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**“Library Management System “**

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## **ACKNOWLEDGEMENT**

Praise be to God, and prayers and peace be upon our master Muhammad. As for what follows:

The search nights went through many obstacles, but we tried to overcome them with firmness and the grace of God.

To our families and friends, they were such support towards ending our search.

To our doctors and our university, who did not hesitate to provide us with any valuable information.

We dedicate this research to you, and we ask God that you like it.

## ABSTRACT

The library management system is a project that intends to create a computerized system to handle all of the library's everyday operations.

This project has a number of capabilities that are not typically seen in traditional library management systems, such as the ability to login as a user and the ability to log in as an administrator.

It also contains an admin login feature, which allows the administrator to keep track of the entire system.

It also features an online notice board where Admin can post information about workshops or seminars being held in our institutions or nearby colleges, and librarians can add it to the notice board following proper verification from the respective institution conducting the seminar.

It also offers a feature that allows students to see a list of books issued, as well as their issue and return dates, after login into their accounts. Students can also request that the library add additional books by filling out a book request form.

After logging into his is admin account, the librarian can generate a variety of reports, including student reports, issue reports, and book reports.

Overall, this project is being designed to assist students and library staff in maintaining the library in the most efficient manner possible while also reducing human labor.

## ***INTRODUCTION***

A college library management is a project that manages and stores books information electronically according to student's needs.

The system helps both students and library manager to keep a constant track of all the books available in the library.

It allows both the admin and the student to search for the desired book. It becomes necessary for colleges to keep a continuous check on the books issued and returned and even calculate fine. This task if carried out manually will be tedious and includes chances of mistakes.

These errors are avoided by allowing the system to keep track of information such as issue date, last date to return the book and even fine information and thus there is no need to keep manual track of this information which thereby avoids chances of mistakes.

Thus this system reduces manual work to a great extent allows smooth flow of library activities by removing chances of errors in the details

## 1.1 PROBLEM STATEMENT

Problems faced by libraries before there was a computerized system:

- ❖ Loss of palpable files

If there is no computerized system file loss due to some human error

- ❖ damaged of palpable files

In the absence of a computerized system, files are always lost due to accidental spillage of water or coffee on the files, or due to collapse or destruction of the place such as fires.

- ❖ Difficult to search record

In the absence of a computerized system, it is difficult to search for a specific file among large numbers of files

- ❖ take up more space

Increasing the number of tangible files leads to an increase in space consumption, so these files are preserved

- ❖ Cost consuming As

In the absence of a computerized system, we need pens, papers, files and other tools. And all this requires a lot of costs

## 1.2 OBJECTIVES

- a. Setting the time in terms of borrowing and not waiting too long
- b. Library services development (search, add...)
- c. The shift from traditional management control to electronic management
- d. Speed and accuracy in procedures based on technology in this field
- e. Allow subscribers to access their data

## 1.3 THE TARGET GROUPS OF THE PROJECT

In our project, we target the category of workers and employees in libraries.  
We also support university students and graduates to help them in research and projects  
And also doctors and employees of scientific companies who constantly need scientific research

### PRELIMINARY LITERATURE REVIEW

(Al Shawabkeh 2009)

Mention In his study (Libraries and the Movement of Free Access to Information), the aim of the study is to enable researchers to access information without any financial and cost restrictions.

And that is through the introduction of technology, modern devices and the Internet, and this leads to reduced budgets, but it leads to an increase in maintenance and development costs.

(Harris 2007)

In his studies, he expected that the change in libraries would elevate them to become a café for culture.

His study aimed to identify the models of change that managers follow to keep pace with the era of change.

(Colhoun 2003)

(Change in libraries and technology services)

Focusing on the role of technology in change to increase the productivity of services, and thus the use of various technology applications, and Cornell University took a place for application.

(Carolyn 2001)

focused in his study on technology with the aim of studying how technological change in their work environment, and the role of management in following stable and encouraging behaviors and practices so that workers move to the technology stage without any difficulties.

( David, 1998)

In his study “Management of Adopting Modern Technology in Libraries” agreed with the study of (Colhoun 200) and the study of Carolyn (2001), which aimed to identify how to manage technological change in libraries in general, with a focus on the study of Pre-change stages, through a case study of resistance to technological change prior to implementing the required technology projects

Starting with library workers and localizing them, With a focus on the model of psychological factors and the structure of the human personality that makes it

Reluctance to accept change,

The research model was studied between two groups of libraries, and it was noted that the workers in the first group ( Lowest university libraries (they have higher levels of acceptance of technology change than specialist libraries, and their staff have shown higher acceptance rates of technology change than specialist libraries) It is mediocre in acceptance of changes in general, with poor vision of change and apparent resistance of its administrations to formulating a change policy in Searched Libraries.

Through previous studies, the researcher found great importance for interaction with change in terms of similarities and differences between this study

And previous studies, this study agreed with its predecessors to a large extent on the importance of change and adaptation to it, and what distinguishes this study from

Previous studies focused on managing public libraries in the era of change from the point of view of the managers themselves, and in terms of benefiting from them.

The researcher benefited from previous studies, and benefited from them in choosing the appropriate method, tool, references and sources for the subject of the study.



## CHAPTER 3:

### 3.1 METHODOLOGY (PROCESS MODEL)

We want to use the reuse-oriented model, also called reuse-oriented development (ROD), is a method of software development in which a program is refined by producing a sequence of prototypes called models, each of which is automatically derived from the preceding one according to a sequence of defined rules.

The reuse-oriented model can reduce the overall cost of software development compared with more tedious manual methods. It can also save time because each phase of the process builds on the previous phase which has already been refined. When carefully carried out, ROD can minimize the likelihood of errors or bugs making their way into the final product.

#### About Reuse Oriented Model

Reuse Oriented Model (ROM), also known as reuse-oriented development (ROD), it can be steps of the software development for specific duration in which software is redesigned through creating a sequence of prototypes known as models, every system is derived from the previous one with constant series of defined rules.

The reuse-oriented model isn't always sensible in its pure form due to cause of an entire repertoire of reusable additives that might not be available. In such cases, several new system components need to be designed. If it is not done, ROM has to compromise in perceived requirements, leading to a product that does not meet exact requirements of user. This model depends upon perception that maintenance might be viewed as a pastime involving reuse of existing system components.

The reuse model has 4 fundamental steps which are followed:

To identify components of old system that are most suitable for reuse.

To understand all system components.

To modify old system components to achieve new requirements.

To integrate all of modified parts into new system.

A specific framework is required for categorization of components and consequently required modification. The complete reuse version may begin from any segment of the existence cycle – need, planning, code, design, or analyze data – not like other models.

#### Advantages:

It can reduce total cost of software development.

The risk factor is very low.

It can save lots of time and effort.

It is very efficient in nature.

#### Disadvantages:

Reuse-oriented model is not always worked as a practice in its true form.

Compromises in requirements may lead to a system that does not fulfill requirement of user.

Sometimes using old system component, that is not compatible with new version of component, this may lead to an impact on system evolution.

## 3.2 REQUERMENTS

### NON FUNCTIONAL REQUIREMENTS

#### Product Requirements

- **Security:**

The system has a login page and sign up to create account and login for the system and Password must be at least 10 characters and the password save as a hidden field in database

- **Usability:**

The system shall allow the users to access the system from the Internet using HTML orit's derivative technologies like XML/CSS. The system uses a web browser as an interface. Since all users are familiar with the general usage of browsers, no special training is required. The system is user friendly and online help makes using the system easy and also the product will support English language.

- **Availability:**

The system is available 100% for the user and is used 24 hours in a day and 365days a year. The system shall be operational 24 hours a day and 7 days a week.

- **Efficiency:**

Mean Time to Repair (MTTR) –Even if the system fails, the system will be recovered back up within 2 minutes or less.

- **Accuracy:**

The system should accurately provide real time information taking into consideration various concurrency issues. The system shall provide 100% access reliability.

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- **Performance:**

1. Response Time The respond time to a user should be within one to two seconds from the request time.

2. Throughput The LBMS shall enable many users to access it concurrently. The volume of transactions will depend directly on the number of users.

- **Accuracy:**

The LBMS accuracy is determined by the speed of use executed by its users

- **Portability:**

The LBMS has been developed and coded using PHP scripts. These scripts run on a Windows environment via the WampServer. The codes can be moved from this environment to other platforms like UNIX and Mac OS supporting other servers like IIS, Apache with PHP scripts and ODBC modules installed.

## FUNCTIONAL REQUIREMENTS

### ❖ USER LOGIN:

#### Description of feature

This feature used by the user to login into system. They are required to enter username and password before they are allowed to enter the system. The user id and password will be verified and if invalid user name is there user is allowed to not enter the system, and it decide if the you are an admin or user.

#### Functional requirements

- user name is provided when they register.
- The system must only allow user with valid username and password to enter the system.
- The system performs authorization process which decides what user level can access to.
- The user must be able to logout after they finished using system.

### ❖ REGISTER NEW USER

#### Description of feature

This feature can be performed by all users to register new user to create account.

#### Functional requirements

- System must be able to verify information
- System must be able to delete information if information is wrong

### ❖ REGISTER NEW BOOK

#### Description of feature

This feature allows to add new books to the library

#### Functional requirements

- System must be able to verify information
- System must be able to not allow two books having same book id

### ❖ SEARCH BOOK

#### Description of feature

This feature is found in book maintenance part. We can search book based on book id, book name and public ationor by author name.

#### Functional requirements

- System must be able to search the database based on select search type
- System must be able to filter book based on keyword entered
- System must be able to show the filtered book in table view

## ❖ ISSUE BOOKS AND RETURN BOOKS

### Description of feature

This feature allows to issue and return books and also view reports of book issued.

### Functional requirements

- System must be able to enter issue information in database.
- System must be able to update books if the book is borrowed or not
- System must be able to search if book is available or not before issuing books
- System should be able to enter issue and return date information

## ❖ EVENT ADDITION

### Description of feature

This feature allows adamantoid information about various event

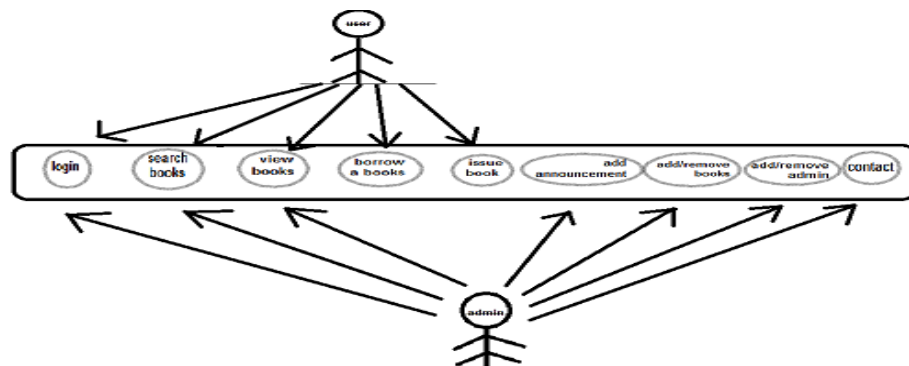
### Functional requirements

- System should be able to add detailed information about events.
- System should be able to display information on notice board available in the homepage of site
- System should be able to add a start time for the event and end time of the event

## CHAPTER4: SOFTWARE DIAGRAMS

### 4.1 USE CASE DIAGRAM

**Use case diagrams** referred as a Behavior model or diagram. It simply describes and displays the relation or interaction between the users or customers and providers of application service or the system. It describes different actions that a system performs in collaboration to achieve something with one or more users of the system. Use case diagram is used a lot nowadays to manage the system.



In above library system project there are two users Librarian and Student. Both Librarian and Student can do all activities after login in to library management system.

#### **LIBRARIAN ACTIVITY:**

- Login
- Add announcement
- Add/remove books
- Add/remove admin
- contact
- View Books
- Search Book

#### **STUDENT ACTIVITY:**

- Login
- Search Book
- View Books
- Borrow a books
- Issue book

## 4.3: SEQUENCE DIAGRAM

### THE IMPORTANCE OF A SEQUENCE DIAGRAM FOR A LIBRARY MANAGEMENT SYSTEM

The significance of the Library Management System Sequence Diagram is that it might aid in the comprehension of project requirements. This also aids in describing the project's current processes. Because it displays the interaction between the items (objects) and the system, the sequence diagram is quite useful.

The sequence diagram depicts major tasks that define the project's process. These activities are accompanied with user choices that lead to more effective interaction. These are the main roles that the Library Management System should have, in my opinion as a programmer.

A sequence diagram is used to define the order in which events in a system occur in order to produce the intended result. It comes in handy when you need to investigate the behavior of multiple events in a single-use scenario.

### HOW TO MAKE A LIBRARY MANAGEMENT SYSTEM SEQUENCE DIAGRAM?

First, let's work out the objects that we want to represent in our diagram. We're designing a library management system, so we'll need at least four basic elements: Member, Librarian, Book, and Transaction. With Gleek, we don't need to set these up separately when creating a sequence diagram. We can just start describing the interactions and Gleek will automatically create the objects needed.



## SEQUENCE DIAGRAM OF COLLEGE LIBRARY MANAGEMENT SYSTEM USERS

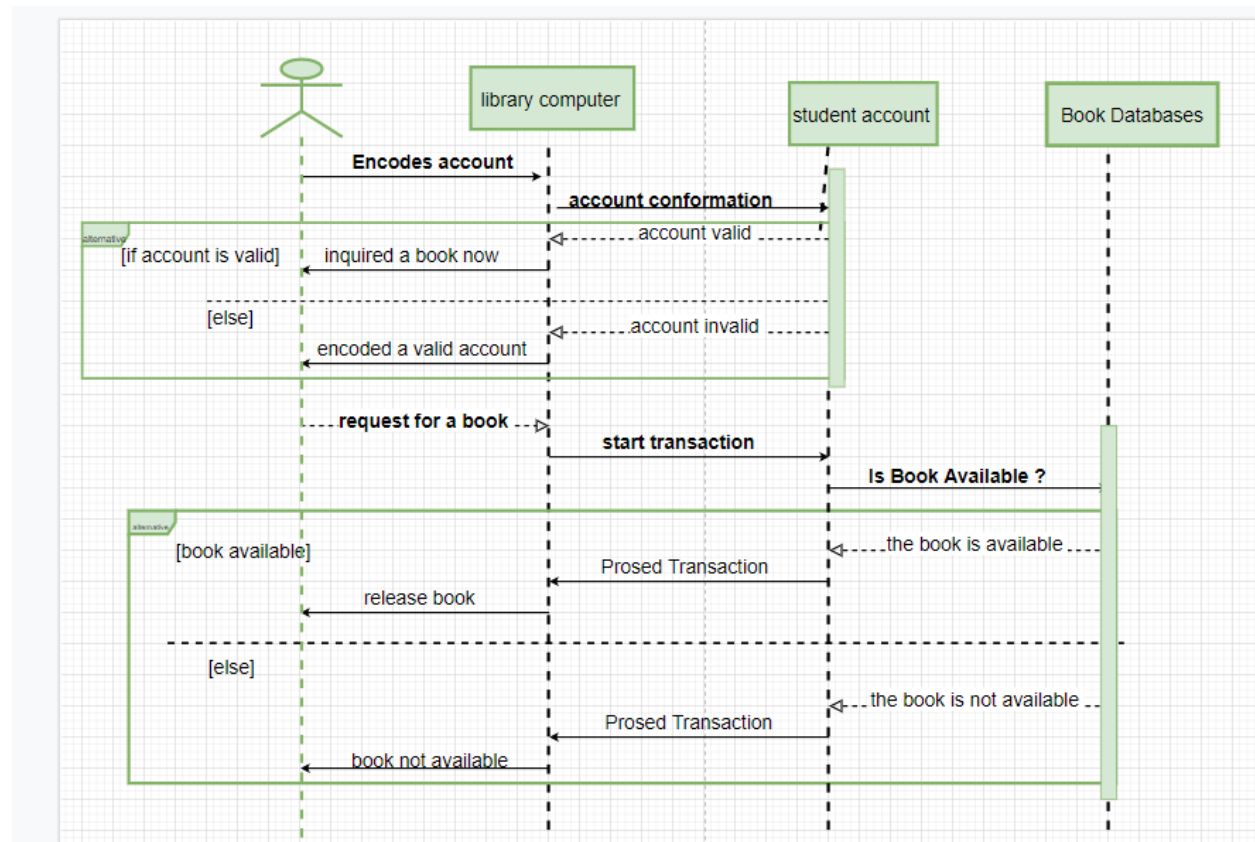
The **Users of the College Library Management System Sequence Diagram** are the following:

- **School Librarian** – The majority of the time, the system will be used by school librarians. They will keep an eye on the books and handle the borrowing and returning of books on a regular basis. In addition, they were in charge of all library-related activities.
- **Book Borrowers** – Students were not the only ones who borrowed books; professors and instructors were also among them. They will have access to the system as well, but they will need to log in to do so. This will assist the librarian and administrative staff in keeping track of the book borrowers.
- **School Admin** – The Library Management System can be implemented as a standalone project or as part of a larger initiative. Nonetheless, it always has the administrator, who has access to all of the library's data. When there are major circumstances or problems, this is done.

## LIBRARY MANAGEMENT SYSTEM SEQUENCE DIAGRAM WITH EXPLANATION

The Sequence Diagram with Explanation for the Library Management System is provided to further explain its concepts. This diagram is based on the notion of Library Management and depicts a sequence of events.

## LIBRARY MANAGEMENT SYSTEM SEQUENCE DIAGRAM



The diagram depicts the sequence of messages that occurred during the Library management activity. The illustration depicts a single scenario that is frequent in library management systems. When a borrower borrows a book, this scenario depicts the series of events and messages that occur.

The student, library server (computer), account database, and book database are all shown in the sequence diagram. These objects were created based on real-life library management tasks. To determine how the operation is carried out, the sequence of messages was plotted beneath the items.

## STEPS IN CREATING A SEQUENCE DIAGRAM FOR LIBRARY MANAGEMENT SYSTEM.

- **Step 1: Familiarize Sequence Diagram Symbols**  
Diagram of the Order of Events Symbols — are used to generate a Sequence Diagram in order to highlight the system's interactions in terms of message sequences. Before you design the Sequence Diagram, you must be familiar with their symbols and uses.  
The overall System interaction is depicted by each of the sequence diagram symbols. Using these Sequence Diagram symbols to emphasize the System's actions would be considerably easier.
- **Step 2: Determine the targeted users**  
You'll need to determine your target users after you've familiarized yourself with the symbols. The users who are most likely to use your project are those who are specifically targeted.  
If your project is a school library management system, your users will be the staff, administrators, and students. You could inquire about the typical activities they engage in when performing library administration chores. This knowledge will assist you in taking the following step.
- **Step 3: Analyze the activities included**  
In order to create a sequence diagram, you must first analyze the situation. It will assist you in comprehending the diagram's function and avoiding costly mistakes. In order to create a sequence diagram, the information acquired from the targeted users is extremely useful. All you have to do now is examine the data and select the most valuable information. Then you're ready to move on to the next stage.
- **Step 4: Plot the Sequence Diagram**  
To plot the sequence diagram, you will need the objects, messages, and lifelines. You will base the sequence of events (interaction) from the evaluated information to have the exact Sequence Diagram.  
To plot your Sequence diagram, you need to place first the objects involved and their lifelines.

Then start building the series of interactions or messages among the objects. If you encounter some decisions or constraints, you will place alternatives depending on the situation.

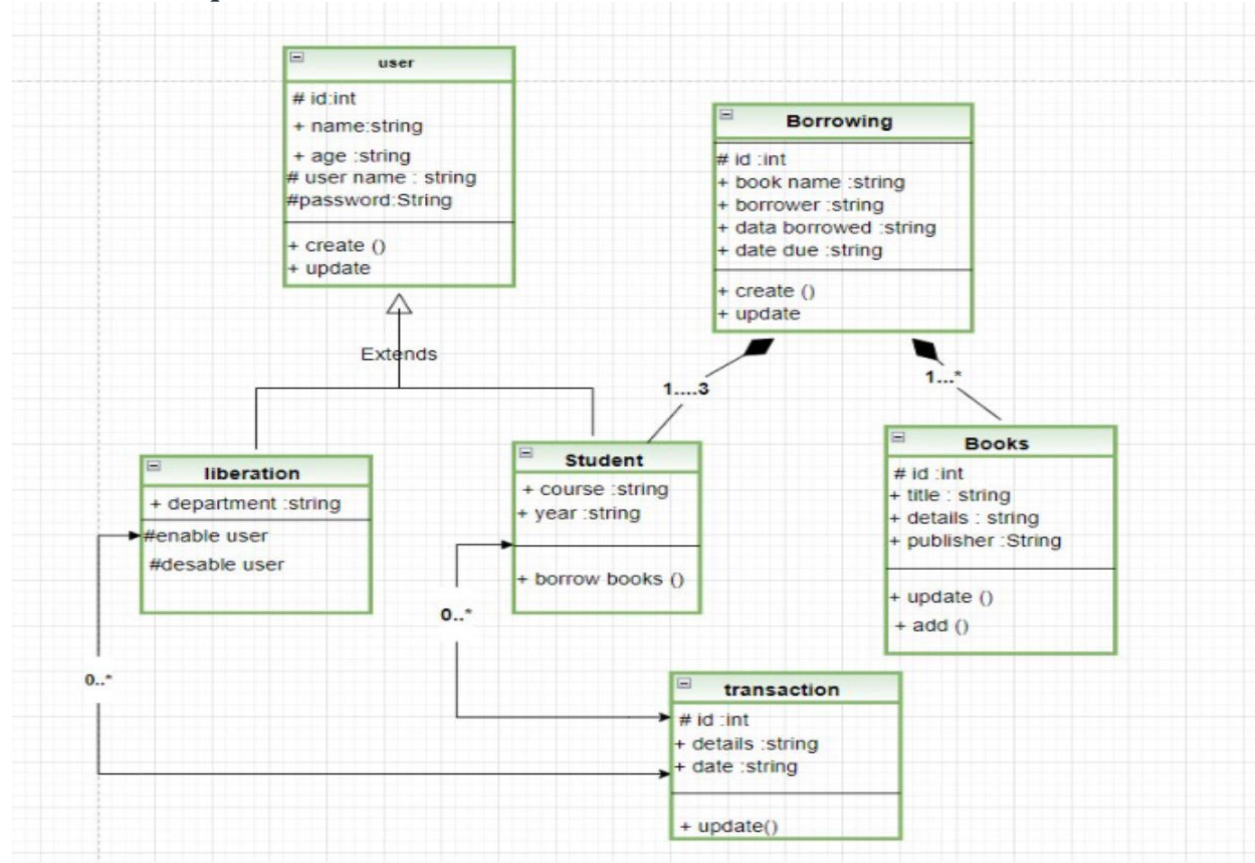
After that, you will review all the events and interactions you've made and check if there are still missing. Creating the sequence diagram will help you figure out the needs of your project and your concerns with it.

## 4.4: CLASS DIAGRAM

### Class Diagram for Library Management System

In Object-Oriented modeling, the main building block generally represents different objects in a system, their attributes, their different functions, and relationships among objects. These building blocks are known as [Class Diagram](#).

Class diagrams are generally used for conceptual modeling of static view of a software application, and for modeling translating models into programming code in a detailed manner. At time of developing or construction software systems, a class diagram is widely used. They are also used for data modeling. It is used to show classes, relationships among them, interface, association, etc. Class in a class diagram simply is a blueprint of an object. It simply describes and explains different type of objects in system, and different types of relationships that exist between them.



**Class Diagram for Library Management System :**  
Aggregation and Multiplicity are two important points that need to take into consideration while designing a Class Diagram. Let us understand in detail.

1. **Aggregation** –

Aggregation simply shows a relationship where one thing can exist independently of other thing. It means to create or compose different abstractions together in defining a class. Aggregation is represented as a part of relationship in class diagram. In diagram given below, we can see that

aggregation is represented by an edge with a diamond end pointing towards superclass. The “Library Management System” is superclass that consists of various classes.

These classes are User, Book, and Librarian as shown in diagram. Further, for “Account” class, “User” is a superclass. All of these, share a relationship and these relationships are known as aggregate relationships.

2. **Multiplicity** –

Multiplicity means that number of elements of a class is associated with another class. These relations can be one-to-one, many-to-many, and many-to-one or one-to-many. For denoting one element we use **1**, for zero elements we use **0**, and for many elements we use **\***. We can see in diagram; many users are associated with many books denoted by **\*** and this represents a **many-to-many** type of relationship. One user has only one account that is denoted by **1** and this represents a **one-to-one** type of relationship. Many books are associated with one librarian and this represents **many-to-one** or **one-to-many** type of relationship. All these relationships are shown in diagram.

Class Diagram for Library Management System simply describes structure of Library Management System class, attributes, methods or operations, relationship among objects.

## Classes of Library Management System:

**Library Management System classes –**  
It manages all operations of Library Management System. It is central part of organization for which software is being designed.

- **User Class –**  
It manages all operations of user.
- **Librarian Class –** It manages all operations of Librarian.
- **Book Class –**  
It manages all operations of books. It is basic building block of system.
- **Borrowing Class –**  
It manages all operations of borrowing operations.
- **Student Class –**  
It manages all operations of student.
- **Transaction Class –**  
It manages all operations of transaction.

## Attributes of Library Management System:

- **User Attributes –**  
Id , Name , age
- **Librarian Attributes –**  
Department
- **Book Attributes –**  
Id, Title, Details , Publisher
- **Borrowing Attributes –**  
Id, Book name , Borrower , Date borrowed , Date due
- **Student Class Attributes –**  
Course , year
- **Transaction Class Attributes –**  
Id , Details ,Date

## Methods of Library Management System:

- **User Methods –**  
Create(), Update()
- **Librarian Methods –**  
Enable\_User(), Desable\_User ()
- **Book Methods –**  
Update(), Add()
- **Borrwing Methods –**  
Create(), Update()
- **Transaction Methods –**  
Update()

## Class Diagram of Library Management System :

## CHAPTER 5:

### CHALLENGES

While preparing for this project, we faced many challenges.

Coming to the fore is the lack of time due to the presence of exams and the busyness of the university hours, but we were able to manage time correctly by 70%, and it was the first project that we prepared from scratch.

We also faced a problem in searching for the system requirements, because there were a lot of ideas that could be added to the project. We faced the problem of difficulty in analyzing and drawing SEQUENCE DIAGRAM

### TEAM MEMBER WORK

**Alaa Qadous:** detection, introduction, target group, design use-case diagram, functional requirement.

**Saja Moqady:** acknowledgment, primary literature review, part of process model.

**Batool anwer:** abstraction, objectives, nonfunctional requirement, references, process model, use-case, sequence and class diagram .

**Batool nawasra:** Design sequence and class diagram, challenges, part of process model, project assembly final design.



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