KG REDDY
College of Engineering & Technology
New Age Engineering

Accredited by NAAC

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

SOFTWARE ENGINEERING

LAB MANUAL

Subject Code   : CS505PC

Regulation   : R18/JNTUH

Academic Year   : 2020-2021

III B. TECH I SEMESTER

COMPUTER SCIENCE AND ENGINEERING

KG REDDY COLLEGE OF ENGINEERING AND TECHNOLOGY

Affiliated to JNTUH, Chilkur,(V), Moinabad(M) R. R Dist, TS-501504

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

VISION AND MISSION OF THE INSTITUTION

VISION

To become self-sustainable institution this is recognized for its new age engineering through innovative teaching and learning culture, inculcating research and entrepreneurial ecosystem, and sustainable social impact in the community.

MISSION

- To offer undergraduate and post-graduate programs that is supported through industry relevant curriculum and innovative teaching and learning processes that would help students succeed in their professional careers.
- To provide necessary support structures for students, this will contribute to their personal and professional growth and enable them to become leaders in their respective fields.
- To provide faculty and students with an ecosystem that fosters research and development through strategic partnerships with government organisations and collaboration with industries.
- To contribute to the development of the region by using our technological expertise to work with nearby communities and support them in their social and economic growth.

VISION AND MISSION OF CSE DEPARTMENT

VISION

To be recognized as a department of excellence by stimulating a learning environment in which students and faculty will thrive and grow to achieve their professional, institutional and societal goals.

MISSION

- To provide high quality technical education to students that will enable life-long learning and build expertise in advanced technologies in Computer Science and Engineering.
- To promote research and development by providing opportunities to solve complex engineering problems in collaboration with industry and government agencies.
- To encourage professional development of students that will inculcate ethical values and leadership skills while working with the community to address societal issues.

DEPARTMENT OF COMPUTERSCIENCE AND ENGINEERING

PROGRAM EDUCATIONAL OBJECTIVES (PEOS):

A graduate of the Computer Science and Engineering Program should:

PEO1	**Program Educational Objective1: (PEO1)** The Graduates will provide solutions to difficult and challenging issues in their profession by applying computer science and engineering theory and principles.
PEO2	**Program Educational Objective2 :(PEO2)** **The** Graduates have successful careers in computer science and engineering fields or will be able to successfully pursue advanced degrees.
PEO3	**Program Educational Objective3: (PEO3)** The Graduates will communicate effectively, work collaboratively and exhibit high levels of Professionalism, moral and ethical responsibility.
PEO4	**Program Educational Objective4 :(PEO4)** **The** Graduates will develop the ability to understand and analyse Engineering issues in a broader perspective with ethical responsibility towards sustainable development.

PROGRAM OUTCOMES (POS):

PO1	**Engineeringknowledge**:Applytheknowledgeofmathematics,science,engineering Fundamentals andanengineeringspecializationtothesolutionofcomplexengineeringproblems.
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.

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PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling 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 contexts, 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 work**: Function effectively as an individual, and as a member or leader In diverse teams, and in multi-disciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, 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 ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES(PSOS):

PSO1	**Problem Solving Skills** – Graduate will be able to apply computational techniques and software principles to solve complex engineering problems pertaining to software engineering.
PSO2	**Professional Skills** – Graduate will be able to think critically, communicate effectively, and collaborate in teams through participation in co and extra-curricular activities.
PSO3	**Successful Career** – Graduates will possess a solid foundation in computer science and engineering that will enable them to grow in their profession and pursue lifelong learning through post-graduation and professional development.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

PREREQUISITES:

A course on "Programming for Problem Solving"

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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.

S. No	List of Experiments	Page No.
1	Passport automation System	
2	Book Bank	
3	Online Exam Registration	
4	Stock Maintenance System	
5	Online course reservation system	
6	E-ticketing	
7	Software Personnel Management System	
8	Credit Card Processing	
9	E-book management System.	
10	Recruitment system	

FACULTY   **HOD, CSE**

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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

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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.

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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.
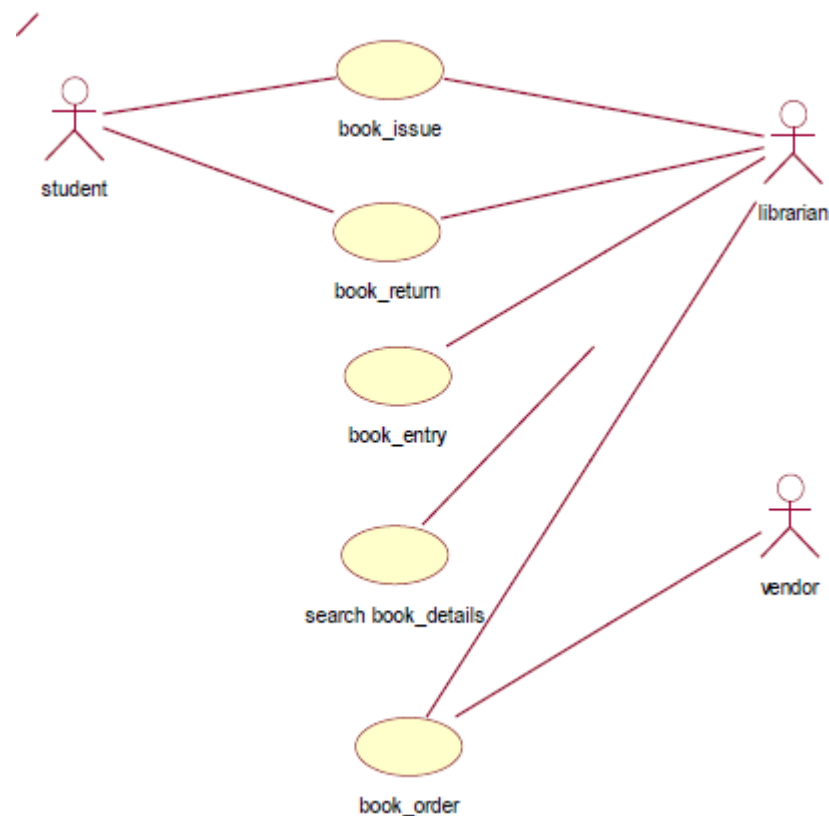
Post Condition: Check the status of reservation.

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.
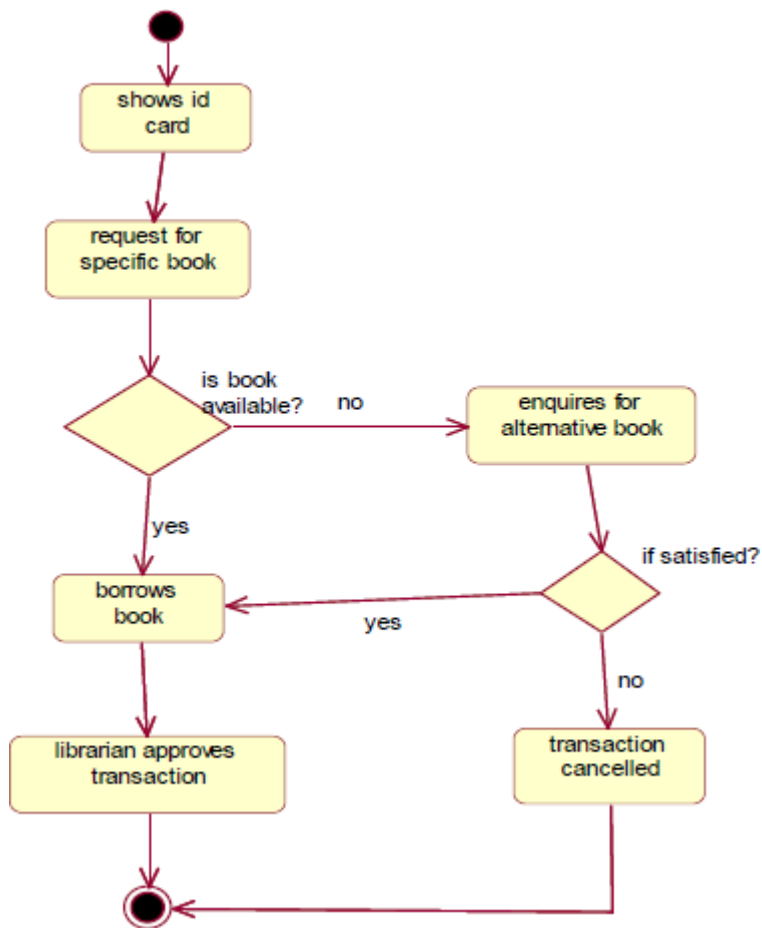

Figure 1. Usecase diagram for Book Bank System

Activity Diagram:

Activity diagrams are graphical representations of workflows of stepwise activities and actions with
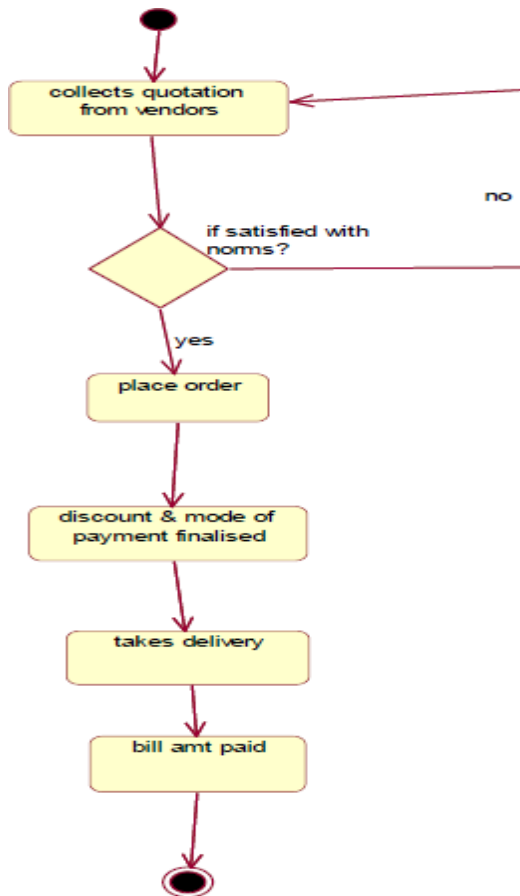
support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams can be used to describe the business and operational step-by-step workflows of components in a

system. An activity diagram shows the overall flow of control. An activity is shown as an rounded box containing the name of the operation.
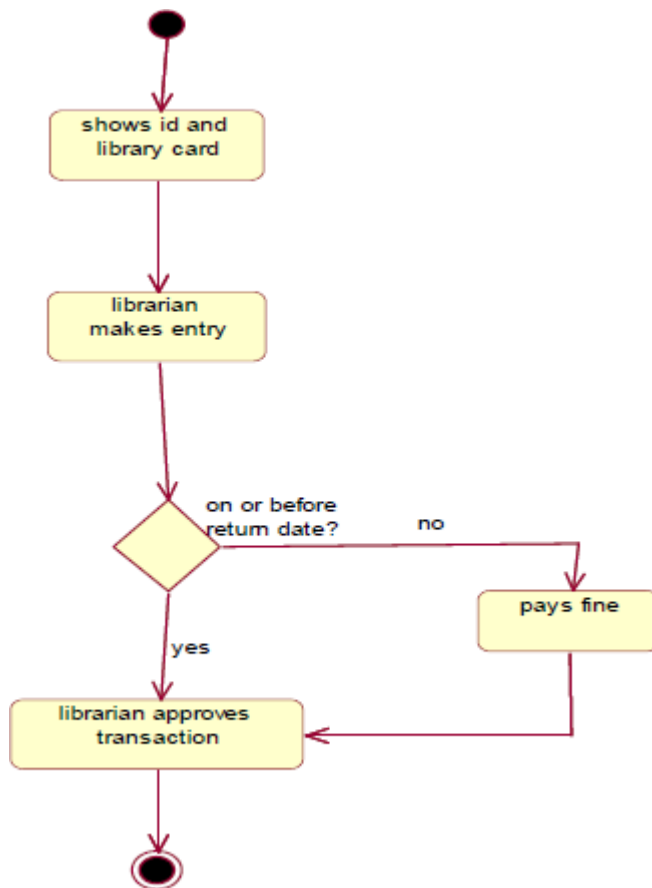
This activity diagram describes the behaviour of the system.
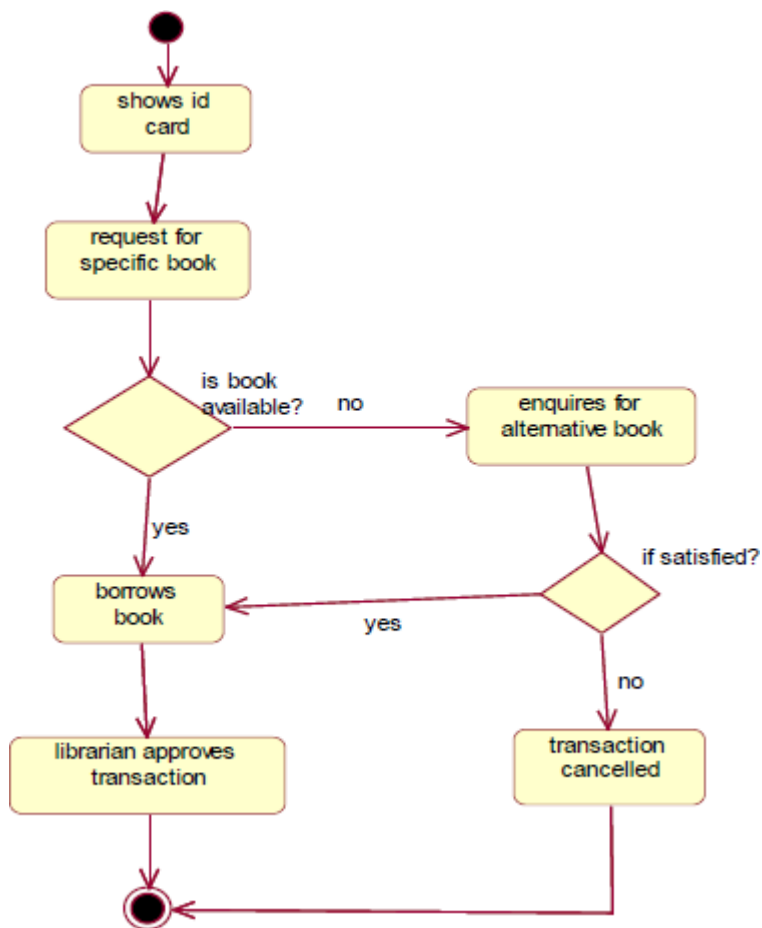
Figure 2. Activity Diagram for Book Bank System [borrow book]

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

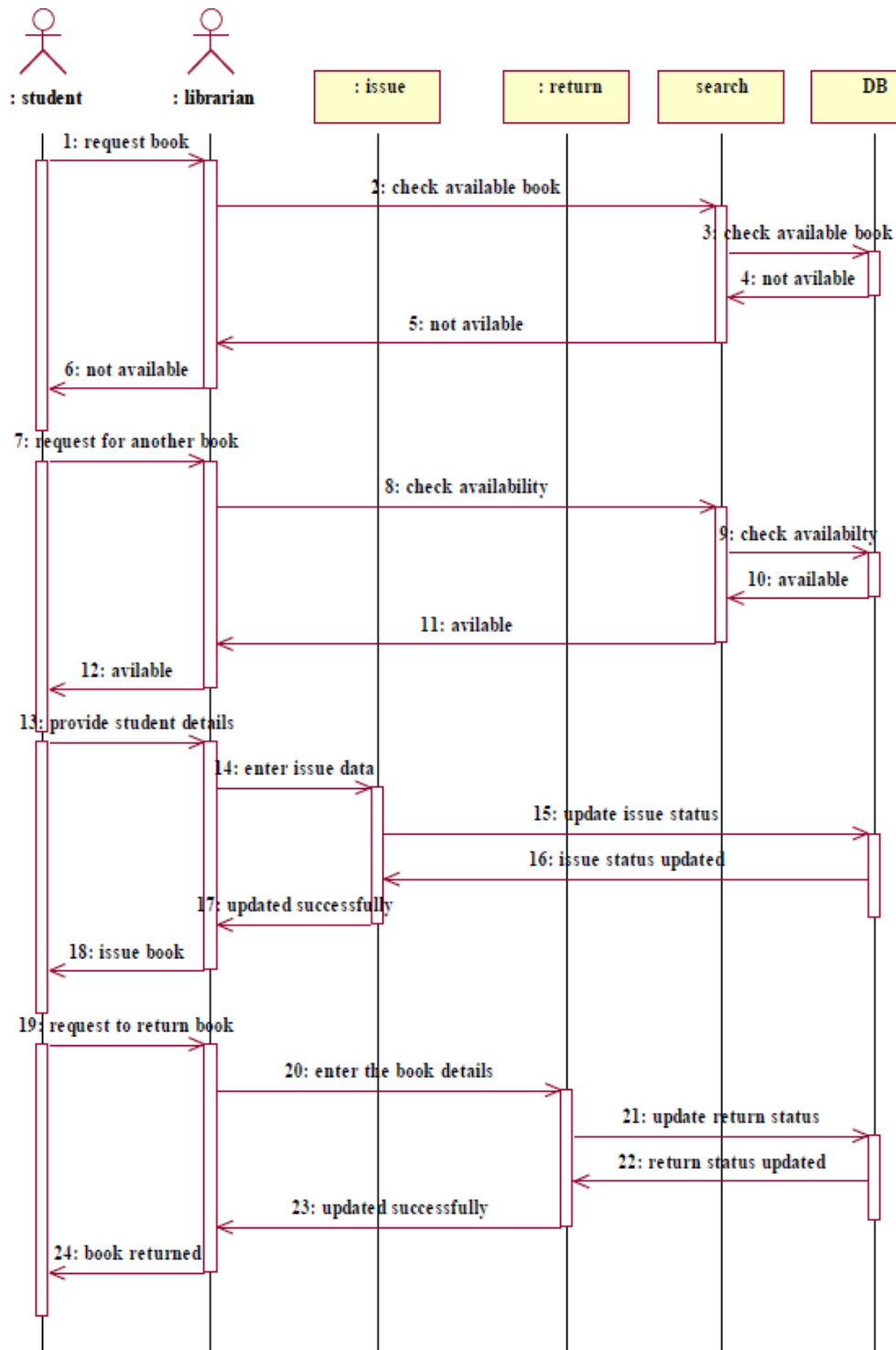**Figure 4. Activity Diagram for Book Bank System [Return book]**

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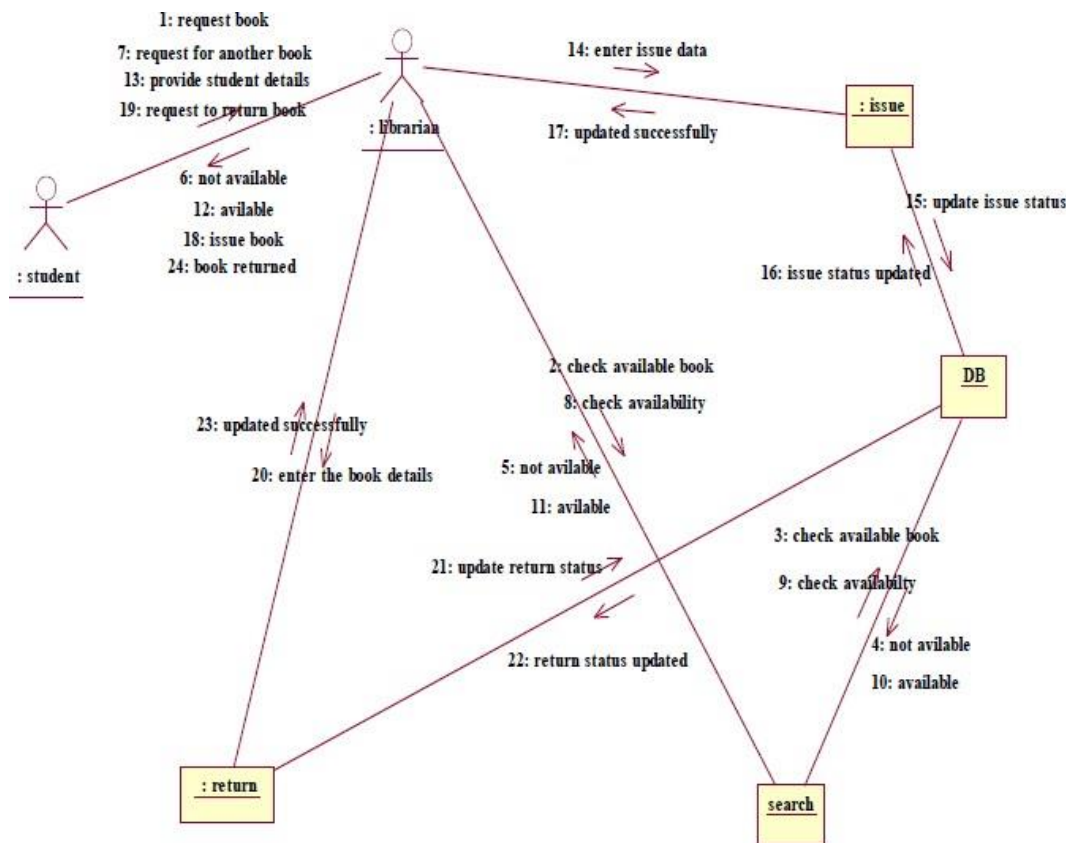
An event also is considered to be any action by an object that sends information. The event line represents a message sent from one object to another, in which the "form" object is requesting an operation be performed by the "to" object. The "to" object performs the operation using a method that the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

15

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

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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
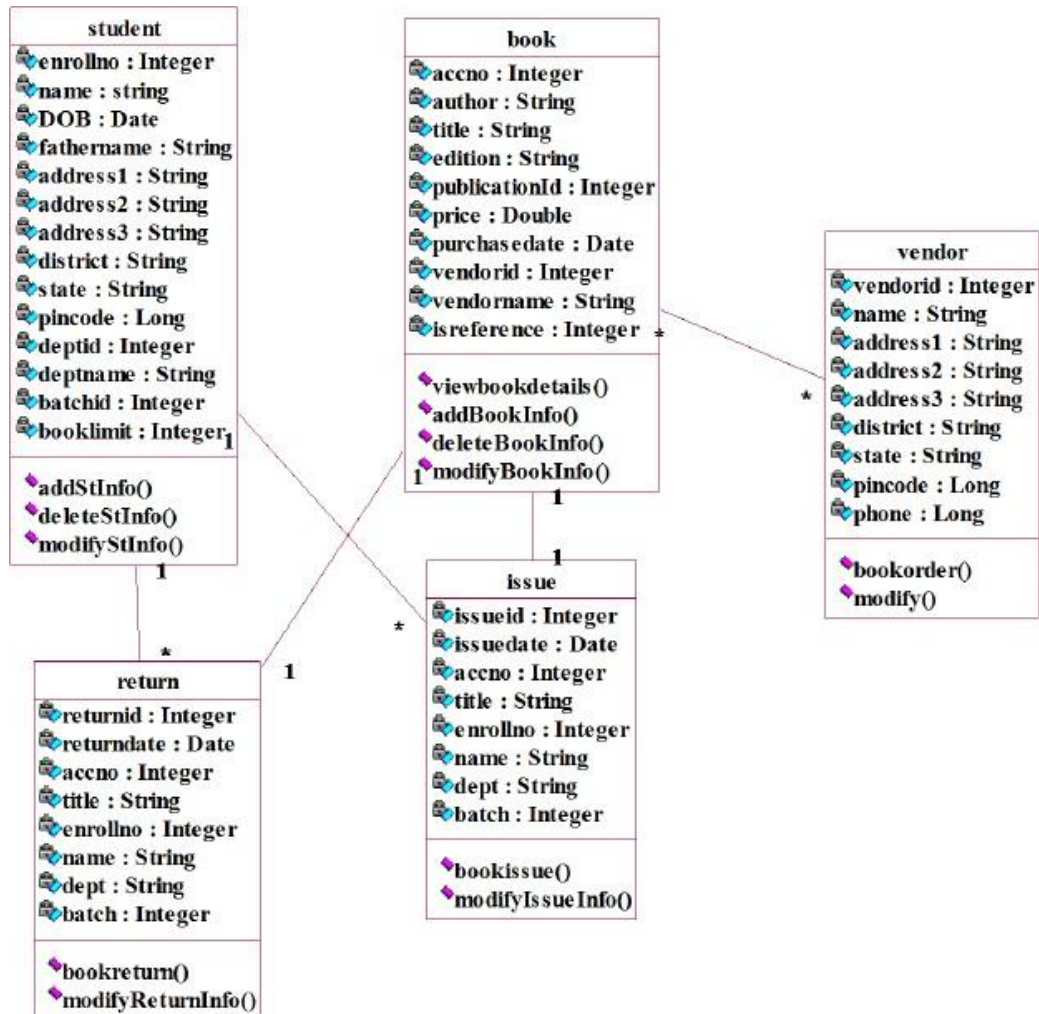
3) Issue:

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().
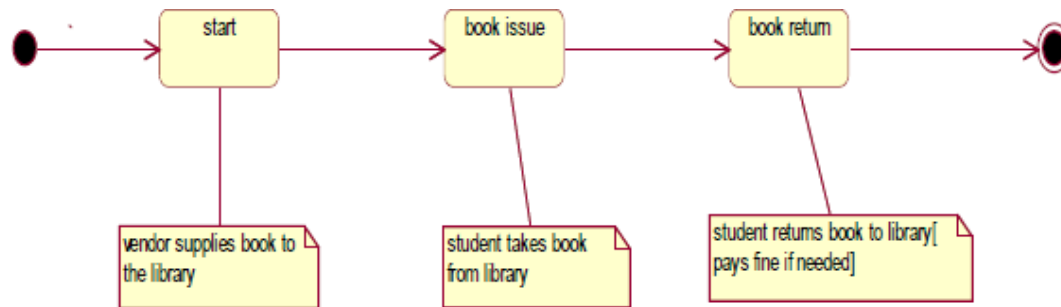
6) Detail:

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

Figure 7. Class Diagram For Book Bank System
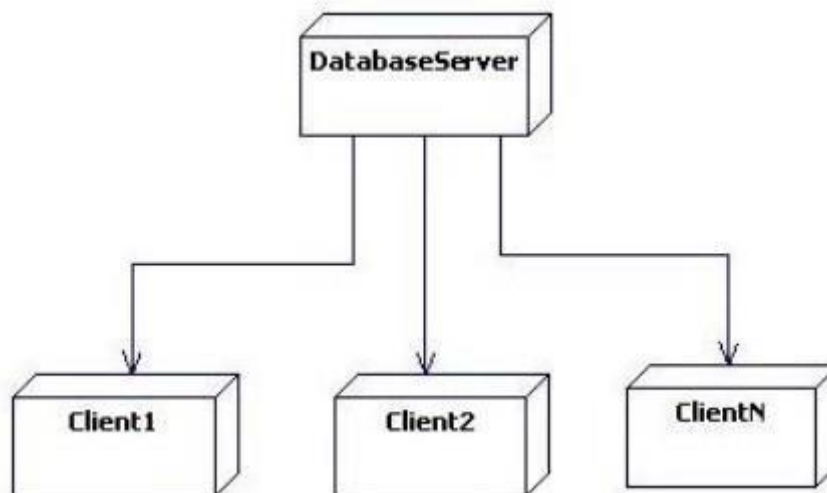
State Chart Diagram

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
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5. Preparation of Software Requirement Specification Document:

2.1 **Users Characteristics:**

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Software Requirements:

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Front end   : J2EE

 Back end   : My SQL Server

 IDE used   : Netbeans

Hardware Requirements:

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CASE Tool: STARUML

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CASE Tool: StarUML

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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.

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Invoked by the librarian when a member returns the book.

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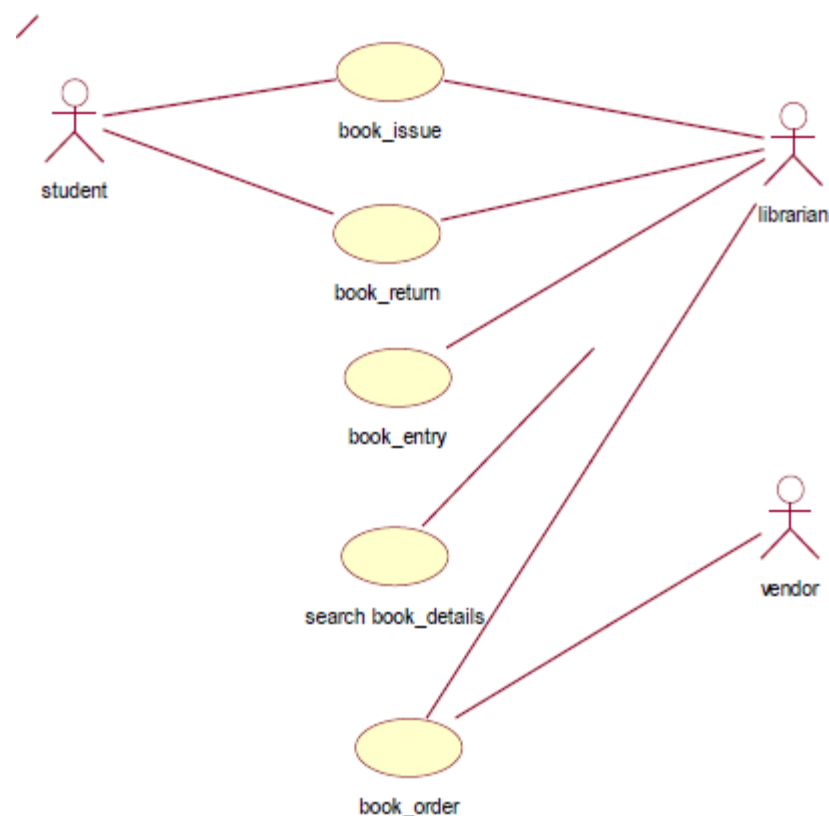**Post Condition: C**heck the status of reservation.

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.

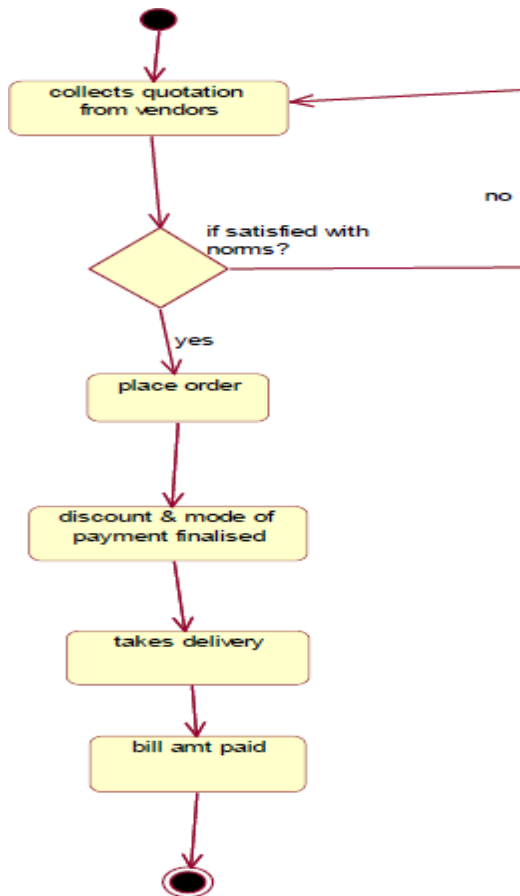**Figure 1. Usecase diagram for Book Bank System**

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

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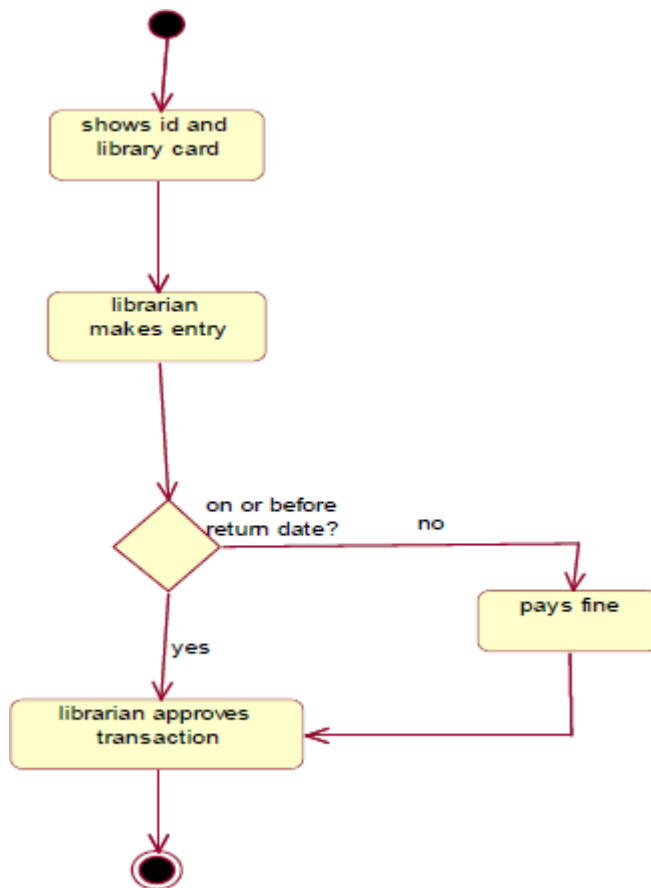
This activity diagram describes the behaviour of the system.

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

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

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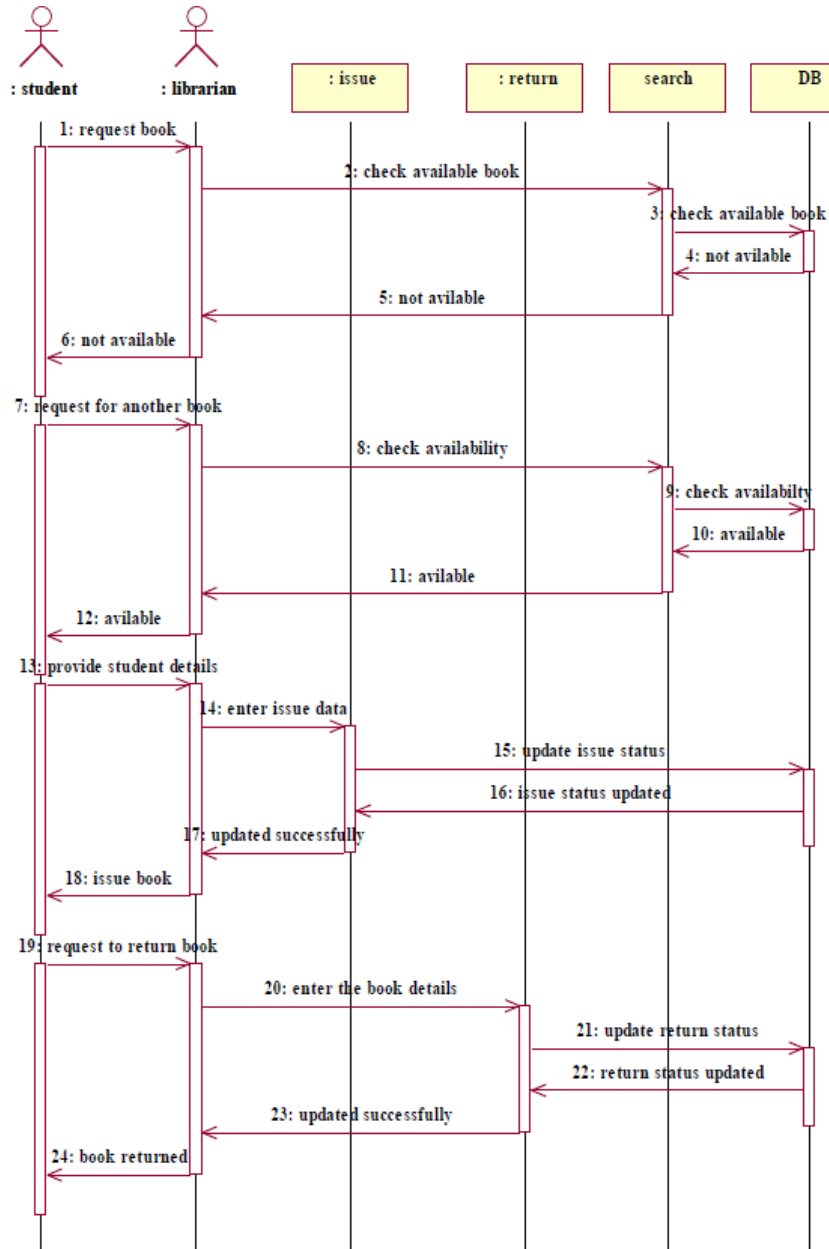**Figure 4. Activity Diagram for Book Bank System [Return book]**

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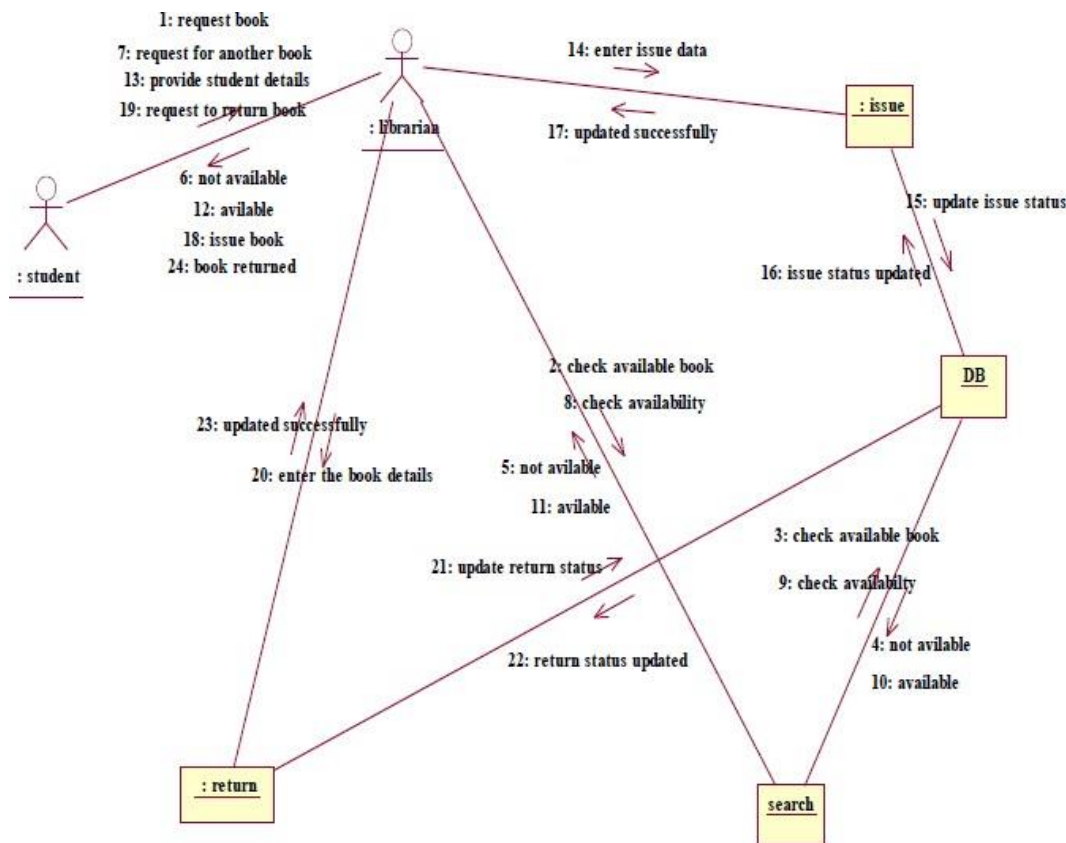
An event also is considered to be any action by an object that sends information. The event line represents a message sent from one object to another, in which the "form" object is requesting an operation be performed by the "to" object. The "to" object performs the operation using a method that

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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:

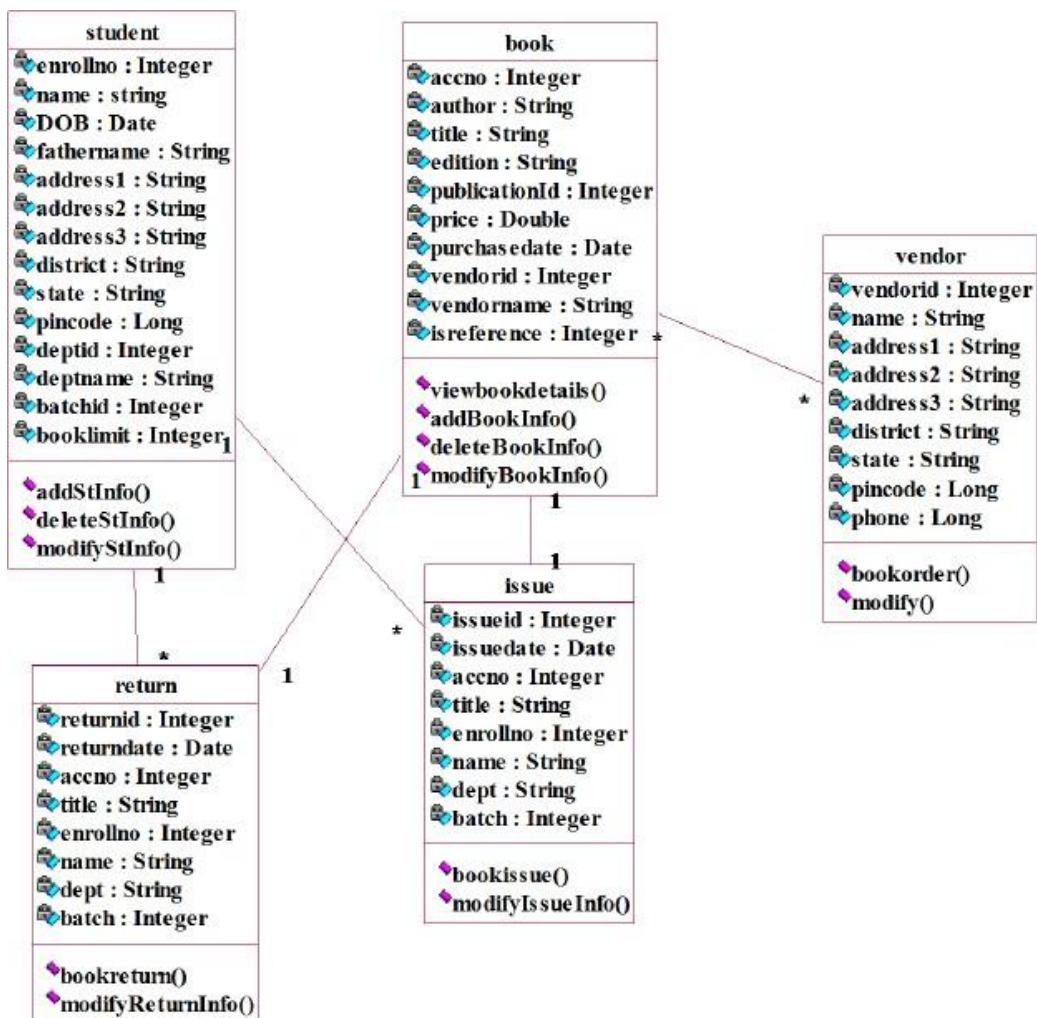It consists of eight attributes and two operations to maintain issue details such as, issue date, accno of issued book, name of the student who borrowed book.

5) Students:

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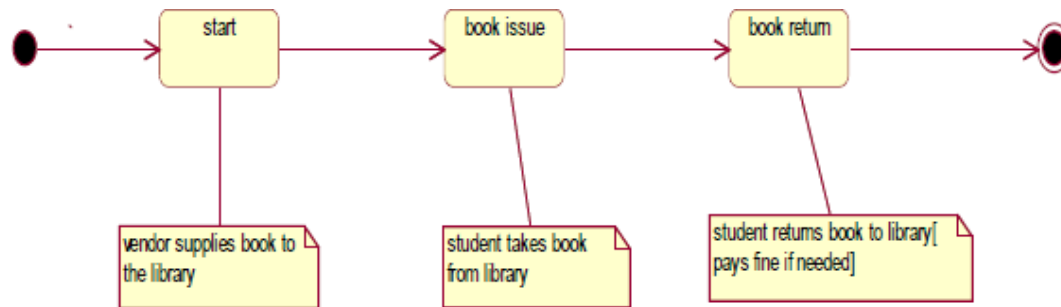
6) Detail:

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

Figure 7. Class Diagram For Book Bank System
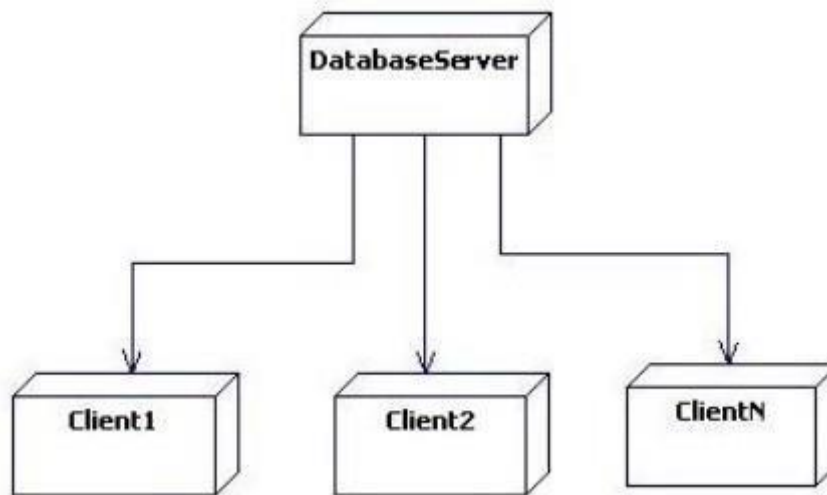
State Chart Diagram

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

43

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