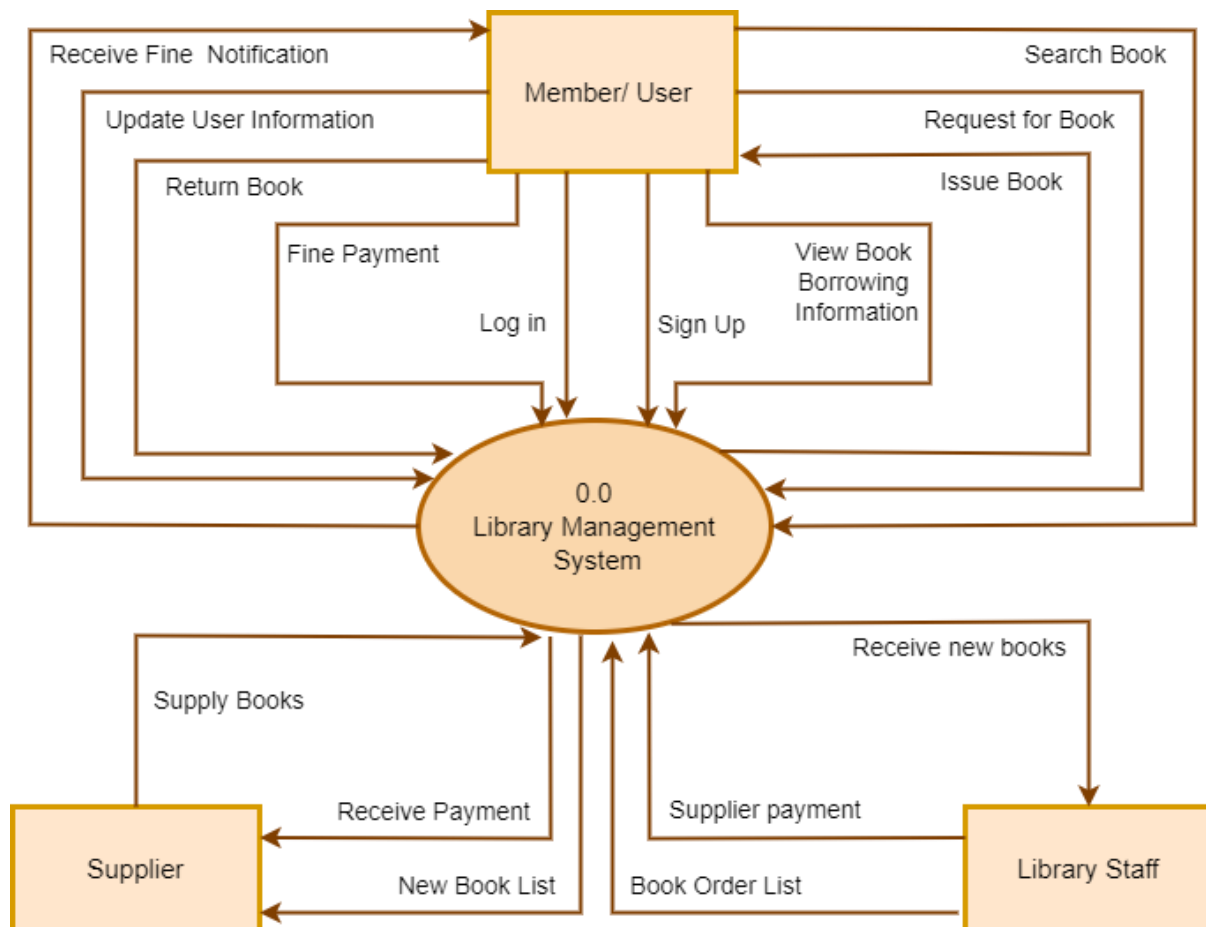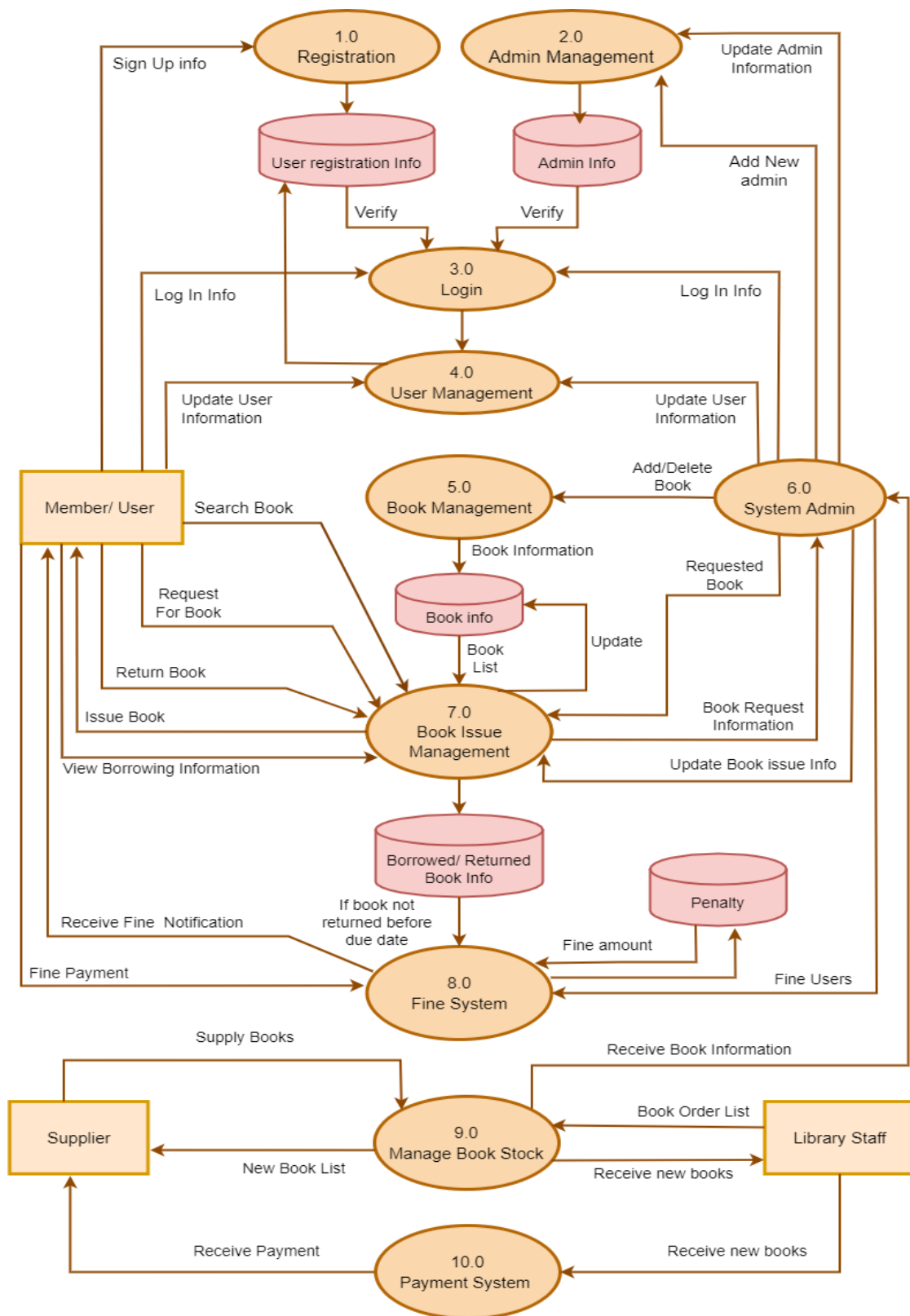

Figure: Context Flow Diagram of Library Management System

This is the CFD of the Library Management System. It has four entities Member/user, System Admin, Supplier, Library Staff.

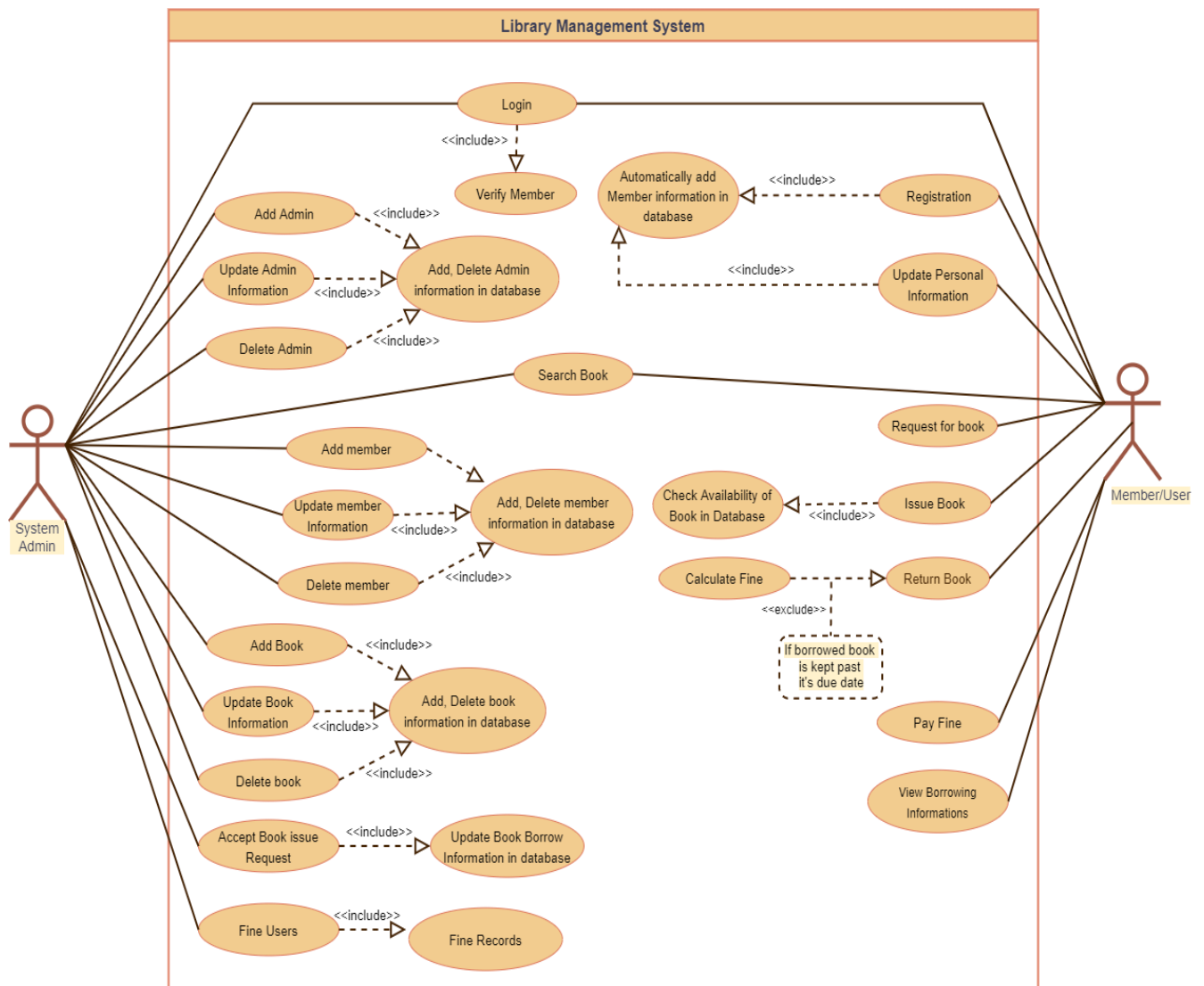## 2.3.2 Data Flow Diagram of Library Management System

Figure: Data Flow Diagram of Library Management System

The DFD contains 3 entities and a total of 10 processes. It shows the data flow of the entire system like how the admin is managing students, admin members, books, and the fine system. Also, how a member is accessing all the features in the system has been portrayed here. Library System Management DFD makes it easier to understand the whole flow of the system and gives a clear vision of how a system is working.

2.4 Brief Description of Use Case Diagram

A use case diagram is a graphical depiction of a user's possible interactions with a system. A use case diagram shows various use cases and different types of users the system has and will often be accompanied by other types of diagrams as well. Use case diagrams are used to gather the requirements of a system including internal and external influences. These requirements are mostly design requirements. Hence, when a system is analyzed to gather its functionalities, use cases are prepared and actors are identified.

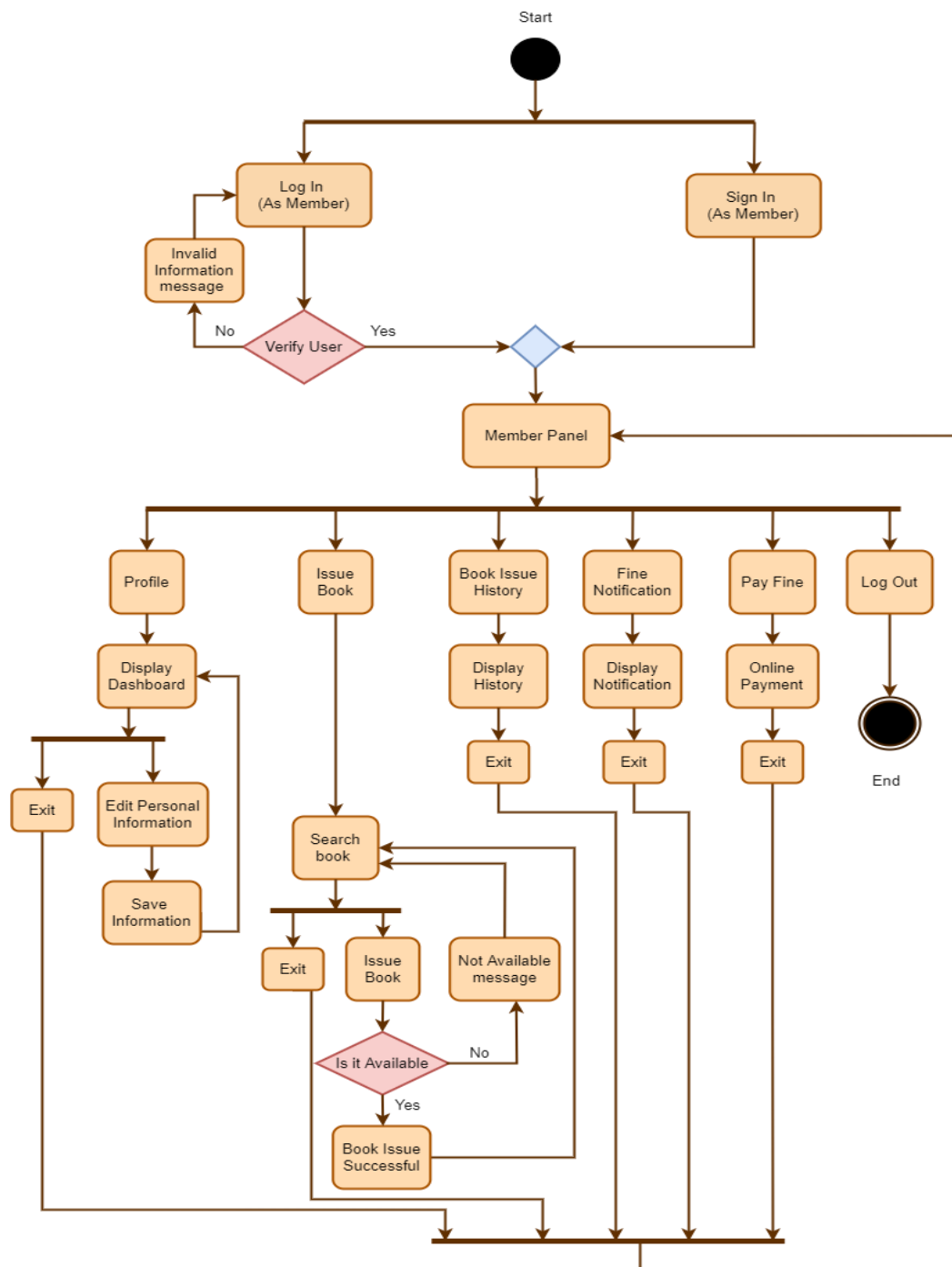## 2.4.1 Use Case Diagram of Library Management System

Figure: Use Case Diagram of Library Management System

2.5 Brief Description of Activity Diagram

An activity diagram is a behavioral diagram. it depicts the behavior of a system. An activity diagram portrays the control flow from a start point to a finish point showing the various decision paths that exist while the activity is being executed. Activity Diagrams describe how activities are coordinated to provide a service that can be at different levels of abstraction. Typically, an event needs to be achieved by some operations, particularly where the operation is intended

to achieve several different things that require coordination, or how the events in a single-use case relate to one another, in particular, use cases where activities may overlap and require coordination.

2.5.1 Activity Diagram of Library Management System

Figure: Activity Diagram of Library Management System

This activity diagram gives an abstract view of the library management system. The diagram shows the system has various paths for different decisions a user can make. It gives an abstract view of how the works are being executed in the system.

2.6 Limitations of Library Management System

The computer viruses, lack of standardization for digitized information, quick degrading properties of digitized material, different display standard of digital product and their associated problem, hazardous nature of the radiation from the monitor, etc. makes digital libraries sometimes handicapped.

- ➤ **File loss:** When a computerized system is not implemented file is always lost because of the human environment. Sometimes due to some human error, there may be a loss of records.

- ➤ **Space consuming:** After the number of records become large the space for physical storage of file and records also increase if no computerized system is implemented.

- ➤ **Speed of access:** As more and more computers are connected to the website speed of access reasonably decreases. If new technology won't evolve to unravel the matter then soon the Internet is going to be filled with error messages.

- ➤ **Cyber Hacks:** If the system security is not good enough then there are chances of cyber hacking. This can cause data damage and unauthorized exploitation of user information.

- ➤ **Cost consuming:** As there is no computerized system to add each recording paper will be needed which will increase the cost for the management of the library.

2.7 Screenshots of Library Management System

2.7.1 Sign Up Page
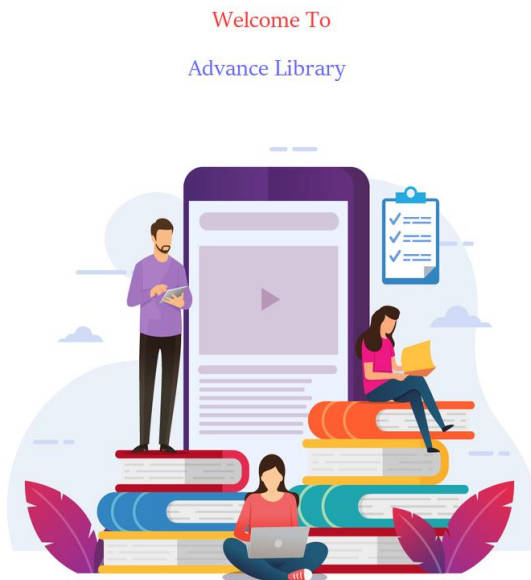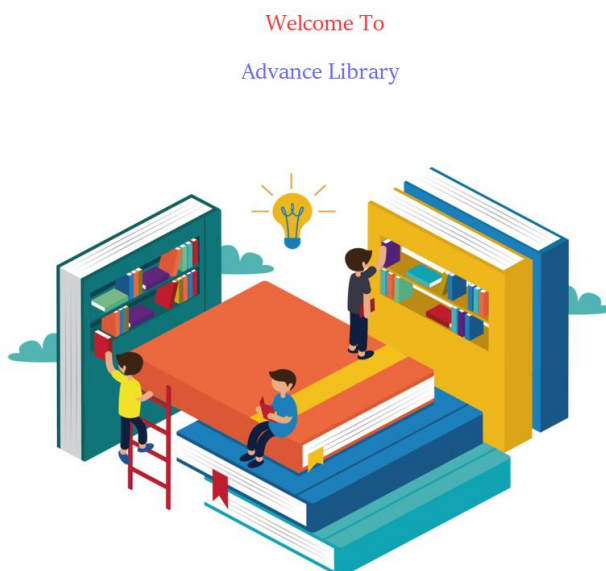
2.7.2 Login Page

2.7.3 Dashboard
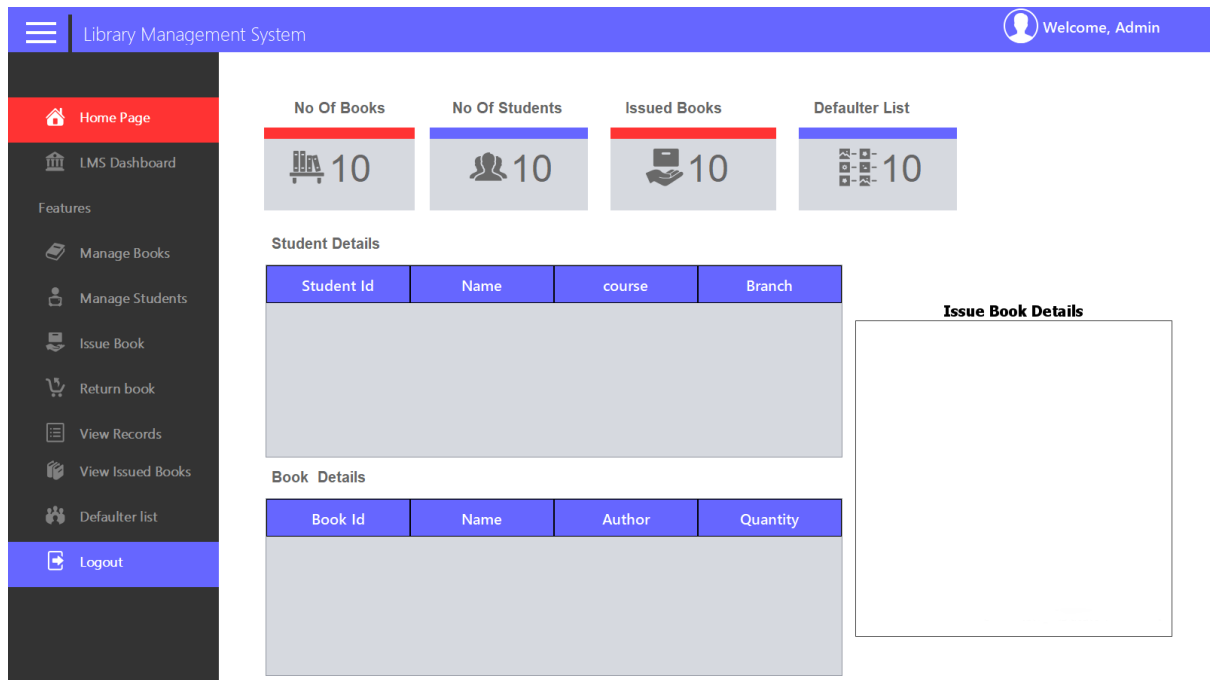
2.7.4 Issue Book

2.7.5 Manage Book

◀◀ Back

X
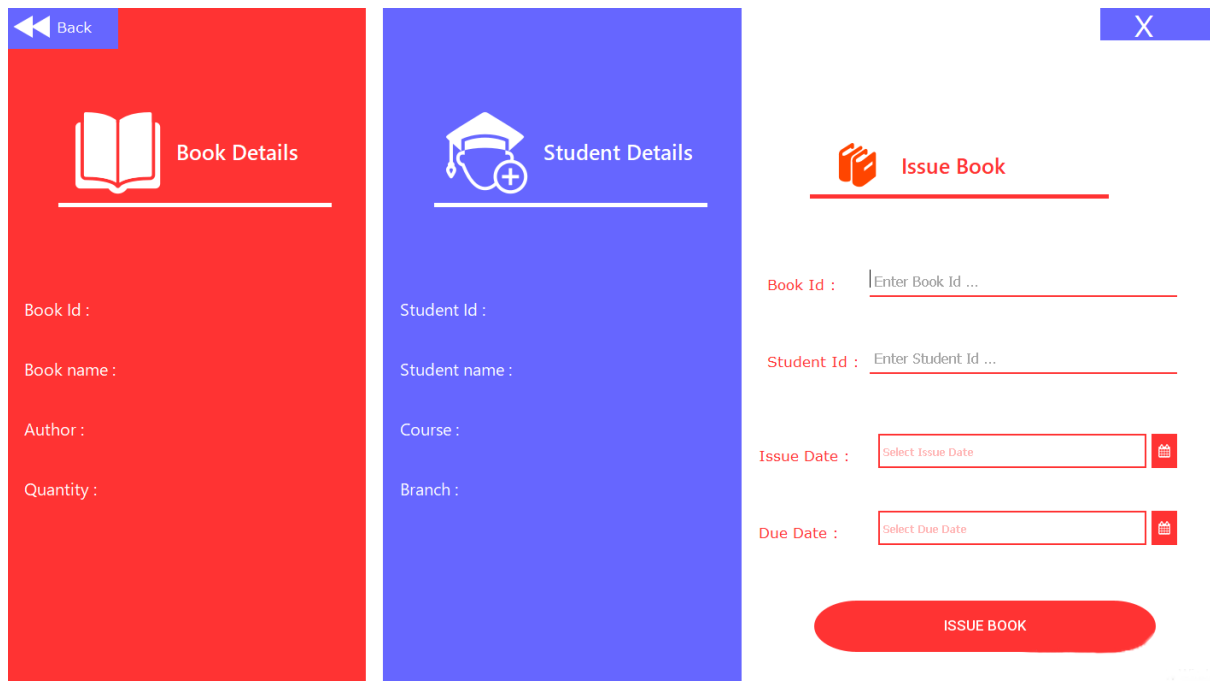
Manage Books

Enter Book Id

Enter Book Id ...

Enter Book Name :

Enter Book Name : ...

Author Name

Author Name ...

Quantity

Quantity ...

ADD   UPDATE   DELETE

Book Id	Name	Author	Quantity

2.7.6 Manage Students

◀◀ Back

X

Manage Students

Enter Student Id

Enter Student Id ...

Enter Student Name :

Enter Student Name : ...

Select Course

BSC ▼

Select Branch

IT ▼

ADD   UPDATE   DELETE

Student Id	Name	Course	Branch

2.7.7 Return Book

Back

X

Book Details

Return Book

Issue Id :

Book name :

Student Name :

Issue Date :

Due Date :

Book Id : Enter Book Id ...

Student Id : Enter Student Id ...

FIND

RETURN BOOK

2.7.8 Issued Book Details

Back

X

Issued Book Details

Id	Book Name	Student Name	Issue Date	Due Date	Status

2.7.9 All Records

Id	Book Name	Student Name	Issue Date	Due Date	Status

CHAPTER-03
Alternative Proposals

3.1 Solution A

- Making a system review feature where members can file their complaints or give their review on the library management system.

- Taking responsive action on user complaints and solving them as soon as possible.

- The attention of fines that are unpaid by users and increase the fines with each passing day if they are unpaid.

- Book sorted by a different department in the library

- Making proper user guidelines of the system for making it easier for users to access every feature.

3.2 Solution B

- Adding research paper, educational audio, and videos to the library management system along with regular books.

- Adding audio search in the library management system along with the type system.

- Adding different online fine paying methods.

- Online help service from a volunteer through chat.

- Book sorted by catalog system in the library.

- New book suggestion by genre choice of the user in the system.

CHAPTER-04

Feasibility Analysis

4.1 Feasibility Study

The goal of the feasibility study is to identify the operational, technical and economic, and environmental benefits of the proposed project "Library Management System". During the feasibility study, the focus is on determining the user needs, studying the application area in depth, assessing the strengths and weaknesses of the present work method, and reporting results to authority.

The major objective of the application is to provide users desired service. The new system may change from moving a hardcopy, report-based environment to a screen-display environment, new types of information, in different formats, are required.

4.2 Feasibility Analysis of Solution A

4.2.1 Technical Feasibility

❖ The technology needed to implement this solution is available.
❖ Proper user guideline about the system is available.
❖ A fine calculation system is added.

4.2.2 Operational Feasibility

❖ It requires less manpower to fit in the current system.
❖ Experienced employees can handle any situation better.
❖ The system is user-friendly and is easy to use.

4.1.3 Economic Feasibility

Serial No.	Topic	Proposed System
01	Server Cost	90,000 Tk
02	System Maintainance	40,000 Tk
03	No. of stuff	30(minimum)
04	Stuff Salary (Per Year)	4,50,000 Tk
05	Book Collection	1,10,500 Tk
06	Utility Service (Per Year)	35,000 Tk
07	Library Maintainace	65,000 Tk
Total Cost		7,32,500 Tk

Initial cost of the Project = 9,50,000 Tk

Total Cost   = (9,50,000 + 7,32,500) Tk

         = 16,82,500 Tk

Total Income = 23,50,000 Tk (Per Year)

Total Benefit = (23,50,000 – 16,82,500) Tk

         = 6,67,500Tk (Per Year)

4.3 Payback Period for Solution A

Payback Period = Total Cost / Benefit per year

Payback Period = (16,82,500 / 6,67,500) year

        = 2 years 5 months (approx.)

4.4 Feasibility Analysis of Solution B

4.4.1 Technical Feasibility

- ❖ The space, time needed to implement this solution is available.
- ❖ Implementation of a total server system is more costly but effective.
- ❖ The technology needed can be implemented however It will be more costly.

4.4.2 Operational Feasibility

- ❖ It requires more manpower to fit in the current system.
- ❖ More skilled employees are required.
- ❖ Internal technical system management is more reliable.

4.4.3 Economic Feasibility

Serial No.	Topic	Proposed System
01	Server Cost	1,05,000Tk
02	System Maintainance	70,000 Tk
03	No. of stuff	40(minimum)
04	Stuff Salary (Per Year)	6,50,000 Tk
05	Book Collection	1,10,500 Tk
06	Research paper, Audio and Video Collection cost	55,000 Tk
07	Utility Service (Per Year)	45,000 Tk
08	Library Maintainace	65,000 Tk
Total Cost		11,00,500 Tk

Initial cost of the Project = 10,50,000 Tk

Total Cost   = (10,50,000 + 11,00,500) Tk

             = 21,50,500 Tk

Total Income = 23,50,000 Tk (Per Year)

Total Benefit = (23,50,000 – 21,50,500) Tk

             = 1,99,500Tk (Per Year)

4.5 Payback Period for Solution B

Payback Period = Total Cost / Benefit per year

Payback Period = (21,50,500 / 1,99,500) year

       = 10 years 7 months (approx.)

By studying the proposal, cost-benefit, payback period, and comparison table of all two solutions we see that solution A will be better than Solution B. Because B has more payback period even though it's more efficient. As the income of the organization hasn't increased therefore implementing solution B can be costlier and will bring more financial challenges for the organization. Therefore, solution A more efficient and cost-effective for the organization for now.

CHAPTER-05

Limitations and Conclusion

5.1 Limitations

In the existing system we have many problems, such that they are time-consuming, needed a lot of manpower, maintainability is so complex.

• We have missed some points in our feasibility analysis hence our payback period for given solutions is not hundred percent accurate.

• Although our proposed system seems to be effective practically it requires more maintenance and is also costlier.

• As we got a very short time to analyze, it is possible that our analysis could have some wrong in the non-critical part.

• We couldn't give the proper solution of the UML diagram due to a lack of our experience.

5.2 Conclusion

In this report, we have studied various tools used to design an improved system. The tools are primarily intended to assist system design. The system design process itself is quite involved and requires, besides the knowledge of tools, sound commonsense, and judgment to decide the level of detail to which the design effort should proceed. We tried to do our best work. Though we have a few limitations we believe that the system we proposed can bring benefits to this organization. Finally, we also tried to gather a few experiences from our work.