



**Jaypee University of Information Technology**  
**Solan (H.P.)**  
**LEARNING RESOURCE CENTER**

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**General Guidelines:**

- ◆ Library books should be used with great care.
- ◆ Tearing, folding, cutting of library books or making any marks on them is not permitted and shall lead to disciplinary action.
- ◆ Any defect noticed at the time of borrowing books must be brought to the library staff immediately. Otherwise the borrower may be required to replace the book by a new copy.
- ◆ The loss of LRC book(s) must be immediately brought to the notice of the Librarian in writing.

Learning Resource Centre-JUIT



SP02080

# **ThinkQuest LIBRARY MANAGEMENT SYSTEM**

**By**  
**AYUSH CHITTORA-021213**  
**RICHA SOFAT-021223**



**MAY-2006**

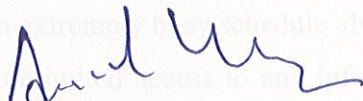
**Submitted in partial fulfillment of the Degree of Bachelor  
of Technology**

**DEPARTMENT OF COMPUTER SCIENCE ENGINEERING  
JAYPEE UNIVERSITY OF INFORMATION  
TECHNOLOGY - WAKNAGHAT**

## ACKNOWLEDGEMENT


### CERTIFICATE

This is to certify that the work entitle, "ThinkQuest Library Management System" submitted by **Ayush Chittora** and **Richa Sofat** in partial fulfillment for the award of degree of bachelor of Technology in Computer Science Engineering of Jaypee University of Informoration Technology has been carried out under my supervision this work has not been submitted partially or wholly to any other University or Institute for the award of this or any other degree or diploma.



Mr. Amol Vasudeva  
Project Coordinator

Richa Sofat  
Ayush Chittora



## ACKNOWLEDGEMENT

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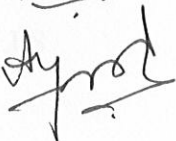
Mr. Sinha, our Network Administrator deserves special thanks.He helped us a lot with the deployment of the software on the network.

Lastly, we would like to thank Abhilishit Soni 3<sup>rd</sup> yr Bioinformatics student who showed a way to the project.

Richa Sofat



Ayush Chittora



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## INTRODUCTION

### LIST OF FIGURES

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## INTRODUCTION

The library plays a significant role in academic institutions. The society needs library to impart better education. Library is a place where you get access to a lot of books on different subjects to improve your knowledge content. Keeping the growing need of managing books the university came up with a library with huge collection on various topics. So we look at the structured design partition of the library system.

Rule of thumb for structured design is to keep modules as small & as independent as possible.

The structure design process begins with the identification of the major tasks and then subsequently subdividing the tasks until we get the smallest modules possible corresponding to the specification. We identified some modules which are independent to a great extent.

These modules are:

- Acquisition
- Cataloguing
- Circulation



## CATALOGUING

Cataloguing is a process of assigning classification numbers, accession no. so as to uniquely recognize each book in library.

Book control can be a complex business. So our challenge has been to tackle the requirements whilst at the same time making the facility easy in use. The Cataloguing facility provides the means of entering catalogue details.

All the information regarding books i.e. title, author, publisher, price, number of copies will be maintained in database. Based upon this information the accession number and classification number will be allotted. When a particular book will be listed while search is in progress all this information will be made available to user.

When borrower makes a request for issue on an item, his/her information in the database is checked. If he/she has not crossed the maximum loans limit, issue request is granted and member's information is updated according to it. The changes are also propagated to issue register.

### Return

When a borrower returns an item, member's loan database is checked to see if item is returned after due date. If items are returned after due date, borrower's fines information is updated. If borrower pays the fines, again his/her fine information is updated. On return of the item the borrower's information & issue/return information is updated.

## **ACQUISITION**

In acquisitions we basically place an order to suppliers to supply the library with the required demand of books. For this we maintain a database having information of the various departments in the university and the suppliers to be contacted in case of ordering books. When a request comes to order a particular book the librarian feeds the requirement of the department and places order to a particular supplier. A department is allocated a particular budget. The books have to be purchased in that limit. The supplier database contains the information regarding the supplier like his name, address and phone no.

## **CIRCULATION**

### **Issue Request**

When borrower makes a request for issue of an item. His/her information in the database is checked. If he /she has not crossed the maximum loans limit, issue request is granted and member's information is updated according to it. The changes are also propagated to issue register.

### **Return**

When a borrower returns an item, member's loan database is checked to see if item is returned after due date. If items are returned after due date, borrower's fines information is updated. If borrower pays the fines, again his/her fine information is updated. On return of the item the borrower's information & issue/return information is updated.

## **ADVANCED SEARCH**

There are times when it is preferable to search specified fields rather than across whole records. The 'Advanced Search' facility enables the more sophisticated user to carry out very specific searches. This is very narrow search and is meant for sophisticated users and searches.

Advanced search provides various options to searcher to narrow the range of search and to be more specific. It asks users to search according to either of these.

Title/Author/Publisher/Book Type.

Even if the searcher doesn't remember any of these but knows the initials the search is possible.

## **SEARCH RESULTS**

When a search is made , all the matched results are shown. The search also shows the status of the searched items i.e. available or not. If its status is 'available' then the book can be issued provided the user satisfies certain criteria.

## **INFORMATION ABOUT BORROWERS**

Borrower's card provides information about the loans of borrower. Borrower's card can hold following information.

- Loans
- Name
- Address
- Year
- Batch
- Stream
- Fines

## SYSTEM MODEL: WATERFALL MODEL

In a typical waterfall model, a project begins with a feasibility analysis. On successfully demonstrating the feasibility of a project, the requirement analysis and project planning begins. The design starts after the requirement analysis is complete, and coding begins after designing is complete. Once the programming is completed, the code is integrated and testing is done. On successful completion of testing, the system is installed. After this, regular operation and maintenance of system takes place.

With waterfall model, the sequence of activities performed in a software development project is:

- Requirement analysis
- Project Planning
- System Design
- Detailed Design
- Coding
- Unit testing
- System Integration and Testing

Linear sequencing of activities has some important consequences. First to clearly identify the end of phase and beginning of next, some clarification mechanism has to be employed at the end of each phase and beginning of next phase.

Each phase must have some defined output that can be evaluated and certified. That is when the activities of a phase are completed; there should be some product that is produced by that phase.

## **INFORMATION GATHERING**

It is a formal process of using research, interviews, meetings and other techniques to collect information about systems, requirements and preferences.

A key part of system analysis is information gathering about the current system. The information gathering has been conducted in three different domains.

### **INFORMATION ABOUT THE LIBRARY**

It had helped in understanding the objectives, goals and management directions of the library. It had provided a platform to comprehend the environment in which candidate system is going to work.

### **INFORMATION ABOUT THE STAFF**

This is about gathering information about the employees who are running the current system and will run the new system. The information gathering about the employees had been performed to understand the job function of the employees, their information requirements and relationship of their jobs to the existing system.

### **IDENTIFYING THE WORKFLOW**

Work flow focuses on what happens to the books and other official data of the library through various points in the system.

## **OBJECTIVES OF THE PROPOSED SYSTEM**

The objective of the candidate system is to meet the objectives and the goals of the current system and take care of future possibilities.

### **Adding**

- Speed
- Accuracy
- Efficiency

### **Eliminating**

- Redundancy of data

## HARDWARE REQUIREMENTS

**Processor:** Pentium 500 MHz or equivalent

**RAM:** When using windows 98 or ME a minimum of 64 Mbytes of RAM is estimated.

However, for Windows 2000 and XP the minimum should be 128 Mbytes.

## SOFTWARE REQUIREMENTS

**TOOLS USED:** Java Swing, SQL, JDBC, Oracle 9i

## Java SWING

Swing is the next generation GUI toolkit to enable enterprise development. Swing does not contain any platform-dependent code.

### SWING FEATURES

Swing provides many features for writing large-scale applications in java. Here is an overview of some of the more popular features.

- **Pluggable Look-and-feel:** One of the most exciting aspects of the swing classes is the ability to dictate the L&F of each of the components, even resetting the L&F at runtime. Swing is capable of emulating several L&Fs and currently supports the Windows, Unix Motif, and “native” Java Metal L&Fs. In addition swing allows the user to switch L&Fs at runtime without having to close the application.
- **Lightweight components:** Most swing components are lightweight. In the purest sense it means that components are not dependent on native peers to render themselves. Instead, they use simplified graphics primitives to paint themselves on the screen and can even allow portions to be transparent.
- Swing has wide variety of new components , such as tables, trees, sliders, spinners, progress bars, internal frames and text components.
- Swing components support the replacement of their insets with an arbitrary number of nested borders.
- There is additional debugging support for rendering your own lightweight swing components.
- You can arbitrarily bind keyboard events to components, defining how they react to various keystrokes under given conditions.



## JDBC

Java Database Connectivity or JDBC for short is set of Java Applications Program Interfaces that enables the developers to create platform and database independent applications in java. The JDBC API provides Java applications with mid-level access to most database systems, via the Structured Query Language (SQL). JDBC Drivers are set of classes that enable the Java application to communicate with databases

Some features of the JDBC are :

- Scroll forward and backward in a result set or move to a specific row
- Make updates to database tables using methods in the Java programming language instead of using SQL commands
- Send multiple SQL statements to the database as a unit, or batch

## Oracle 9i

Lets start with an overview of the features that have been embedded in Oracle 9i to improve the following technical aspects :-

- database performance,
- ease of management,
- scalability,
- security,
- availability

and application areas:

- Internet content management
- ecommerce integration
- packaged applications
- Business Intelligence

### Oracle 9i Performance Improvements

Biggest improvements have been to Parallel Server which Oracle now calls Real Application Clusters and which allow applications to use clustered servers without modification. Other improvements include:

- native compilation of PL/SQL
- better Java performance (better compilation, improved garbage collection)
- distributed database performance enhancements

## **Oracle 9i Manageability Enhancements**

Ease of management of the Oracle database has always been a bone of contention, especially configuration of rollback segments and such like, so Oracle have made great strides to improve manageability as the complexity of the database has increased. These improvements include:

- many operations management enhancements

## **Oracle 9i Scalability Enhancements**

As the demand for Oracle databases to be able to support more and more users continues, issues of scalability become more important. Improvements in this area consist of:

- Real Application Clusters - new servers can be added as required
- reduced resource requirements per user
- improved resource management features to give greater control at lower levels

## **Oracle 9i Security Enhancements**

As the number of users increase and the locations and types of users become more diverse, better security (and privacy) features become essential. The security improvements for Oracle 9i are:

- Improved user security (more password management features, etc.)
- Row-level access control (Oracle Label Security)

## Oracle 9i Availability Improvements

For the last few releases Oracle have been putting a lot of effort into increasing database availability and this continues with Oracle 9i with new features including:-

- Disaster recovery enhancements (standby database management, LogMiner)
- Reduction in off-line maintenance requirements (CREATE TABLE ... AS SELECT... etc.)
- Faster and more precise database repair (after corruption/instance failure)
- Enabling queries to go back in time with flashback queries

# DESIGNING PHASE

## DATA FLOW DIAGRAM

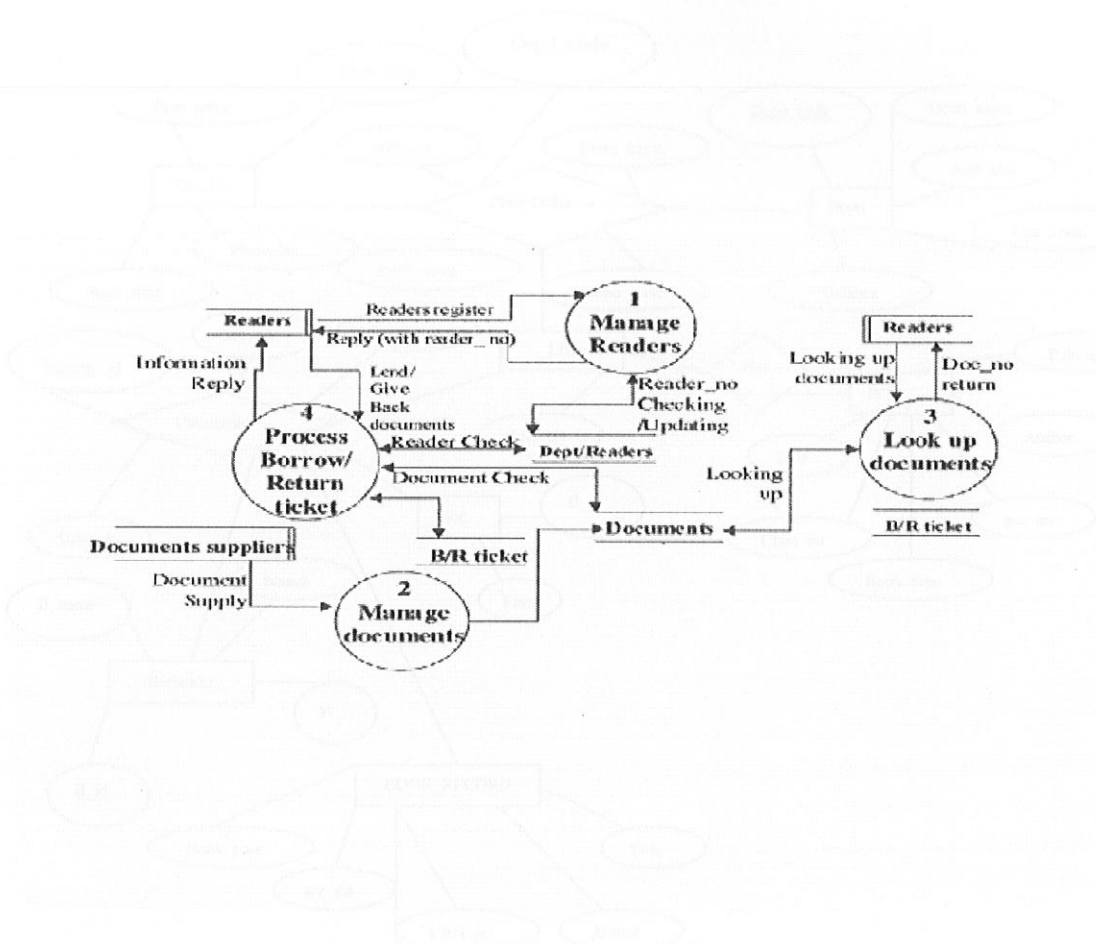
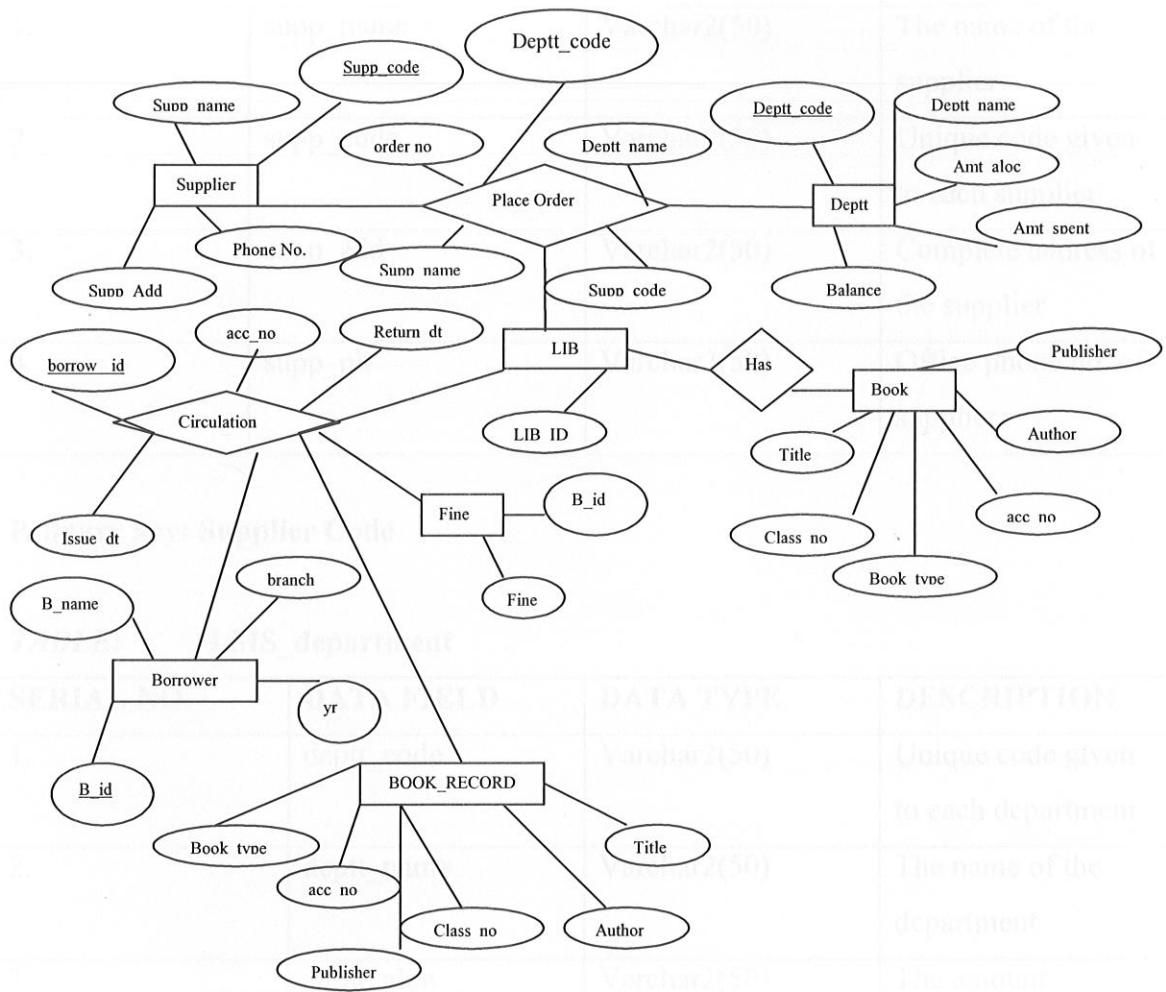


FIG. 1 DFD of the library system

## E-R MODEL



**FIG. 2 E-R Model**

## TABLES

**TABLE: LMS\_supplier**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	supp_name	Varchar2(50)	The name of the supplier
2.	supp_code	Varchar2(50)	Unique code given to each supplier
3.	supp_add	Varchar2(50)	Complete address of the supplier
4.	supp_ph	Varchar2(50)	Office phone no. of supplier

**Primary key: Supplier Code**

**TABLE: LMS\_department**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	deptt_code	Varchar2(50)	Unique code given to each department
2.	deptt_name	Varchar2(50)	The name of the department
3.	amnt_aloc	Varchar2(50)	The amount allocated to a department
4.	amnt_spent	Varchar2(50)	Tells the expenditure

**Primary key: Department Code**

**TABLE: LMS\_placeorder**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	order_no	VARCHAR2(50)	Gives a unique code to the order
2.	date	Varchar2(50)	Date on which order is placed
3.	deptt_code	Varchar2(50)	Unique code given to each department
4.	deptt_name	Varchar2(50)	The name of the department
5.	supp_code	Varchar2(50)	Unique code given to each supplier
6.	supp_name	Varchar2(50)	The name of the supplier
7.	author	Varchar2(50)	Author of the book to be ordered
8.	title	Varchar2(50)	Title of the book to be ordered
9.	publisher	Varchar2(50)	Publisher of the book to be ordered
10.	copies	Varchar2(50)	No. of copies needed to be ordered

**Primary key: Order No.**

**Foreign key: Department Code, Supplier Code**



**TABLE: LMS\_record**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	borrow_name	Varchar2(50)	The name of the borrower
2.	borrow_id	Varchar2(50)	Borrower's card no.
3.	branch.	Varchar2(50)	The Branch he is in
4.	year	Varchar2(50)	The year the borrower is in
5.	address	Varchar2(50)	The complete address of the borrower

**Primary key: Borrower's no.**

**TABLE: LMS\_book**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	acc_no	Varchar2(50)	Unique No. of each book
2.	author	Varchar2(50)	Author of the book
3.	title	Varchar2(50)	Title of the book
4.	publisher	Varchar2(50)	Publisher of the book
5.	cost	Varchar2(50)	Cost of the book
6.	class_no	Varchar2(50)	The place where the book is located
7.	status	Varchar2(50)	If the book is available to be issued or not

**Primary key: Accession no.**

**TABLE: LMS\_circulation**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	borrow_id	Varchar2(50)	Borrower's card no.
2.	acc_no	Varchar2(50)	Accession no. of the book
3.	issue_dt	Varchar2(50)	The date of issuing the book
4.	return_dt	Varchar2(50)	The expected date of return

**Primary key: Accession no.**

**Foreign key: Borrower's no.**

**TABLE: LMS\_lib**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	lib_id	Varchar2(50)	The unique library Id assigned to the library

**Primary key: Lib ID**

**TABLE: LMS\_fine**

SERIAL NO.	DATA FIELD	DATA TYPE	DESCRIPTION
1.	fine	Varchar2(50)	Fine on each student
2.	borrow_id	Varchar2(50)	Borrower's card no.

## THE STARTUP SCREEN

This screen is meant to be used only by the JUIT library staff. Before using this screen they are required to supply their usernames and passwords. Depending upon their usernames and passwords they are granted access and privileges to this screen.

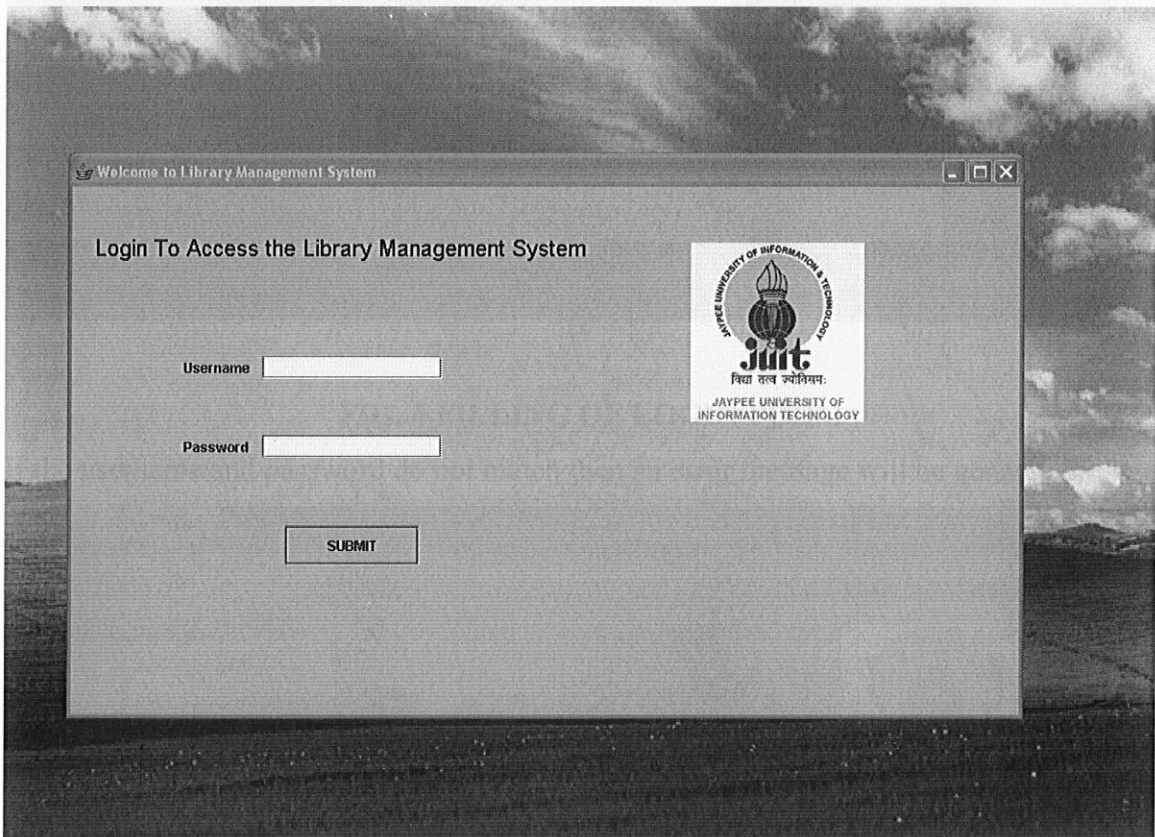
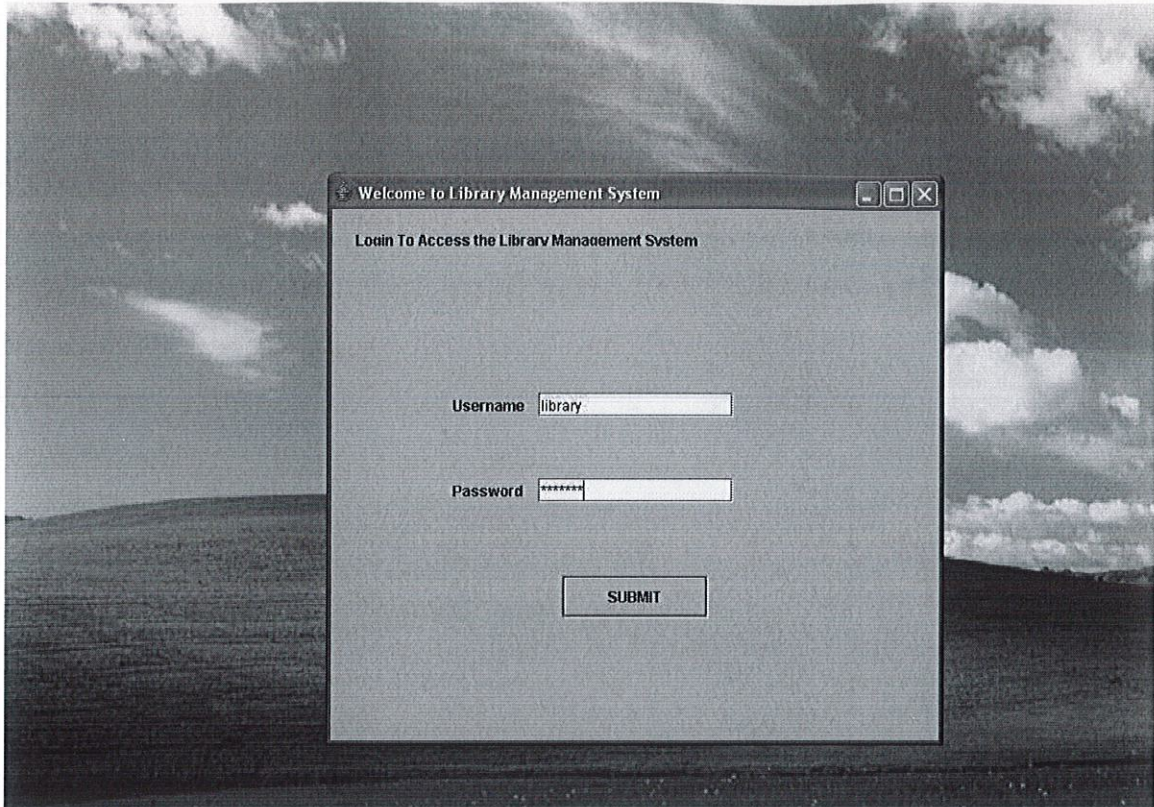
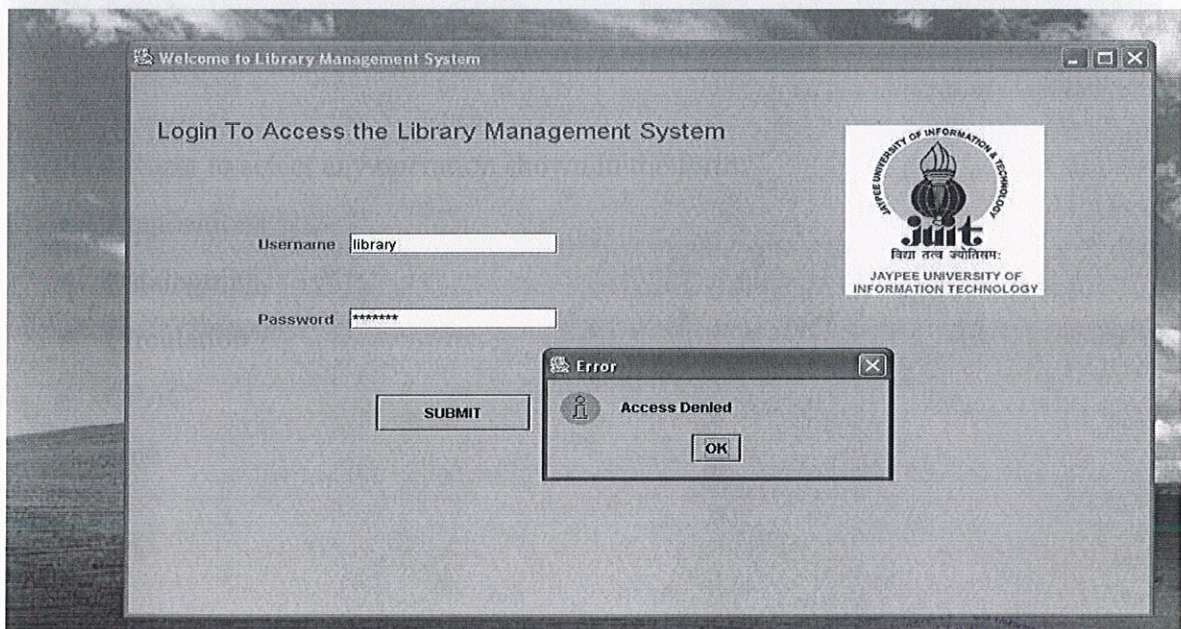


FIG. 3 LOGIN SCREEN



**FIG. 4 FILLING OF LOGIN FORM**

If the username and password do not match then an error message will be generated.



**FIG. 5 ACCESS DENIED**



## MANAGEMENT AND MAINTENANCE

After signing in the ThinkQuest, management and maintenance screen opens up

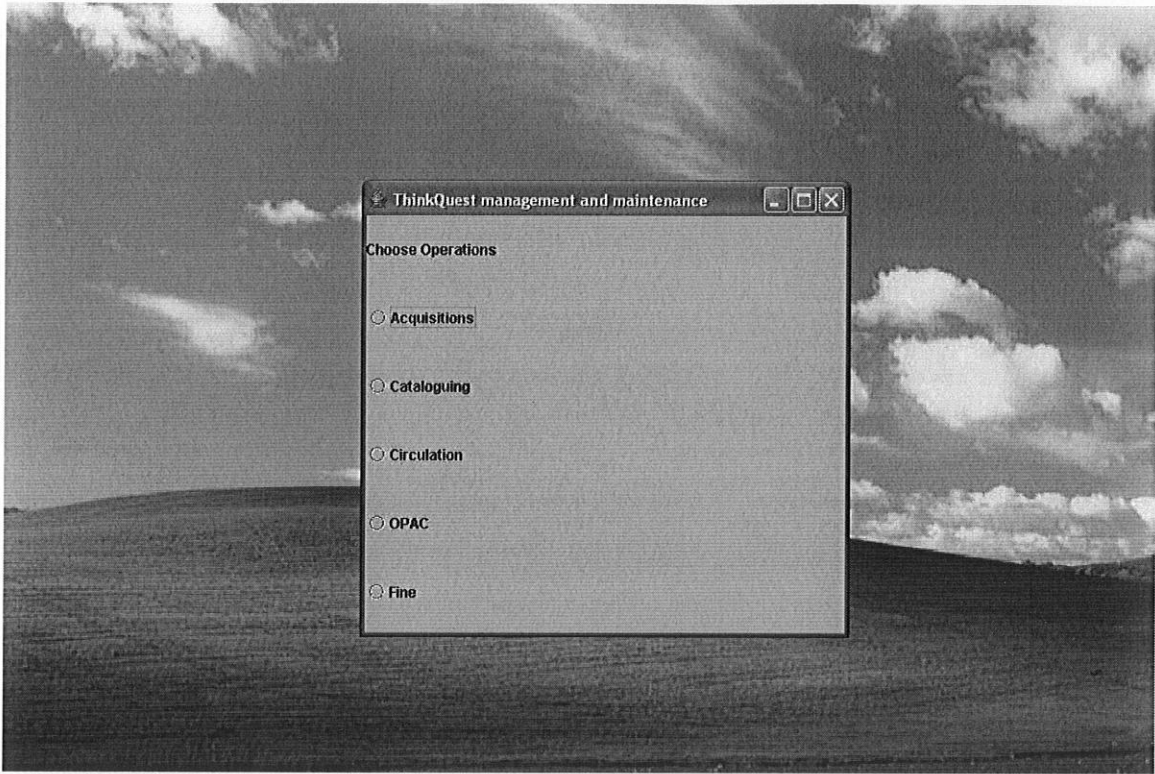


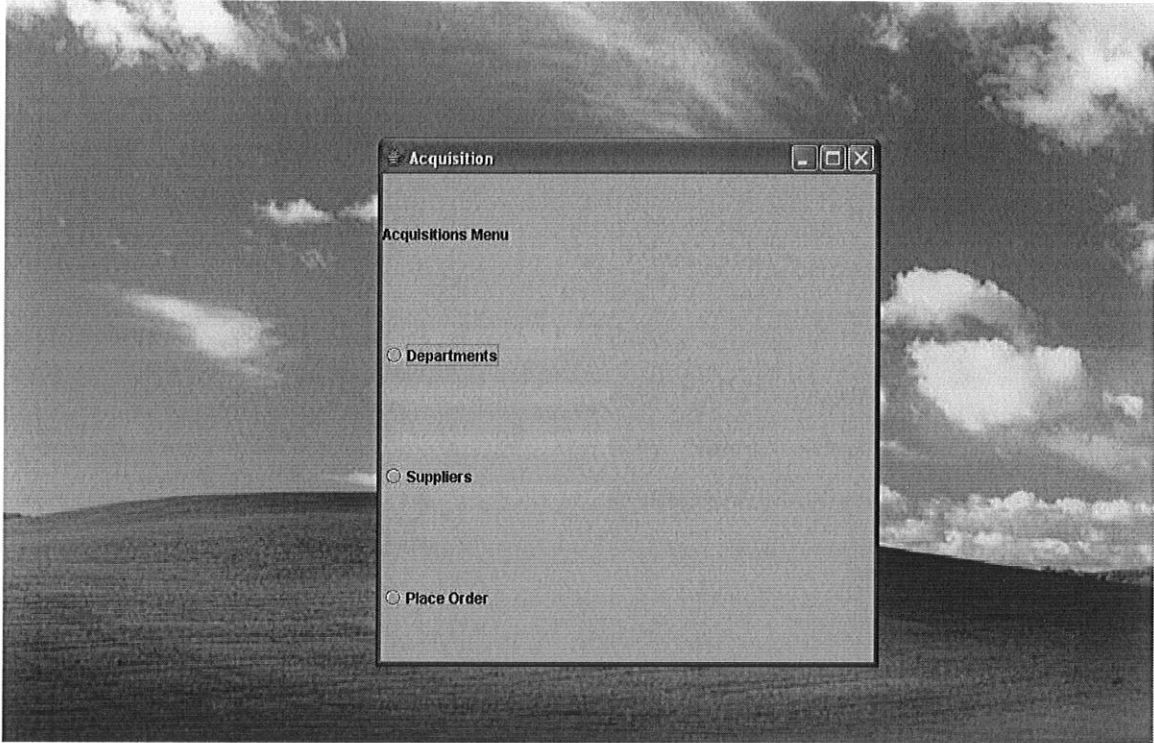
FIG. 6 MANAGEMENT FORM

It asks the user to select any operation shown in the form.

- Acquisitions
- Cataloguing
- Circulation
- OPAC
- Fine

## ACQUISITIONS

Selecting 'Acquisitions' the following screen opens

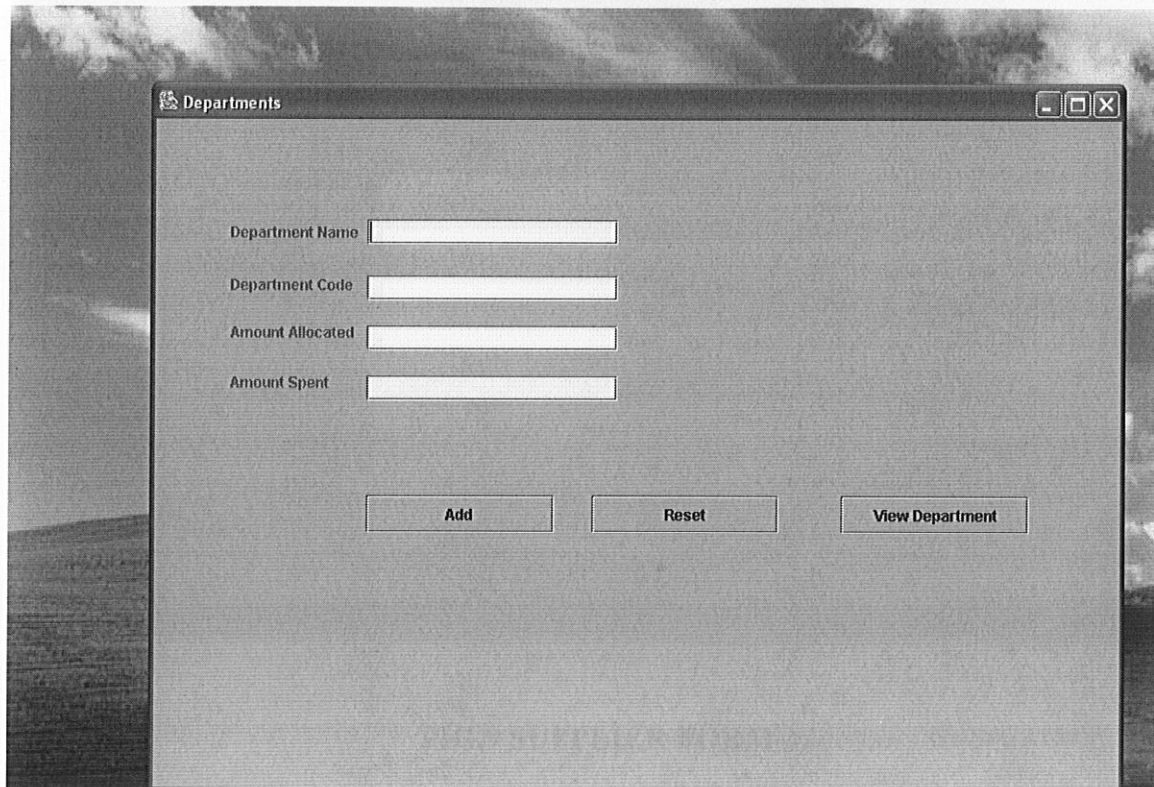


**FIG. 7 ACQUISITION FORM**

From this screen user can select the option corresponding to acquisition

## DEPARTMENTS

This screen gives the details regarding how much money is allocated to a department in a finance year & how much money is spent.

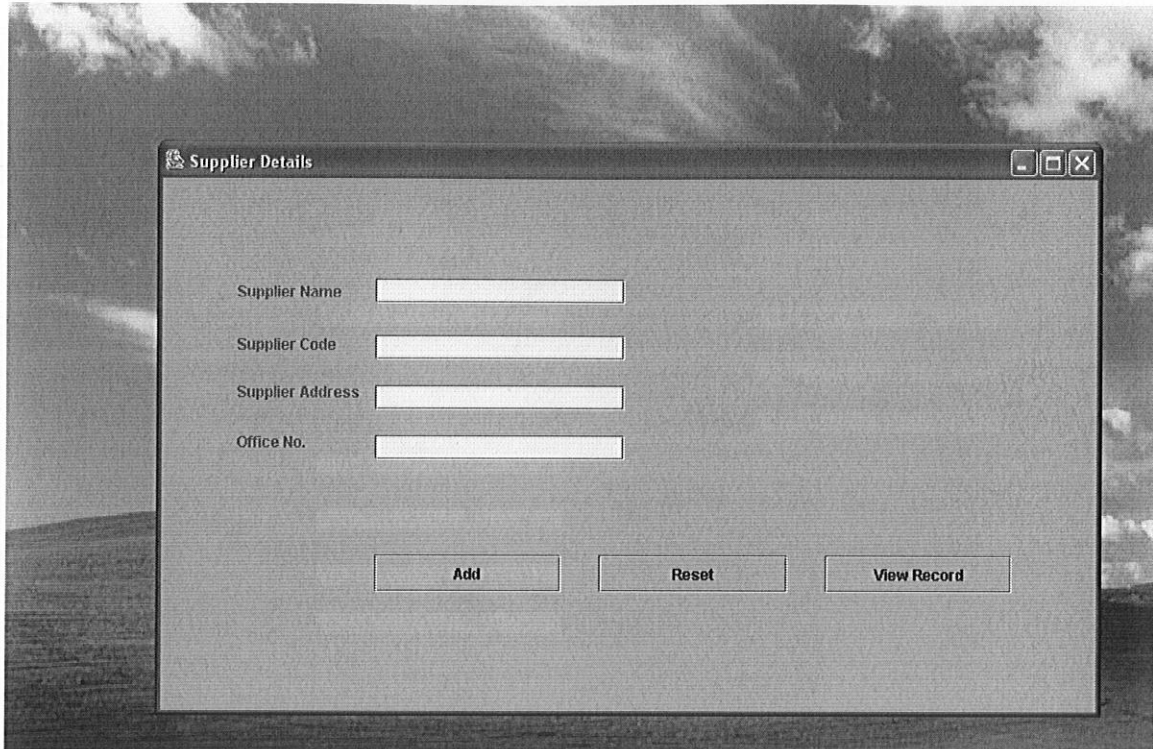


The screenshot shows a window titled "Departments" with a standard Windows-style title bar (minimize, maximize, close buttons). The main content area contains four text input fields stacked vertically, each with a label to its left: "Department Name", "Department Code", "Amount Allocated", and "Amount Spent". Below these fields are three buttons: "Add", "Reset", and "View Department", arranged horizontally from left to right.

**FIG. 8 DEPARTMENT FORM**

## PLAC SUPPLIER SCREEN

This screen shows the detail of the supplier *add to suppliers*

A screenshot of a software window titled "Supplier Details". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. The main content area contains four text input fields, each with a label to its left: "Supplier Name", "Supplier Code", "Supplier Address", and "Office No.". Below these fields are three buttons: "Add", "Reset", and "View Record". The background of the window is a grayscale image of a landscape with hills and a cloudy sky.

**FIG.9 SUPPLIER FORM**

This screen assigns a unique code for each supplier. Hence in all the further screens used the supplier will be identified by the supplier code only. This screen contains all the relevant information regarding a supplier.



## PLACE ORDER SCREEN

This screen is meant to feed the orders placed to suppliers

The screenshot shows a window titled "Place Order Form" with the following fields and controls:

- Order Number:
- Date of Order:
- Deptt. Code:
- Deptt. Name:
- Supplier Code:
- Supplier Name:
- Author:
- Title:
- Publisher:
- Copies:

Buttons:

**FIG. 10 PLACE ORDER FORM**

After the request has been entered, the request needs to be ordered. This screen contains all the details of the receive request screen, the order no. assigns a unique number to the order and date of order.

## CATALOGUING

By clicking on the cataloguing choice you can catalogue the books by entering the various details about the books including the classification no., accession no. and then commit these entries to the central database of the library.

The screenshot shows a window titled "Books Cataloguing" with the following fields and controls:

Accession No.	<input type="text"/>	Author	<input type="text"/>
Title	<input type="text"/>	Book Type	<input type="text"/>
Publisher	<input type="text"/>	Copies	<input type="text"/>
Price	<input type="text"/>	Status	<input type="text" value="YES"/>
Class No.	<input type="text"/>		

Buttons:

FIG. 12 CIRCULATION FORM  
**FIG. 11 CATALOGUING FORM**

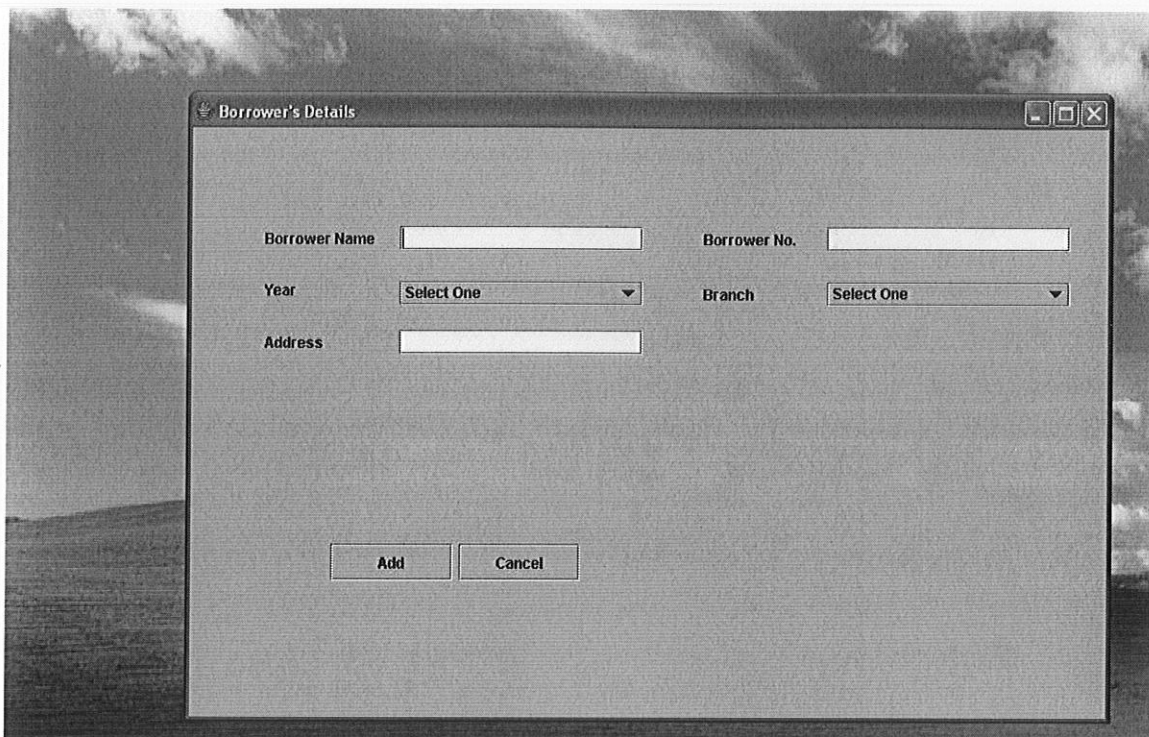
## CIRCULATION

Selecting 'circulation' from main screen of 'management and maintenance' opens following form.



**FIG. 12 CIRCULATION FORM**

## BORROWER'S DETAILS



Borrower's Details

Borrower Name

Borrower No.

Year

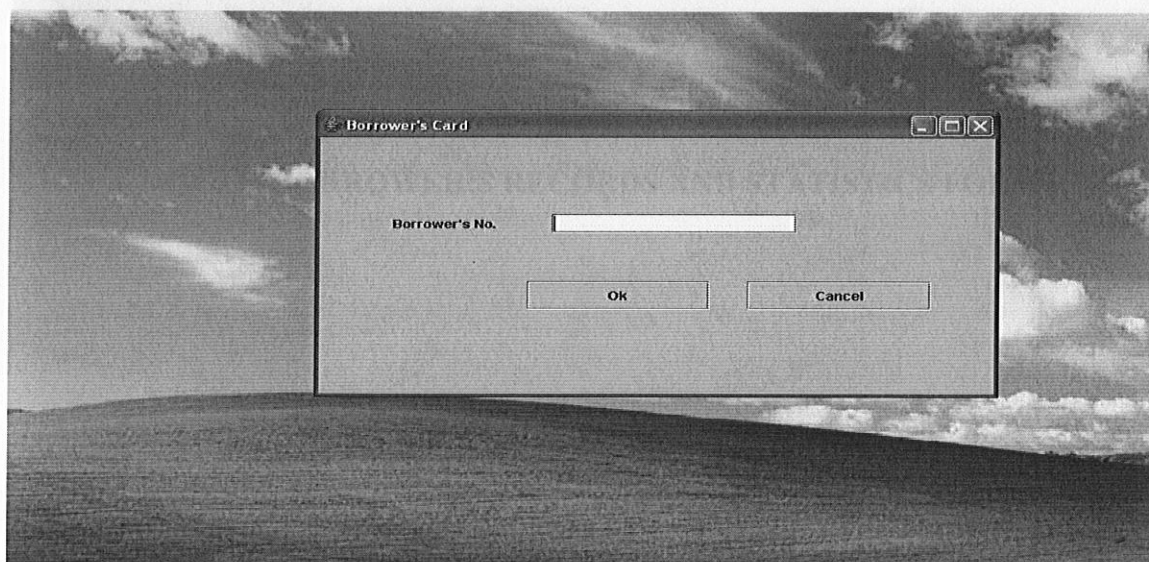
Branch

Address

Add Cancel

**FIG. 13 BORROWER'S DETAILS FORM**

When the borrower wants to issue/return a book he fills in the following form with the accession no. of the book to be issued/returned.



Borrower's Card

Borrower's No.

Ok Cancel

**FIG. 14 BORROWER'S CARD FORM**

When he/she has issued two books he/she cannot issue any other book till one of them is returned. After issuing two books the issue button is disabled

**Borrower Records and Statistics**

Name: Ayush Chittora  
Enrollment Number: 021213  
Branch: Computer Science(CS)  
Year: BTech(fourth yr)  
Address: JUIT

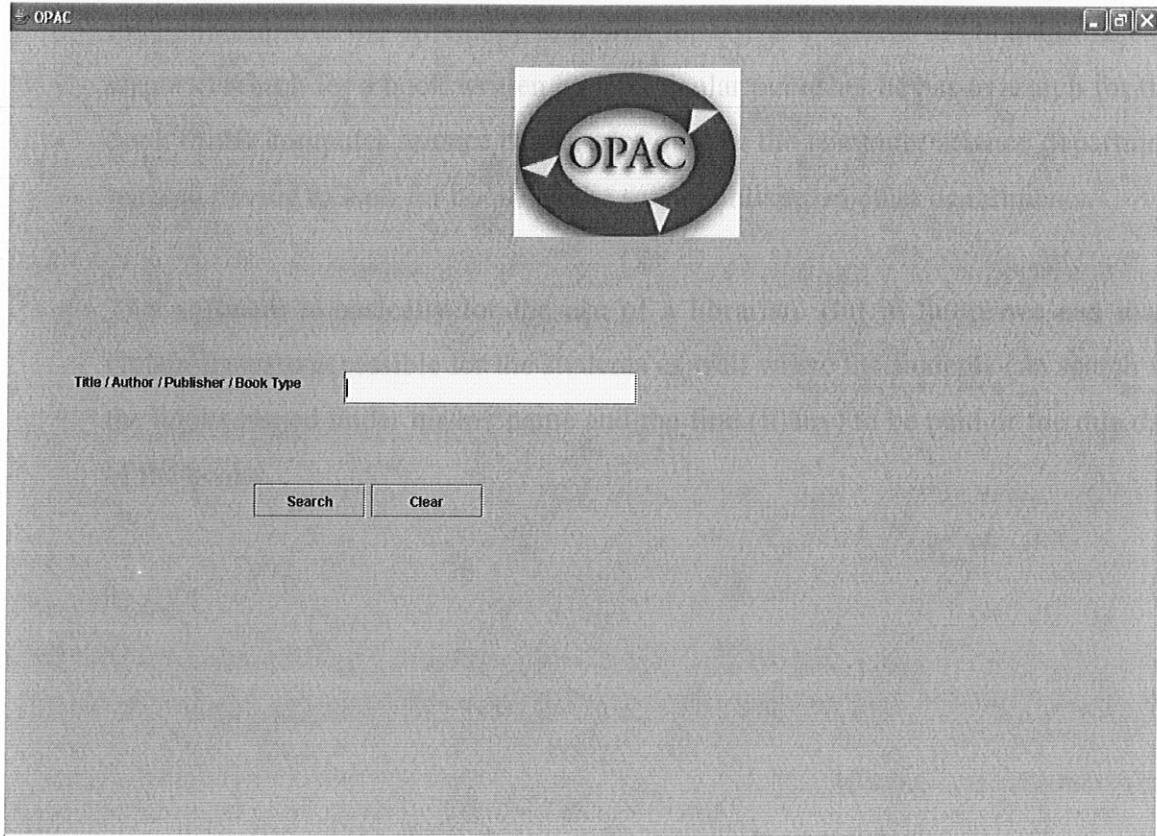
BORROW_ID	ISSUE_DT	RETURN_DT	ACC_NO
021213	5/3/06 12:00 AM	5/13/06 12:00 AM	00101
021213	5/3/06 12:00 AM	5/13/06 12:00 AM	00201

FIG. 16 OPAC FORM

**FIG. 15 BORROWER'S RECORDS AND STATISTICS FORM**

## OPAC (ONLINE PUBLIC ACCESS CATALOGUE)

On clicking on the OPAC choice you are able to do the advanced search operation.

The image shows a screenshot of a web browser window titled "OPAC". The window has a dark grey background. At the top center, there is a circular logo with the letters "OPAC" in the middle, surrounded by three curved arrows pointing clockwise. Below the logo, there is a search input field with the placeholder text "Title / Author / Publisher / Book Type". Underneath the input field, there are two buttons: "Search" and "Clear". The browser window also shows standard window control buttons (minimize, maximize, close) in the top right corner.

**FIG. 16 OPAC FORM**

Here you can search for a book either according to the title, author, publisher or book type. Even if you know just the initials of the book you will be able to get a result showing you all the books available starting with that initial.

## CONCLUSION

### **FUTURE SCOPE**

- As a future scope we can separate the library for every department. This will save time and improve the efficiency to search for e.g. if a student of computer science wants to search for a book written by a particular publisher he has to search for that book in the computer science department only in the computer science department without having to look for books by the same publisher in other departments.
- This software is basically for the use of a librarian. But in future we can make certain features accessible for the students as well where the students can search for the books issued under his/her name and the fine (if any) to be paid or the due date of the books.

#### Limitations:

1. Layout of the forms
2. Report Generation
3. Change Password

## CONCLUSION

The “ThinkQuest Library Management Systems” has been developed to enable user to search, issue or return books in the library. This module has been designed only for the use of librarian. The books can be searched according to the title, author, publisher or book type, thus simplifying the searching technique.

### Problem Faced

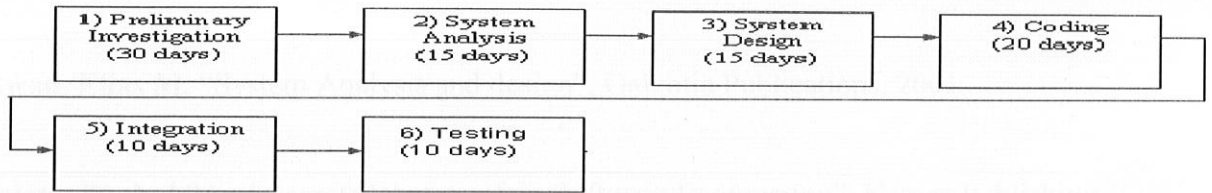
1. First Exposure to JAVA
2. Layout Problem
3. Configuring JDBC

### Limitations:

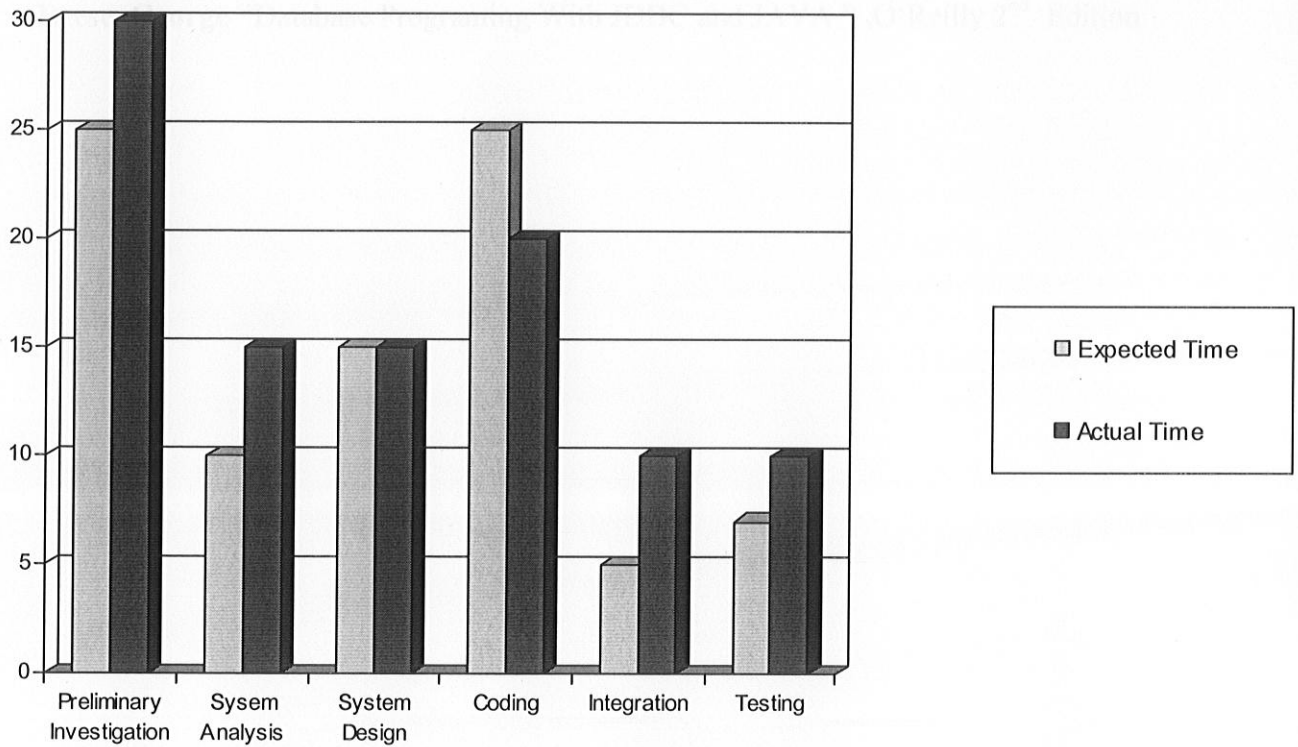
1. Layout of the forms
2. Report Generation
3. Change Password



## PERT CHART



**FIG. 17 PERT CHARTS**



**FIG.18 Comparison between expected and actual time taken**

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