

Introduction

Welcome to the Library Management System! This special system helps us organize and keep track of all the books in our library. It's like a big helper that makes borrowing and returning books super easy for everyone.

With this system, you can borrow books, return them when you're done, and even find out if a book is available. Plus, it helps us keep track of who borrowed what and when it's due back.

So, whether you're looking for a new adventure in a book or just want to return one you've finished, our Library Management System is here to make everything simple and quick!

Scenario Writing

Library management system is used to facilitate the process of borrowing books from the library. The system streamlines the interaction between students and the library staff, making the borrowing process more efficient and convenient.

Scenario-1: Add Student

Scenario Description:

- 1. Request to add a new student profile.
- 2. Input required student details (name, ID, contact information).
- 3. Verify entered information.
- 4. Submit to add the student profile.
- 5. Confirmation message for successful addition of the student.

Scenario-2: Issue Book

Scenario Description:

- 1. Request to issue a book to a student.
- 2. Search for the book by title.
- 3. Verify book availability and condition.
- 4. Enter student ID and book details .
- 5. Confirmation of successful book issuance to the student.

Scenario-3: Return Book

Scenario Description:

- 1. Request to return a book from a student.
- 2. Input student ID and book details.
- 3. Verify book condition and return date.
- 4. Update the book status to "available."
- 5. Confirmation of successful book return.

Scenario-4: Search Student

Scenario Description:

- 1. Request to search for a student in the system.
- 2. Enter student ID or name for search.
- 3. Display student information if found.
- 4. Option to view borrowed books by the student.

Scenario-5: Fine Calculation

Scenario Description:

- 1. Automatically check for overdue books.
- 2. Calculate fines based on return dates and predefined fine policies.
- 3. Display a fine amount for each overdue book.
- 4. Option for librarians to waive or adjust fines if necessary.
- 5. Confirmation of fine calculation and adjustments made.

These scenarios cover various interactions within the Library Management System, from adding students to managing book issuances, returns, searches, and fine calculations.

Stakeholder

1. Students: Borrow and return books, check if books are available, and update their own information.

2. Librarian: Take care of the library's books, help students with questions, and make sure everything runs smoothly.

3. Admin: Help everyone with any problems in the system, make sure everyone has the right access, and keep the system working well.

User Profile

Stakeholder : Librarian

Characteristic	Notes on Characteristics	Requirement implied
Type of user	Librarian	User interface, verification
Age Range	25-50 years	Verification
Frequency of use	Most of the time per day	Performance, operation, acceptance, maintainability
Mandatory	Yes	
Computer Experience	Experienced	User interface, documentation
Education	HSC	
Goals	to optimize resource organization and facilitate efficient knowledge sharing	Performance, resource, maintainability, security, User interface
Language Skills	English ,Bangla	User interface. Documentation
Number of Users	2-5	Performance , Acceptance, operation
Training	May required to need some several session	User interface, documentation
Other System used	No	
Ways of working	Full support from the system.	Acceptance, operation, safety, security,maintenance

Scope

1. User Registration and Login:

- 1) Objective: Enable users to register and log in securely to access library services.
- 2) Functionality: Users will register with essential information and secure login credentials. Password recovery options will be available for users.

2. Add and Update Profile:

1. Objective: Allow users to create and modify their profiles within the system.
2. Functionality: Users can input and update personal details such as contact information and preferences.

3. Book Search and Issue:

- 1) Objective: Facilitate users in finding and borrowing books from the library.
- 2) Functionality: Search functionality for available books based on titles, authors, or categories. Users can borrow books and receive due date notifications.

4. Return Book:

- 1) Objective: Streamline the book return process for users.
- 2) Functionality: Users can initiate book returns, and the system verifies book condition upon return.

5. Fine Calculation:

- 1) Objective: Ensure accurate fine calculation and seamless payment processes.
- 2) Functionality: System calculates fines for overdue books and offers multiple payment options for users to clear fines.

6. Support Services:

- 1) Objective: Provide user support for inquiries and assistance.
- 2) Functionality: Helpdesk feature for users to seek assistance, access FAQs, and resolve common issues within the system.

These functionalities aim to enhance user experience, streamline library operations, and ensure data security within the Library Management System.

Feasibility Study

The aim of this feasibility study for the Library Management System is to determine if implementing the system is practical and worthwhile by evaluating its technical, operational, economic aspects, ensuring it meets user needs while staying secure and within budget.

Here's a simplified feasibility study for a Library Management System:

❖ Technical Feasibility:

- 1) **Hardware Compatibility:** Check if the system works with our current computers and devices. See if any upgrades are needed.
- 2) **Software Compatibility:** Make sure the system can work with other software we use, like operating systems and databases.
- 3) **Technical Expertise:** Check if we have people who know how to use the system, or if we need to train our staff.

❖ Operational Feasibility:

- 1) **User Acceptance:** Ask our staff and users what they think about the system to make sure it fits their needs.
- 2) **Impact on Current Operations:** Figure out how using the system will change how we work and plan ways to deal with any issues.

❖ Economic Feasibility:

- 1) **Cost-Benefit Analysis:** Compare the cost of getting and running the system with the benefits, like saving time or making users happier.
- 2) **Return on Investment (ROI):** Find out how much we might gain from the system compared to what we put into it.

Block Diagram

Block Diagram-1: Student

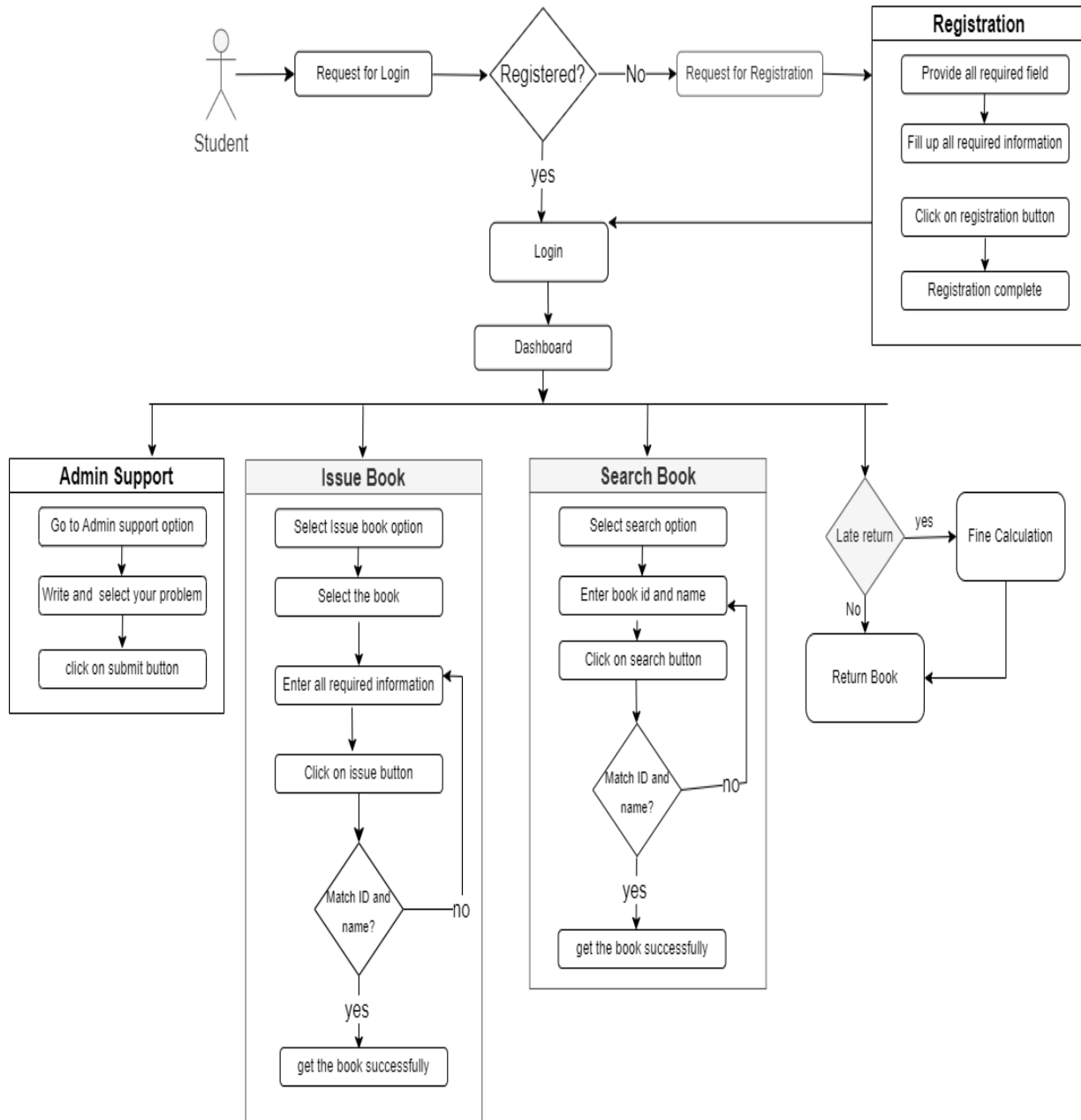


Figure-1 : Block Diagram for Student

Block Diagram-2: Librarian

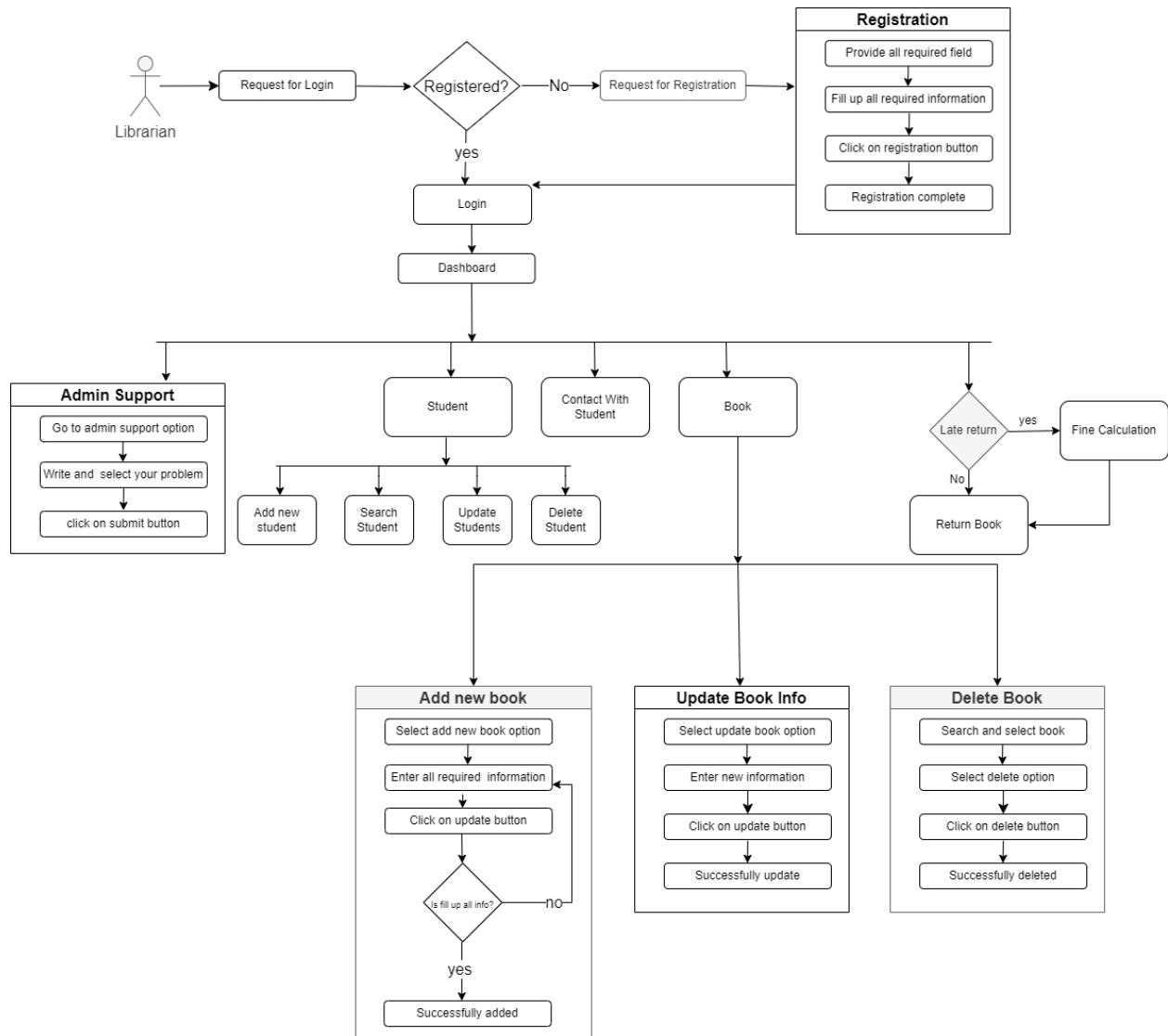


Figure-2 : Block Diagram for Librarian

Block Diagram-3: Admin

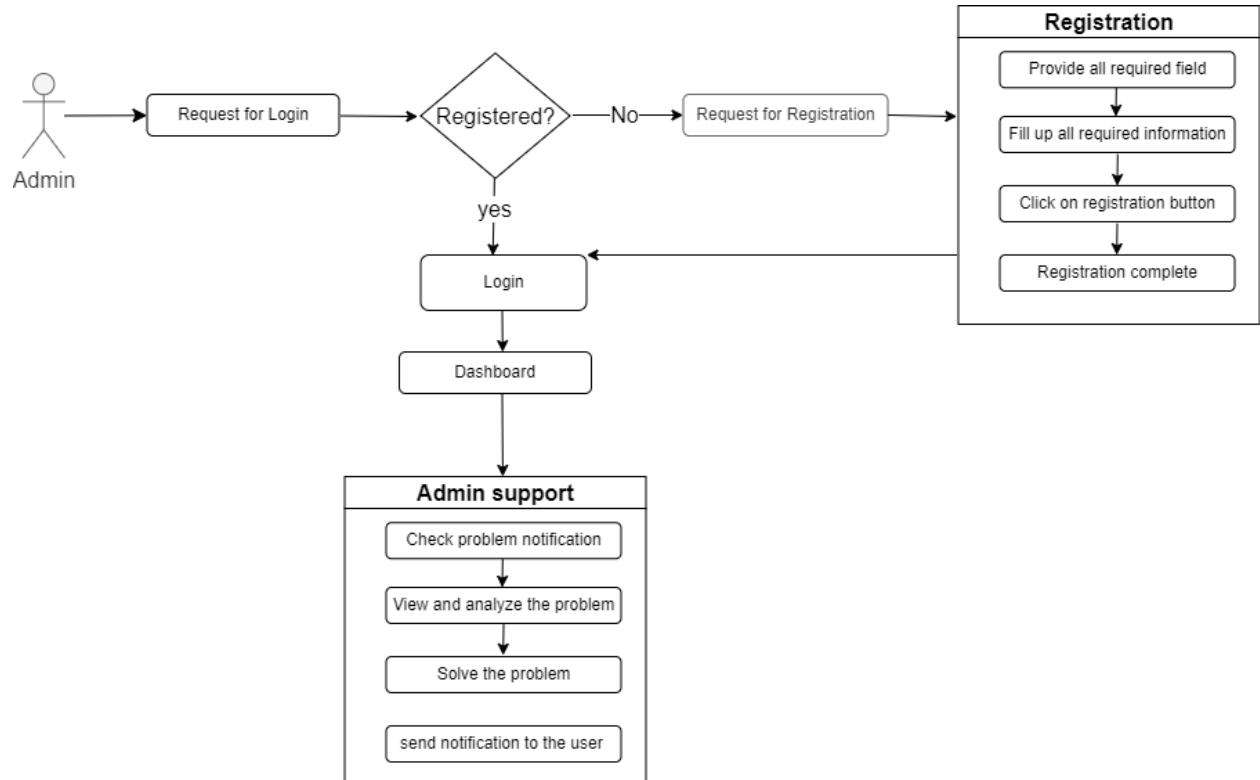


Figure-3 : Block Diagram for Admin

Software Requirement Specifications (SRS)

FR01	Registration & Login
Description	Users register this system first , after that they will login with their valid username and password.
Stakeholder	Student, Librarian, Admin

FR02	Admin Support
Description	If users can face any problem then go to this option and write down the problem and click the submit button after that admin solves this problem.
Stakeholder	Librarian, Students, Admin

FR06	Add new Student
Description	After entering the system admin, Librarians can add new students in this system. They filled up all the info about the new student and clicked the submit button.
Stakeholder	Librarian

FR04	Update Student info
Description	After entering the system, users find the Update Student info option, click on this option and fill up the information which type information they want to update then click the update button.
Stakeholder	Librarian

FR05	Search Student
Description	After entering the system Librarian can find the Search Student option. First of all go to this option and type student id for searching then click the search button.
Stakeholder	Librarian

FR06	Delete Student
Description	After entering the system user Find the delete option and Librarian can delete student from this system
Stakeholder	Librarian

FR07	Add new book
Description	After entering the system admin, Librarians can add new books in this system. They filled up all the info about the new book and clicked the submit button.
Stakeholder	Librarian, Admin

FR08	Update book
Description	After entering the system librarian finds an update book option he can update the book by this option.
Stakeholder	Librarian

FR09	Search Book
Description	After entering the system users see the search books option . First click on the search book option then give the book id on the search option then click the search button.
Stakeholder	Librarian, student

FR10	Delete book
Description	When any book presents the booklist but it is not available then the librarian can delete the book from the booklist.
Stakeholder	Librarian

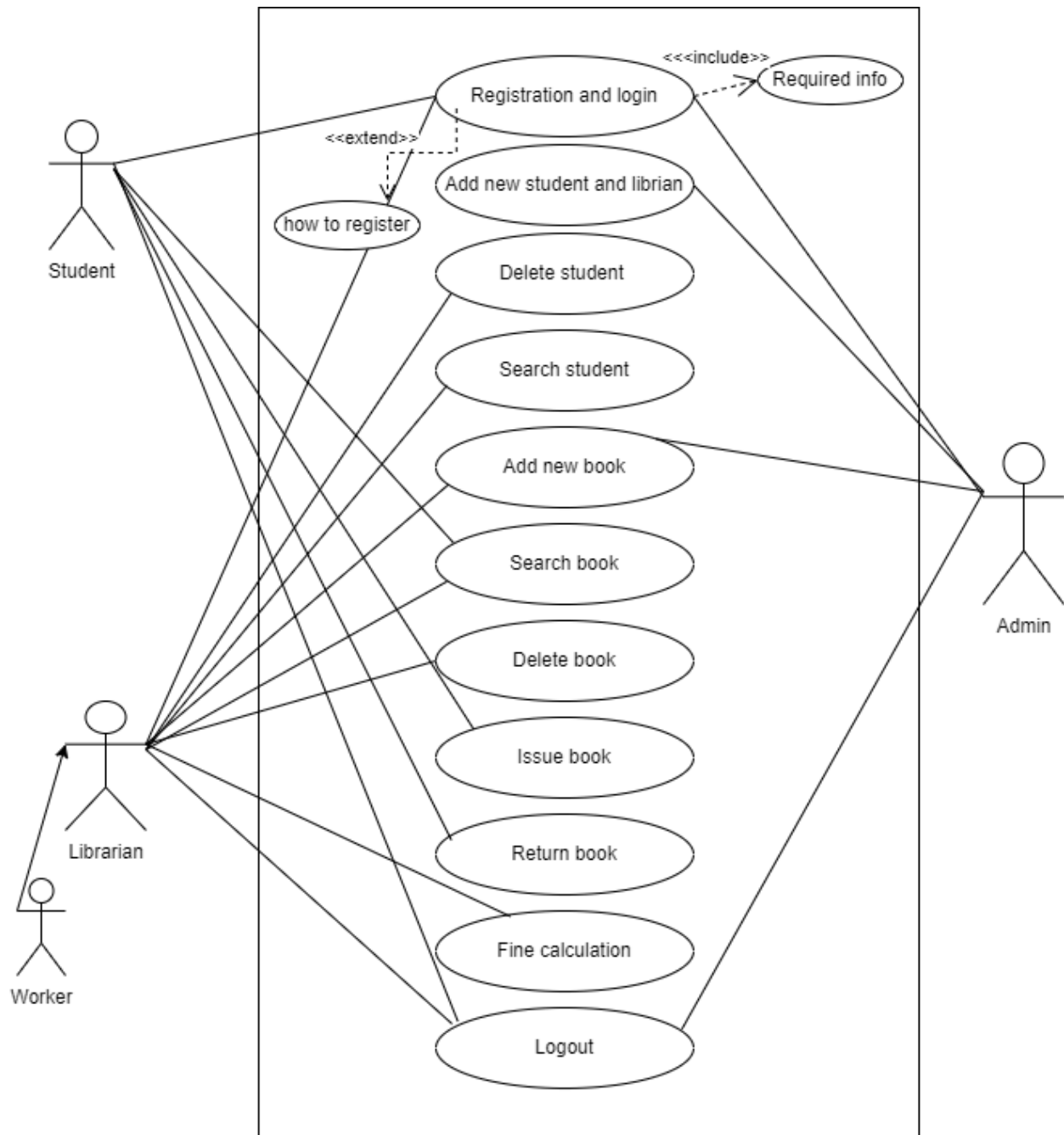
FR11	Issue book
Description	When students want to borrow books from the library, then they can add books info and click the issue book button.
Stakeholder	Student

FR12	Return book
Description	After entering this system Students get the Return book option. First of all students need to fill up all the information boxes then click on the return button.
Stakeholder	Student

FR13	Fine Calculation
Description	When students do not return books on time then the system will start to calculate fine for those students.
Stakeholder	Librarian

FR14	Logout
Description	After all process users click the logout option.
Stakeholder	Librarian, Student, Admin

Use Case



User Case Description

Case Description-01:

Use Case	Request for issue book													
Goal	Students requests for book issue													
Precondition	User must be login first before any request													
Success End Condition	Successfully request for book issue													
Failed End Condition	Sorry your request not successful													
Primary Actors:	Students													
Secondary Actors:	Admin													
Trigger	Apply request for issue books													
Main Success Scenario	<table><tr><td>1</td><td>User requests a book.</td></tr><tr><td>2</td><td>System confirm book availability</td></tr><tr><td>3</td><td>Fillup all required information</td></tr><tr><td>4</td><td>Book is issued to the user.</td></tr><tr><td>5</td><td>Library inventory updated</td></tr><tr><td>6</td><td>User receives confirmation</td></tr></table>		1	User requests a book.	2	System confirm book availability	3	Fillup all required information	4	Book is issued to the user.	5	Library inventory updated	6	User receives confirmation
1	User requests a book.													
2	System confirm book availability													
3	Fillup all required information													
4	Book is issued to the user.													
5	Library inventory updated													
6	User receives confirmation													

Alternative Flows	1.1	User request for a book
		1.1a Server down
		1.1b Try again for login this system
	1.2	User search a book
		1.2a Book is not available 1.2b An error message displayed
	3.1	Fillup all required information
		3.1a please enter valid all information
Quality Requirements	User finished all works in 30 min	

Case Description-02:

Use Case	Add New Student
Goal	Add new Student and librarian to this System
Precondition	Librarian and student must be register in this system
Success End Condition	User successfully enter all the information
Failed End Condition	User not be able to add new student and librarian

Primary Actors:	Librarian											
Secondary Actors:												
Trigger	Click add button for add new students											
Main Success Scenario	<table><tr><td>1</td><td>User requests to add a student or librarian</td></tr><tr><td>2</td><td>User enters student details.</td></tr><tr><td>3</td><td>System validate details</td></tr><tr><td>4</td><td>Click on add button</td></tr><tr><td>5</td><td>If the details are valid the student and librarian is added</td></tr></table>		1	User requests to add a student or librarian	2	User enters student details.	3	System validate details	4	Click on add button	5	If the details are valid the student and librarian is added
1	User requests to add a student or librarian											
2	User enters student details.											
3	System validate details											
4	Click on add button											
5	If the details are valid the student and librarian is added											
Alternative Flows	<table><tr><td>1.1</td><td>User enter incomplete details</td></tr><tr><td></td><td>1.1a Display error</td></tr><tr><td>2.1</td><td>Enter student details</td></tr><tr><td></td><td>2.1a Display invalid details</td></tr><tr><td>4.1</td><td>System allow the user to reenter the details</td></tr></table>		1.1	User enter incomplete details		1.1a Display error	2.1	Enter student details		2.1a Display invalid details	4.1	System allow the user to reenter the details
1.1	User enter incomplete details											
	1.1a Display error											
2.1	Enter student details											
	2.1a Display invalid details											
4.1	System allow the user to reenter the details											
Quality Requirements	User finished all works in 30 min											

Case Description-03:

Use Case	Search Students											
Goal	Search Student from this system											
Precondition	Students must be added to this system											
Success End Condition	User can find searched student successfully											
Failed End Condition	User not be able to Search Student											
Primary Actors:	Librarian											
Secondary Actors:												
Trigger	Identify students by search their student id											
Main Success Scenario	<table><tr><td>1</td><td>User request a search student</td></tr><tr><td>2</td><td>User enter student details</td></tr><tr><td>3</td><td>System find matching student</td></tr><tr><td>4</td><td>System display student information</td></tr><tr><td>5</td><td>Process concludes with ta display information</td></tr></table>		1	User request a search student	2	User enter student details	3	System find matching student	4	System display student information	5	Process concludes with ta display information
1	User request a search student											
2	User enter student details											
3	System find matching student											
4	System display student information											
5	Process concludes with ta display information											
Alternative Flows	<table><tr><td>2.1</td><td>User request a search student</td></tr><tr><td></td><td>2.1a server not response 2.1a try again</td></tr><tr><td>3.1</td><td>Enter student details to search</td></tr><tr><td></td><td>3.1a Invalid student details</td></tr></table>		2.1	User request a search student		2.1a server not response 2.1a try again	3.1	Enter student details to search		3.1a Invalid student details		
2.1	User request a search student											
	2.1a server not response 2.1a try again											
3.1	Enter student details to search											
	3.1a Invalid student details											

		3.1b Show error
	4.1	System search the database for matching student
		4.1a Student not found
		4.1b Show no result
Quality Requirements	User finished all works in 30 min	

Case Description-04:

Use Case	Return Book							
Goal	User can return book							
Precondition	Student Must be issued book							
Success End Condition	User can Return book by this option							
Failed End Condition	User not be able to return book							
Primary Actors:	Student							
Secondary Actors:								
Trigger	Request to return book							
Main Success Scenario	<table><tr><td>1</td><td>User initiates the return process</td></tr><tr><td>2</td><td>User enter the book and their student id</td></tr><tr><td>3</td><td>System validate the book and book and user information</td></tr></table>		1	User initiates the return process	2	User enter the book and their student id	3	System validate the book and book and user information
1	User initiates the return process							
2	User enter the book and their student id							
3	System validate the book and book and user information							

	4	Click on submit button
	5	Book is successfully returned and update inventory
Alternative Flows	1.1	Server not response
		1.1a Display error 1.1b Try again
	1.2	Invalid details
		1.2a Show error message 1.2b Enter valid information
Quality Requirements	To successfully can return book	

Case Description-04:

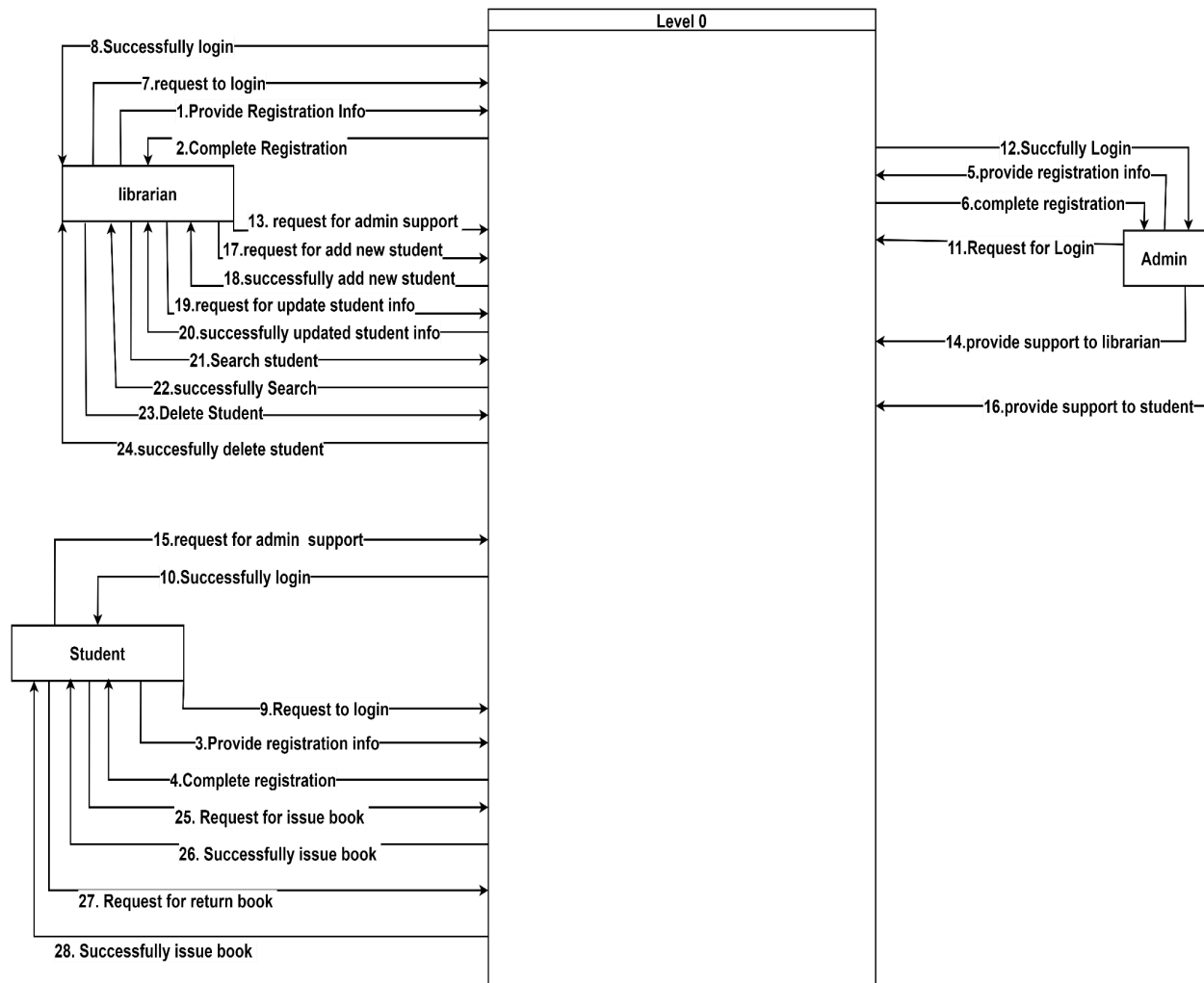
Use Case	Fine Calculation
Goal	Add fine for late book return
Precondition	Student Must be issued book
Success End Condition	User can give fine by this option
Failed End Condition	User not be able to add fine
Primary Actors: Secondary Actors:	Student

Trigger	Request to fine calculation													
Main Success Scenario	<table><tr><td>1</td><td>User request fine calculation</td></tr><tr><td>2</td><td>Enter student and book details</td></tr><tr><td>3</td><td>Periodic check for late return</td></tr><tr><td>4</td><td>If valid, Calculate fine for late return</td></tr><tr><td>5</td><td>Notify student of fine</td></tr></table>		1	User request fine calculation	2	Enter student and book details	3	Periodic check for late return	4	If valid, Calculate fine for late return	5	Notify student of fine		
1	User request fine calculation													
2	Enter student and book details													
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5	Notify student of fine													
Alternative Flows	<table><tr><td>1.1</td><td>Request to return book</td></tr><tr><td></td><td>1.1a Show error</td></tr><tr><td></td><td>1.1b try again</td></tr><tr><td>3.1</td><td>Check for late return</td></tr><tr><td></td><td>3.1a on time return</td></tr><tr><td></td><td>3.1b no fine</td></tr></table>		1.1	Request to return book		1.1a Show error		1.1b try again	3.1	Check for late return		3.1a on time return		3.1b no fine
1.1	Request to return book													
	1.1a Show error													
	1.1b try again													
3.1	Check for late return													
	3.1a on time return													
	3.1b no fine													
Quality Requirements	To successfully can add fine													

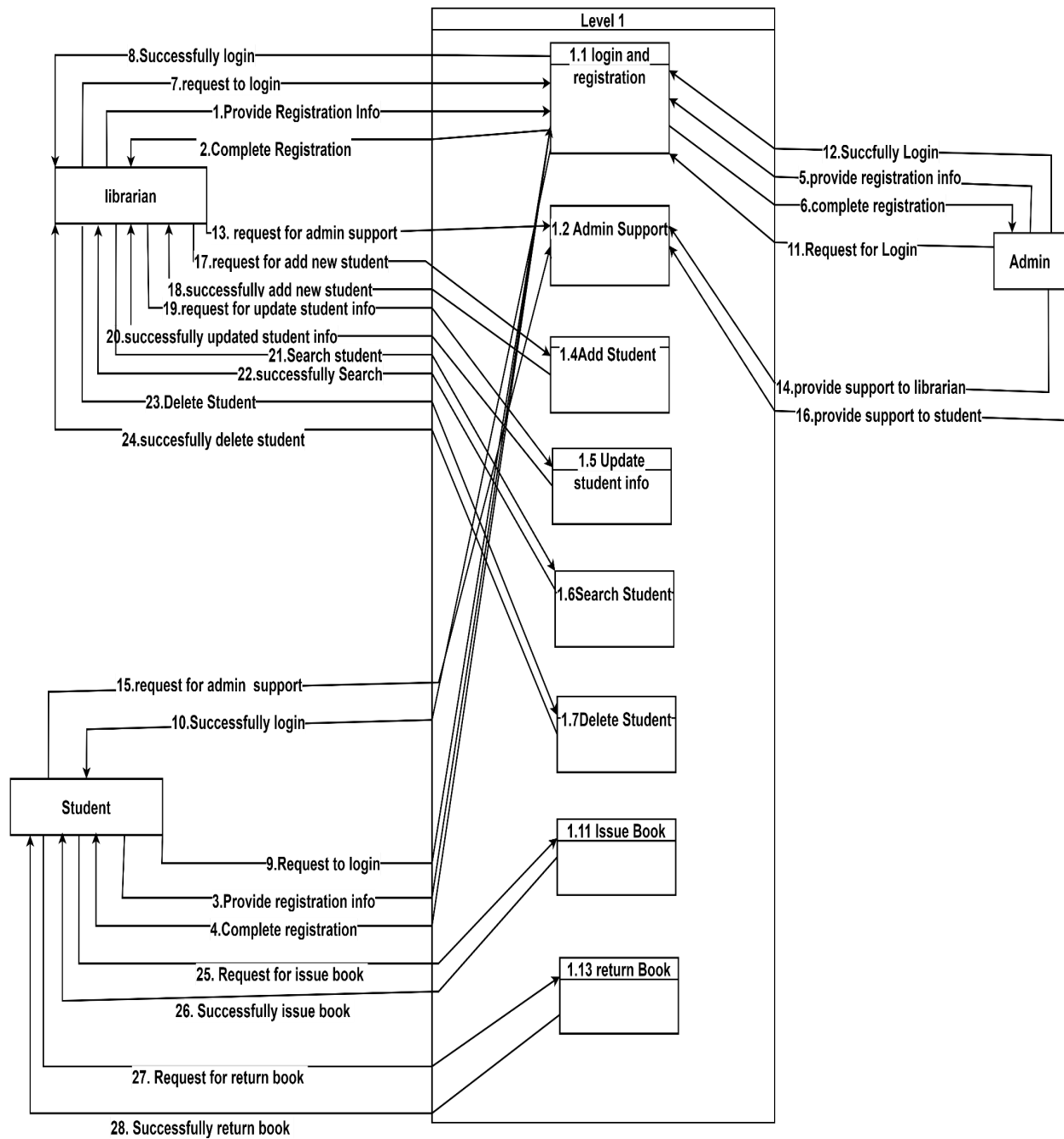
System Design

Data Flow Diagram

Level-0:



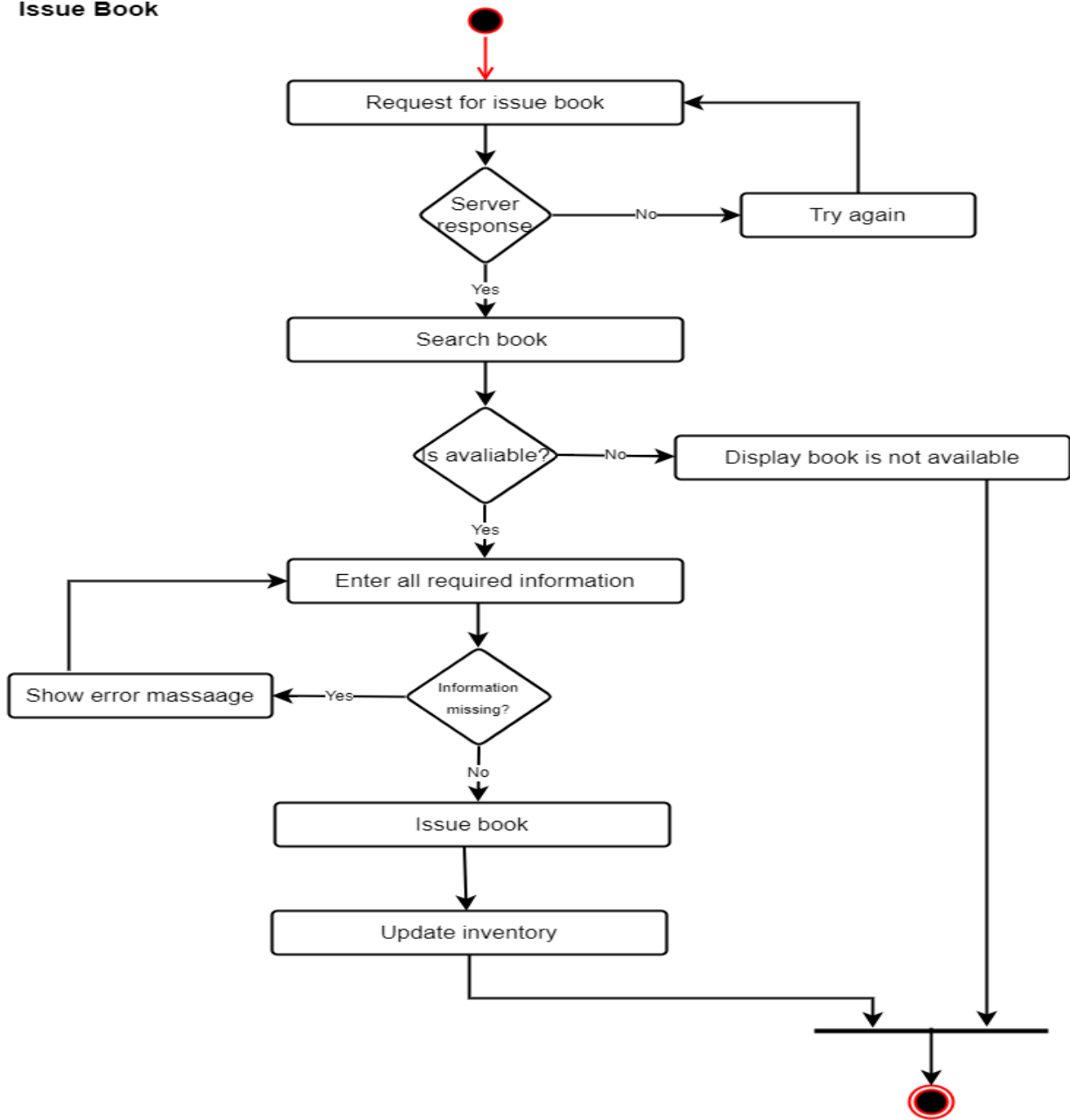
DFD Level 1:



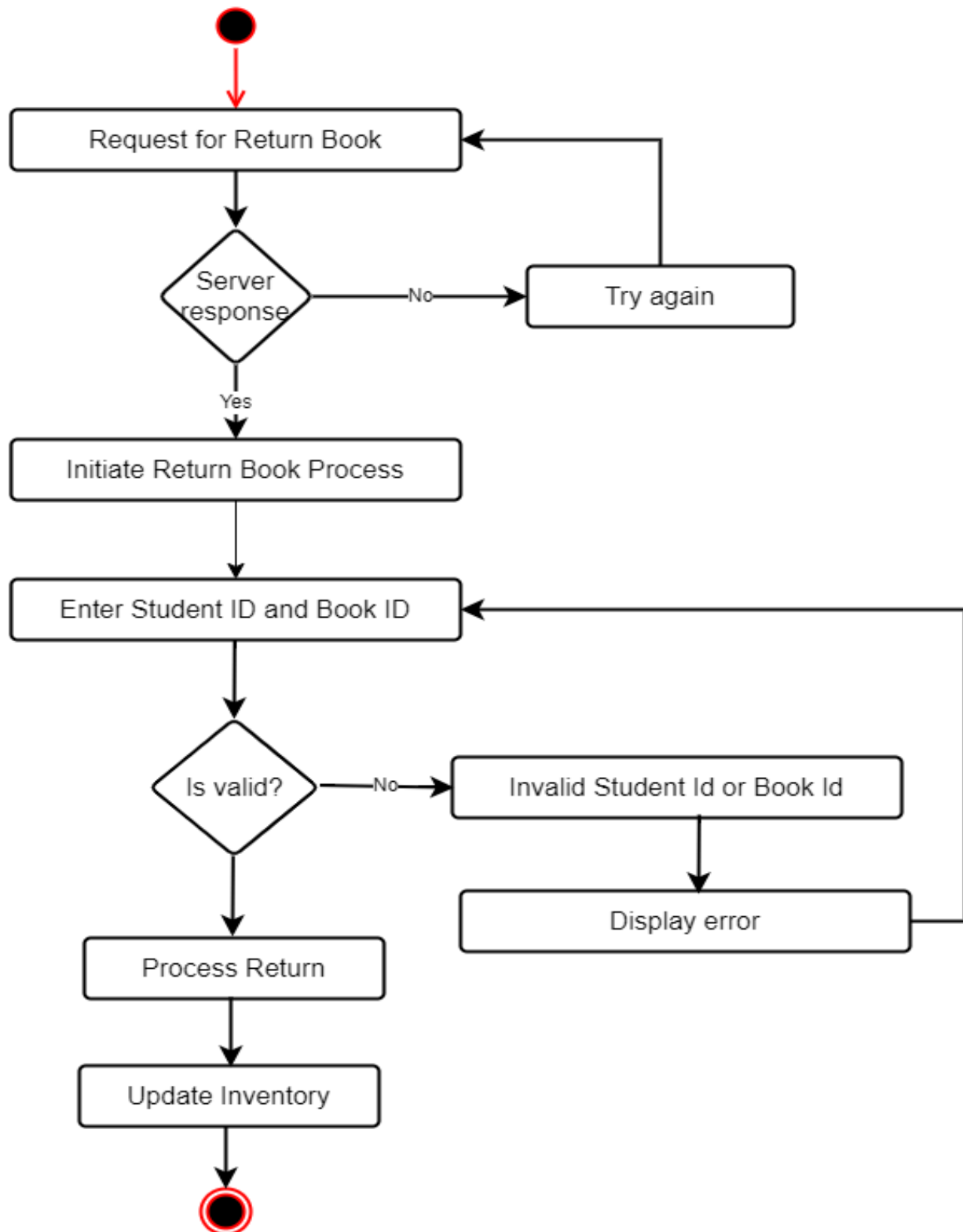
Activity Diagram

1. Issue book

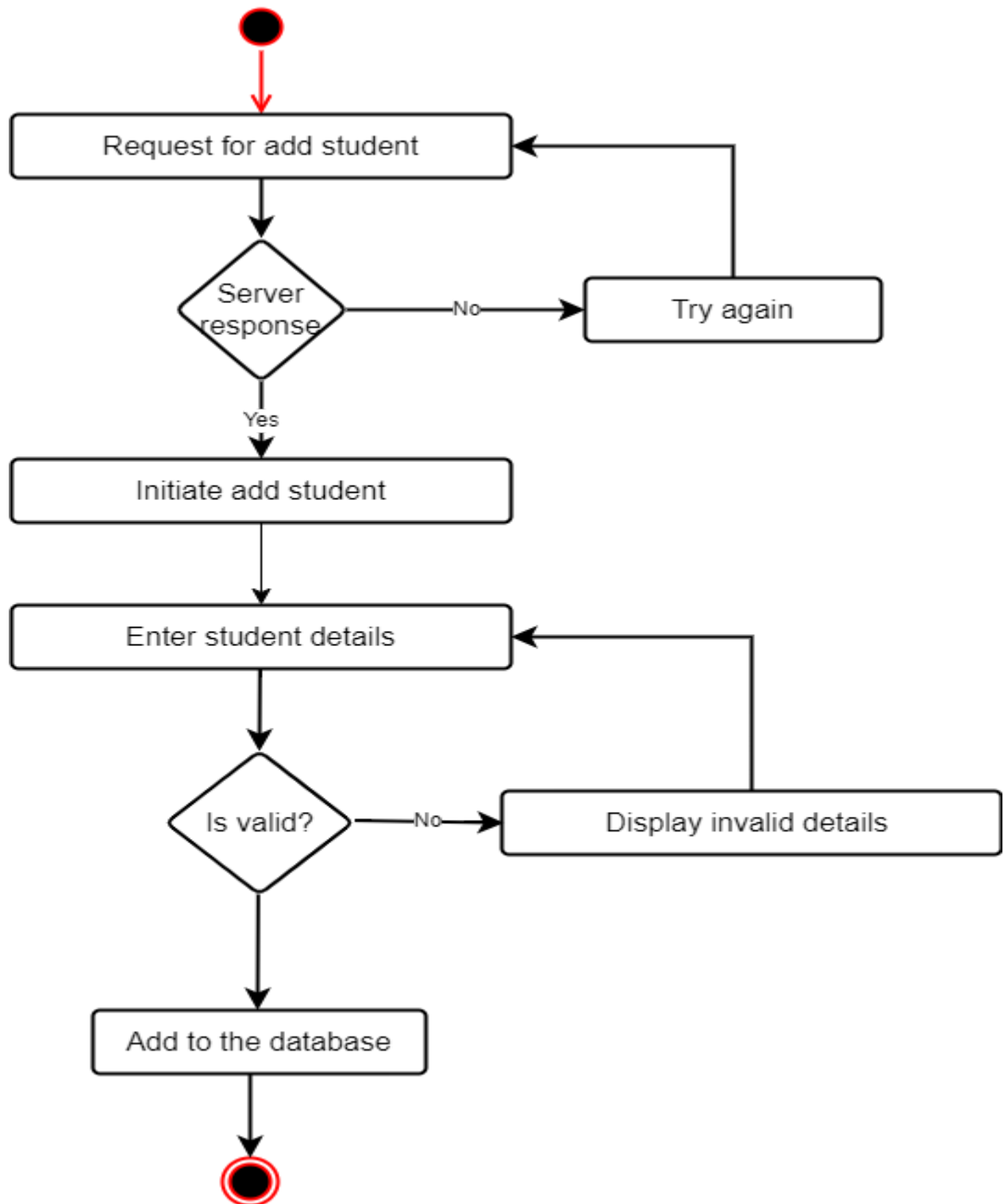
Issue Book



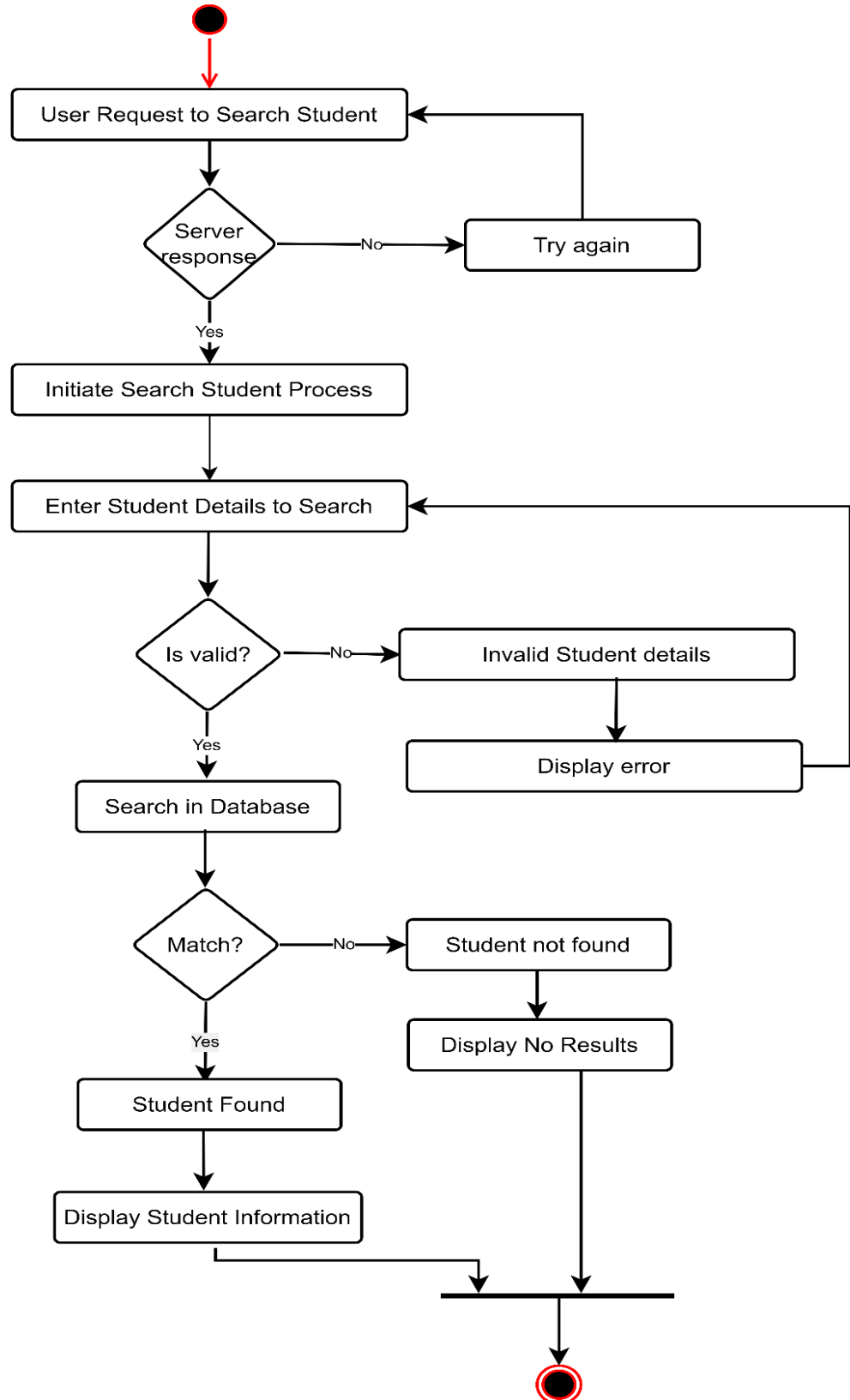
2. Return Book



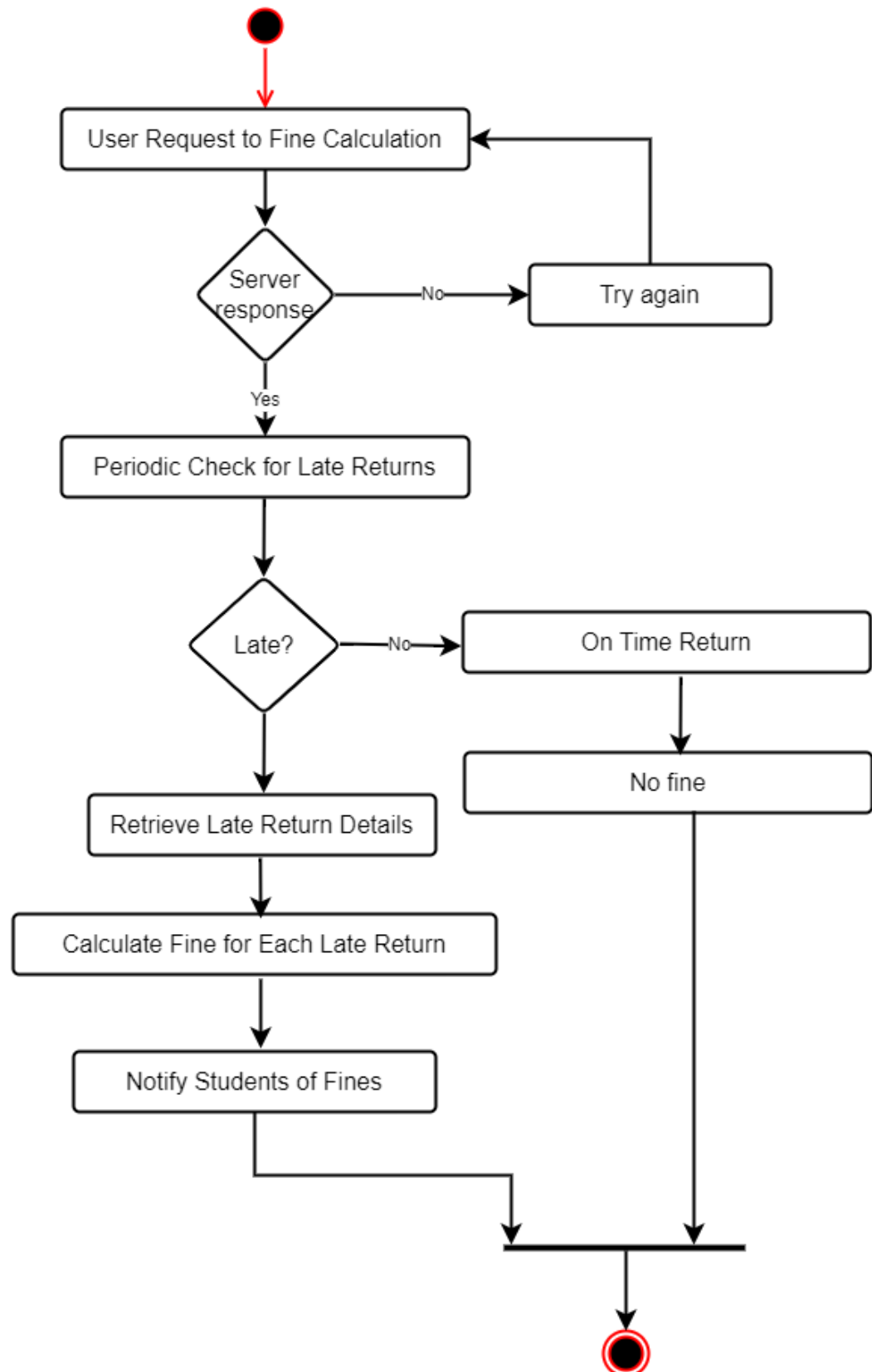
3. Add Student



4.Search Student:

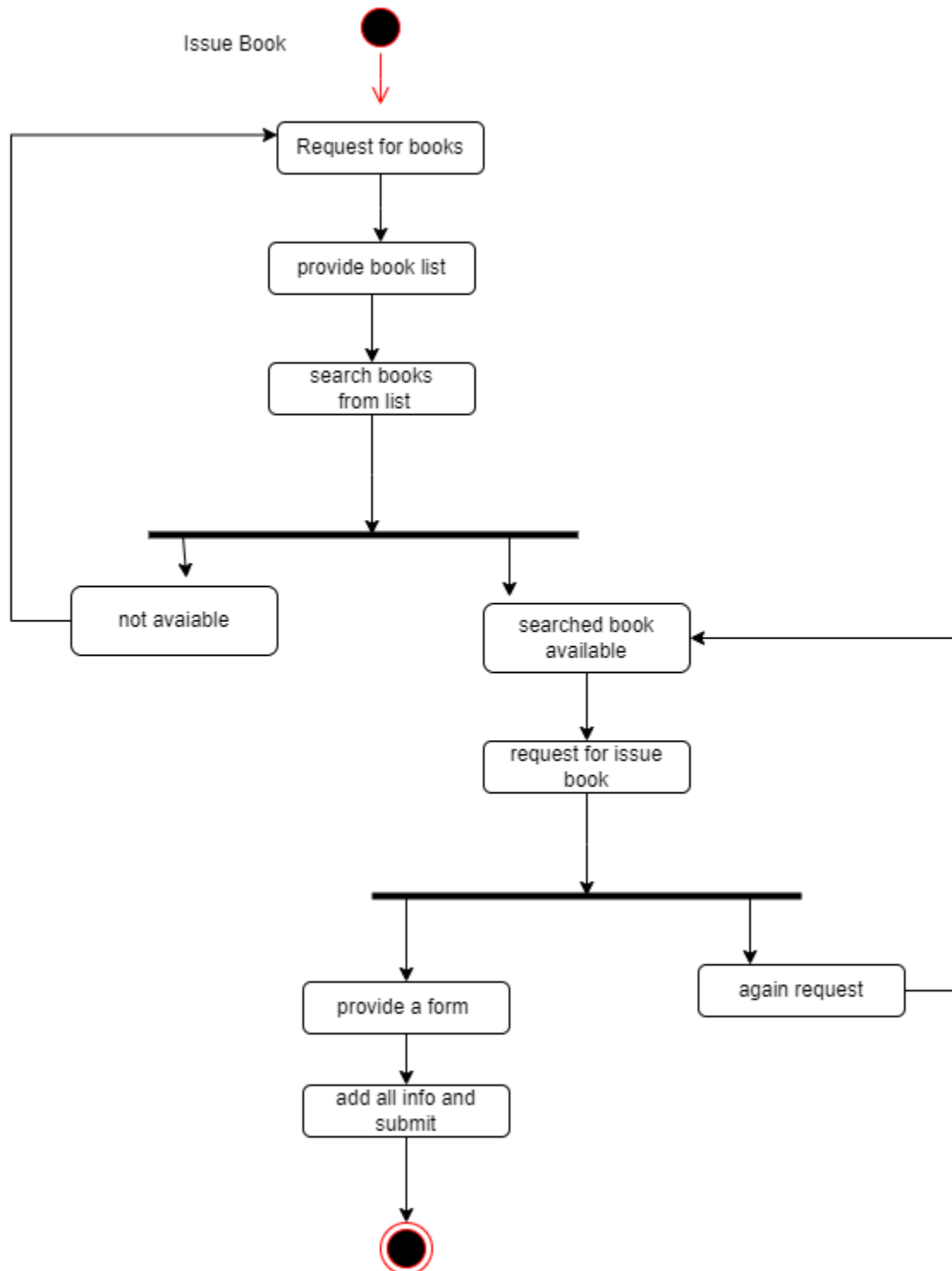


5. Fine Calculation:

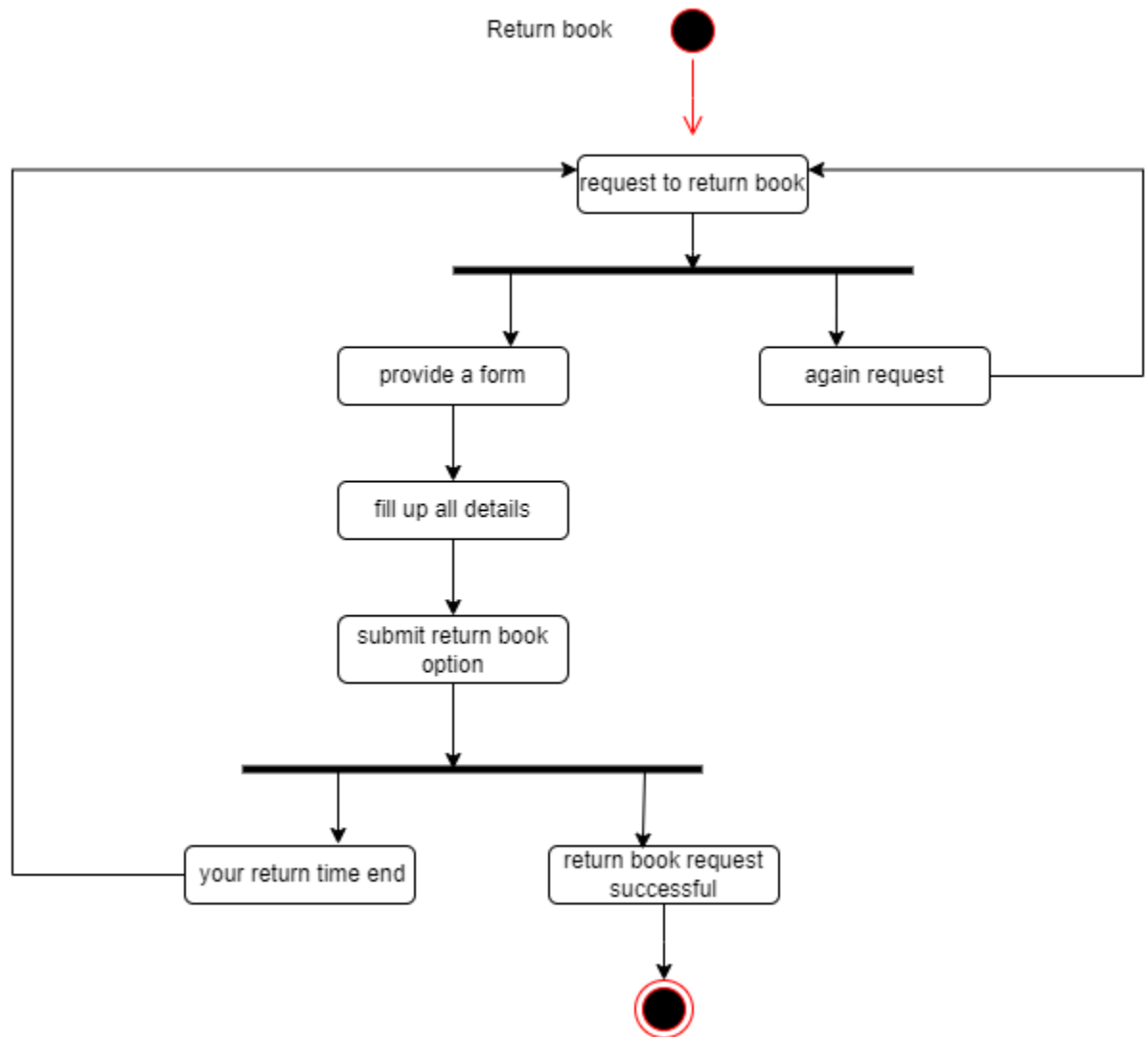


State Diagram

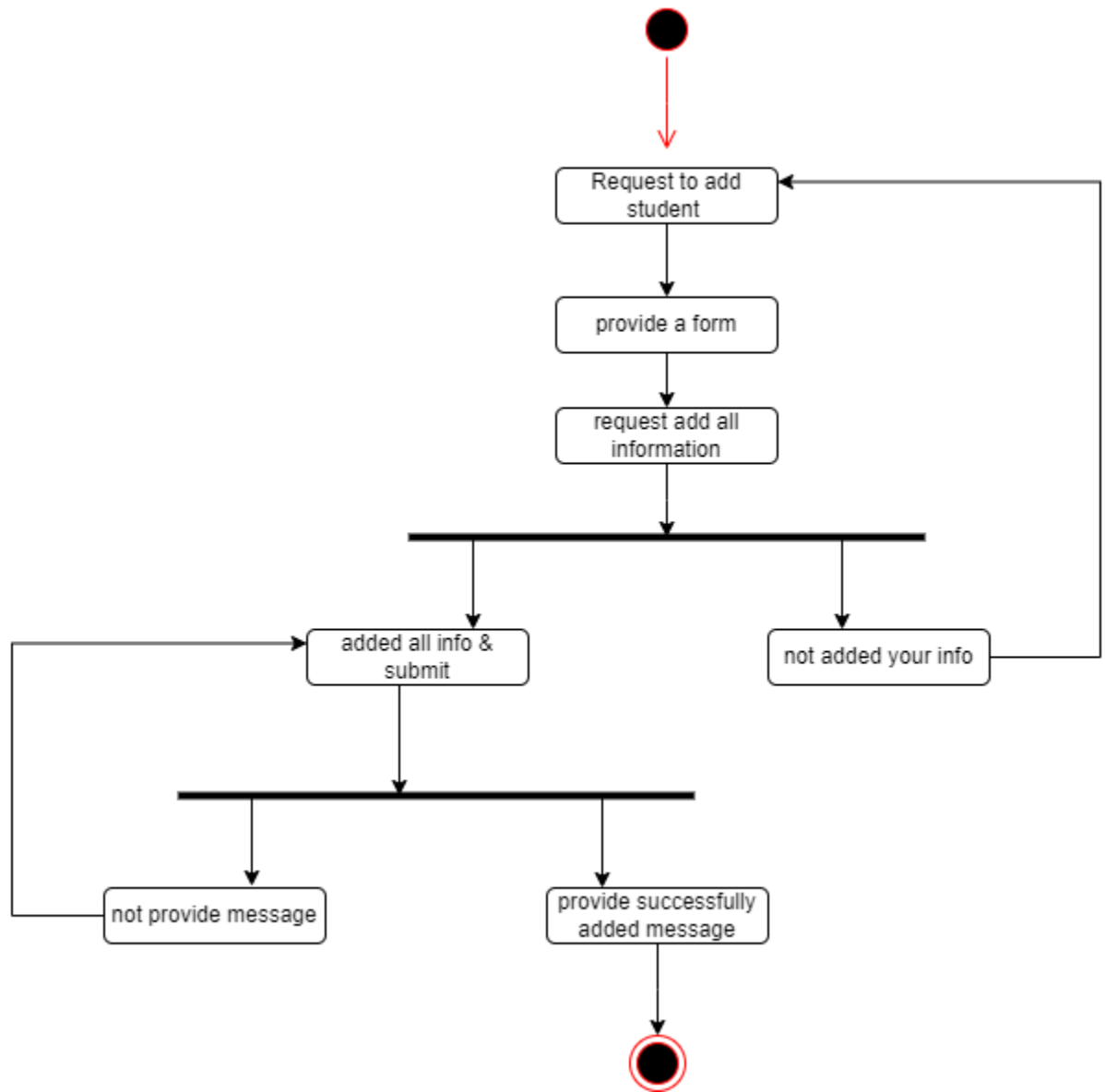
1. Issue Book:



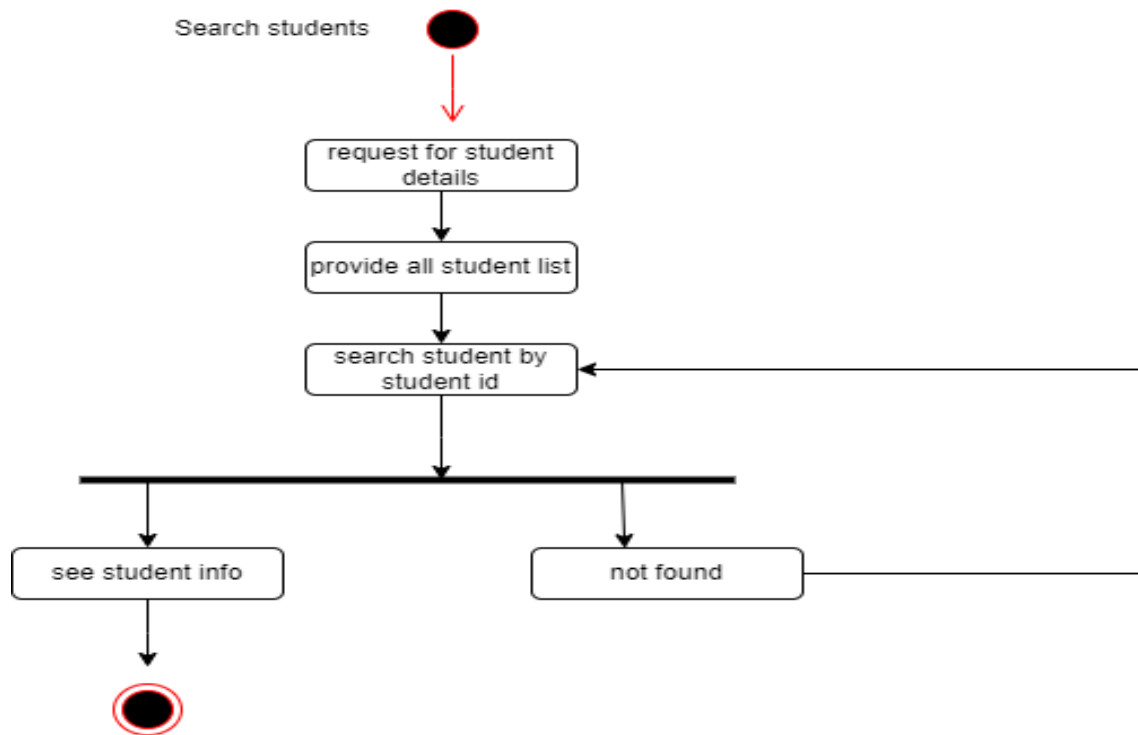
2. Return Book:



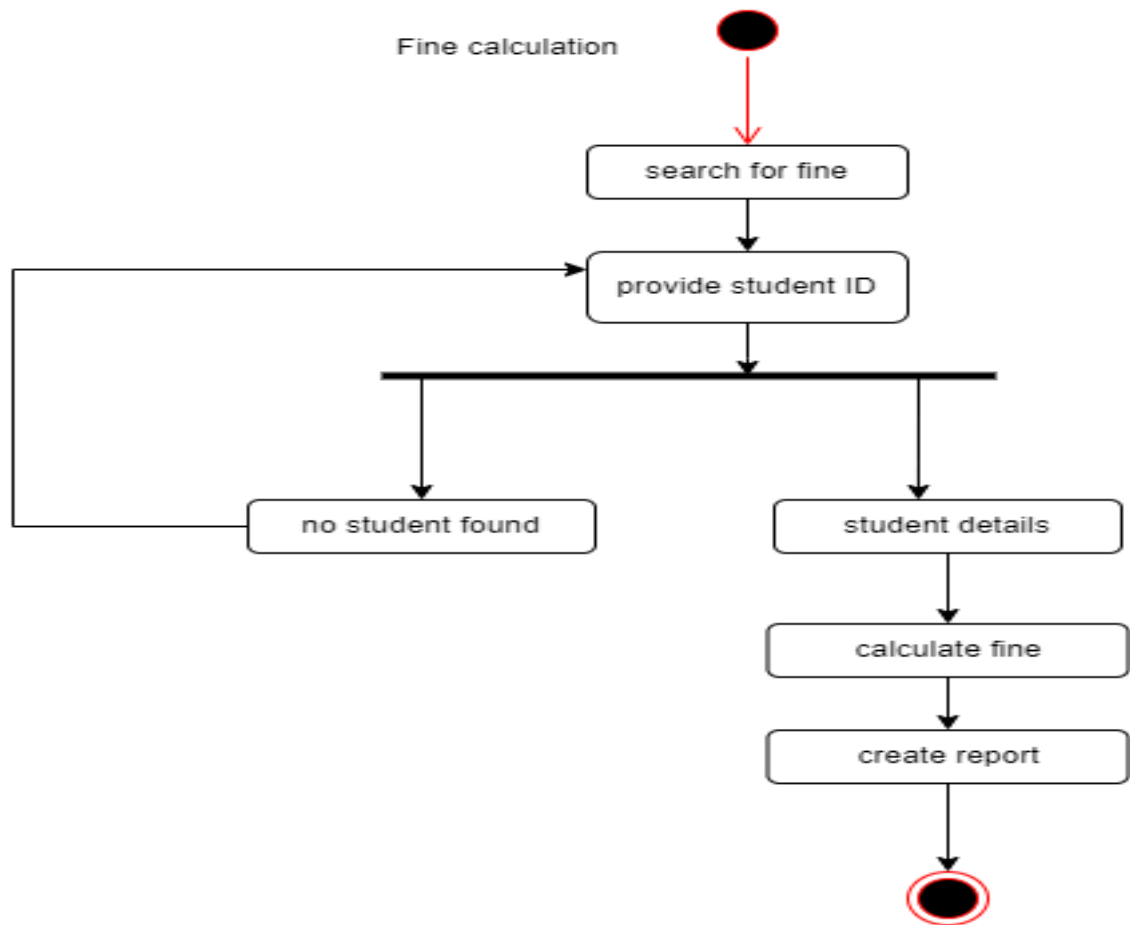
3. Add new Student :



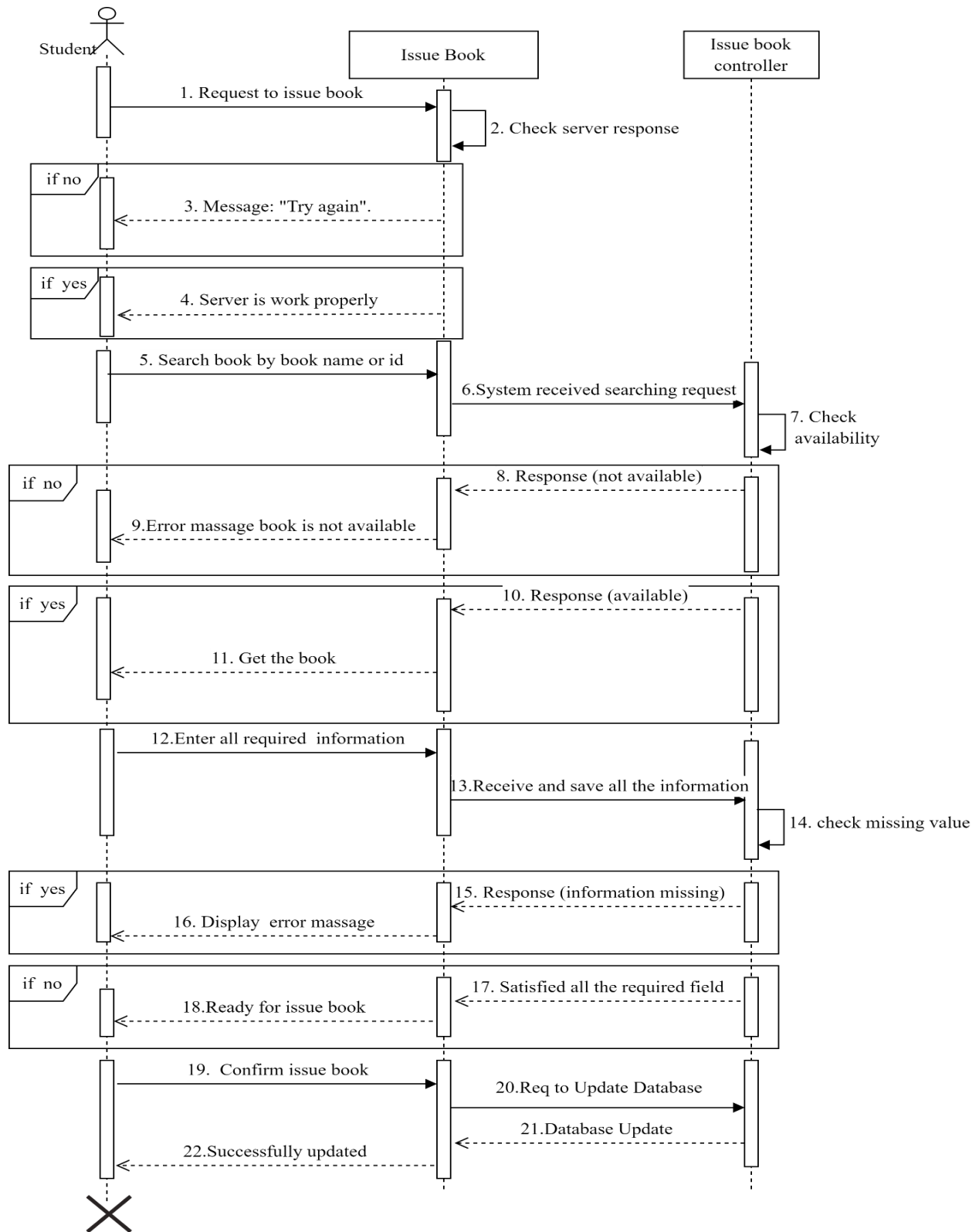
4. Search Student:

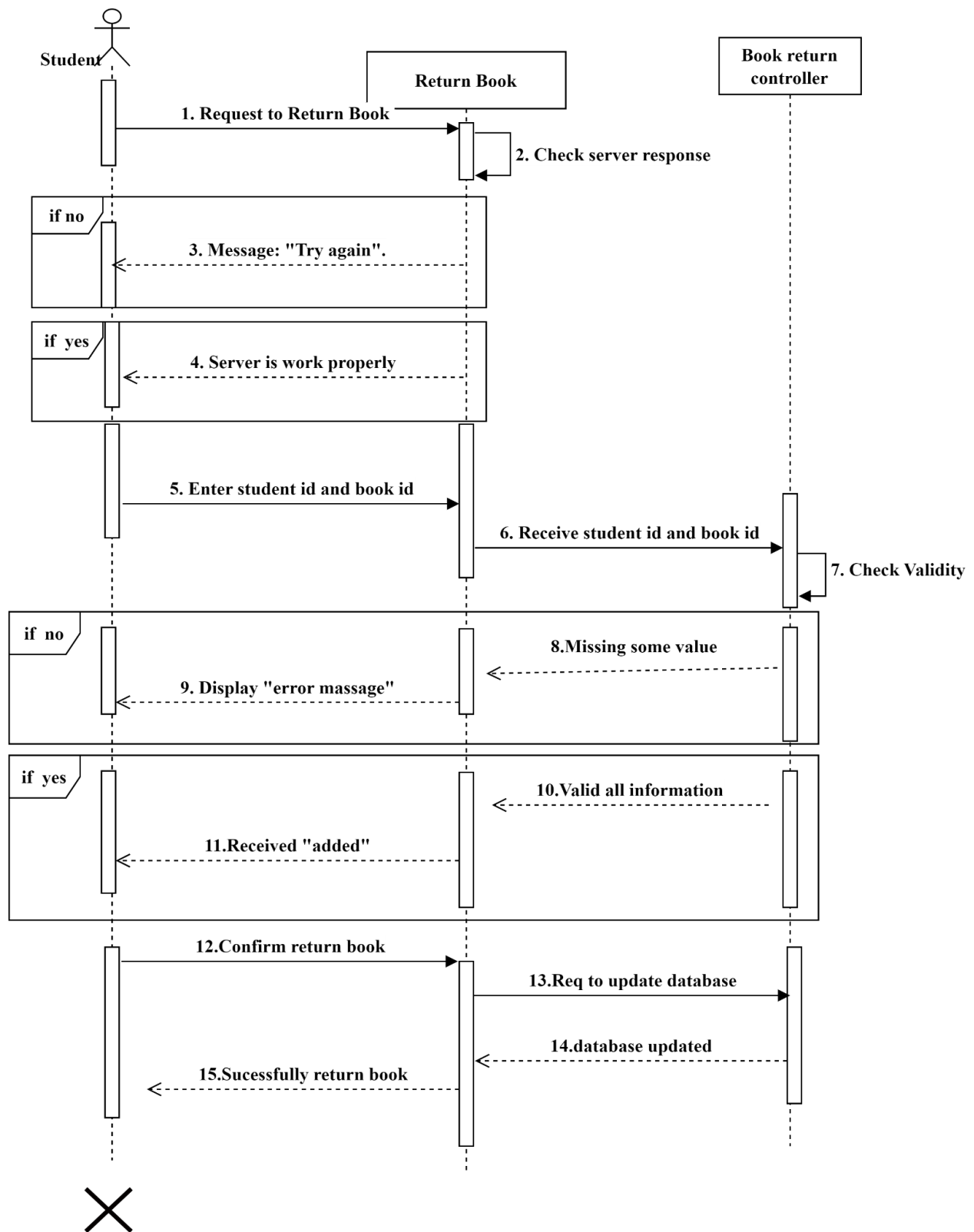


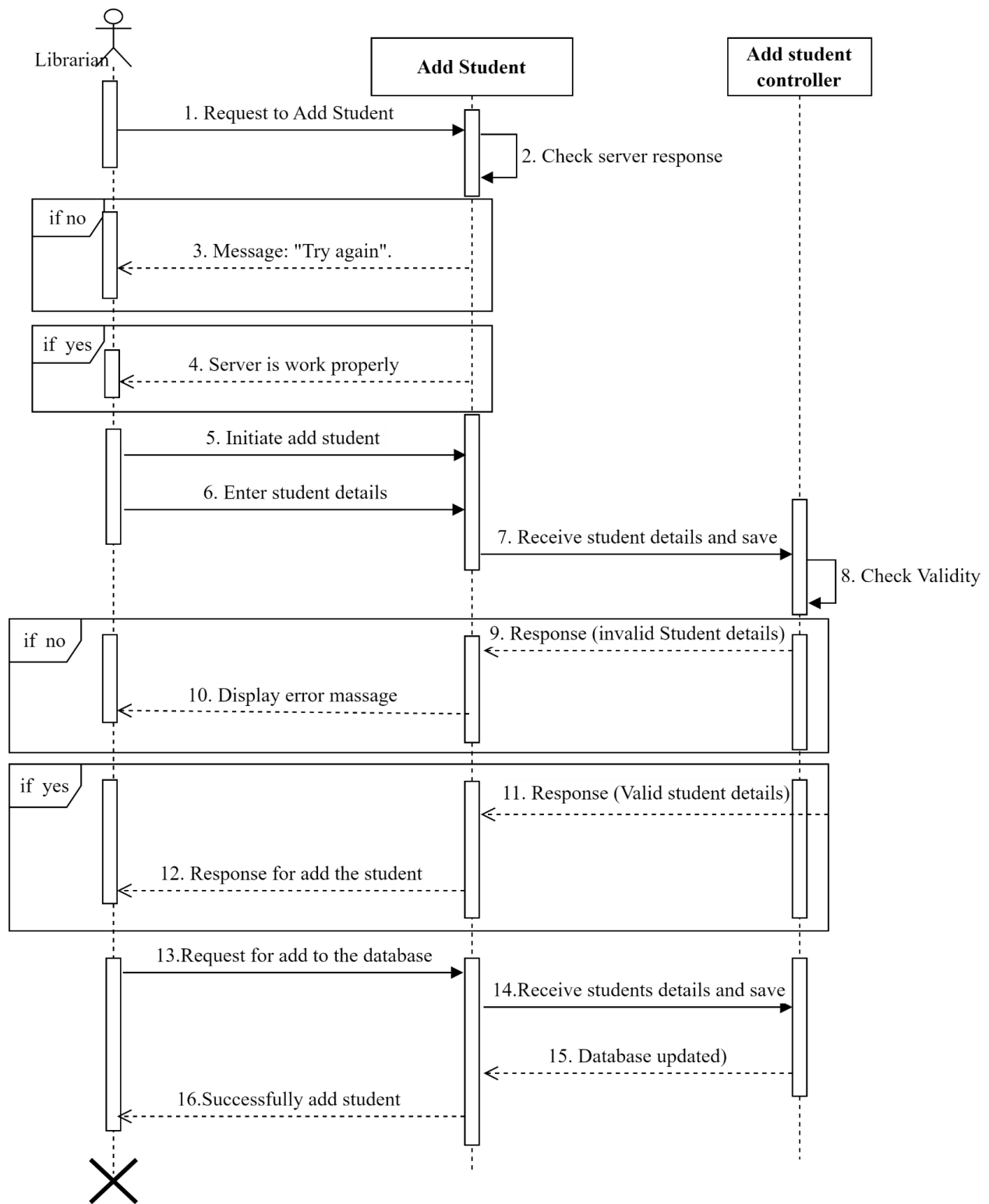
5. Fine calculation:

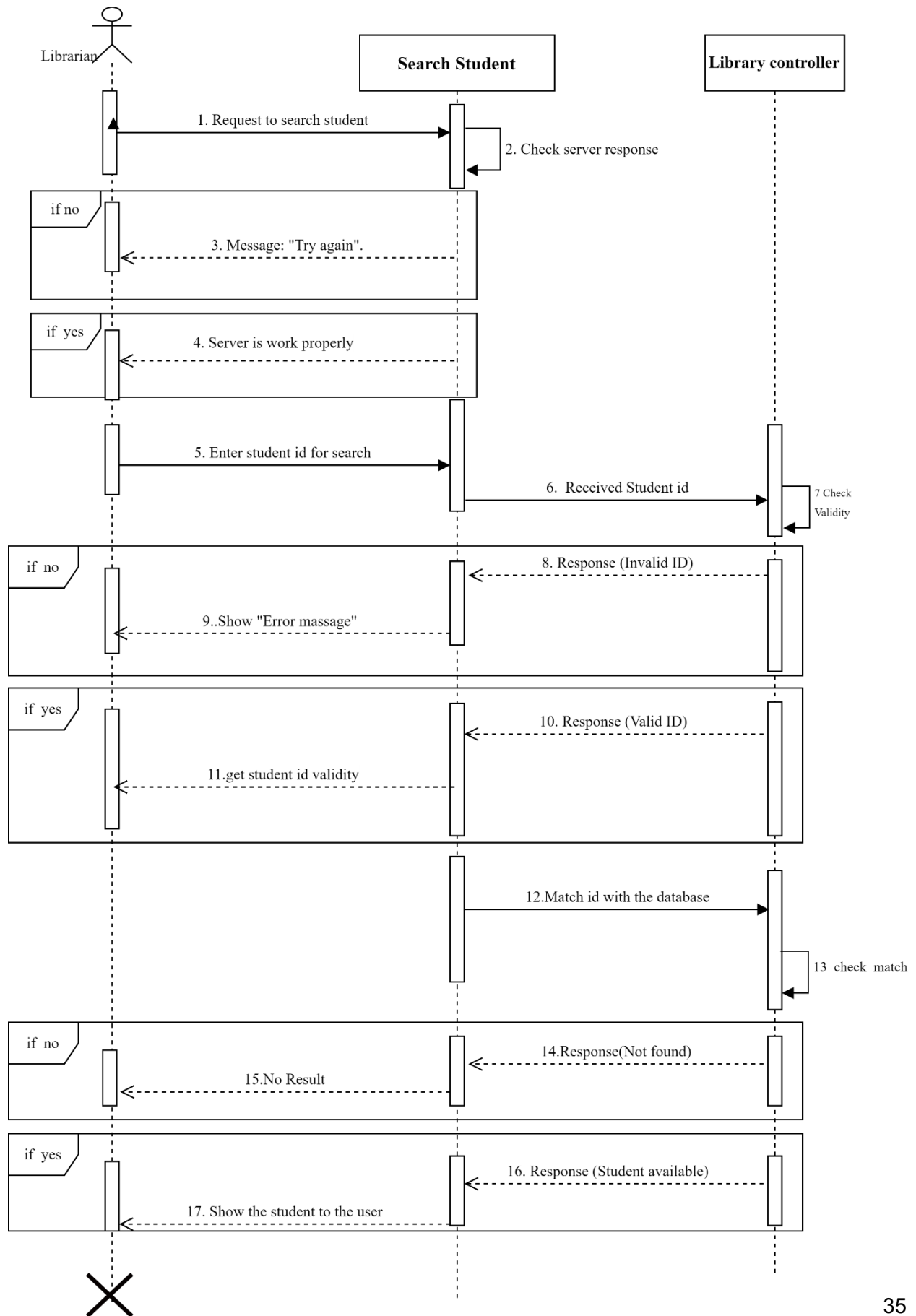


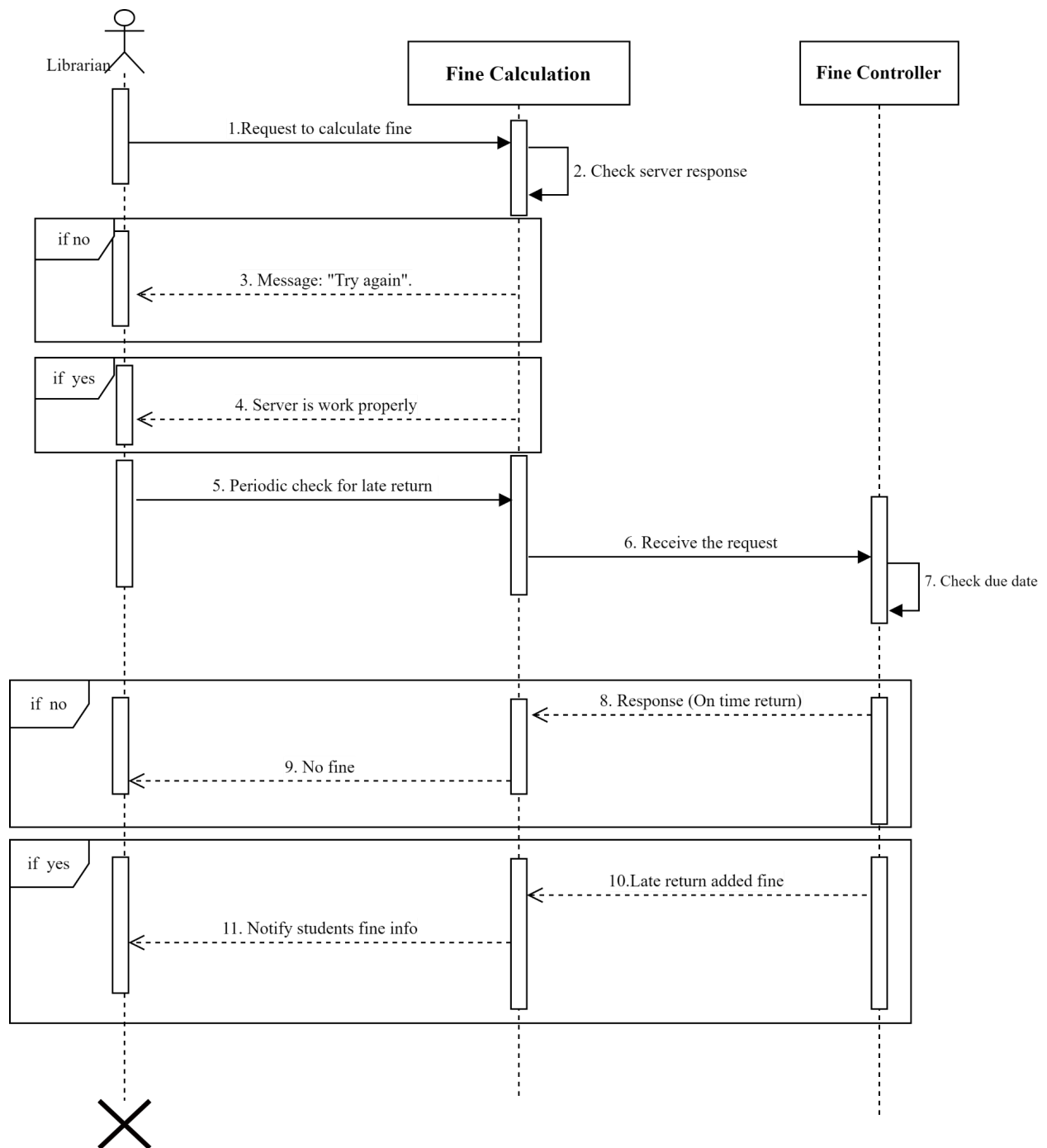
Sequence Diagram





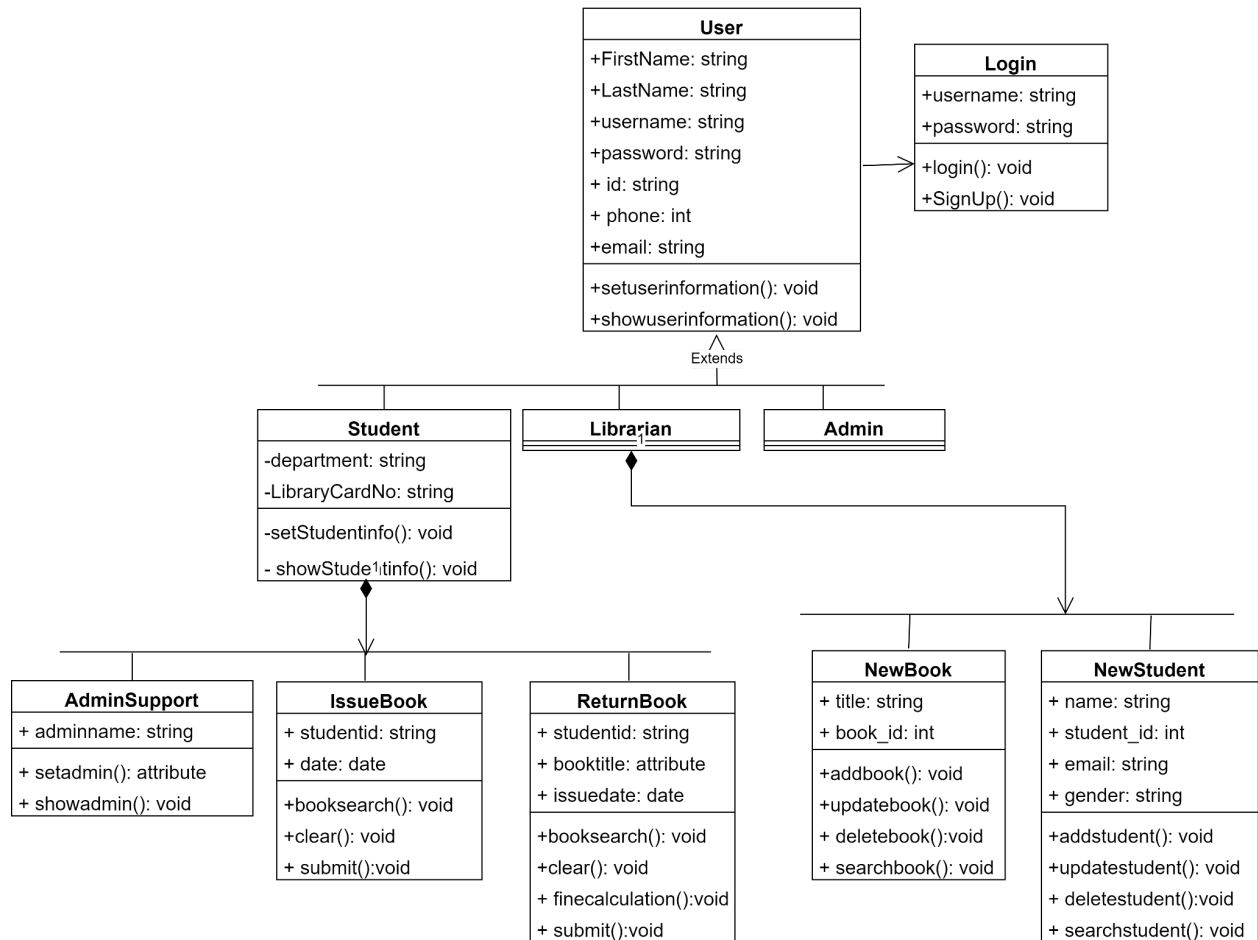






Class Diagram

Class Diagram



Crows footprint entity relationship diagram

ERD

