Indian Institute of Information Technology Dharwad

SOFTWARE REQUIREMENTS SPECIFICATION

For

Library Management System

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1. Introduction:

1.1 Purpose: The main objective of this document is to illustrate the requirements of the project Library Management System. The document gives the detailed description of the both functional and Non-functional requirements proposed by the client. The purpose of this project is to provide an environment to maintain the details of the book and library members. This project describes the hardware and software interface requirements for the project using ER Diagrams (**Entity Relationship Diagram**) and (**Unified Modelling Language**) UML diagrams.

1.2 Document Conventions:

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- Convention for main title
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- Convention for Sub-title
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1.3 Scope of Development Projects: Library Management System is basically updating the manual Library System into an Internet based application So that users can know the details of their account, availability of books and maximum limit for borrowing.

The project is specifically designed for the use of librarians and library users. The product will work as a complete user interface for library management process and library usage from an ordinary user. Library management System can be used by an existing or a new library to manage its books and book borrowing, insertion and borrowing. It is specially used for any educational institute where modifications in the content can be done easily according to the requirements.

The project can be easily implemented under various situation. We can add new features as and when we require making reusability possible as there is flexibility in all the modules.

The Language used for developing the project is C++ as it is quite advantageous than other language as for we know, the tools available and cross platform compatibility, libraries, cost (freely available), and development process.

1.4 Definitions, Acronyms and Abbreviations

C++: Platform Independence

SRS: Software Requirements Specifications

ER: Entity Relationship

UML: Unified Modeling Language

SQL: Structured Query Language

IDE: Integrated Development Environment

ISBN: International Standard Book Number

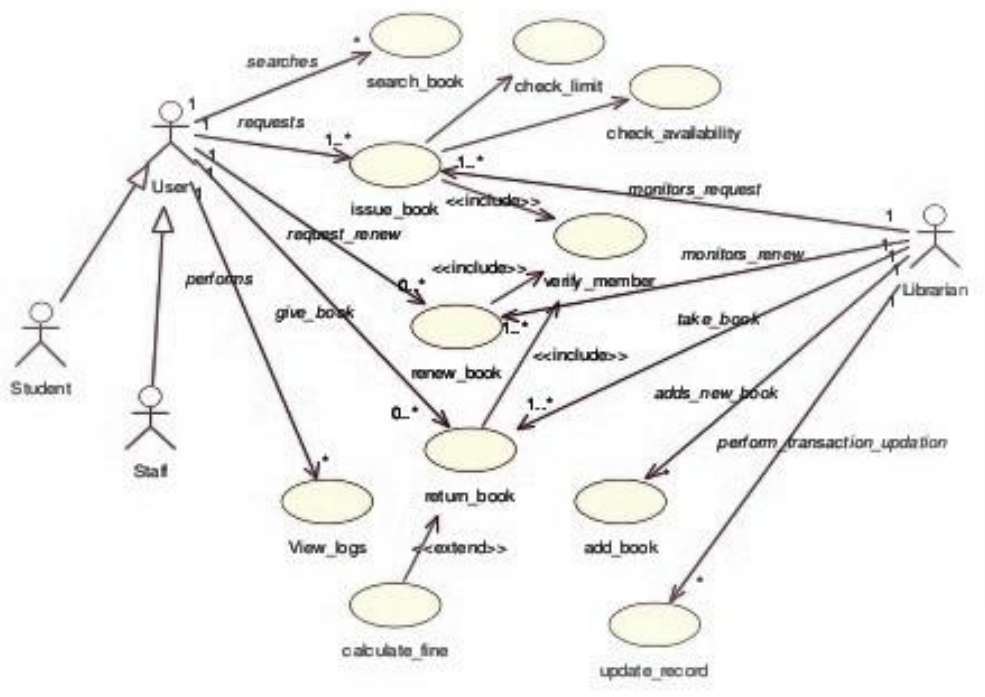
IEEE: Institute of Electrical and Electronics Engineers

1.5 References

- Websites
  - http://ebookily.net/doc/srs-library-management-system
  - http://www.slideshare.net/

2. Overall Descriptions

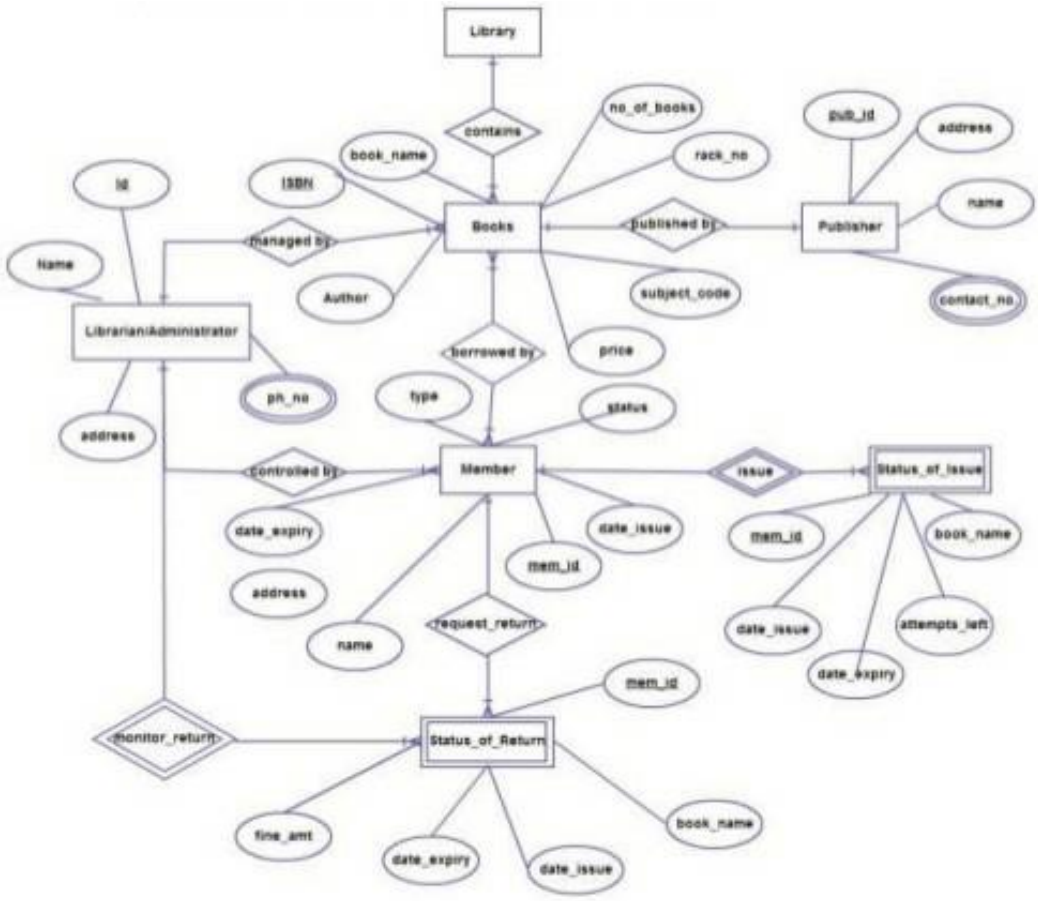
2.1 Product Prospective: Use case diagram of a Library Management System



This diagram shows the basic overview of our project. The users can be either staff or student. This System will provide a search

functionality to facilitate the search of resources. This search will be based on various categories viz. book name or the ISBN. Further the library staff personnel can add/update the resources and add the resource user from the system. The user of the system can request issue/renew/return of the book for which they would have to follow certain criteria.

2.2 Product Function: Entity Relationship Diagram of Library Management System



The online Library System Provides online real time information about the books available in the library and the user information. The main purpose of this project is to reduce the manual work. This Software is capable of managing Book issues, Return/managing fine, generating various reports for record-keeping according to end user requirements.

The librarian will act as the administrator to control member and manage books. The member's database can be fetched by the librarian from the database as and when required. The valid members are also allowed to view their account information.

2.3 Use Classes and Characteristics: The system provides different types of service based on the type of user [Member/Librarian]. The librarian will be acting as the controller and he will have all the privileges of an administrator. The member can be either a student or staff of the University who will be accessing the Library online.

The features that are available to the librarian are:-

- A librarian can issue a book to the member.
- Can view the different categories of books available in the library.
- Can view the List of books available in each category.
- Can take the book returned from students.
- Add books and their information to the database
- Edit information of the existing books
- Can check the report of the issued books
- Can access all the accounts of the students

The features that are available for the members are:-

- Can view the different categories of the books availale in the Library
- Can view the List of books available in each category
- Can own an account in the library
- Can view the books issued to him
- Can put a request for a new book

- Can view the history of books issued to him previously
- Can search for a particular book

2.4 Operating Environment: The product will be operating in windows environment. The Library Management System is a website and shall operate in all famous browser, for a model we are taking Microsoft Internet Explorer, Google Chrome, and Mozilla Firefox. The only requirement to use this online product would be internet connection.

The Hardware configuration include Hard Disk, Monitor, Keyboard. The basic input device required are keyboard, mouse and output device are monitor, printer etc.

2.5 Assumptions and Dependencies: *The assumptions are:-*

- The coing should be error free
- The system should be user- friendly so that it is easy to use for the users
- The information of all users, books and libraries must be stored in a database that is accessible by the website
- The system should have more storage capacity and provide fast access to the database
- The system should provide search facilty and support quick transaction
- The Library System is running 24 hours a day
- Users may access from any computer that has Internet browsing capabilities and an Internet connection
- Users must have their correct username and password to enter into their online accounts to do actions

The dependencies are:-

- The specific hardware and software due to which the product will be run
- On the basis of listing requirement and specification the project will be developed and run
- The end user(admin) should have proper understanding of the product
- The system should have the general report stored
- The information of all the user must be stored in a database that is accessible by the Library System
- Any update regarding the book from the library is to be recorded to the database and the data entered should be correct.

2.6 Requirements: *Software Configuration:-*

This software package is developed using c++ as frontend.

Microsoft SQL Server as the back end to store the database.

Operating System: Windows 10

Language: C++

Database: MS SQL Server (backend)

Hardware Configuration:-

Processor: i5 quad-core CPU

Hard Disk: 1TB

RAM: 8GB

2.7 Data Requirements: The inputs consist of the query to the database and the output consists of the solutions for the query. The

output also includes the user receiving the details of their accounts. In this project the inputs will be the queries as fired by the user like create an account, selecting books and putting into account. Now the output will be visible when the user requests the server to get details of their account in the form of time, date and which books are currently in the account.

3. External Interface Requirements

3.1 GUI: The software provides good graphical interface for the use and the administrator can operate on the system, performing the required task such as create update, viewing the details of the book.

- It allows user to view quick reports like Book issued/Returned in between particular time.
- It provide stock verification and search facility based on different criteria.
- The user interface must be customizable by the administrator
- All the modules provided with the software must fit into this graphical user interface and accomplish to the standard defined.
- The design should be simple and all the different interfaces should follow a standard template
- The user interface should be able to interact with the user management module and a part of the interface must be dedicated to the login/logout module.

Login Interface:-
In case the user is not yet registered, he can enter the details and register to create his account. Once his account is created he can 'Login' which asks the user to type his username and password. If the

user entered either his username or password incorrectly than an error message appears.

Search:-
The member or librarian can enter the type of book he is looking for and the title he is interested in, then he can search for the required book by entering the book name.

Categories View:-
Categories view shows the categories of books available and provides ability to the librarian to add/edit or delete category from the list.

Librarian Control Panel:-
This control panel will allow librarian to add/remove users; add, edit, or remove a resources. And manage lending options.

4. System Features

The users of the system should be provided the surety that their account is secure. This is possible by providing:-

- User authentication and validation of members using their unique member ID
- Proper monitoring by administrator which includes updating account status, showing a popup if the member attempts to issue number of books that exceed the limit provided by the library policy, assigning fine to member who skip the date of return
- Proper accountability which includes not allowing a member to see other's member account. Only administrator will see and manage all member accounts.

5. Other Non-functional Requirements

5.1 Performance Requirements: The proposed system that we are going to develop will be used as Chief performance system within the

different campuses of the University/Institute which interacts with the respective staff and students. Therefore, it is expected that the database would perform functionally all the requirements that are specified by the institute.

- The performance of the system should be fast and accurate
- The system should be able to handle large amount of the data. Thus it should accommodate high number of the books and users without any fault.

5.2 Safety Requirements: The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup so that the database is not lost. Proper UPS/inverter facility should be there in case of power supply failure.

5.3 Security Requirements

- System will use secured database
- Normal user can just read information but they cannot edit or modify anything except their personal and some other information
- System will have different types of users and every user has access constraints
- Proper user authentication should be provided
- No one should be able to hack user's password
- There should be separate accounts for admin and user such that no member can access the database and only admin has the rights to update the database.

5.4 Requirement attributes

- There may be multiple admins creating the project, all of them will have the right to create changes to the system. But the members or other user cannot do changes
- The project should be open source

- The quality of the database is maintained in such a way so that it can be very user friendly to all the user of the database
- The user be able to easily download and install the system

5.5 Business Rules: A business rule is anything that captures and implements business policies and practices. A rule can enforce business policy, make a decision, or infer new data from existing data. This includes the rules and regulations that the system user should abide by. This includes the cost of the project and the discount offers provided. The user should avoid illegal rules and protocols. Neither admin nor member should cross the rules and regulations.

5.6 User Requirement: The users of the system are members and librarian of the institute who acts as administrator to maintain the system. The administrator of the system should have more knowledge of the internals of the system and is able to rectify the small problems that may arise due to disk crashes, power failures and other catastrophes to maintain the system. The proper user interface, user manual, online help and the guide to install and maintain the system must be sufficient to educate the users on how to use the system without any problem.

The admin provides certain facilities to the users in the form of:-

- Backup and recovery
- Forgot password
- Data migration i.e. whenever user register for the first time then the data stored in the server
- Data replication i.e. if the data is lost in one branch it is still stored with the server
- Auto recovery i.e. frequently auto saving the information
- Maintaining files i.e. File Organization
- The server must be maintained regularly and it has to be updated from time to time

6. Other Requirements

6.1 Data and Category Requirement: There are different categories of users namely teaching staff, Librarian, Admin, Students etc. Depending upon the category of user the access rights are decided. It means if the user is an administrator then he can be able to modify the data, delete, modify, append etc. All other user except the Librarian only have the right to retrieve the information about database. Similarly there will be different categories of books available. According to the categories of books their relevant data should be displayed. The categories and the data related to each category should be coded in particular format.

6.2 Appendix

A: Admin, Abbreviations, Acronym, Assumptions; B: Books, Business rules C: Class, Convention, Client; D: Data requirement, Dependencies; G: GUI; K: Key; L: Library, Librarian; M: Member; N: Non –functional Requirement; O: Operating Environment; P: Performance, Perspective, Purpose; R: Requirement, Requirement attributes; S: Safety, Scope, Security, System Features; U: User, User Class and characteristics, User requirement;

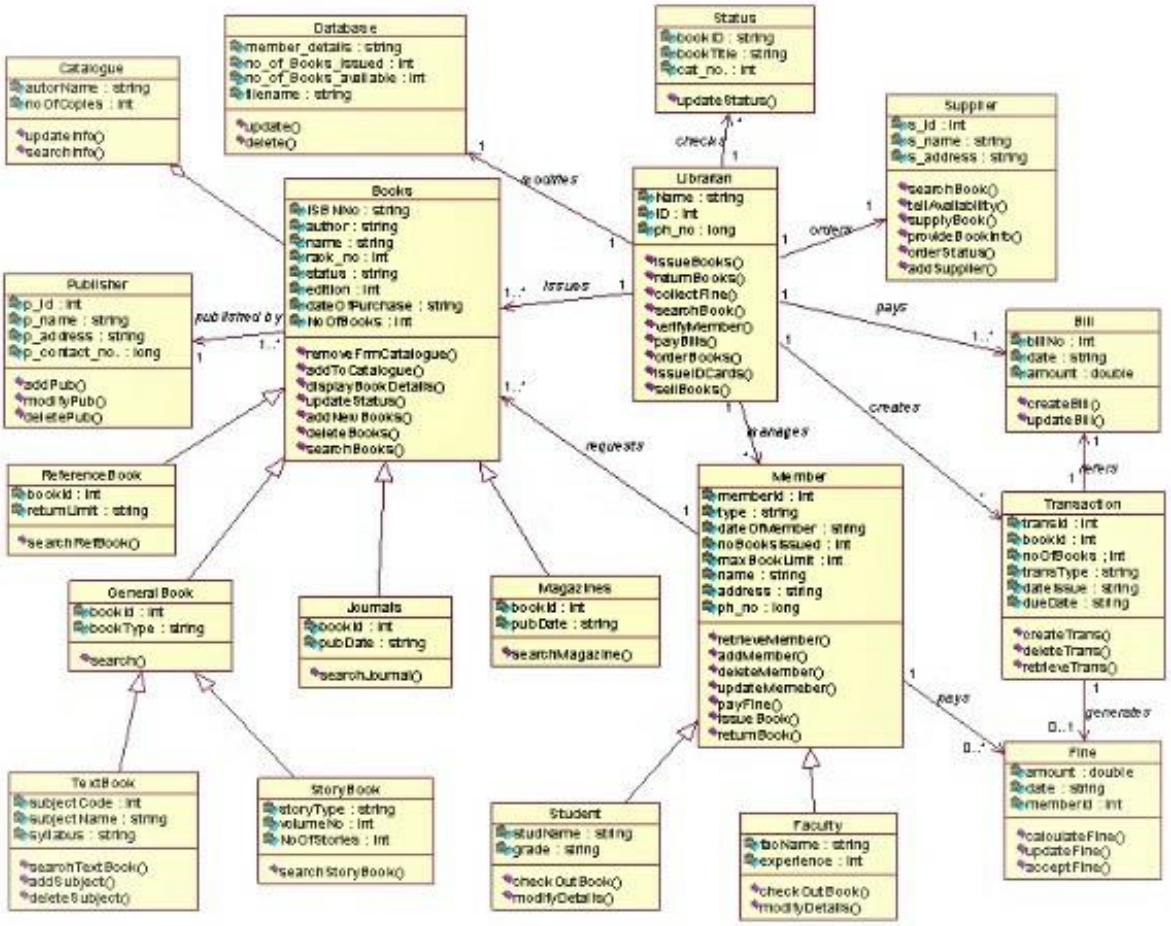
6.3 Glossary: The following are the list of conventions and acronyms used in this document and the project as well:

- Administrator: A login id representing a user with user administration privileges to the software
- User: A general login id assigned to most users
- Client: Intended user for the software
- SQL: Structured Query Language; used to retrieve the information from the database
- SQL Server: A server used to store data in an organized format
- Layer: Represents a section of the project

- User Interface Layer: The section of the assignment referring to what the user interacts with directly
- Data Storage Layer: The section of the assignment referring to where all data is recorded
- Use Case: A broad level diagram of the project showing a basic overview
- Class diagram: It is a type of static structure diagram that describe the structure of a system by showing the system's cases, their attributes, and relationship between the classes
- Interface: Something used to communicate across different mediums
- Unique Key: Used to differentiate entries in a database

6.4 Class Diagram:

A Class is an abstract, user defined description of a type of a data and the operations that can be performed on instances (i.e. objects) of the data. A class of data has a name, a set of attributes that describes its characteristics, and a set of operations that can be performed on the objects of that class. The classes structure and their relationship to each other frozen represent the static model. In this project there are certain main classes which are related to other classes required for their working. There are different kind of relationship between the classes as shown in the diagram like normal association, aggregation, and generalization. The relationship are depicted using a role name and multiplicities. Here 'Librarian', 'Member' and 'Books' are the most important classes which are related to other classes.



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