Online Seminar Library Management System

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1.Introduction

The introduction of the Software Requirements Specification (SRS) provides an overview of the entire SRS with purpose, scope, definitions, acronyms, abbreviations, references and overview of the SRS. The aim of this document is to gather and analyze and give an in-depth insight of the complete Online Seminar Library Management System of IIT (Institute of Information Technology) by defining the problem statement in detail. The detailed requirements of the Online Seminar Library Management System are provided in this document. It helps to increase in the number of readers, better management of seminar libraries of IIT.

1.1 Purpose

The purpose of the project is to maintain the details of books and library members of both IIT students and Teachers. The main purpose of this project is to maintain an easy circulation system between students and the libraries. Online Seminar Library Management System basically an online platform base library which help student that student can easily request for a book, collect book from library, show their info like (fine, address, phone number) etc. They can also see the availability of books by using book details. IIT Officer maintain the library, collect fine which is auto calculated in this system, see students all details easily. Moreover, the user can check all these features from their home and overall maintenance online library is easier and more reliable.

1.2 Project Scope

- Manually updating the library system into an android based application so that the user can know the details of the books available and maximum limit on borrowing from their computer and also through their phones.
- The ILM System provides information's like details of the books, insertion of new books, deletion of lost books, limitation on issuing books, fine on keeping a book more than one month from the issued date.
- Also, online security ensures for all library user

1.3. Glossary

This subsection contains definitions of all the terms, acronyms, and abbreviations used in the document. Terms and concepts from the application domain are defined.

- SRS – Software Requirement Specifications
- UI – User Interface
- SDLC – Software Development Life Cycle
- GUI – Graphical User Interface
- API – Application Programming Interface
- JAVA -> platform independence
- SQL -> Structured query Language
- DFD -> Data Flow Diagram

1.4. References

IEEE. IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998

1.5. Overview

Online Seminar library management of IIT is a subpart of Boolean automation project that manages and stores books information electronically according to student's needs. It is all about organizing, managing the seminar library and seminar library-oriented hole tasks. The system helps both students and IIT Officer to keep a constant track of all the books available in the library. It allows both the admin and the student to search for the desired book. It becomes necessary for any library to keep a continuous check on the books issued and returned and even calculate fine. Student, teacher both are member in this system, IIT Officer maintain this system. Member and admin see hole info about students and book list. IIT officer add, remove and delete book if needed. They add student list into Database. They receive fine from student, if its late from their return date. Both user and admin update their profile easily. Student borrow a book for 3 days. Student show their issue information easily, they can delete their pending book request etc.

Overall, this Online seminar Library Management system reduce the maintenance efforts and also help students and teacher use library in easy way.

2. User Classes and Characteristics:

There are two types of stakeholders in our project, such as:

1. IIT Officer

IIT officer one of the actors in our project. He acts like as an admin. In our project the admin has unique id, unique email, username and password. He is responsible for full system. Officer update books, approve book, edit book, receive book from student and others library-oriented tasks. He can also maintain books in a stack, means record the availability at regular time interval.

2. Library User (Student, Teacher)

Library user can student or IIT teachers. They are also primary actor in our project. Admin panel provide email password to student for library uses. They use this information and logged in our online library management system. A student can search books, issue books, see return books date, see his own dashboard and also see his fine.

3. Design and Implementation

Constraints Design and implementation constraints are those that we have used to implement this project make successful. It also describes tool that enables developers and testers to view and interact with the user interface (UI) elements of this application.

3.1 User Interface Technology

User interface (UI) is everything designed into a system view that which person's associates with this system may like the interface of this system.

3.1.1 Programming Language

For developing this system, we will use Java as a programming language. Java is a widely used open-source general-purpose programming language that is especially suited for Android application development. Java

is a programming language, and a powerful tool for making dynamic and interactive mobile applications based on Android operating system.

3.1.2 XML

XML stands for Extensive Mark-up Language. It is a mark-up language that describes the style of a mobile application based on Android operating system. XML describes how elements of the application should be displayed. Build responsive, mobile-first projects on with the world's most popular component library.

3.2 Implemented Tools and Platform

Every business plan, campaign, or project comes down to Tactics, Tools, and Strategies. To conceive, develop, and implement a sound social media marketing strategic plan that will be successful needs to have those three critical components.

3.2.1 Web Server

A Web server is a program that uses HTTP (Hypertext Transfer Protocol) to serve the files that form Web pages to users, in response to their requests, which are forwarded by their computers' HTTP clients. Dedicated computers and appliances may be referred to as Web servers as well. We will use the Apache HTTP server to implement this project. We will use RESTful API to retrieve data from our server to mobile application. RESTful stands for Representational State Transfer. And API stands for Application Programming Interface.

3.2.2 Database Server

We will use MySQL database server to store all of the information of this system. The reason behind to choose the database server are given below:

1. Data Security
2. High performance
3. Reporting and Data Mining
4. Complete workflow control
5. Reduce total cost of ownership

4. Requirement Specification

We have 3 levels of users :

- User module:

In the user module, user will check the availability of the books.

- Issue book
- Request book
- Return book
- Fine details
- Edit profile

- Administration module: The following are the module in the administration/admin module:
  - Add student
  - Entry book details
  - Add new book
  - Remove books
  - Update details of book
  - Approve book
  - Fine collection

The complete requirement specification based on the elicitation process is described in this section.

4.1 Functional Requirement

Functional requirements refer to the functions which are mandatory of our system. Functional requirements must be able to perform on the software system. Every system must have some functional requirements and non-functional requirements. Here Library user will be student or teacher, admin will be IIT Officer.

4.1.1 IIT Officer and seminar library user show the book list and search book.

Requirement 1	**IIT Officer and library user show the book list and search book**
Description	In our system admin panel and also user like students and teachers show the book list and search book using book identification number or book name or year wise etc. Both actors see the book list and find book sing search option.
Stakeholder	Library users, IIT Officer
Priority	High

4.1.2 user view their dashboard

Requirement 2	**IIT Officer and library user view their dashboard**
Description	After login successfully IIT officer or library user view their dashboard. In admin dashboard add/delete books, book request, issue details, registered students and other information will be showed. In library user dashboard issue book, book list, account, fine will showed.
Stakeholders	IIT Officer, Library user
Priority	High

4.1.3 Student and admin can edit their profile

Requirement 3	**Librarian and library user can edit their profile**
Description	In this system librarian and library user can edit their profile, username, password and other information. If they want to edit their profile first, they should login the system and they should go to their profile and then they can update their profile.
Stakeholders	IIT Officer, library user
Priority	Low

4.1.4 IIT Officer add/delete books

Requirement 4	**IIT Officer add/delete/edit books**
Description	In this system, IIT Officer is a primary actor and he/she can add, delete, edit books. He/she first logged in, the system and then add/ delete/edit book. Beside of this books database automatically update.
Stakeholder	IIT Officer
Priority	High

4.1.5 IIT Officer approve new book and update database details

Requirement 5	**IIT Officer approve new book and update details**
Description	If a student sends book request, then officer approve the books for 3 days and finally update the book details.
Stakeholder	Library user, IIT Officer
Priority	High

4.1.6 Library User request for one book at a time using book identification number

Requirement 6	**Library User request for one book at a time using book identification number**
Description	A library user request for one book at a time to admin. He/She can delete his/her pending book request from user dashboard.
Stakeholder	Library user
Priority	High

4.1.7 IIT Officer search a student by student first name or username

Requirement 7	**IIT Officer search a student by student first name or username**
Description	Librarian can see all student's information. If librarian search a student for any purpose, he can use student first name, username for search a specific student and see his/ her information
Stakeholder	IIT Officer
Priority	High

4.1.8 Librarian and student change their username

Requirement 11	**Librarian and student change their username**
Description	Student and admin ca change their username successfully.
Stakeholder	Library user, IIT Officer
Priority	High

4.1.9 Library user see their expired date and fine in user dashboard

Requirement 12	Library user see their expired date and fine in user dashboard
Description	A student can issue book bye send book request. He/she can see issue date and expired date of book and see his/her fine.
Stakeholder	Library user, IIT Office
Priority	

4.1.10 Library user & admin can recover their password

Requirement 13	Library user & admin can recover their password
Description	In this system admin and a student can login by their username or email and password. If they forget their password, they can recover password by click forget password and then get e link in their mail to recover the password.
Stakeholder	Library user, admin
Priority	

4.1.11 IIT Officer can see student's details

Requirement 15	Librarian (IIT Officer) can see student's details
Description	An admin (librarian) can see all student's details. First, he/she need to login this system and then he/she can see all registered student's details.
Stakeholder	Library user, Librarian (IIT Officer)
Priority	

5 Non-Functional Requirements

5.1 Usability Requirement

The system shall allow the users to access the system from the phone using web application. The system uses web application as an interface. Since all users are familiar with the general usage of library website, no special training is required. The system is user friendly which makes the system easy.

5.2 Availability Requirement

The system is available 100% for the user and is used 24 hours a day and 365 days a year. The system shall be operating some operation open days of university.

5.3 Efficiency Requirement

Mean Time to Repair (MTTR) - Even if the system fails, the system will be recovered back up within an hour or less.

5.4 Accuracy

The system should accurately provide real time information taking into consideration various concurrency issues. The system shall provide 100% access reliability.

5.5 Performance Requirement

The information is refreshed depending upon whether some updates have occurred or not in the application. The system shall respond to the member in not less than two seconds from the time of the request submittal. The system shall be allowed to take more time when doing large processing jobs. Responses to view information shall take no longer than 5 seconds to appear on the screen.

5.5.1 Speed and Latency Requirements

Speed and latency requirements must be ensured while retrieving data from the cloud server.

SLR-1	Search must be faster
Description	Admin or library user search book others info within faster and easity
Stack Holders	Admin and Library Users
Priority	High

5.5.2 Precision and Accuracy Requirements

Student and admin search many info, and they must be accurate.

PAQ-1	Search must be accurate
Description	Admin or library user search book others info and these are accurate
Stack Holders	Admin and Library Users
Priority	High

5.5.3 Capacity Requirements

The developed system by us must be capable to handle user data, provide accurate information, handling database, manage http request etc.

CR-1	Search Thousands of data within 5 second
Description	Admin or library user search book others information with a little of time
Stack Holders	Admin and Library Users
Priority	High

5.5.4 Reliability Requirement

The system has to be 100% reliable due to the importance of data and the damages that can be caused by incorrect or incomplete data. The system will run 7 days a week, 24 hours a day.

5.6 Data Requirements

For defining data requirements, we need to build the model. For our application maximum data would be loaded from remote user. And for that purpose, we need to focus on some major points. Such as:

- Types of entity of the system
- Capacity and resources of the data requirements
- Data source sequence
- Data availability schedules
- Quantity of data
- Availability of data

5.7 Performance Requirements

It is very important to maintain performance of any software system. To ensure performance, weneed to maintain some steps. Now, I will explain some perspective by which we are going to enhance the performance of our project.

5.8 Security Requirements

Making software security as a requirement is very important. Software security requirements should be its functional requirement. Software security enforces security of an application system. Functionality related to software security can either be directly tested or observed. Some security related requirements are given below:

- Get access according to logged in user
- Fine calculation must be correct

- Signing out from system
- Handling encrypted passwords
- Keep our database in secure

5.9 Integrity Requirements

Integrity requirements refers to a security system which ensures an expectation of data quality. It also ensures that all data of the system would never be exposed to the malicious modification or accidental destruction. For that reason, we will store our user passwords as encrypted format which is impossible to decrypt. It is also called hashed password. Also our database must be protected from sql injection , penetration test.

5.10 Privacy Requirements

It is very important to ensure privacy of the system users. Privacy requirements enhances to protect stakeholder's privacy. In this way, all data or a partial part of data are going to be disclosed according to system's privacy policy. To ensure privacy, the central database should be protected by the anonymous. Users are permitted to get access to those data which are being associated by them which can be ensured by the user log in system.

5.11 Usability and Human-Interaction Requirements

The main target of developing any system is to make the system user friendly and easy to usable for the end users like student and teacher.

6 Requirement Engineering Process

Requirement's engineering refers to the process of defining, documenting and maintaining requirements in the engineering design process. It is a common role in systems engineering and software engineering.

6.1 Requirement Elicitation Techniques

Requirement elicitation is the process of collecting and refining stakeholder's requirements. That's means IIT Office seminar library's requirements. Projects are garbage-in-garbage-out meaning that poor quality requirements typically lead to project issues and failure.

5.1.1 Hold Elicitation Interviews

Our team hold an interview with iit seminar library management officer. We discuss of the seminar library

6.1.2 System Interface Analysis

The first thing to do is to identify which systems the system-to-be shall communicate with. It could be a server on the Internet, a piece of software on the same host as the system-to-be, some hardware or something completely different. The following is an incomplete list of types of interfaces that we have considered:

- Relational Databases
- Protocols
    - For Communication on the internet
    - For communication via a specific port on the computer

- Specific addressing RAM

6. Use case Diagram

Use case diagram comprises actors and use cases, where actors perform several cases or one. This also shows which actors have access to which use case. Here is the use case diagram for house management system.

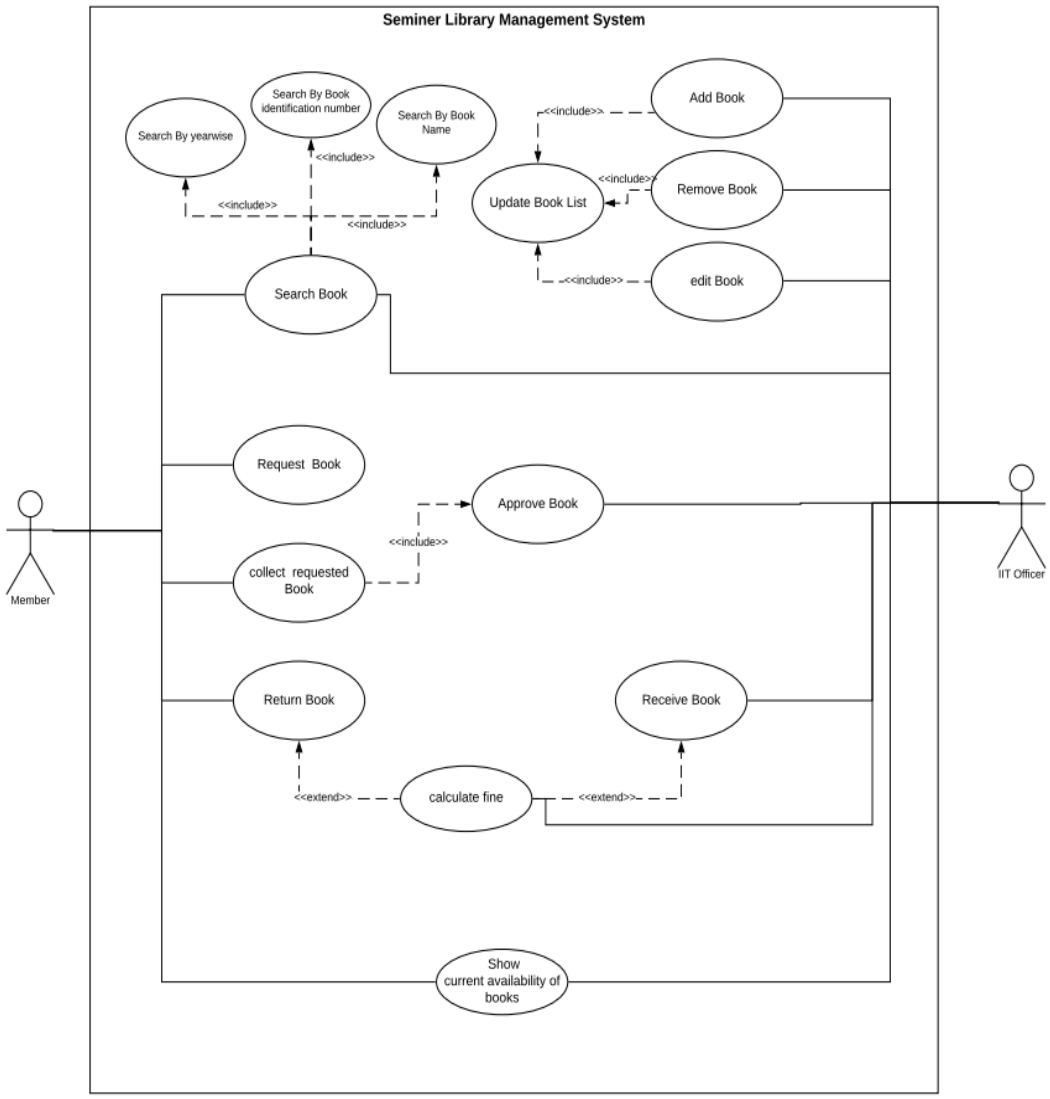


Figure 1.1 Use case diagram

7 Use Case Description

All use cases from use case diagram are explained here.

Table 7.1 Search Book

Use Case	Search Book	
Goal	Find book successfully.	
Precondition	Search book	
Success End condition	Show book details (book identification number, name, author, quantity, available status)	
Failed End Condition	Book isn't available.	
Primary Actor	Student, Teacher	
Secondary Actor	N/A	
Trigger	Press Search Button	
Main Success Flow	**Step**	**Action**
	1	Student/teacher can search book using book identification number
Alternative Flow	**Step**	**Action**
	1.a	Student/Teacher can search book using book name
Quality Requirements	Student/Teacher find book within 5 seconds	

Table 7.2 Add Book

Use Case	Add Book	
Goal	Add book successfully into seminar library database	
Precondition	Must to be logged in.	
Success End condition	Add new book successfully.	
Failed End Condition	Books don't add into database	
Primary Actor	IIT officer	
Secondary Actor	N/A	
Trigger	Click add book option	
Main Success Flow	**Step**	**Action**
	1	IIT Officer(admin) give all the information details about book.
	2	Click add button
	3	update the book list add new book successfully
Alternative Flow	**Step**	**Action**
		N/A
Quality Requirements	Admin add book into database within 5 seconds after clicking add button.	

Table 7.3 Edit Book

Use Case	Edit Book	
Goal	Edit book successfully and upgrade existing book info.	
Precondition	Must to be logged in.	
Success End condition	Edit book successfully.	
Failed End Condition	Can't edit book information	
Primary Actor	IIT officer	
Secondary Actor	N/A	
Trigger	Click edit book option	
Main success flow	**Step**	**Action**
	1	Find book using book identification number
	2	Click update button.
	3	IIT Office(admin) update some information about book
	4	Click edit book
	5	Update exiting book info
Alternative Flow	**Step**	**Action**
	1.a	Find book using book name
Quality Requirements	Admin edit book into database within 5 seconds after clicking edit button.	

Table 7.4 Remove Book

Use Case	Remove Book	
Goal	Remove book successfully and Remove existing book from database.	
Precondition	Must to be logged in.	
Success End condition	Remove book successfully from database	
Failed End Condition	Can't Remove book information from database	
Primary Actor	IIT officer	
Secondary Actor	N/A	
Trigger	Click delete book button	
Main Success Flow	**Step**	**Action**
	1	Find book using book identification number.
	2	Click Remove/delete button.
	3	Click ok button
Alternative Flow	**Step**	**Action**
	1.a	Find book using book name
Quality Requirements	Admin Remove book from database within 5 seconds after clicking ok button.	

Table 7.5 Request Book

Use Case	Request Book	
Goal	Request book successfully and save request info into database	
Precondition	Must to be logged in.	
Success End condition	Book request send successfully	
Failed End Condition	Can't send the book request	
Primary Actor	Student/Teacher	
Secondary Actor	N/A	
Trigger	Click request button	
Main Success Flow	**Step**	**Action**
	1	Find book using book identification number.
	2	Click request button.
	3	Request send successfully, click ok.
Alternative Flow	**Step**	**Action**
	1.a	Find book using book name
	3.a	You have already a pending book request
	3.b	This book is not available in our library
	3.c	Request failed
Quality Requirements	Student/Teacher send book request successfully within 5 second	

Table 7.6 Collect Requested Book

Use Case	Collect request book	
Goal	Collect requested book successfully from seminar library	
Precondition	Must to be logged in.	
Success End condition	Collect requested book successfully	
Failed End Condition	Can't Collect requested book successfully	
Primary Actor	Student/teacher	
Secondary Actor	IIT officer	
Trigger	Click show requested info.	
Main Success Flow	**Step**	**Action**
	1	Show the requested book details, like approve date , return date
Alternative Flow	**Step**	**Action**
		N/A
Quality Requirements	Student/teacher collect book with sort time	

Table 7.7 Return book

Use Case	Return Book	
Goal	Return Book successfully	
Precondition	Must to be logged in.	
Success End condition	Return book successfully	
Failed End Condition	Can't return book successfully	
Primary Actor	Student/teacher	
Secondary Actor	IIT officer	
Trigger	N/A	
Main Success Flow	**Step**	**Action**
	1	If added fine, pay your fine give the book .
Alternative Flow	**Step**	**Action**
		N/A
Quality Requirements	Student/teacher return book within sort time	

Table 7.8 Receive book

Use Case	Receive Book	
Goal	Receive Book successfully	
Precondition	Must to be logged in.	
Success End condition	Return book successfully	
Failed End Condition	Can't return book successfully	
Primary Actor	IIT officer	
Secondary Actor	Student/teacher	
Trigger	Show issue information option	
Main Success Flow	**Step**	**Action**
	1	Click issue information
	2	Click take book
	3	Click ok
Alternative Flow	**Step**	**Action**
	3.a	Add fine
	3.b	Collect fine from student
	3.c	Click paid fine option
Quality Requirements	Received book from student/teacher within 5 second.	

Table 7.9 Calculate fine

Use Case	Calculate fine	
Goal	Collect fine from student	
Precondition	Must to be logged in.	
Success End condition	Collect fine successfully	
Failed End Condition	Technical error show	
Primary Actor	IIT officer	
Secondary Actor	Student/teacher	
Trigger	Take book from expired info option	
Main Success Flow	**Step**	**Action**
	1	Click expired book info
	2	Click take book
	3	Take accurate fine
	4	Click paid button
	5	Click ok
Alternative Flow	**Step**	**Action**
		N/A
Quality Requirements	Received fine from student within 5 second.	

Table 7.10 Show current availability of Books

Use Case	Show current availability of Books	
Goal	Show current availability of Books successfully	
Precondition	Must to be logged in.	
Success End condition	Collect fine successfully	
Failed End Condition	Don't show the current availability of book	
Primary Actor	IIT officer, Student/teacher	
Secondary Actor	N/A	
Trigger	Select book option	
Main Success Flow	**Step**	**Action**
	1	Show the current availability of books.
Alternative Flow	**Step**	**Action**
	1.a	Books isn't available in seminar library database
Quality Requirements	Show available within 5 second	

8 Activity Diagram

An activity diagram is a graphical representation of an executed set of procedural system activities and considered a state chart diagram variation. Activity diagrams describe parallel and conditional activities, use cases and system functions at a detailed level. Activity diagram for house rental management system is given below.

8.1 Search Book

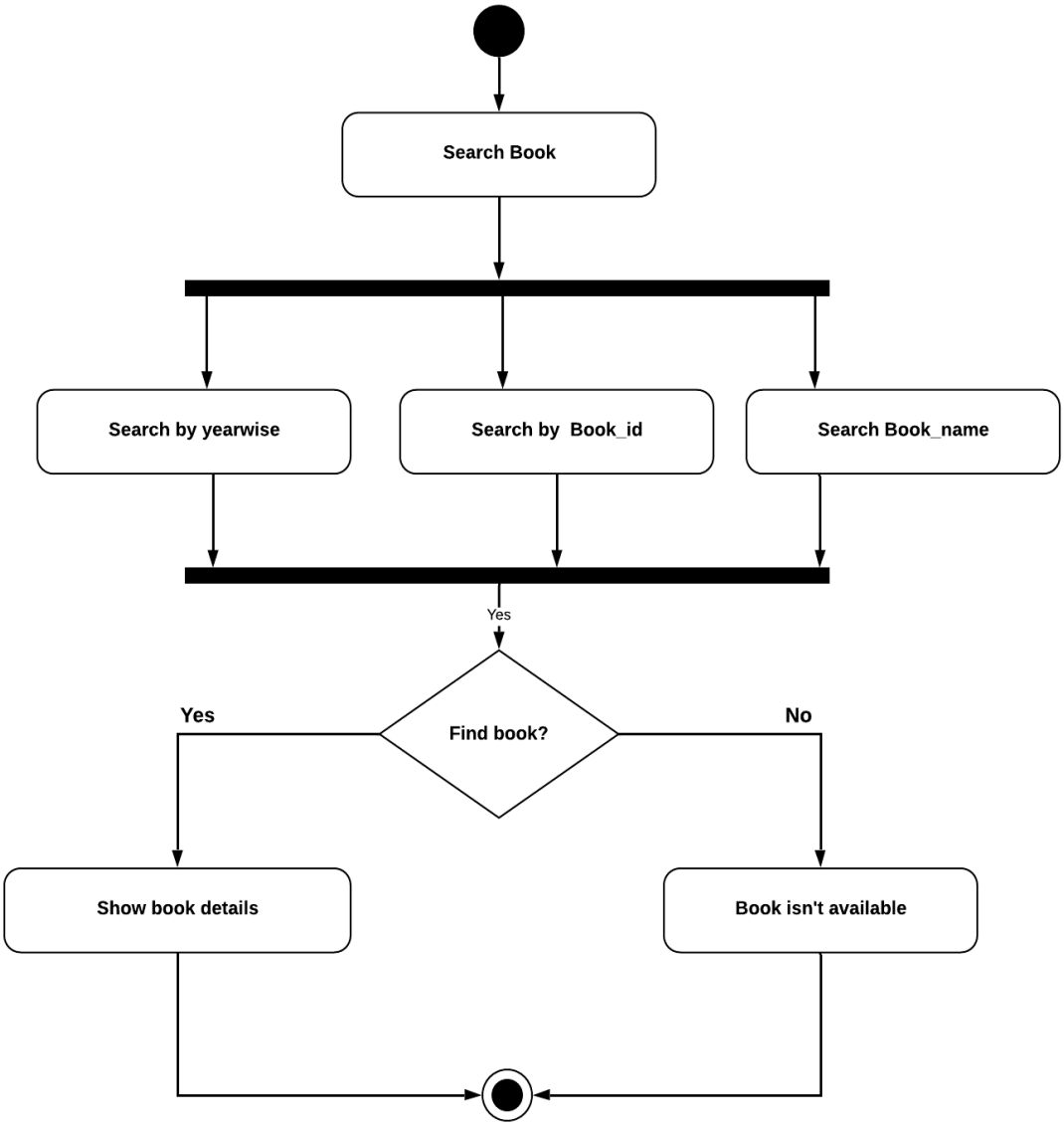


Figure 8.1 Search Book

8.2 Add Book

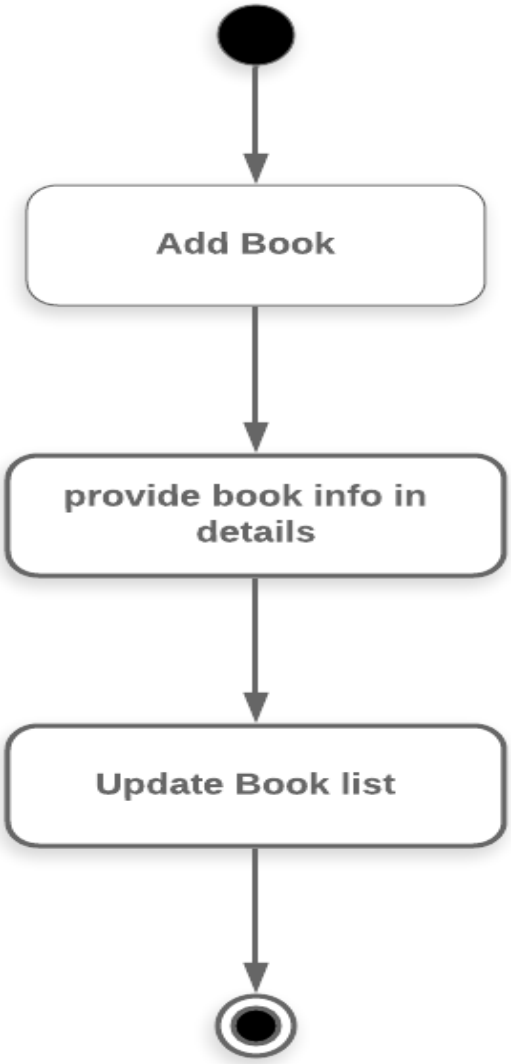


Figure 8.2 Add Book

8.3 Edit Book

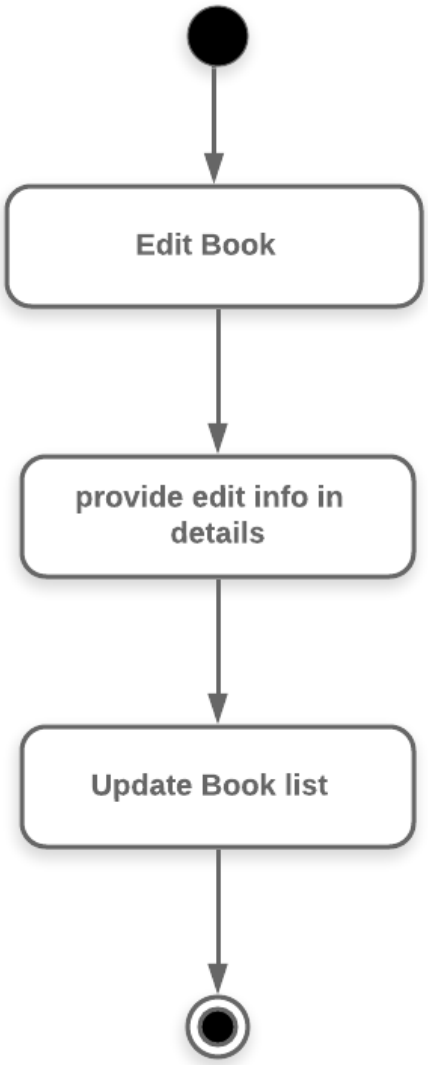


Figure 8.3 Edit Book

8.4 Remove Book

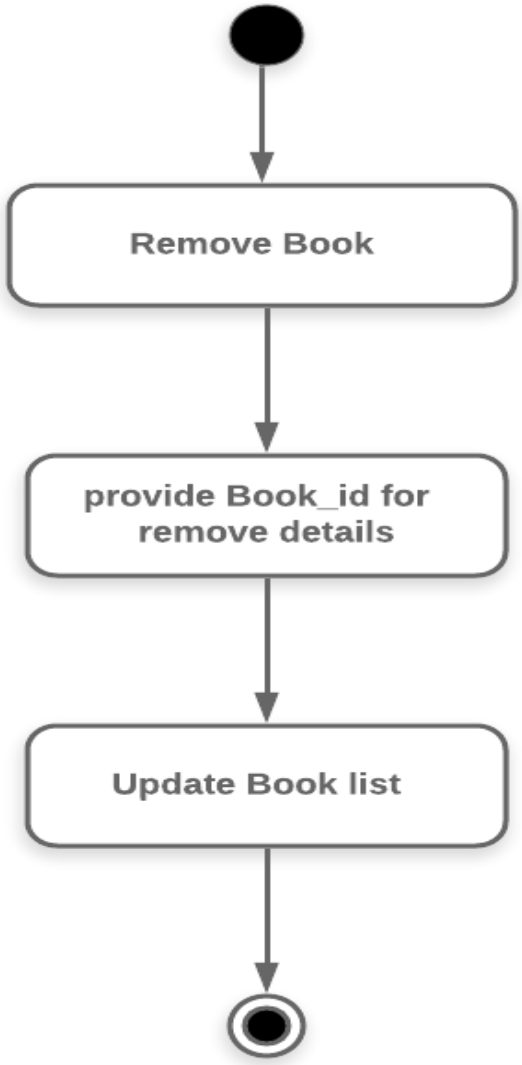


Figure 8.4 Remove Book

8.5 Request Book

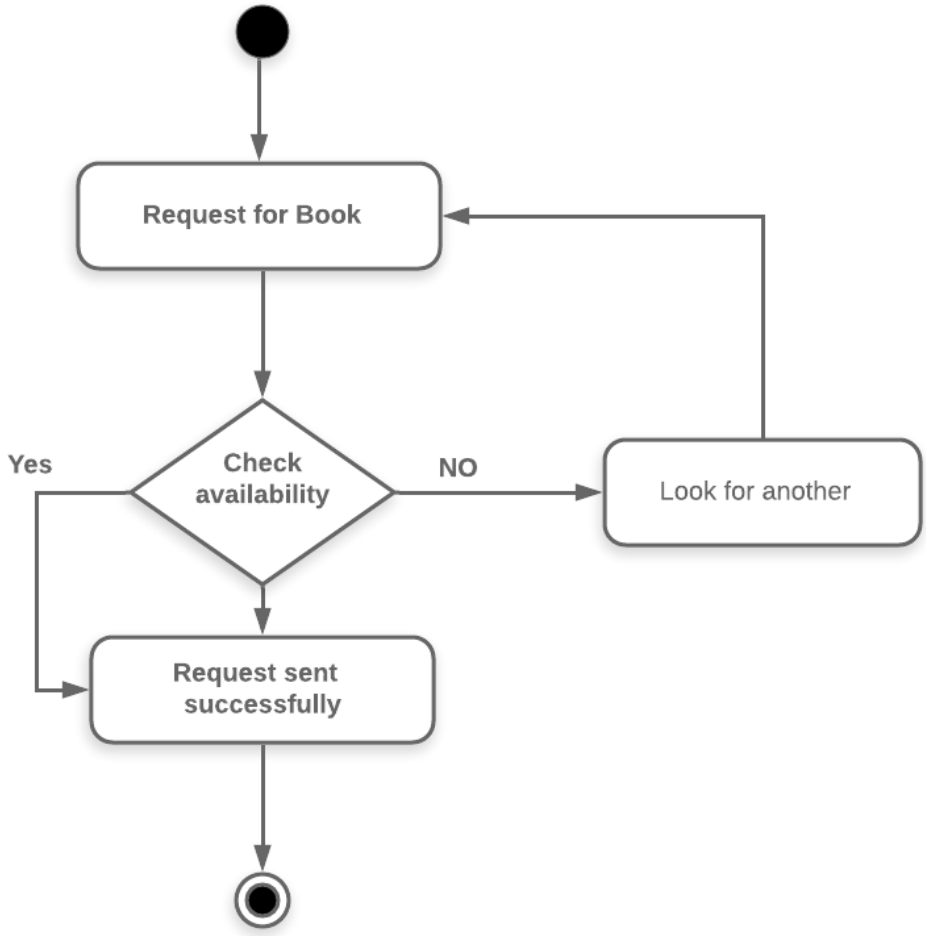


Figure 8.5 Request Book

8.6 Collect requested book

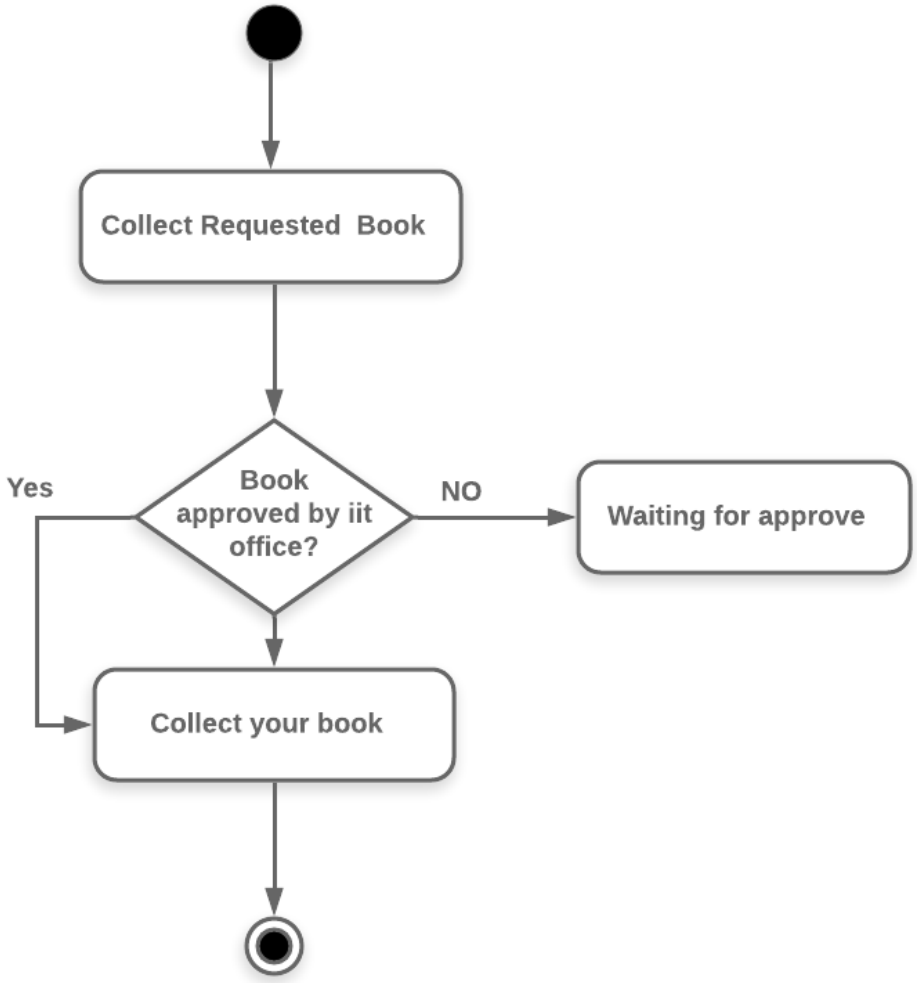


Figure 8.6 Collect requested book

8.7 Return Book

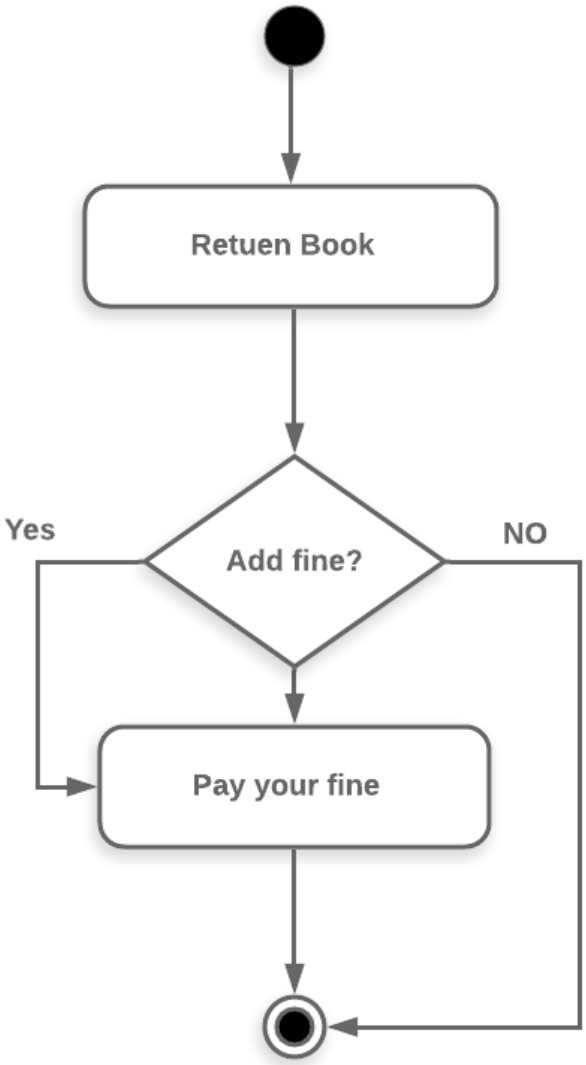


Figure 8.7 Return book

8.8 Receive Book

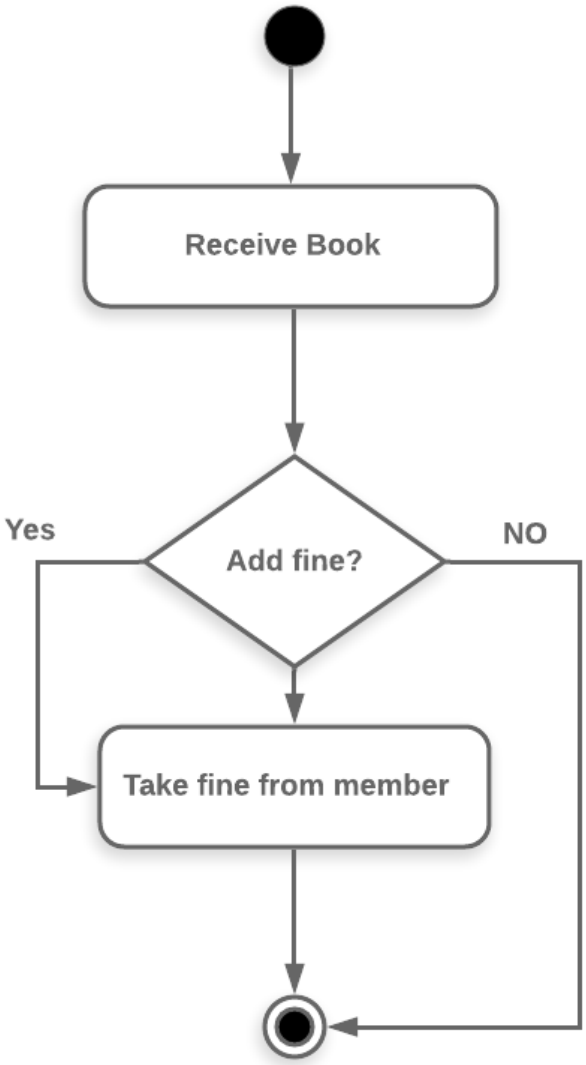


Figure 8.8 Receive book

8.9 Calculate fine

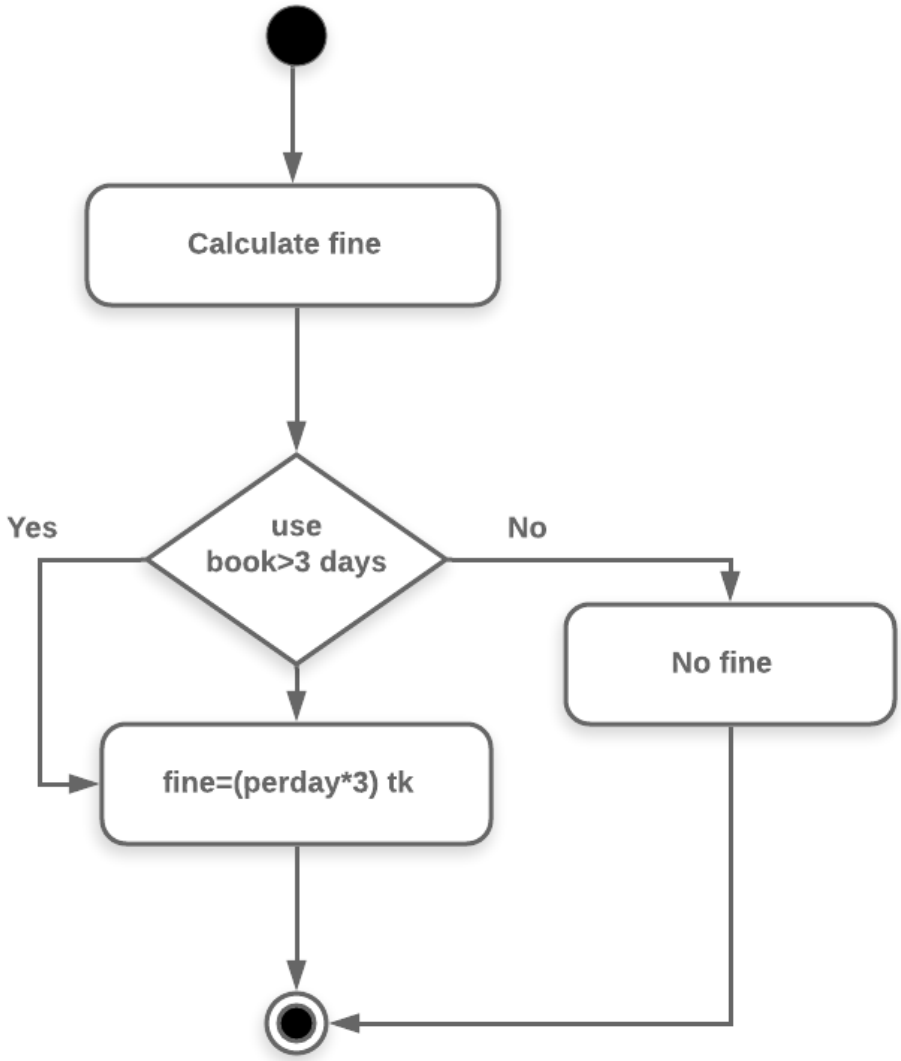


Figure 8.9 Calculate fine

8.10 Show current availability of books

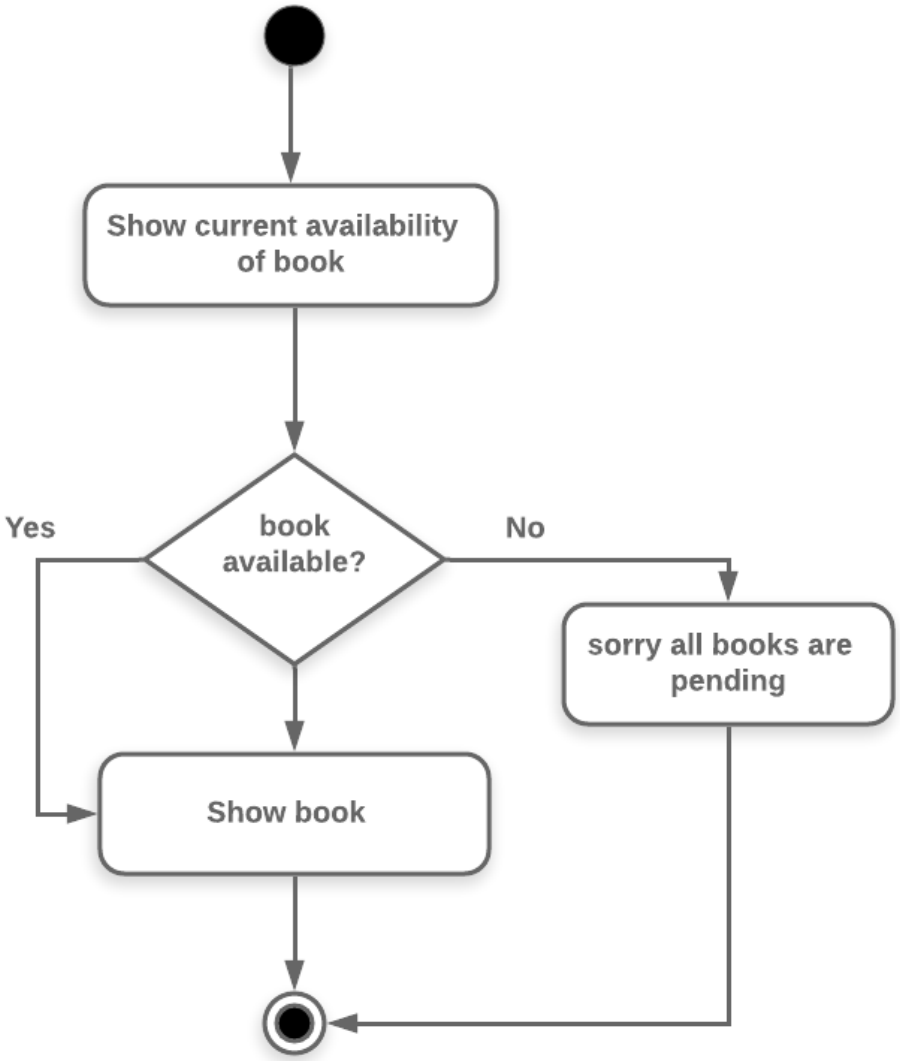
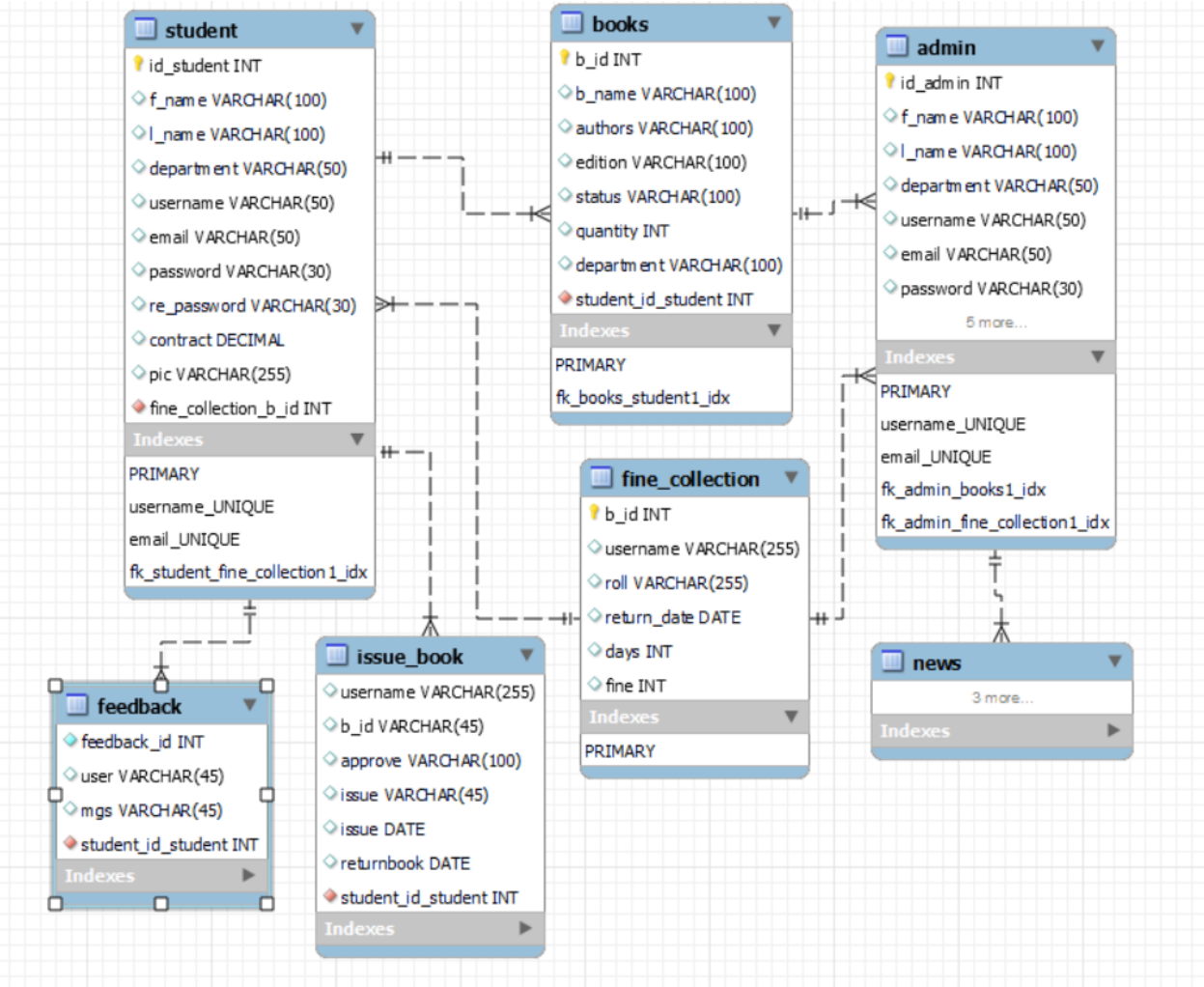


Figure 8.10 Show current availability of book

9. ER Diagram



10 Requirements traceability matrix

A traceability matrix is a document, usually in the form of a table, used to assist in determining the completeness of a relationship by correlating any two baselined documents using a manytomany relationship comparisons. It is often used with high-level requirements (these often consist of marketing requirements) and detailed requirements of the product to the matching parts of high-level design, detailed design, test plan, and test cases.

10.1 Test Case

Test No	Test Case
TC1	Login with valid user name/email & password.

TC2	Search book by book identification number
TC3	Search book using book name
TC4	Edit username successfully
TC5	Edit password successfully
TC6	Return book successfully
TC7	Add student using student information
TC8	Add book using book information
TC9	Edit Book successfully
TC10	Delete book from database successfully
TC11	Approve pending book using approve button
TC12	Collect Fine from student successfully
TC13	Update profile successfully

11 Appendix

11.1 Prioritization of requirements

We've prioritized the functional requirements by following Three-level Scale technique.

11.1.1 Three-level Scale

With the numbering on the different sections of the diagram, the priority of the sections is implicit. Important items have the highest preference, while urgent items have lower preference.

1. High Priority – These requirements are urgent and important. These are requirements that are generally with respect to compliance or contract that cannot be left out. These requirements need to be implemented in the current release and not implementing the same will have some adverse effect on the business.

2. Medium Priority – These requirements are important but not as urgent. Implement these after you implement the high priority items. If you see closely there is a line that splits this quadrant into 2 parts. Implement the items that are on the right side of the line first as they are relatively of higher medium priority.

3. Do these later – These items are urgent but do not have a lot of effect on the business. Hence do it after completing the more important medium priority items. Similar to the medium priority items, this quadrant has also been split into two; the items on the right side have a higher priority relatively to the items on the left.

4. Low Priority – These items are neither important nor are they urgent. The items on the right-hand side of the diagonal have higher priority. Start with the bottom-right corner of the high-priority quadrant and work your way up and left.