Bachelor of Technology (B.Tech)

Department of Computer Science and Engineering

III year I sem- Software Engineering
Laboratory Manual

SIDDHARTHA INSTITUTE OF TECHNOLOGY & SCIENCES

(Approved by AICTE, New Delhi & Affiliated to JNTUH,
Hyderabad)Accredited by NBA and NAAC with 'A+' Grade
Narapally, Korremula Road, Ghatkesar, Medchal- Malkajgiri (Dist)-501 301

Vision of the Institute

To be a reputed institute in technical education towards research, industrial and societal needs.

Mission of the Institute

Mission	Statement
IM_1	Provide state-of-the-art infrastructure, review, innovative and experiment teaching –learning methodologies.
IM_2	Promote training, research and consultancy through an integrated institute industry symbiosis
IM_3	Involve in activities to groom professional, ethical values and social responsibility

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(*Approved by AICTE, New Delhi &Affiliated to JNTUH, Hyderabad*)
Narapally, Telangana – 500 088.

Department of Computer Science and Engineering

Vision of the Department

To be a recognized center of Computer Science education with values, and quality research

Mission of the Department

Mission	Statement
DM_1	Impart high quality professional training with an emphasis on basic principles of Computer Science and allied Engineering
DM_2	Imbibe social awareness and responsibility to serve the society
DM_3	Provide academic facilities, organize collaborated activities to enable overall development of stakeholders

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Department of Computer Science and Engineering

Program Educational Objectives (PEOs)

PEO's	Statement
PEO1	Graduates will be able to solve Computer Science and allied Engineering problems, develop proficiency in computational tools.
PEO2	Graduates will be able to communicate and work efficiently in Multidisciplinary teams with a sense of professional and social responsibility.
PEO3	Graduates will be able to exhibit lifelong learning ability andpursue career as architects, software developers and entrepreneurs.

Programme Outcomes

PO1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental context, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and team network:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-Long learning:** Recognize the need for, and have the preparation and able to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO1	**Program Applications:** Able to develop programs modules for cloud based applications.
PSO2	**Development Tools:** Able to use tools such as Weka, Rational Rose Raspberry-Pi, Sql and advanced tools

SOFTWARE ENGINEERING LAB

PREREQUISITES:

A course on "Programming for Problem Solving"

.

COURSE OBJECTIVES:

To have hands on experience in developing a software project by using various softwareengineering principles and methods in each of the phases of software development.

COURSE OUTCOME

1. Ability to translate end-user requirements into system and software requirements
2. Ability to generate a high-level design of the system from the software requirements
3. Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Course Name: SE LAB **Course Code**: CS505PC

Year/Semester: **III/I** **Regulation: R18**

List of Experiments

Do the following 8 exercises for any two projects given in the list of sample projects or any otherprojects:

1) Development of problem statement.
2) Preparation of Software Requirement Specification Document, Design Documents and TestingPhase related documents.
3) Preparation of Software Configuration Management and Risk Management related documents.
4) Study and usage of any Design phase CASE tool
5) Performing the Design by using any Design phase CASE tools.
6) Develop test cases for unit testing and integration testing
7) Develop test cases for various white box and black box testing techniques.

FACULTY **HOD, CSE**

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

EXPERIMENT 1

1. Problem Statement: A Book Bank lends books and magazines to member, who is registered in the system. Also it handles the purchase of new titles for the Book Bank. Popular titles are brought into multiple copies. Old books and magazines are removed when they are out or date or poor in condition. A member can reserve a book or magazine that is not currently available in the book bank, so that when it is returned or purchased by the book bank, that person is notified. The book bank can easily create, replace and delete information about the tiles, members, loans and reservations from the system.

2. Preparation of Software Requirement Specification Document:

Users Characteristics:

Student: They are the people who desire to obtain the books and submit the information to the database.

Librarian: He has the certain privileges to add the books and to approval of the reservation of books.

System Modules:

Log in: Secure registration of student and librarian by filling online registration form.

Book bank: Book bank contains all the books. New book added to the book bank with bookno, title name, author, edition, publisher name details to the database. Any book is deleted if damaged. Update of the book information also done.

Operations: student and administrator perform their operations like add book, delete book, update information, view book details are implemented in log in WebPages.

Non-functional requirements:

Privacy: privacy maintained for each and every user by providing user credentials username and password.

Portability: installation on multiple platforms and execution of software.

3. Preparation of Software Configuration Management

Software Requirements:

Operating sytem: windows 7/10

Front end : J2EE

Back end : My SQL Server

IDE used : Netbeans

Hardware Requirements:

Processor:i3 or higher

RAM : 4 GB

Hard Disk drive: 500 GB

1. Study and usage of any Design phase CASE tool

CASE Tool: STARUML

How to Install StarUML on Windows 10

Star UML is a UML (**Unified Modeling Language**) tool, introduce by MKLab. It is an open-source modeling tool that supports the UML framework for system and software modeling. StarUML is based on UML version 1.4, it provides 11 different types of diagram and it accepts UML 2.0 notation. Version 2.0 was released for beta testing under a property license.

StarUML is actively supporting the **MDA (Model Driven Architecture).** It approaches by supporting the UML profile concept and allowing it to generate code for multiple languages. It also provides a number of bug fixes and improved compatibility with the modern versions of the Windows Operating System.

StarUML is mostly used by the Agile and small development teams, professional persons and used by the educational institutes

Diagram Types in StarUML

1. Use Case Diagram

2.Class Diagram

3.Sequence Diagram

4.Collaboration Diagram

5.Statechart Diagram

6.Component Diagram

7.Deployment Diagram

8. Composite Structure Diagram

Features of StarUML

1. It supports multi-platform such as macOS, Windows, and Linux.
2. It involves UML 2.x.standard compliant.
3. Includes Entity-Relationship diagram (ERD), Data-flow diagram (DFD), and Flowchart diagram.
4. It creates multiple windows.
5. It has modern UX and dark and light themes.
6. Featured with retina (High-DPI) display support.
7. Includes model-driven development.
8. It has open APIs.
9. Supports various third-party extensions.
10. Asynchronous model validation.

11. It can export to HTML docs.

Steps to Download and Install StarUML

Step 1: Go on the browser, type in the URL “StarUML”

Step 2: Click on the very first search “Download-StarUML”.

Step 3: There will be 3 Operating Systems (OS) options, click on the option as per the devise OS.

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2. Performing the Design by using any Design phase CASE tools

CASE Tool: StarUML

Use_Case Diagram:

The book bank use cases are:

1. book_issue
2. book_return
3. book_order
4. book_entry
5. search book_details

Actors Involved:

1. Student

2. Librarian
3. Vendor

Usecase Name : Search Book_Details

The librarian initiates this use case when any member returns or request the book and checking if the book is available.

Precondition: The librarian should enter all Book details.

Normal Flow: Build message for librarian who search the book.

Post Condition: Send message to respective member who reserved the book.

Usecase Name : Book_ Issue

Initiated by librarian when any member wants to borrow the desired book. If the book is available, the book is issued.

Precondition: Member should be valid member of library.

Normal Flow: Selected book will be issued to the member.

Alternative Flow: If book is not available then reserved book use case should be initiate. **Post Condition:** Update the catalogue.

Usecase Name : Book_Order

Initiated by librarian when the requested book is not available in the library at that moment. The book is reserved for the future and issued to the person when it is available.

Precondition: Initiated only when book is not available.

Normal Flow: It reserved the book if requested.

Post Condition : Mention the entry in catalogue for reservation.

Usecase Name : Book_Return

Invoked by the librarian when a member returns the book.

Precondition: Member should be valid member of library.

Normal Flow: Librarian enters bookid and system checks for return date of the book. **Alternative Flow:** System checks for return date and if it returned late fine message will be displayed.

Post Condition: Check the status of reservation.

Usecase Name : Book_Entry

The purchase book use-case when new books invoke it or magazines are added to the library.

Precondition: Not available or more copies are required.

Normal Flow: Enter bookid,author information, publication information, purchased date, prize and number of copies.

Post Condition: Update the information in catalogue.

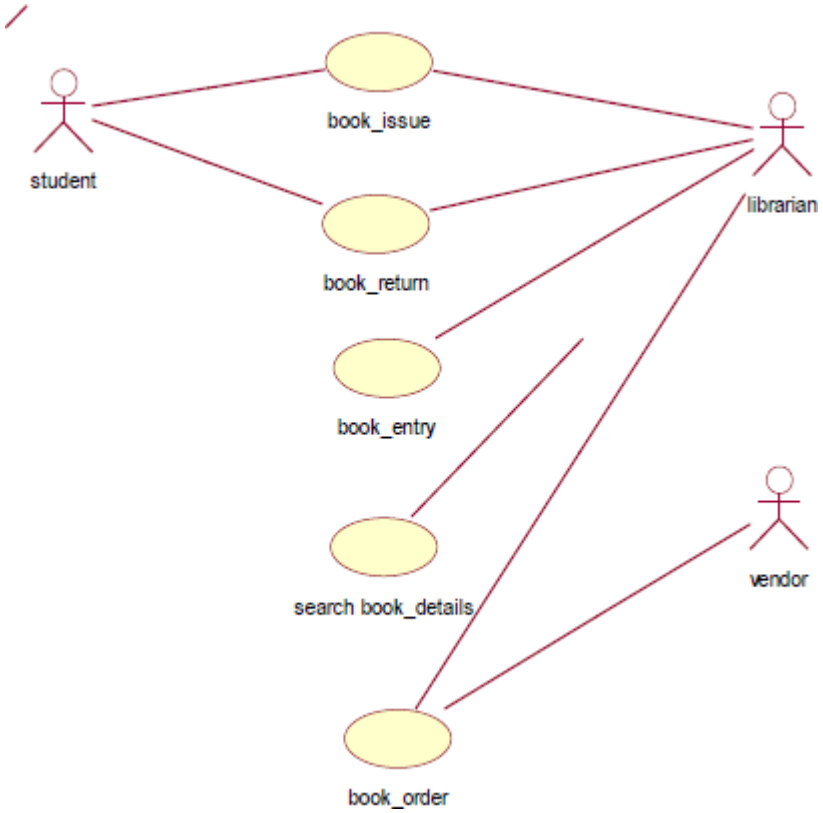

Figure 1. Usecase diagram for Book Bank System

Activity Diagram:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with

support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a

system. An activity diagram shows the overall flow of control. An activity is shown as an rounded box containing the name of the operation.

This activity diagram describes the behaviour of the system.

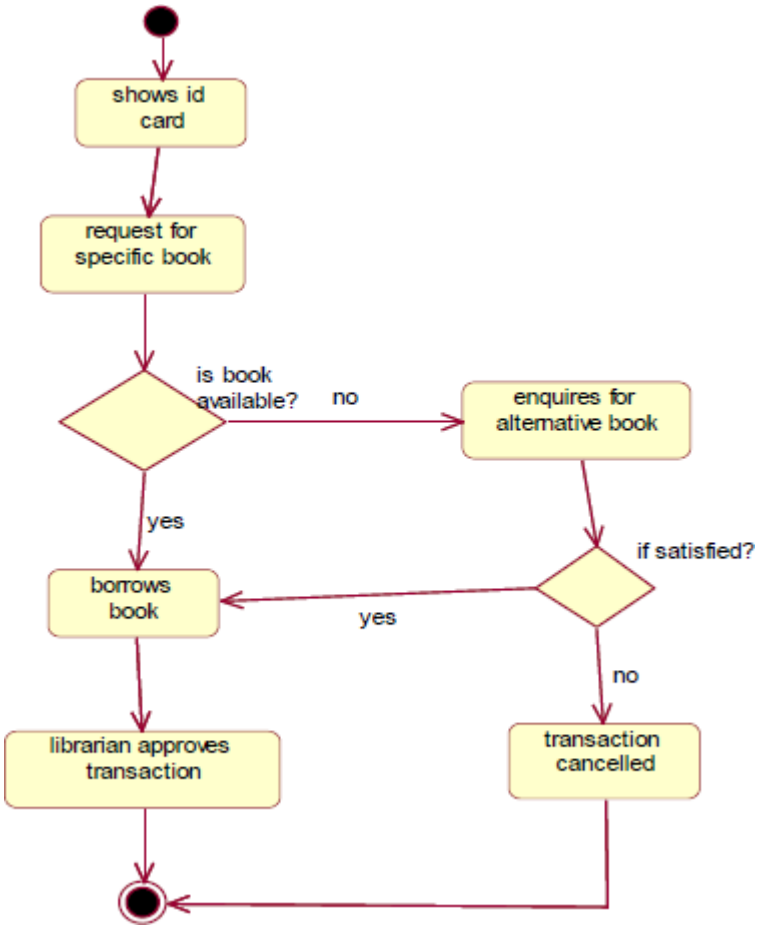

Figure 2. Activity Diagram for Book Bank System [borrow book]

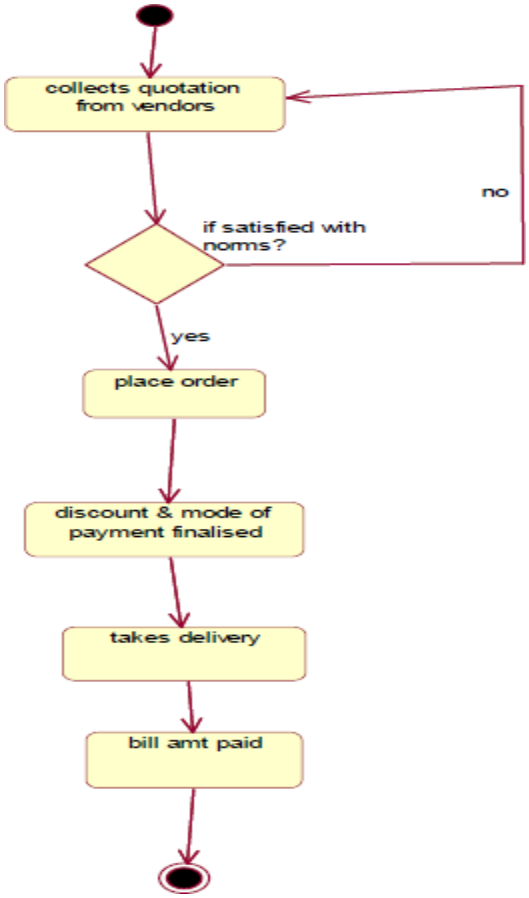

Figure 3. Activity Diagram for Book Bank System [order book]

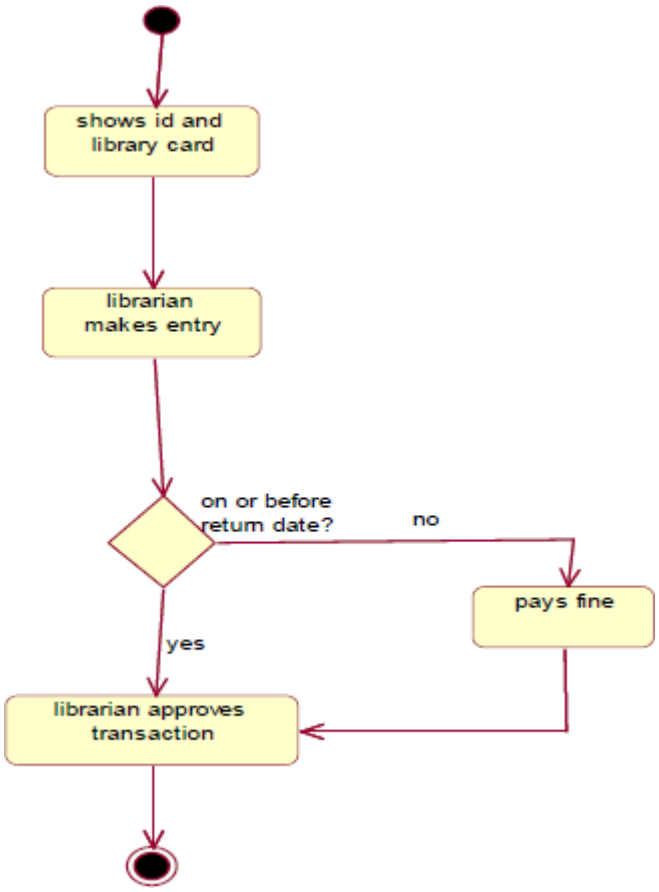

Figure 4. Activity Diagram for Book Bank System [Return book]

Sequence Diagram:

A sequence diagram represents the sequence and interactions of a given USE-CASE or scenario. Sequence diagrams can capture most of the information about the system. Most object to object interactions and operations are considered events and events include signals, inputs, decisions, interrupts, transitions and actions to or from users or external devices.

An event also is considered to be any action by an object that sends information. The event line represents a message sent from one object to another, in which the "form" object is requesting an operation be performed by the "to" object. The "to" object performs the operation using a method that the class contains.

It is also represented by the order in which things occur and how the objects in the system send message to one another.

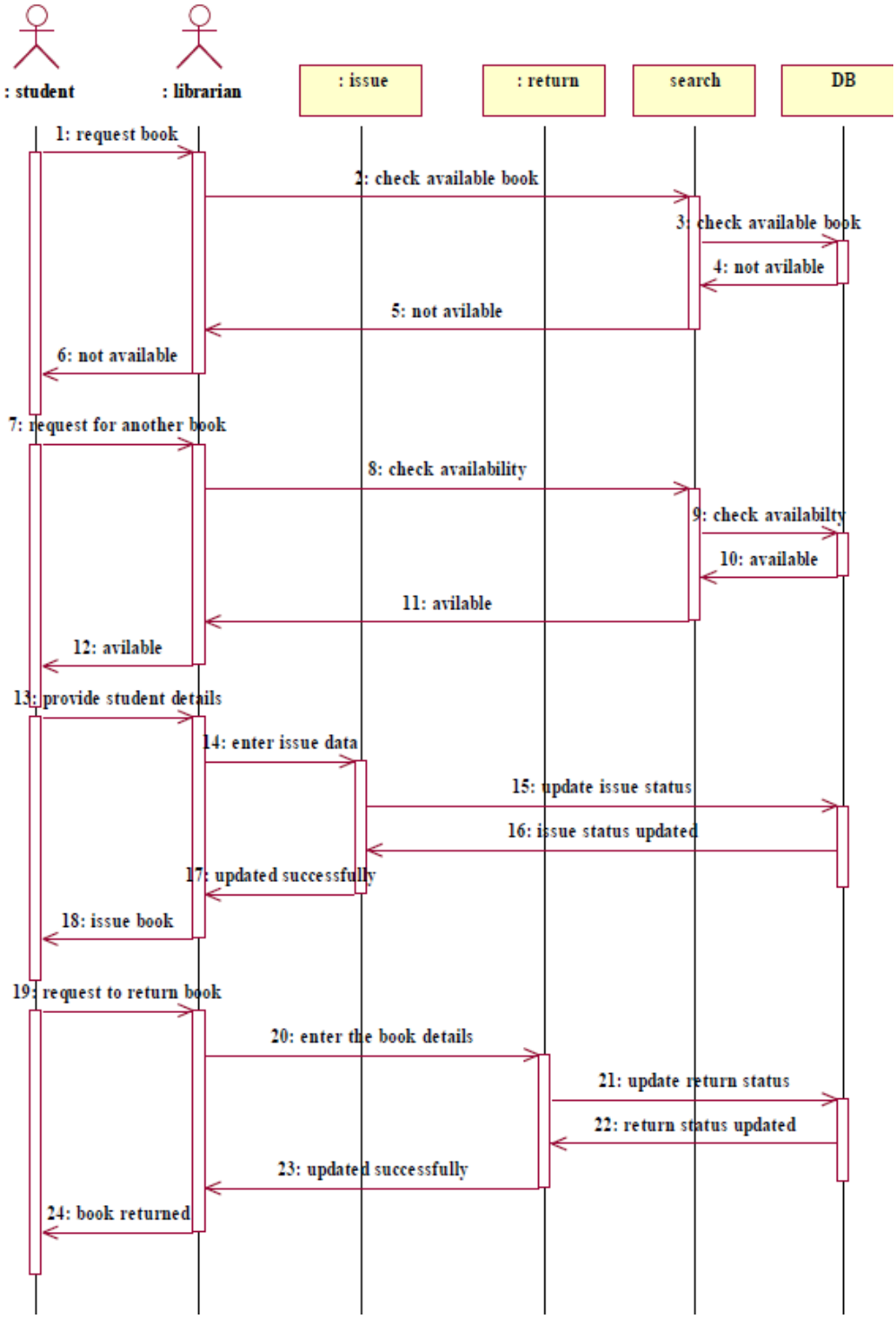

Figure 5. Sequence Diagram For Book Issue & Return

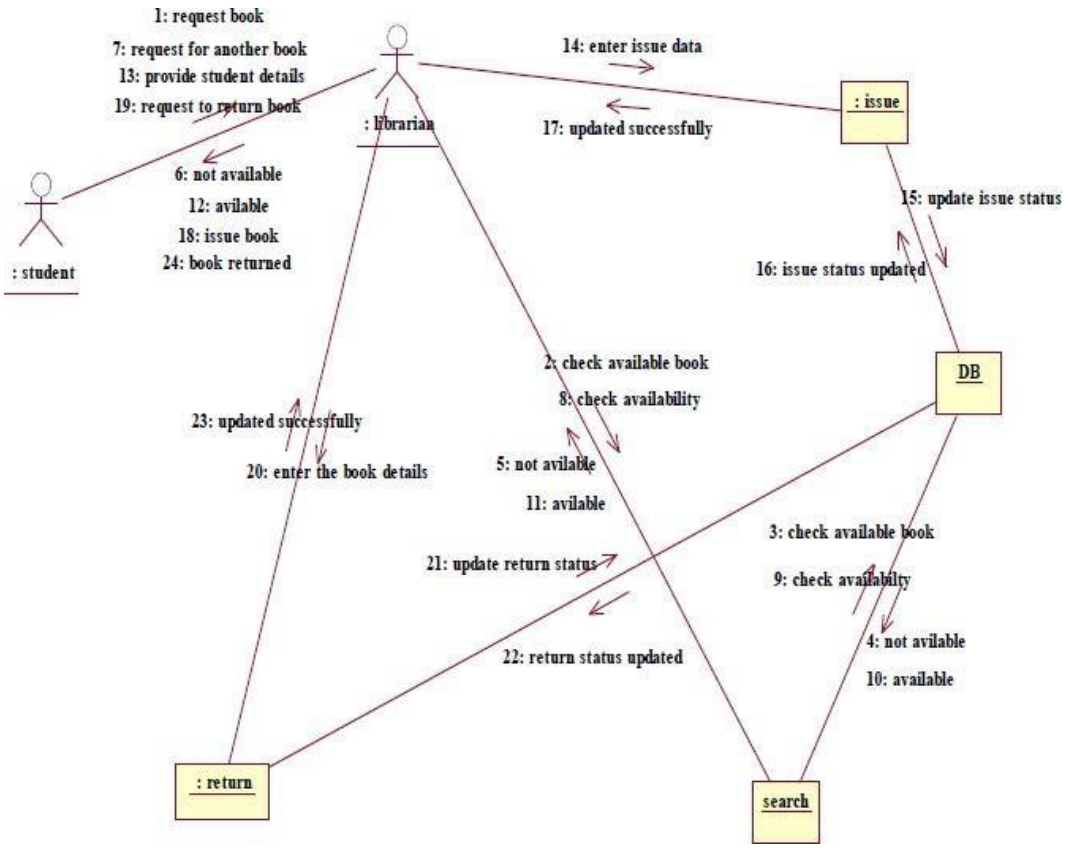

Figure 6. Collaboration Diagram For Book Issue & Return

Class Diagram:

The class diagram, also referred to as object modeling is the main static analysis diagram. The main task of object modeling is to graphically show what each object will do in the problem domain. The problem domain describes the structure and the relationships among objects.

The ATM system class diagram consists of four classes:

1. Student
2. Book
3. Issue
4. Return
5. Vendor
6. Details

1) Student:

It consists of twelve attributes and three operations. The attributes are enrollno, name, DOB, fathername, address, dept name, batch and book limits. The operations of this class are addStInfo(), deleteStInfo(), modifyStInfo().

2) Book:

It consists of ten attributes and four operations. This class is used to keep book information such as author, title, vendor, price, etc

3) Issue:

It consists of eight attributes and two operations to maintain issue details such as, issue date, accno of issued book, name of the student who borrowed book.

4) Return:

It consists of eight attributes and two operations to maintain issue details such as, issue date, accno of issued book, name of the student who borrowed book.

5) Students:

The attributes of this class are name, dept ,year ,bcode no The operation is display students().

6) Detail:

The attributes of this class are book name, author, bcode no The operations are delete details().

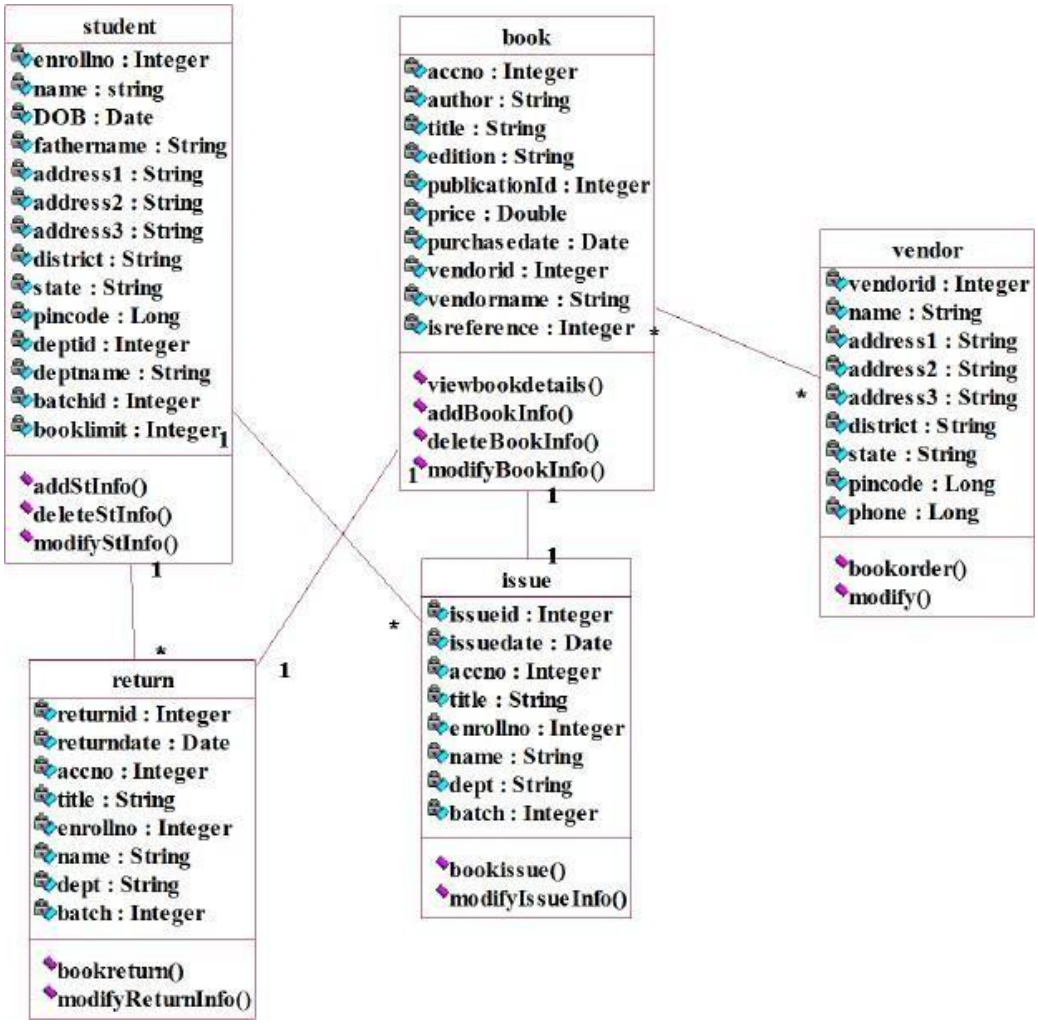

Figure 7. Class Diagram For Book Bank System

State Chart Diagram

It consists of state, events and activities. State diagrams are a familiar technique to describe the behavior of a system. They describe all of the possible states that a particular object can get into and how the object's state changes as a result of events that reach the object.

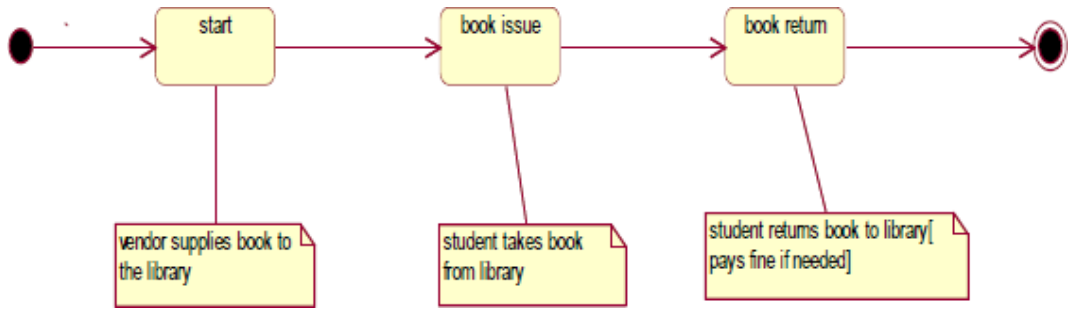

Figure 8. State Chart Diagram for BookBank System

Deployment Diagram and Component Diagram

Deployment diagrams are used to visualize the topology of the physical components of a system where the software components are deployed.

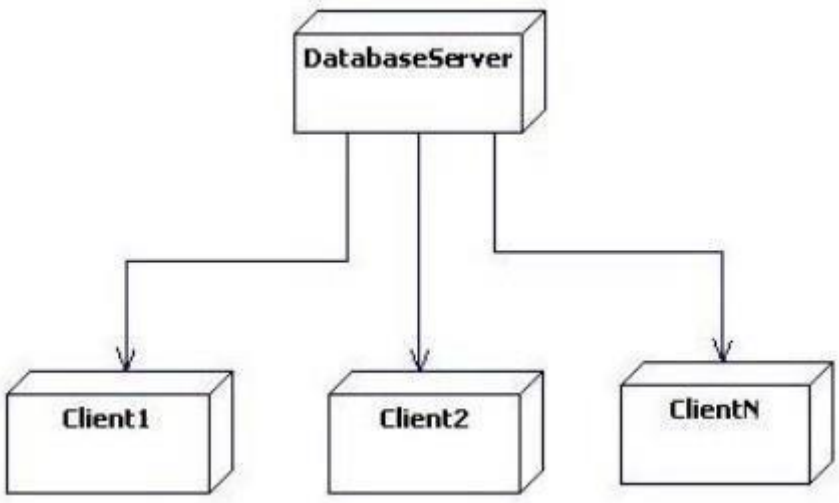

Figure 9: Deployment Diagram for Book Bank System

3. Develop test cases for unit testing and integration testing

4. Develop test cases for various white box and black box testing techniques.

LOGIN FORM:

SL.No	Test Case	Excepted Result	Test Result
1	Enter valid name and password & click on login button	Software should display main window	Successful
2	Enter invalid	Software should not display main window	successful

BOOK ENTRY FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data , if any Error like entering text data instead of number or entering number instead of text..is found then it gives proper message otherwise Adds Record To the Database	successful
2.	On the Click of DELETE Button	This deletes the details of book by using Accession no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful
4.	On the Click of SEARCH Button	Displays the Details of book for entered Accession no. Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful

USER ACCOUNT FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data , if any Error like entering text data instead of number or entering number instead of text..is found then it gives proper message otherwise Adds Record To the Database	successful
2.	On the Click of DELETE Button	This deletes the details of student by using Register no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful
4.	On the Click of SEARCH Button	Displays the Details of book for entered Register no. Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful

BOOK ISSUE FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data ,if the accession number book is already issued then it will giving proper msg.	successful
2.	On the Click of DELETE Button	This deletes the details of book by using Register no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful
4.	On the Click of SEARCH Button	Displays the Details of issued book..Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful

BOOK RETURN FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data , if any Error like entering text data instead of number or entering number instead of text..is found then it gives proper message otherwise Adds Record To the Database	successful
2.	On the Click of DELETE Button	Which deletes the details of book by using Register no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful

4.	On the Click of SEARCH Button	Displays the Details of returned book … Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful

5. Preparation of Software Requirement Specification Document:

2.1 **Users Characteristics:**

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Front end : J2EE

Back end : My SQL Server

IDE used : Netbeans

Hardware Requirements:

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Diagram Types in StarUML

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CASE Tool: StarUML

Use_Case Diagram:

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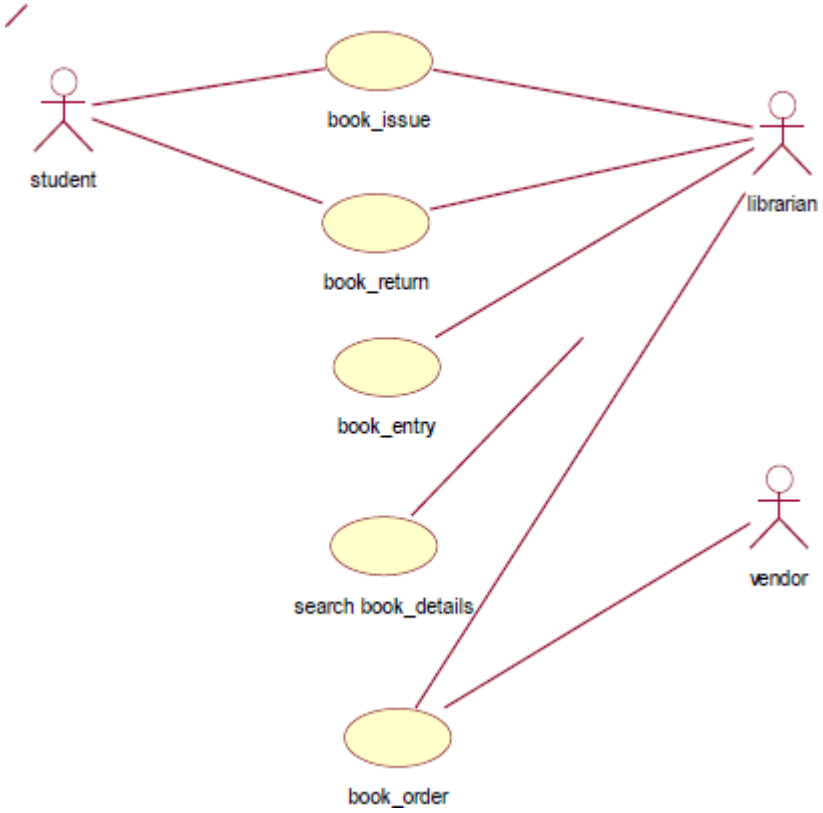

Figure 1. Usecase diagram for Book Bank System

Activity Diagram:

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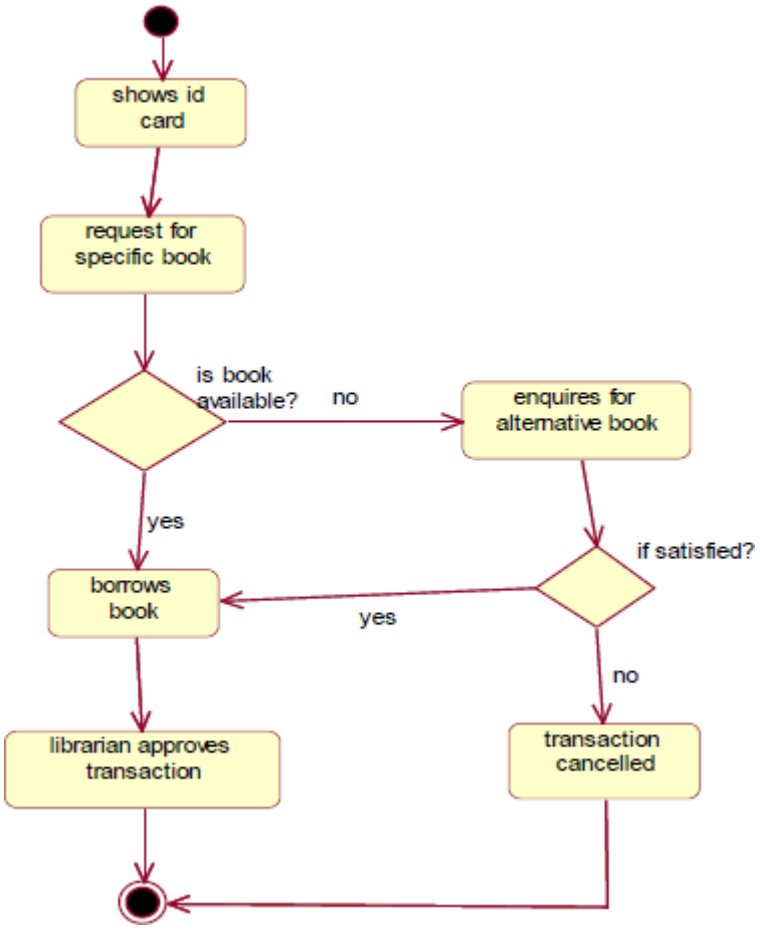

Figure 2. Activity Diagram for Book Bank System [borrow book]

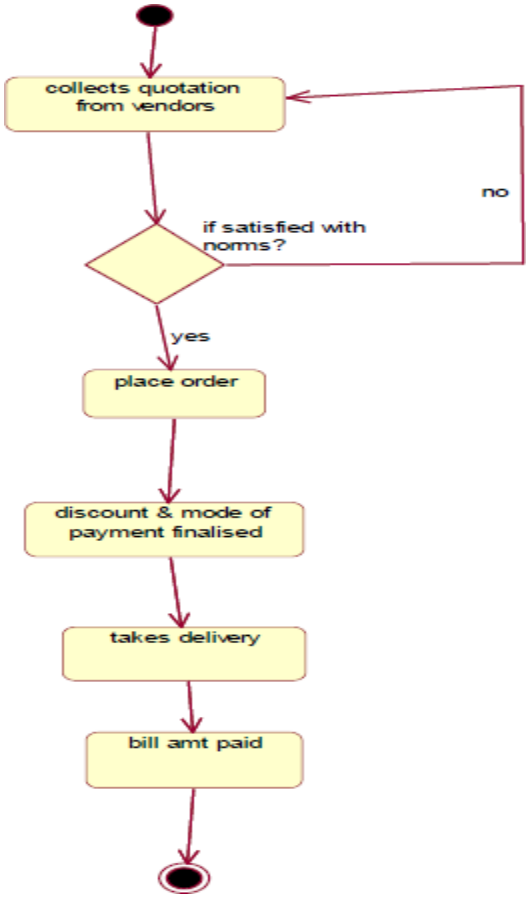

Figure 3. Activity Diagram for Book Bank System [order book]

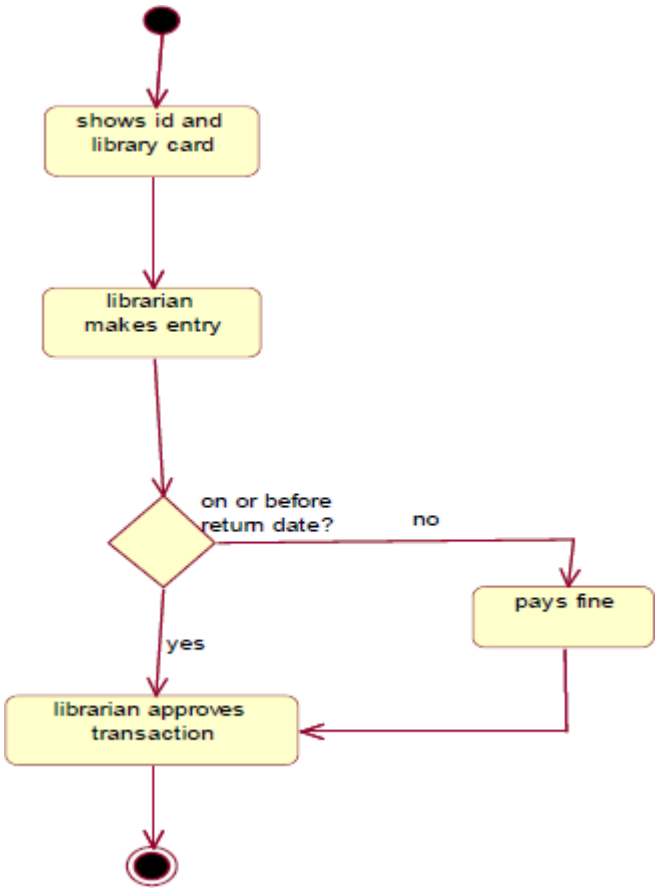

Figure 4. Activity Diagram for Book Bank System [Return book]

Sequence Diagram:

A sequence diagram represents the sequence and interactions of a given USE-CASE or scenario. Sequence diagrams can capture most of the information about the system. Most object to object interactions and operations are considered events and events include signals, inputs, decisions, interrupts, transitions and actions to or from users or external devices.

An event also is considered to be any action by an object that sends information. The event line represents a message sent from one object to another, in which the “form” object is requesting an operation be performed by the “to” object. The “to” object performs the operation using a method that

the class contains.

It is also represented by the order in which things occur and how the objects in the system send message to one another.

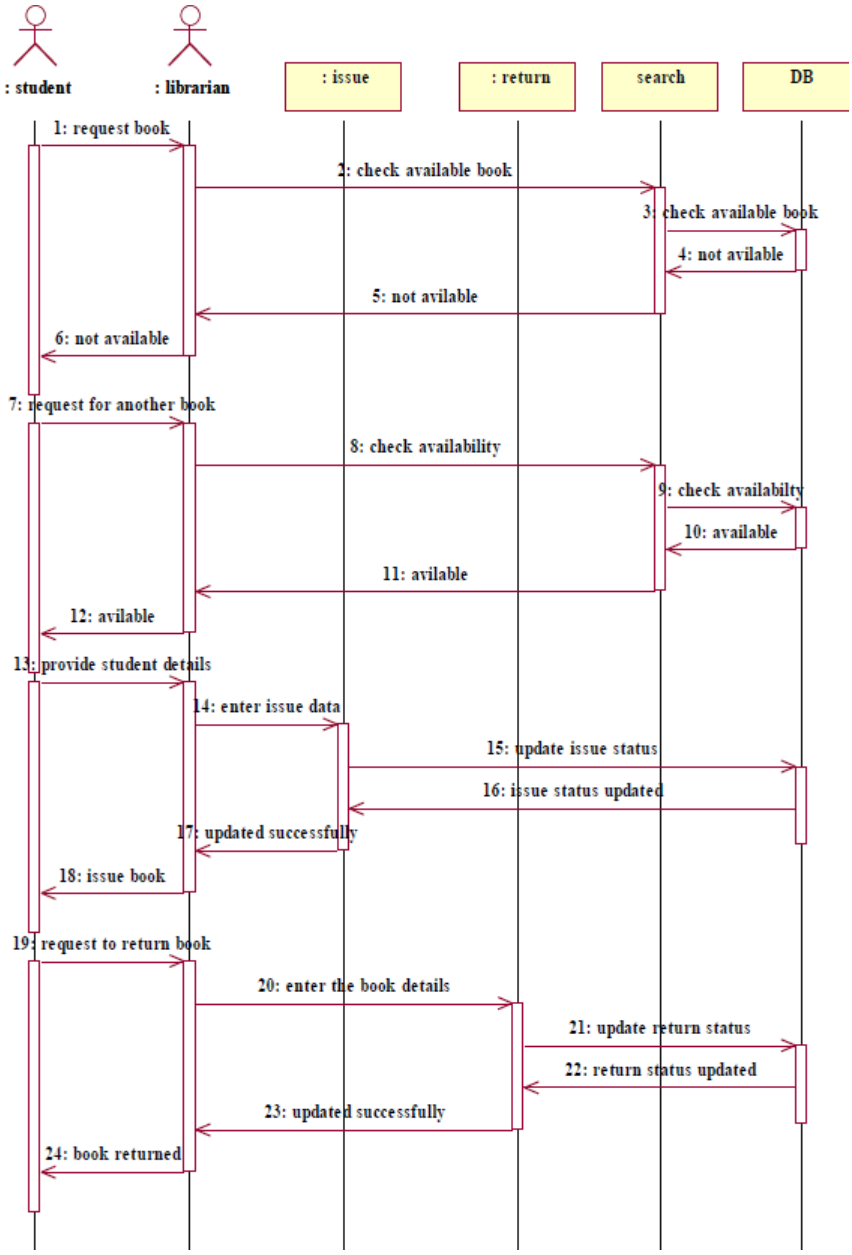

Figure 5. Sequence Diagram For Book Issue & Return

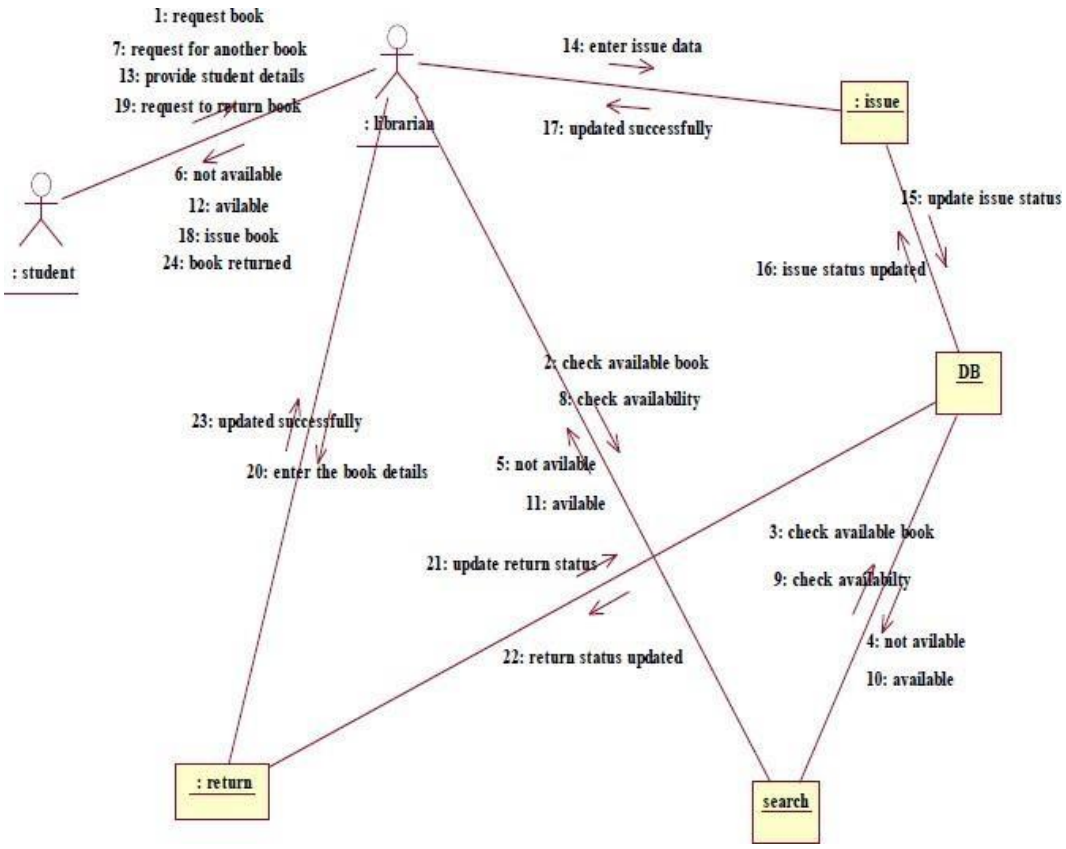

Figure 6. Collaboration Diagram For Book Issue & Return

Class Diagram:

The class diagram, also referred to as object modeling is the main static analysis diagram. The main task of object modeling is to graphically show what each object will do in the problem domain. The problem domain describes the structure and the relationships among objects.

The ATM system class diagram consists of four classes:

1. Student
2. Book
3. Issue
4. Return
5. Vendor
6. Details

1) Student:

It consists of twelve attributes and three operations. The attributes are enrollno, name, DOB, fathername, address, dept name, batch and book limits. The operations of this class are addStInfo(), deleteStInfo(), modifyStInfo().

2) Book:

It consists of ten attributes and four operations. This class is used to keep book information such as author, title, vendor, price, etc

3) Issue:

It consists of eight attributes and two operations to maintain issue details such as, issue date, accno of issued book, name of the student who borrowed book.

4) Return:

It consists of eight attributes and two operations to maintain issue details such as, issue date, accno of issued book, name of the student who borrowed book.

5) Students:

The attributes of this class are name, dept ,year ,bcode no The operation is display students().

6) Detail:

The attributes of this class are book name, author, bcode no The operations are delete details().

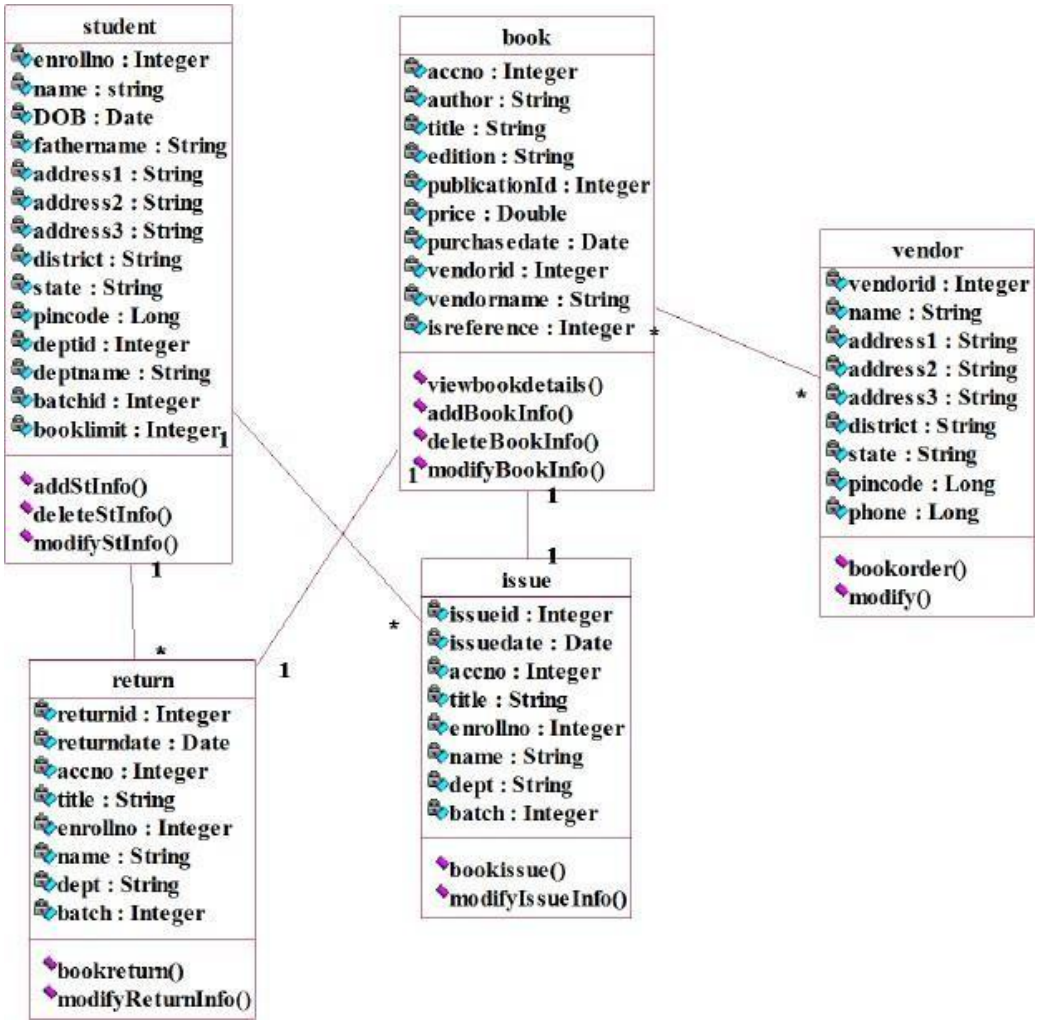

Figure 7. Class Diagram For Book Bank System

State Chart Diagram

It consists of state, events and activities. State diagrams are a familiar technique to describe the behavior of a system. They describe all of the possible states that a particular object can get into and how the object's state changes as a result of events that reach the object.

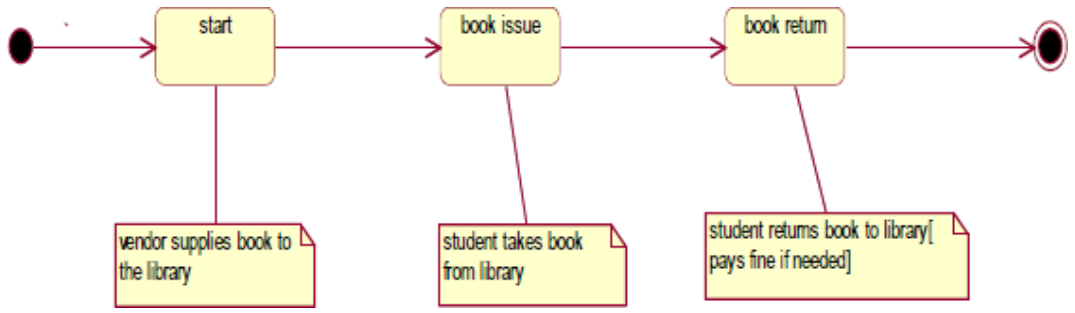

Figure 8. State Chart Diagram for BookBank System

Deployment Diagram and Component Diagram

Deployment diagrams are used to visualize the topology of the physical components of a system where the software components are deployed.

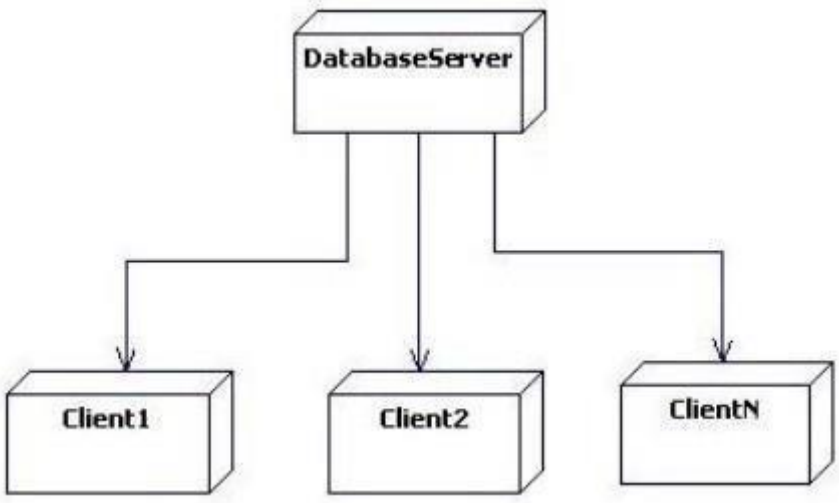

Figure 9: Deployment Diagram for Book Bank System

8. Develop test cases for unit testing and integration testing

9. Develop test cases for various white box and black box testing techniques.

LOGIN FORM:

SL.No	Test Case	Excepted Result	Test Result
1	Enter valid name and password & click on login button	Software should display main window	Successful
2	Enter invalid	Software should not display main window	successful

BOOK ENTRY FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data , if any Error like entering text data instead of number or entering number instead of text..is found then it gives proper message otherwise Adds Record To the Database	successful
2.	On the Click of DELETE Button	This deletes the details of book by using Accession no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful
4.	On the Click of SEARCH Button	Displays the Details of book for entered Accession no. Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful

USER ACCOUNT FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data , if any Error like entering text data instead of number or entering number instead of text..is found then it gives proper message otherwise Adds Record To the Database	successful
2.	On the Click of DELETE Button	This deletes the details of student by using Register no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful
4.	On the Click of SEARCH Button	Displays the Details of book for entered Register no. Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful

BOOK ISSUE FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data ,if the accession number book is already issued then it will giving proper msg.	successful
2.	On the Click of DELETE Button	This deletes the details of book by using Register no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful
4.	On the Click of SEARCH Button	Displays the Details of issued book..Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful

BOOK RETURN FORM:

SL.No	Test Case	Excepted Result	Test Result
1	On the click of ADD button	At first user have to fill all fields with proper data , if any Error like entering text data instead of number or entering number instead of text..is found then it gives proper message otherwise Adds Record To the Database	successful
2.	On the Click of DELETE Button	Which deletes the details of book by using Register no.	Successful
3.	On the Click of UPDATE Button	Modified records are Updated in database by clicking UPDATE button.	Successful

4.	On the Click of SEARCH Button	Displays the Details of returned book … Otherwise gives proper Error message.	Successful
5.	On the Click of CLEAR Button	Clears all fields	Successful
6.	On the Click of EXIT button	Exit the current book details form	successful
7.	On the Click of NEXT button	Display the next form	successful