LIBRARY MANAGEMENT SYSTEM

Document Control:

Project Revision History				
Date	**Version**	**Author**	**Brief Description of Changes**	**Approver Signature**

1. Introduction:

The purpose of a library management system is to operate a library with efficiencyand at reduced costs. The system being entirely automated streamlines all the tasks involved in operations of the library. The library management system software helps in reducing operational costs.

Managing a library manually is labor intensive and an immense amount of paperwork is involved. An automated system reduces the need for manpower and stationery. This leadsto lower operational costs. The system saves time for both the user and the librarian. With just a click the usercan search for the books available in the library. The librarian can answer queries with ease regarding the availability of books. Adding, removing or editing the database makes easy for librarian.

Stock checking and verification of books in the library can be done within a fewhours. The automated system saves a considerable amount of time as opposed to the manual system. The library management system software makes the library a smart one by organizing the books systematically by author, title and subject. This enables users tosearch for books quickly and effortlessly. An advanced organized library is an integral part of any educational institution.

Preliminarily, the librarian has to add student and book details into the database. Librarian can view/delete/update those details through the Library Management system. On account of this, the user can access the library at any time. The librarians can assist the data without any confusion. If he/she access any user details then it shows username, id, book details. They no need to write it on paper for any references. By editing the data they can change the parameter in it. In spite of working on the manual, the librarian can feel easy to handle the automatic system. It has more additional features such as librarian can maintain library records and issues. It always tracks the count of the book in the library and issued book details. This causes a flexible service for librarians and students. It is a user-friendly interface, so basic computer knowledge is enough to access the LMS. The system is a customizable and user-configurable one which causes it to use in different organizations such as universities.

1.1 ACRONYMS/ABBREVIATIONS:

LMS	Library Management System
RRE	REGEX REGULAR EXPRESSION

1.2 Key Project Objectives:

The objective of the Library Management System project is to computerize the functions of the library. Computerization helps in better record keeping and management of the library.

1.3 Project Purpose:

Library management manages and stores books information electronically according to user's needs. The system helps both user and library manager to keep a constant track of all the books available in the library. It allows both the admin and the user to search for the desired book.

1.4 Project Scope:

Supports the librarian to add/view/delete/update details from the library stock and helps user to access required books from library and Allows User to Access Search Book.

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Limitations:

- Requires high-speed internet connectivity for a web-based system
- Unlike online systems that use cloud computing, Open-Source system stocks data on the computer's hard drive. This raises the risk of data loss
- sometimes it may find complicated to operate for first-time users

1.5 In Scope:

1. Establish communication between Librarian and Student.
2. Transferring Books from library to students.
3. Searching and accessing books will be easy.

1.6 Functional Overview:

Librarian login: the librarian can access the entire functionality of the system via this component. He/she can maintain the records and track them as per necessity. Also, the admincan add or remove entries into the system respectively.

Add and update books: The Librarian can add new books or other materials to the system with the essential details. Thus, the librarian can maintain the system effectively.

Search Books: all users of the system, including admin can search for library materials. Admin and users can search for books by entering the name of the book or id of the book. It allows all the users to have the books according to their requirement and will be able to view the books present in the database along with their details.

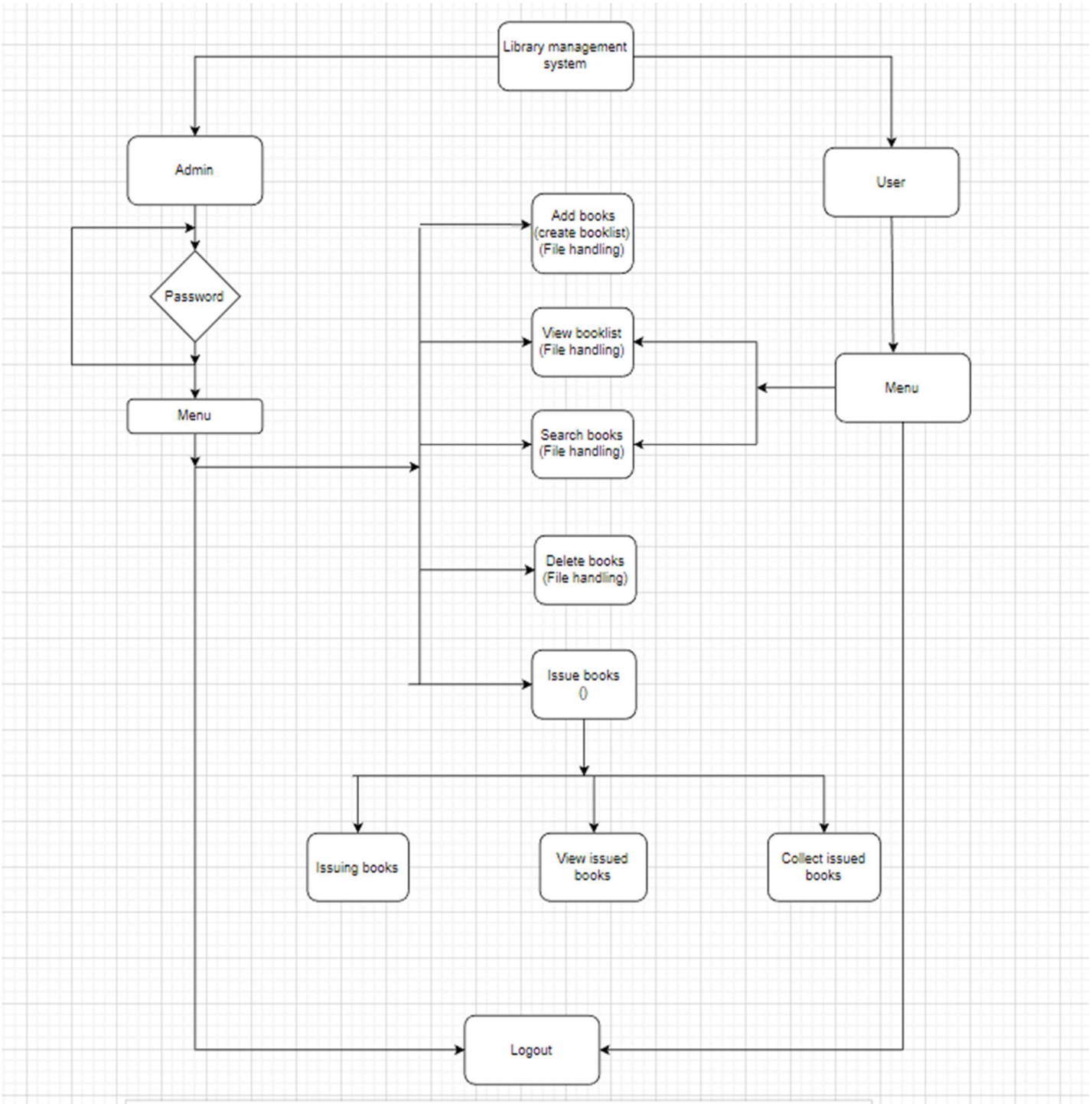
Issued Books: the librarian can view issued books. Also, the otherdetails like user details who took the book will be available in this module.

Delete Books: The book record is deleted from the library register book when the book has been lost or totally damaged by the user.

Return Book: The Book Will Be added back to the library by the librarian with or without Penalty.

2. Design Overview:

Flow Diagram:



2.1 Design Objective:

Admin:

1. Using Add(),Add books to the LMS database
2. Using Delete(),Delete books from LMS database
3. Using Search(),Search books from LMS based on requirement using bookname, bookid, author name
4. Using returnBook(),When issued book is returned, with or without penality
5. Using IssueBook(),When Book is issued to the user

Student:

1. Using Search(), Search Books In the LMS database.
2. Using Display(), Display the Books Available in the LMS database.

2.2 Performance:

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.

2.3 Security:

1. Data should be permanent in file-handling.
2. System will use secured database.
3. Normal users can just read information but they cannot edit or modify anything except their personal and some other information.
4. Proper user authentication should be provided
5. No one can should be able to hack admins pin.

2.4 User Characteristics:

The systems provide different types of services based on the type of login. The librarian will be acting as the controller and he will have all the privileges of an

administration. The user can be a student can be related to a university or others.

These are the Features for the Librarian:

- A Librarian can issue a book.
- Can View the different Category of Books in the Library.
- Can be able to return/collect the book issued from the user.
- Add book to the database.
- Can view the existing books.
- Can check the list of the issue books.

These are the features for the user:

- Can view the books in the library.
- Can Search for the particular book.

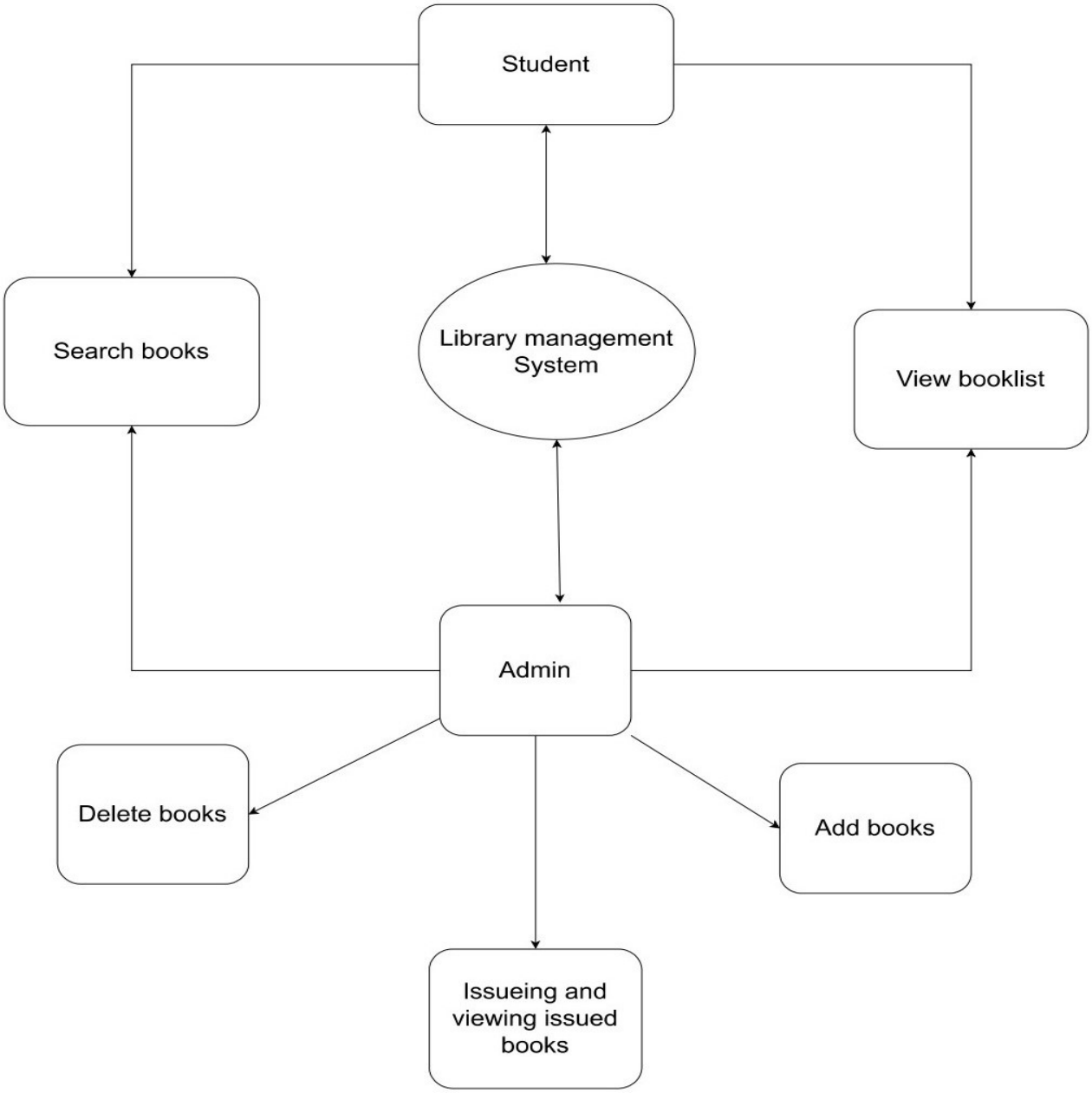
2.5 Performance Requirements:

The proposed systems that we are going to develop will be used as the chief performance system within the different campuses of the university or others which interacts with the university staff and students. Therefore, it is expected that the database would perform functionally all the requirements that are specially by the university.

1. The performance of the system should be fast and accurate.
2. LMS shall be handled expected and non-expected errors in ways that prevent loss in information and long downtime period. Thus, it should have inbuilt errors testing to identify invalid pin.
3. The system should be able to handle large amount of data. Thus, it should accommodate high number of books and users without any fault.

System Architecture:

3.1 System Architecture Diagram:



3.2 Software Requirement:

- GCC
- G++
- MAKE

3.3 Functional Requirements:

- File Handling
- Inheritance
- Virtual Function
- Polymorphism

Environment Description:

UBUNTU: Ubuntu is an open-source operating system (OS) based on the Debian GNU/Linux distribution. Ubuntu incorporates all the features of a Unix OS with an added customizable GUI, which makes it popular in universities and research organizations. Ubuntu is primarily designed to be used on personal computers, although a server edition does also exist.

C++ language: C++ is one of the world's most popular programming languages. C++ can be found in today's operating systems, Graphical User Interfaces, and embedded systems. C++ is an object-oriented programming language which gives a clear structure to programs and allows code to be reused, lowering development costs.

C++ is portable and can be used to develop applications that can be adapted to multiple platforms. C++ is a cross-platform language that can be used to create high-performance applications. C++ was developed by Bjarne Stroustrup, as an extension to the C language. C++ gives programmers a high level of control over system resources and memory. The language was updated 4 major times in 2011, 2014, 2017, and 2020 to C++11, C++14, C++17, C++20.

C++ includes control statements, objects and classes, inheritance, constructor, destructor, this, static, polymorphism, abstraction, abstract class, interface, namespace, encapsulation, arrays, strings, exception handling, File IO, etc.

C++ runs on a variety of platforms, such as Windows, Mac OS, and the various versions of UNIX. This C++ tutorial adopts a simple and practical approach to describe the concepts of C++ for beginners to advanded software engineers.

gdb: gdb is the acronym for GNU Debugger. This tool helps to debug the programs written inC, C++, Ada, Fortran, etc. The console can be opened using the gdb command on terminal.

Time zone Support:

India Standard Time, is the time zone observed throughout India, with a time offsetof UTC+05:30.

User desktop requirements:

Desktop hardware

- Display resolution of 1024x768 pixels or above
- Any computer manufactured in the last 6 years
- CPU (circa 2013+): Intel i3/i5/i7 generation 3 and later
- RAM: 8GB or greater - For optimal performance, 6GB or 8GB are recommended if you will be running multiple browser tabs and/or multiple applications at the sametime
- Internal memory:512 GB SSD/HDD.

Desktop operating system:

- Linux desktop editions - A GUI-based LINUX system must be used.