



A MAJOR PROJECT REPORT
ON
JAVA BASED LIBRARY MANGEMENT SOFTWARE

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ALIGARH

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University Polytechnic

Faculty Engineering & Technology

Aligarh Muslim University

Certificate

This is to certify that the work embodied in the project report entitled “Billing system in JAVA” which is being submitted by **Lakshmendra Singh, Akshay Dubey and Hritick Goyal** in partial fulfilment of requirement for the awards of the “**DIPLOMA IN COMPUTER ENGINEERING**” of **UNIVERSITY POLYTECHNIC, ALIGARH MUSLIM UNIVERSITY, ALIGARH**.

This is a record of their cumulative effort carried out under my supervision and guidance. They completed this work unflagging zeal, interest and enthusiasm.

Mr Salim Ishtyaq

(Assistant Professor)

University Polytechnic

A.M.U, Aligarh

ACKNOWLEDGEMENT

With immense pleasure and great sense of satisfaction we acknowledge those without whom, the completion of this project couldn't have been achieved. It is great privileges that I take this opportunity to express my heartfelt regards and gratitude to my teacher “Mr Salim Ishtyaq”, University Polytechnic, Aligarh Muslim University, Aligarh for his inspiring guidance, constant encouragement and help which was always forthcoming.

This affectionate attitude and constructive made this works easy and interesting

ABSTRACT

Library management system is a project which aims in developing a computerized system to maintain all the daily work of library .This project has many features which are generally not available in normal library management systems like facility of user login and admin login through which the admin can monitor the whole system. It provides an environment where student after logging in their accounts can see list of books issued and its issue date and return date. The librarian after logging into his account i.e. admin account can generate various reports such as student report, issue report and book report.

Overall this project of ours is being developed to help the students as well as staff of library to maintain the library in the best way possible and also reduce the human efforts.

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1. Introduction

- The project “Library management System” is an application to automate the process of issuing, returning, and maintaining records of books in a library. It reduces the risk of paper work such as file lost, file damaged and time consuming. It can help user to manage the transaction or record more effectively and timesaving.
- This software named **Library Management System** will have following features-
 1. It will be able to issue books to students.
 2. It will be able to receive returned books from the students.
 3. It will maintain a record of books available in the library.
 4. It will also maintain the records of students and admin(s).
 5. It will also generate printed records of library statistics.
- The proposed system either does not require paper work or very few paper works is required. All the data is feted into the computer immediately and various reports can be generated through computers. Since all the data is kept in a database no data of the library can be destroyed. Moreover work becomes very easy because there is no need to keep data on papers.

- Computer operator control will be there and hence, no errors. Moreover storing and retrieving of information is easy. So work can be done speedily and in time.

2. Need of Billing Systems

- ✓ Avoids a lot paperwork in issuing books and keeping records.
- ✓ Performing automated calculations of fine and addition of new books.

Six Major Benefits of Automation-

The primary benefits of operations automation are:

Cost reduction,
Instant updates,
Reduced paperwork,
Reduced wastage of time,
Accessibility, and
Performance

Cost reduction:

Not having a **Library management** software can make tiny extra costs appear. You have to keep record of all details of books/students using a manual way that can cost you as well, as time is money. But with **Library management** software you can save it all in the system and in the software without having write it down and keep wasting money on pens and notebooks to keep everything recorded.

Instant updates:

Library management software updates you about all the issued books with records and adding new books to the Database as well. This way you remain updated about the books, students and the records remain under check. As the book issue happens the issued book get updated along with the required information about the student to which it is issued.

Reduced paperwork:

It helps you to reduce paperwork by keeping everything in soft form and only under few circumstances prints the statistics on the paper.

Reduced wastage of time:

Librarian is able to search record by using few clicks of mouse and few search keywords thus saving his valuable time.

Accessibility:

The accessibility makes it simple for the librarian to get the updates anywhere and this way the librarian always has an eye on what is happening in the library.

Performance:

The system is developed to cope up with the current issues and problems of library .The system can add user, validate user and is also bug free.

3. Hardware Used

Desktop/Laptop computer with following minimum requirements:-

- 2 GB RAM
- Intel Based processor
- Windows 7 OS or higher.
- Intel HD Graphics Driver or higher.



Computer System

Additional Hardware used:

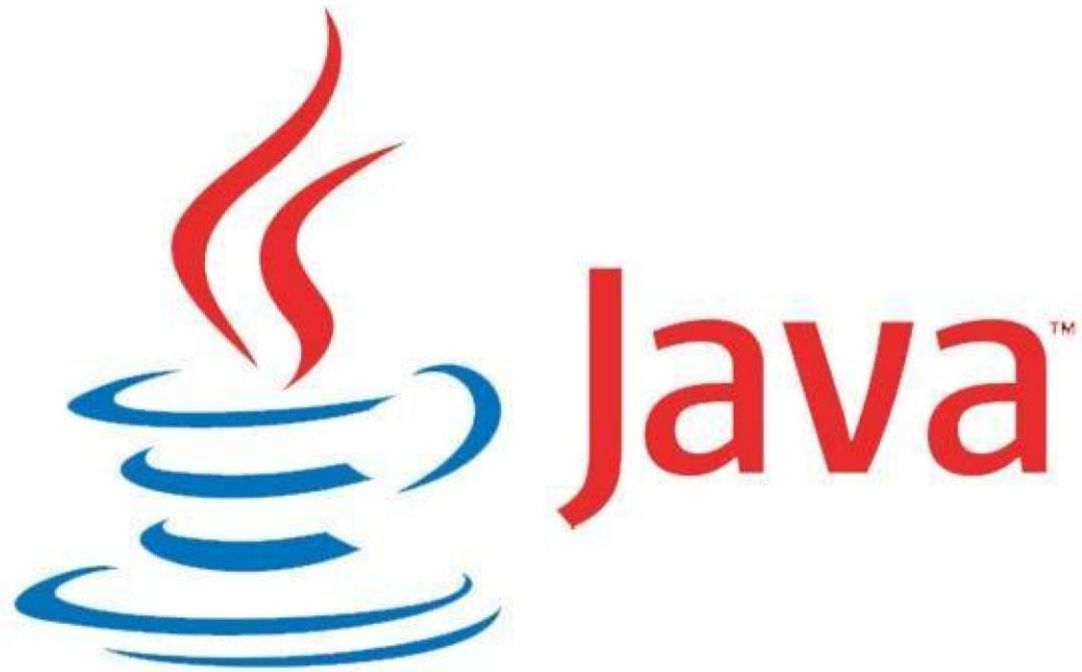
➤ Printer



PRINTER

4. Softwares/Applications used:

1. Application – JAVA
2. Database – SQLite Manager
3. Languages used – JAVA
4. Development tools – NetBeans, JAVA Development Kit, Notepad++
5. Web Browser- Mozilla Firefox



JAVA



NetBeans

GET INTO PC

Download from Your Desktop App

NetBeans



Mozilla Firefox

SOFTWARE

Front End

1. Language used: JAVA

We use this language is supports event driven programming feature.

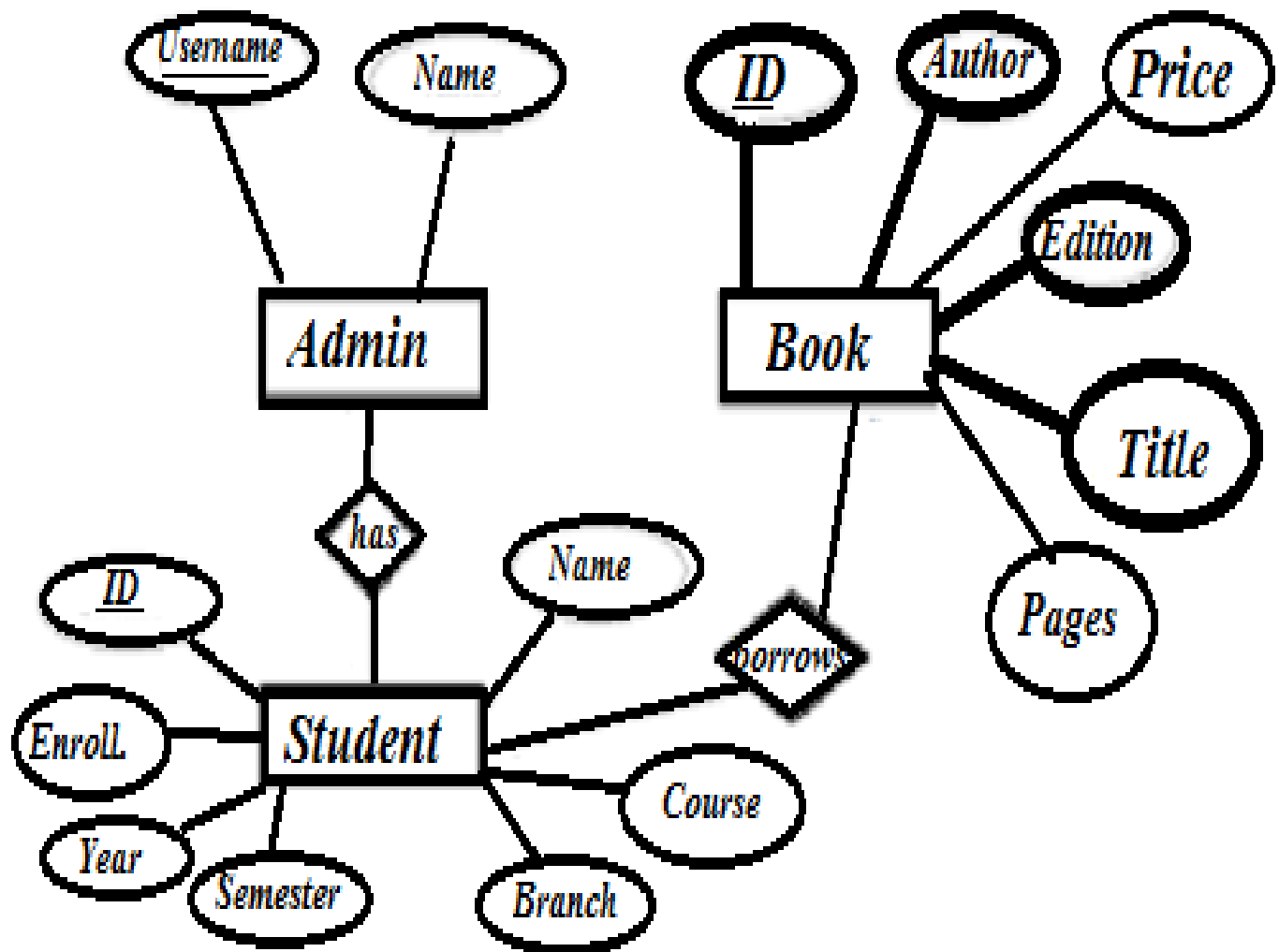
Back end

Supporting Software: SQLite Manager. This is used to storing data in the form of tables. It is easy to use.



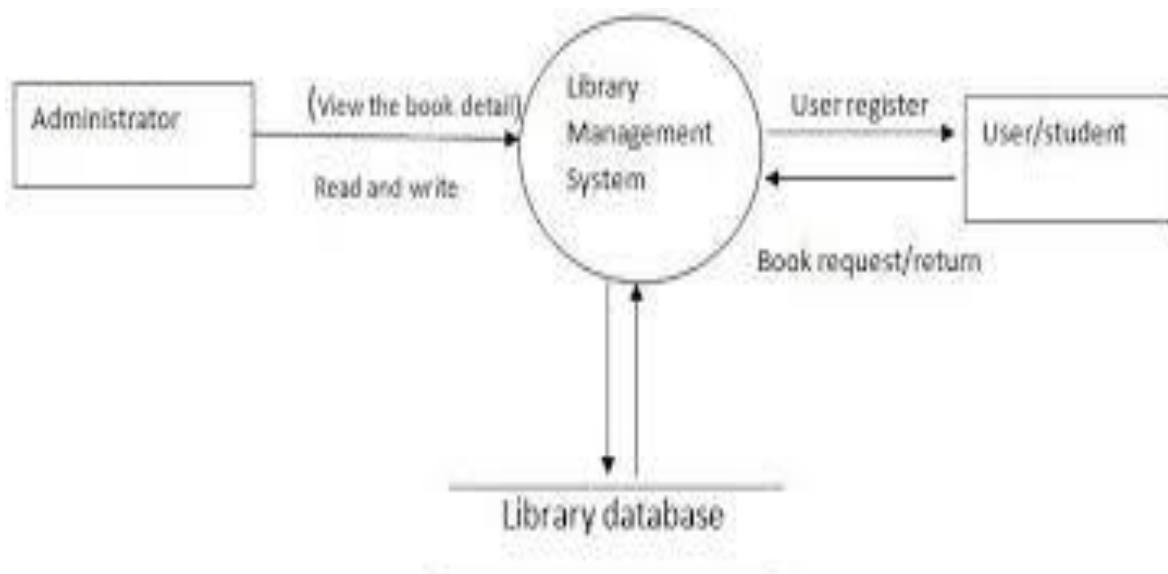
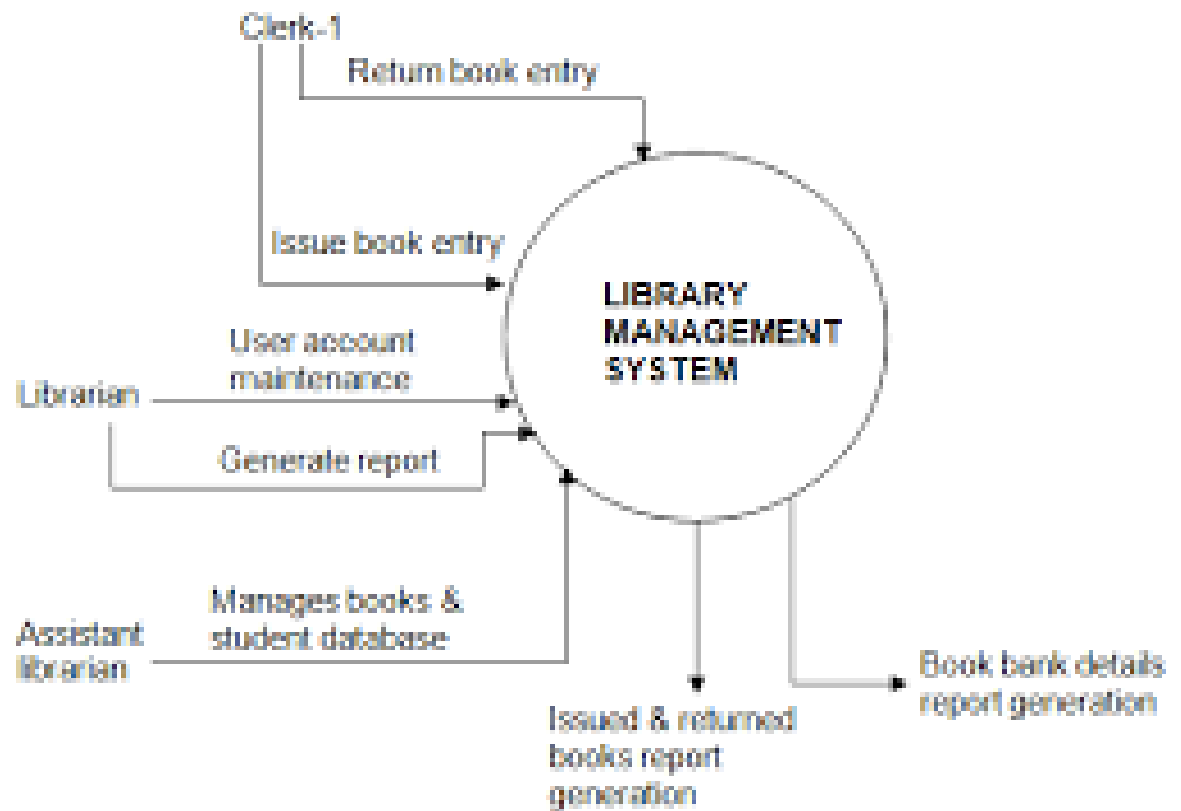
SQLite Manager

5. Entity Relationship (E-R) Diagram



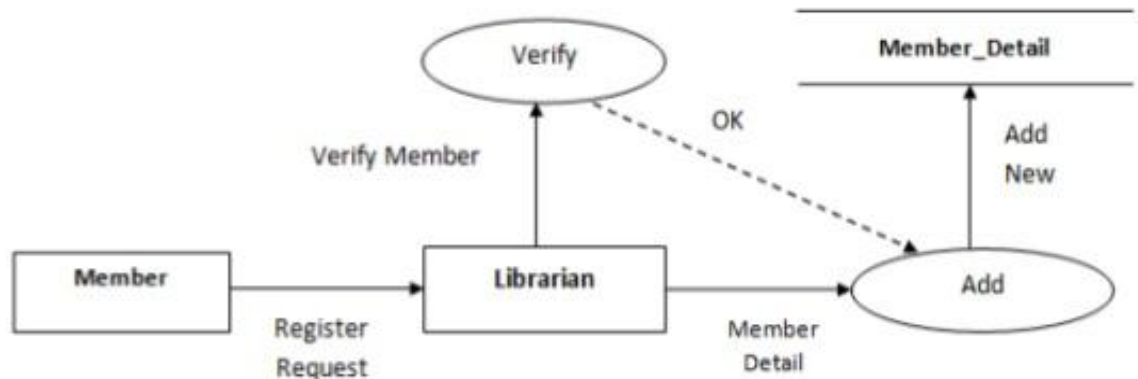
6. Data Flow Diagram

DATA FLOW DIAGRAM



Dataflow Diagram

Add Member:



1. Member request for new registration by filling required entries
2. Librarian verifies the member detail with its own database.
3. If verification is OK, a new member is added to Member Detail


7. Library Management System Detailed Information

(A) Login Page

This page is the first page on project start up. User enters his/her username and password and then this page directs the user to main menu through the loading page. However, if the username/password is incorrect then an error message is displayed showing the no. of attempts left. The user can also retrieve his/her password if forgotten by the method of security question.

Login

User Name 


Password 

toggle button to show or hide password 

Trouble Login...!




Login


User Name 

Password

Trouble Login...!



Message

 Invalid Pin 2 attempts left

(B) Account Recovery Page

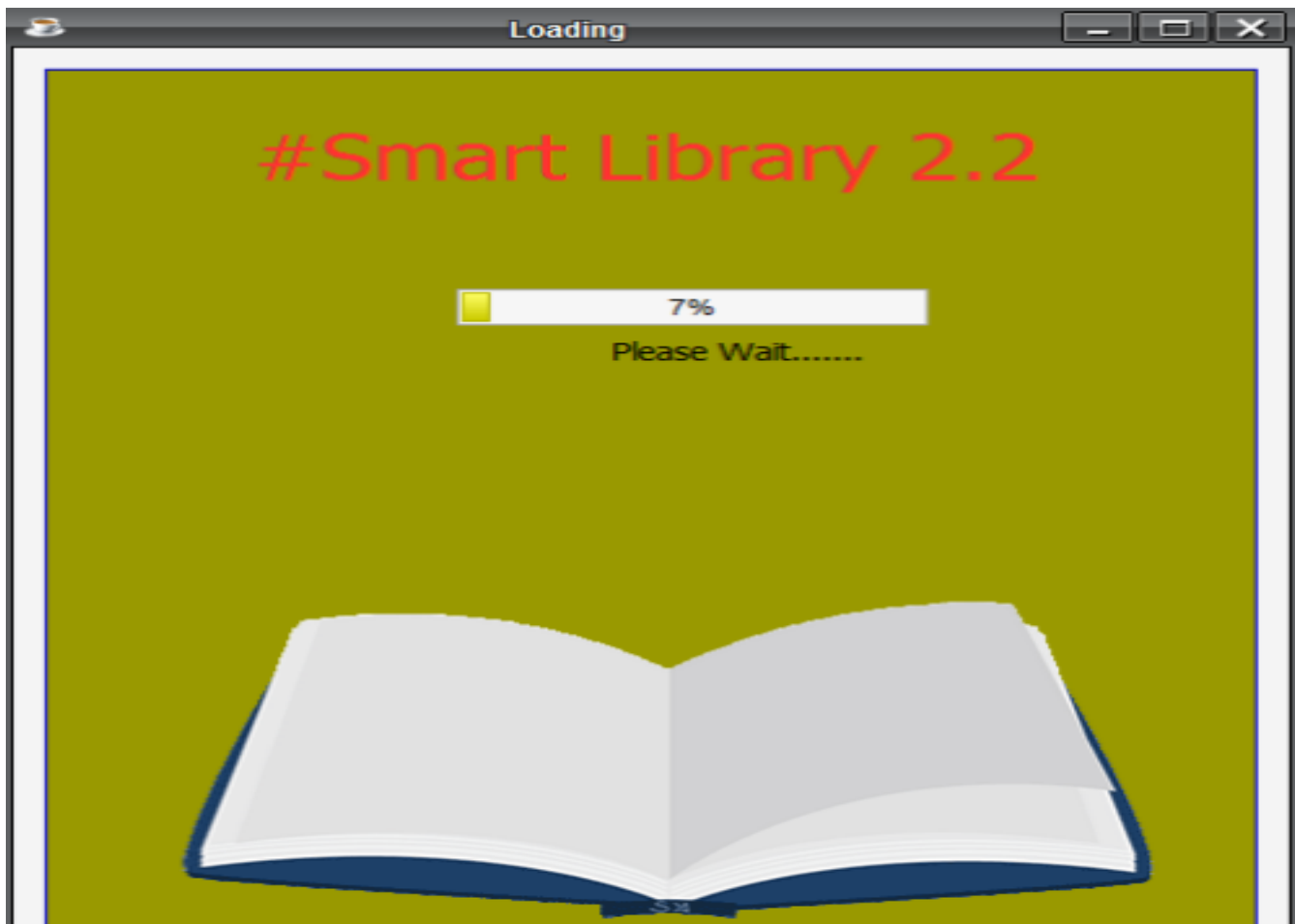
The screenshot shows a web browser window titled "Forgot Password". The page has a yellow background and a red title "Forgot Password". It contains several input fields and buttons. The "User Name" field is filled with "Akshay". The "Name" field is filled with "AkshayDubey". The "For Security Question" field is filled with "What is your nick name?". The "Answer" field is filled with "rajul". The "Your Password" field is filled with "122428". There are three buttons: "Search" (black with white text), "Retrive" (grey with black text), and "Change Password" (black with white text). A "Back" button (black with white text) is also present at the bottom right.

User Name	Akshay	<i>Search</i>
Name	AkshayDubey	
For Security Question	What is your nick name?	<i>Retrive</i>
Answer	rajul	
Your Password	122428	
<i>Change Password</i>		<i>Back</i>

- This page lets the user to recover his/her account in case of forgotten password.
- The account can be recovered on the basis of a security question whose answer is already present in the database as entered by the user.
- The user needs to enter the username and click on the search button and all the fields related to that account are automatically retrieved from the database.
- The user needs to enter the correct answer to the security question for the retrieval of the account to be successful.
- The user can also change password if he/she desires.

(C) Loading Page

- It is the in between page that connects login page to main menu.
- It supports animated gif and a progress bar to make it look attractive.



(D)Main Menu

There are several options for each link in the menu. These options are:-

- There are several options for each link in the menu. These options are:-
- File- Issue Book, Return Book, Renew, Close
- Edit- Student info, Book info, Account info
- Delete- Student, Book, Account

- View- Student Detail, Book Detail, Statistics, Account Details, Renew Details
- New Book- To add a new book into the database.
- New Student-To add new student into the database.
- Issue Book- To issue a book with a Student ID.
- Return Book-To receive book and calculate fine (if any).
- About- For information about the developers.



(E)Add Account Page

- The new account page allows the user to add new account in database.
- User needs to enter the details in their corresponding fields.
- User can add a new account by pressing “Add” button.
- The user can also select the security question by dropdown list.
- User can also provide the image of the Account Holder.
- When the records are entered in database, a message displaying “Account Created” appears.

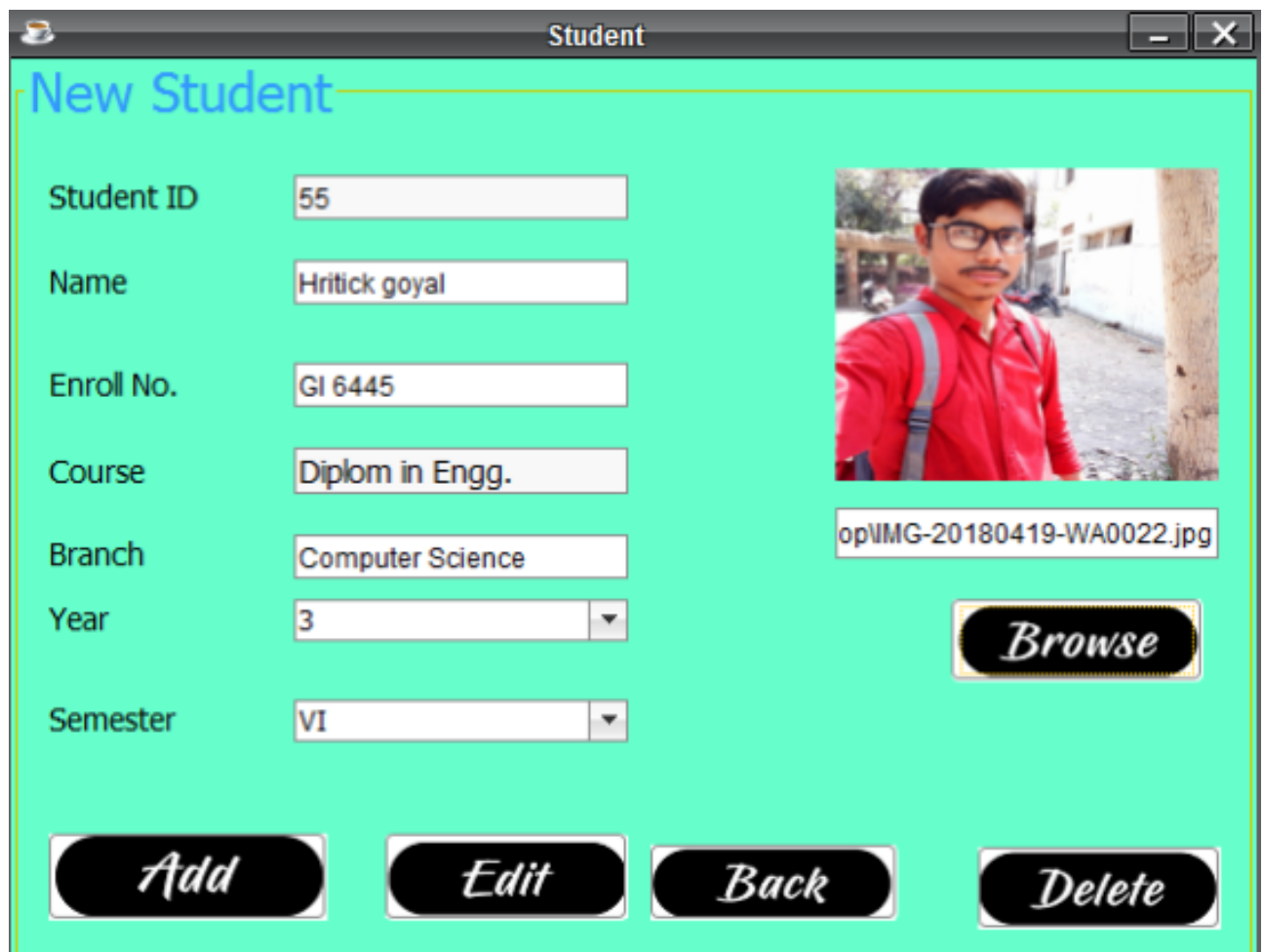


The screenshot shows a web application window titled "Signup" with a "New Account" section. The form contains the following fields and controls:

- User Name:** Text input field containing "Akshay".
- Name:** Text input field containing "Akshay Dubey".
- Password:** Text input field containing "akkidubey".
- Security Quesition:** Dropdown menu with the selected option "What's your mother t...".
- Answer:** Text input field containing "Hindi".
- Profile Picture:** A placeholder image of a man in a blue shirt. Below it is a text field containing the file path "rs\Cs\Desktop\raju\image.jpg".
- Buttons:** "Add" and "Back" buttons at the bottom, and a "Browse" button next to the profile picture field.

(F) New Student Page

- The new student page allows the user to add new student in database.
- Student id field is generated randomly and other fields are provided by user.
- User can add a new student by pressing “Add” button.
- Year and Semester are provided by dropdown list.
- Student can provide his/her image also.
- When the records are entered in database, a message displaying “Student Added” appears.



New Student

Student ID: 55

Name: Hritick goyal

Enroll No.: GI 6445

Course: Diplom in Engg.

Branch: Computer Science

Year: 3

Semester: VI

Photo: op\IMG-20180419-WA0022.jpg

Browse

Add *Edit* *Back* *Delete*

(G)New Book Page

- The new book page allows the user to add new book in database.
- Book ID field is generated randomly and other fields are provided by user.
- User can add a new item by pressing “Add” button.
- The Edition of the book is provided by dropdown list.
- User can also provide the image of the book.
- When the records are entered in database, a message displaying “Book Added” appears.



The screenshot shows a web application window titled "New Book". The interface has a green header with the text "New Book" in green. Below the header, there are several input fields for book information:

- Book ID:** A text field containing the value "697".
- Name:** A text field containing the value "Communication System".
- Edition:** A dropdown menu showing the value "4".
- Author:** A text field containing the value "Simon, Hykin".
- Price:** A text field containing the value "850".
- Pages:** A text field containing the value "1100".

To the right of the input fields, there is a preview of a book cover for "COMMUNICATION SYSTEMS" by Simon Haykin, 4th Edition. Below the preview, there is a text field containing the file path "ers\Cs\Desktop\images.jpeg" and a "Browse" button.

At the bottom of the form, there are four buttons: "Add", "Edit", "Back", and "Delete". The "Add" button is highlighted with a yellow border.

(H) Statistics Page

- This page shows the statistics of the Database.
- It tells about the books that are currently issued and the students to which they are issued.
- User can search for the book/student by id, name, edition, Branch, price, pages, author, enrolment no. etc.
- The user can print the Library Statistics and even save the Statistics in the PDF form which increases the functionality.

The screenshot displays a web application window titled "Statistics". It features two main sections: "Issue Detail" and "Return Detail".

Issue Detail Section:

Book_ID	Name	Edition	Author	Price	Pages	Student_ID	Enroll_No	Branch	DateOfIssue
564	Let us C	3	Y. Kanetkar	350	470	267	GJ6782	Computer	Apr 10, 2...
697	Communi...	1	Simon, Hy...	900	1100	577	GI7220	Computer	25/04/20...
833	Environm...	2	Benny Jos...	370	400	414	GI 7326	Computer	25/04/20...
551	Data Com...	4	Forouzan	650	820	317	GI 7304	Computer	25/04/20...

Return Detail Section:

Student_ID	Name	Enroll_No	Branch	Year	Book_ID	DOI	DOR
------------	------	-----------	--------	------	---------	-----	-----

Search and Action Buttons:

- Issue Detail:** Search input field, Print button, PDF button.
- Return Detail:** Search input field, Print button, Back button.

(I) Issue Book Page

- This page lets the user to issue a book in the Database to a particular student present in the Database.
- The user needs to enter the Book ID and click on the search button and all the fields related to that book are automatically retrieved from the Database.
- The same case is with Student Detail.
- A Date Chooser is provided at the bottom to select the date of the issue of the book.
- When the user clicks on the “Issue” button, a confirmation message displaying “The Book has been issued” is displayed.

The screenshot shows a web application window titled "Issue". The interface is divided into two main sections: "Book Detail" (light blue background) and "Student Detail" (light red background). The "Book Detail" section contains input fields for Book ID (833), Name (Environmental), Edition (2), Author (Benny Joseph), Price (370), and Pages (400). A book cover for "Environmental Studies" by Benny Joseph is displayed next to a "Search" button. The "Student Detail" section contains input fields for Student ID (414), Name (Zubair Qamar), Enroll No. (GI 7326), Course (Diplom in Engg.), Branch (Computer), Year (3), and Semester (3). A student profile picture is shown next to a "Search" button. At the bottom right, there is a "Date of Issue" field set to "25/04/2018" and two large buttons labeled "Issue" and "Back".

Book Detail	
Book ID	833
Name	Environmental
Edition	2
Author	Benny Joseph
Price	370
Pages	400

Student Detail	
Student ID	414
Name	Zubair Qamar
Enroll No.	GI 7326
Course	Diplom in Engg.
Branch	Computer
Year	3
Semester	3

Date of Issue: 25/04/2018


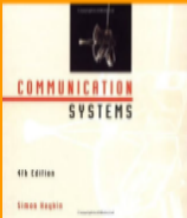
Buttons: Issue, Back

(J) Return Book page

- This page lets the user to receive the returned book from a student
- The user needs to enter the Student ID and click on the search button and all the fields related to that student are automatically retrieved from the Database.
- The same case is with Books.
- A Date Chooser is provided at the bottom to select the date of return of book.
- Thereafter, the no. of days after book issue is calculated.
- Finally, the amount of fine in rupees (if any) is calculated based on the no. of days after issue.

Return

Return Panel

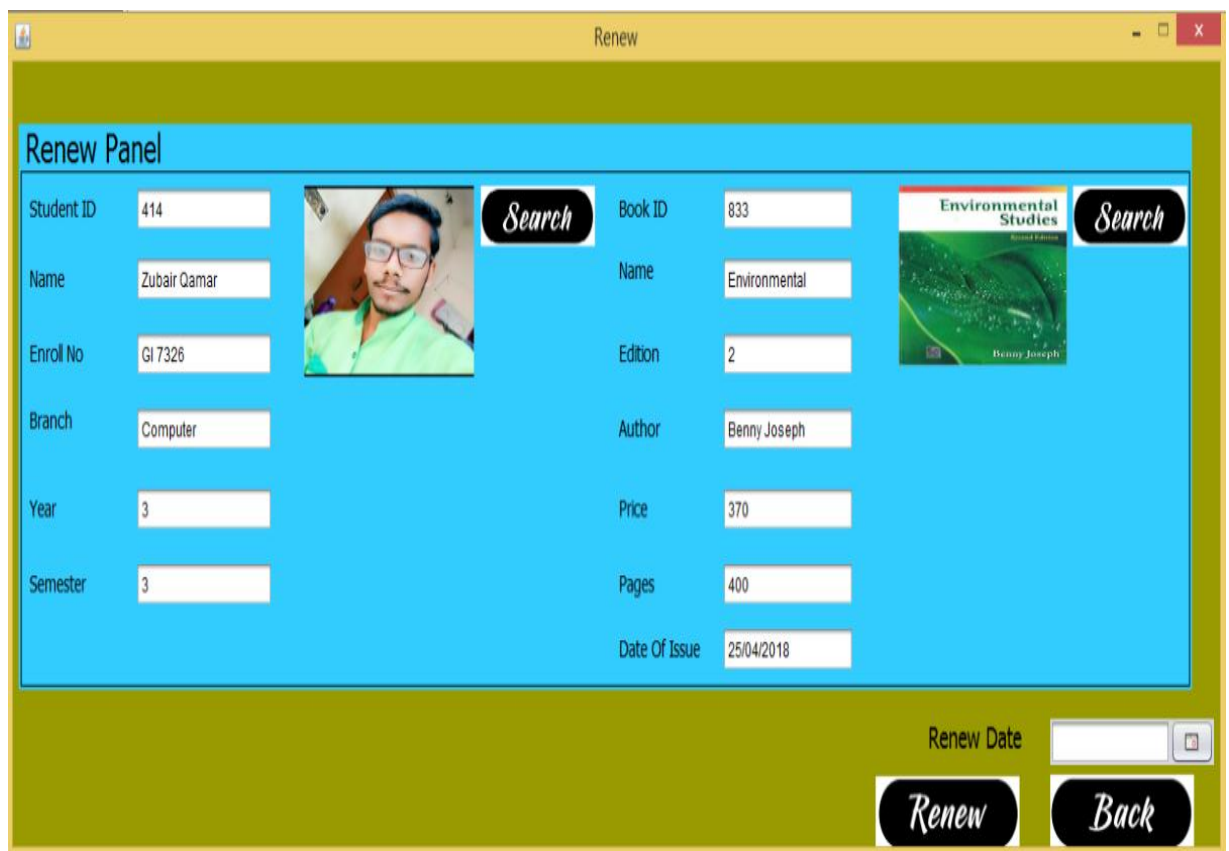
Student ID	577		Search	Book ID	697		Search
Name	Lakshmendar			Name	Communication System		
Enroll NO	GI7220			Edition	1		
Branch	Computer			Author	Simon, Hykin		
Year	3			Price	900		
Semester	3			Pages	1100		
				Date Of Issue	25/04/2018		

No. of Days After Book Issue	35	Return Date	30/05/2018
Amount of Fine In Rupees	49		

Renew **Return** **Back**


(K) Renew Book Page

- This page lets the user to renew the issued book for a student.
- The user needs to enter the Student ID and click on the search button and all the fields related to that student are automatically retrieved from the Database.
- The same case is with Books.
- A Date of Issue text field provide the Issue date when the book is first time issued.
- A Date Chooser is provided at the bottom to select the date of renew of book.
- After click on renew button the book is deleted from issue details.



The screenshot shows a web application window titled "Renew". The main content area is a light blue panel titled "Renew Panel". It contains two columns of input fields for student and book information, each with a "Search" button. A student profile picture is shown in the center. At the bottom right, there is a "Renew Date" field with a calendar icon, and two large buttons labeled "Renew" and "Back".

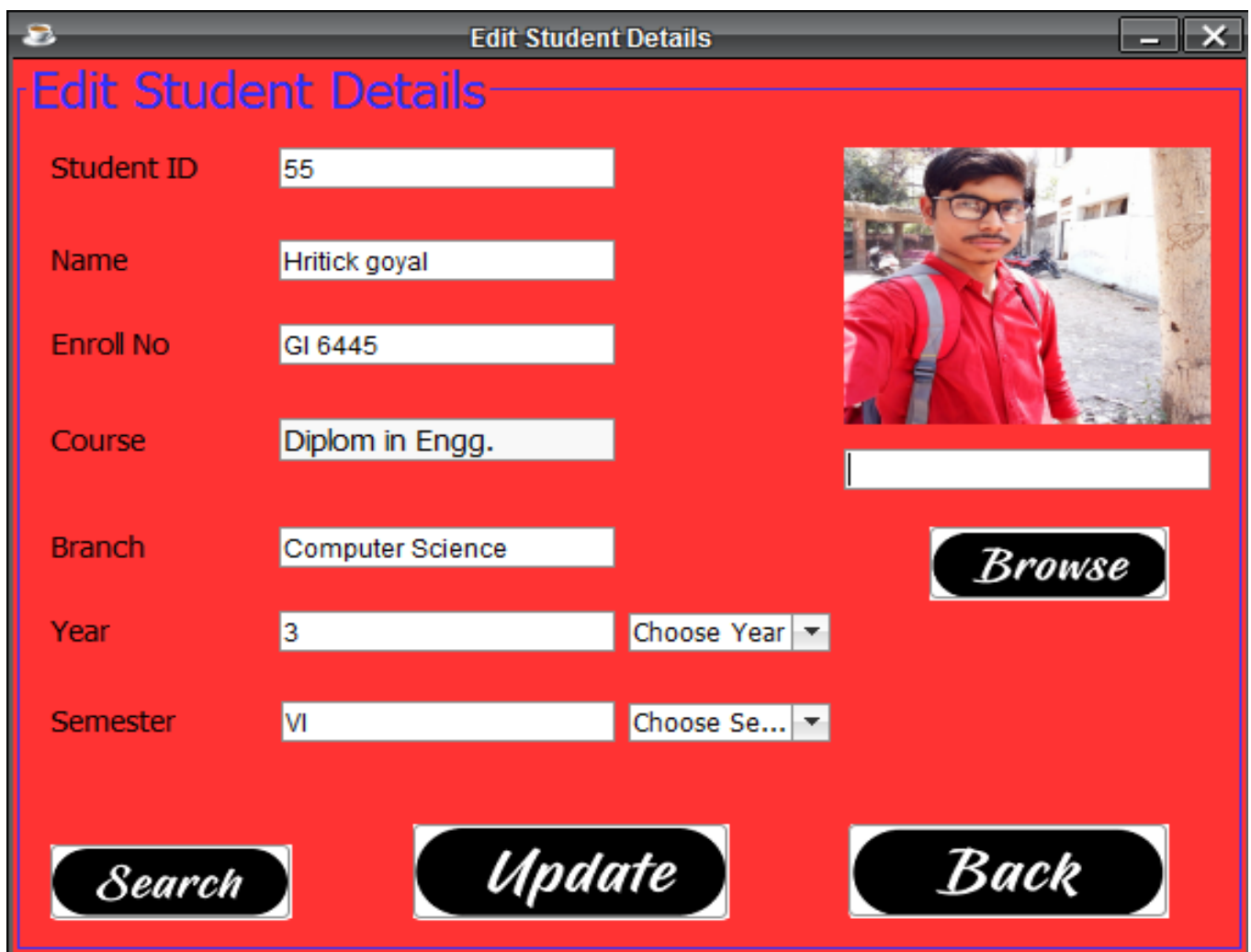
Student Information		Book Information	
Student ID	414	Book ID	833
Name	Zubair Qamar	Name	Environmental
Enroll No	GI 7326	Edition	2
Branch	Computer	Author	Benny Joseph
Year	3	Price	370
Semester	3	Pages	400
		Date Of Issue	25/04/2018

Renew Date: 

Renew **Back**

(L) Edit Students Page

- This page enables the user to edit any student's detail in the Database.
- The user needs to enter the Student ID and click on the search button and all the fields related to that student are automatically retrieved from the Database.
- User can edit the details by typing or by dropdown list.
- User can also update the image of a student.
- When the user clicks on the "Update" button, a confirmation message displaying "The Details have been updated" is displayed.



The screenshot shows a web application window titled "Edit Student Details". The interface has a red background. On the left, there are input fields for "Student ID", "Name", "Enroll No", "Course", "Branch", "Year", and "Semester". The "Student ID" field contains "55", "Name" contains "Hritick goyal", "Enroll No" contains "GI 6445", "Course" contains "Diplom in Engg.", "Branch" contains "Computer Science", "Year" contains "3", and "Semester" contains "VI". To the right of these fields is a photo of a student wearing a red shirt and glasses. Below the photo is a "Browse" button. At the bottom of the form are three buttons: "Search", "Update", and "Back".

Student ID	55	
Name	Hritick goyal	
Enroll No	GI 6445	
Course	Diplom in Engg.	
Branch	Computer Science	
Year	3	Choose Year ▼
Semester	VI	Choose Se... ▼

Search **Update** **Back**

(M) Edit Books Page

- This page enables the user to edit any book's detail in the Database.
- The user needs to enter the Book ID and click on the search button and all the fields related to that book are automatically retrieved from the Database.
- User can edit the details by typing or by dropdown list.
- User can also update the image of the book.
- When the user clicks on the "Update" button, a confirmation message displaying "The Details have been updated" is displayed.



The screenshot shows a web application window titled "Edit Book Details". The interface has a red background. On the left, there are input fields for "Book ID" (697), "Name" (Communication System), "Edition" (1), "Author" (Simon, Hykin), "Price" (900), and "Pages" (1100). To the right of these fields is a book cover image for "COMMUNICATION SYSTEMS" by Simon Hykin, 4th Edition. Below the image is a "Browse" button. At the bottom, there are three buttons: "Search", "Update", and "Back".

Book ID	697
Name	Communication System
Edition	1
Author	Simon, Hykin
Price	900
Pages	1100

Buttons: **Search**, **Update**, **Back**

Book Cover: COMMUNICATION SYSTEMS, 4th Edition, Simon Hykin

(N) Edit Account Page

- This page enables the user to edit any Account's detail in the Database.
- The user needs to enter the Username and click on the search button and all the fields related to that account are automatically retrieved from the Database.
- User can edit the details by typing or by dropdown list.
- User can also update the image of the account holder.
- When the user clicks on the "Update" button, a confirmation message displaying "The Details have been updated" is displayed.



The screenshot shows a web application window titled "Edit Account Details". The interface has a green background and contains the following elements:

- User Name:** A text input field containing "Laksh".
- Name:** A text input field containing "Lakshmendra Singh".
- Password:** A text input field containing "qwerty".
- Security Question:** A text input field containing "is your favourite superhero?".
- Answer:** A text input field containing "Batman".
- Image:** A profile picture of a man with a mustache.
- Buttons:** "Search", "Update", "Back", and "Browse".
- Dropdown:** A dropdown menu labeled "Chosse Any one..." with a downward arrow.

(0) Delete Student Page

- This page enables the user to edit any Account's detail in the Database.
- The user needs to enter the Username and click on the search button and all the fields related to that account are automatically retrieved from the Database.
- User can edit the details by typing or by dropdown list.
- User can also update the image of the account holder.
- When the user clicks on the "Update" button, a confirmation message displaying "The Details have been updated" is displayed.



Delete Student Details

Student ID	<input type="text" value="577"/>	
Name	<input type="text" value="Lakshmendar"/>	
Enroll No	<input type="text" value="GI7220"/>	
Course	<input type="text" value="Diplom in Engg."/>	
Branch	<input type="text" value="Computer"/>	
Year	<input type="text" value="3"/>	
Semester	<input type="text" value="VI"/>	

(P) Delete Book Page

- This page enables the user to edit any Account's detail in the Database.
- The user needs to enter the Username and click on the search button and all the fields related to that account are automatically retrieved from the Database.
- User can edit the details by typing or by dropdown list.
- User can also update the image of the account holder.
- When the user clicks on the "Update" button, a confirmation message displaying "The Details have been updated" is displayed.



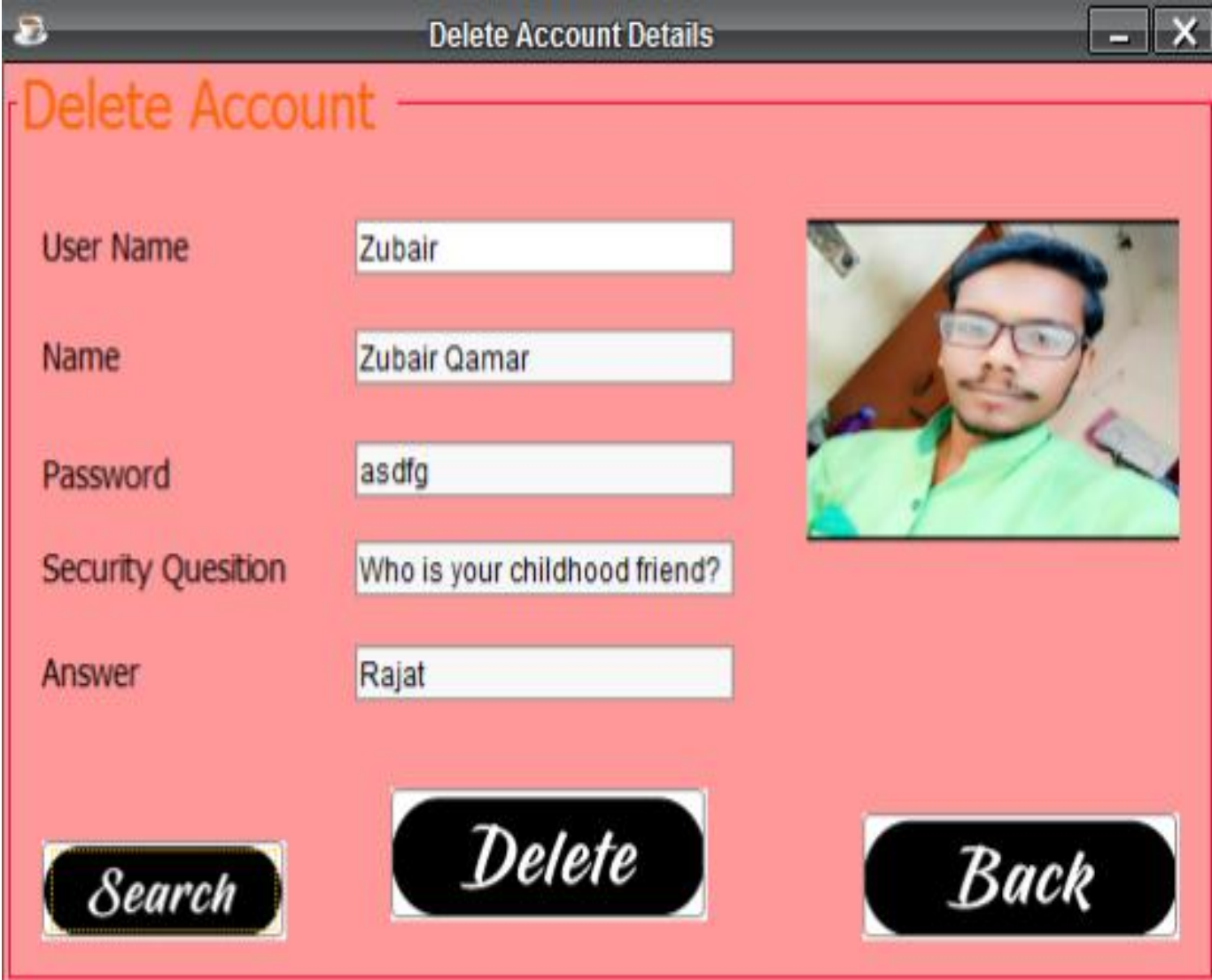
The screenshot displays a web application window titled "Delete Book". The interface has a pink background and a yellow border. On the left, there are input fields for book details: Book ID (697), Name (Communication System), Edition (1), Author (Simon, Hykin), Price (900), and Pages (1100). To the right of these fields is a book cover image for "COMMUNICATION SYSTEMS" by Simon Hykin, 4th Edition. At the bottom, there are three black buttons with white text: "Search", "Delete", and "Back".

Field	Value
Book ID	697
Name	Communication System
Edition	1
Author	Simon, Hykin
Price	900
Pages	1100

Buttons: Search, Delete, Back

(Q) Delete Account Page

- This page enables the user to delete any Account from the Database.
- The user needs to enter the Username and click on the search button and all the fields related to that account including the image are automatically retrieved from the Database.
- When the user clicks on the “Delete” button, a confirmation message displaying “The Account has been deleted” is displayed.



The screenshot shows a web application window titled "Delete Account Details". The main heading is "Delete Account". The form contains the following fields and values:

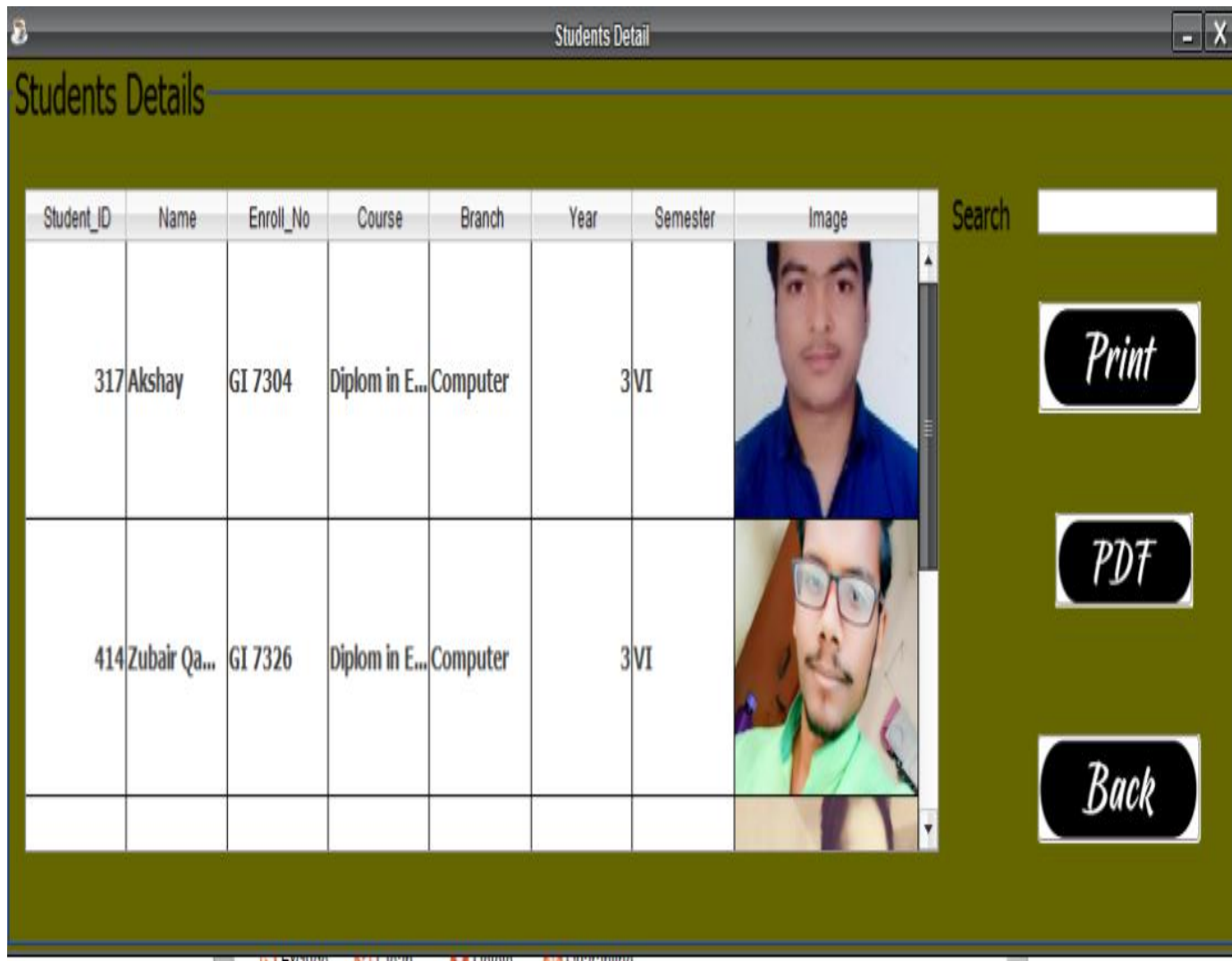
Field	Value
User Name	Zubair
Name	Zubair Qamar
Password	asdfg
Security Question	Who is your childhood friend?
Answer	Rajat

To the right of the form is a profile picture of a man with glasses and a mustache, wearing a green shirt.

At the bottom of the form are three buttons: "Search", "Delete", and "Back".

(R) View Students Page

- The View Students page provides description and details about the students present in the Database.
- These details include the Student id, Name, Enrolment No, Course, Branch, Year and Semester.
- It also shows the image of the student.
- The user can search by ID or any other field.
- The user can print the details of the Students and can also save these details in the form of PDF file.



(S) View Books Page

- The View Books page provides description and details about the books present in the Database.
- These details include the Book id, Name, Edition, Author, Price and Pages.
- It also shows the image of the book.
- The user can search by ID or any other field.
- The user can print the details of the Books and can also save these details in the form of PDF file.

Book Detail

Book Details

Search

Print

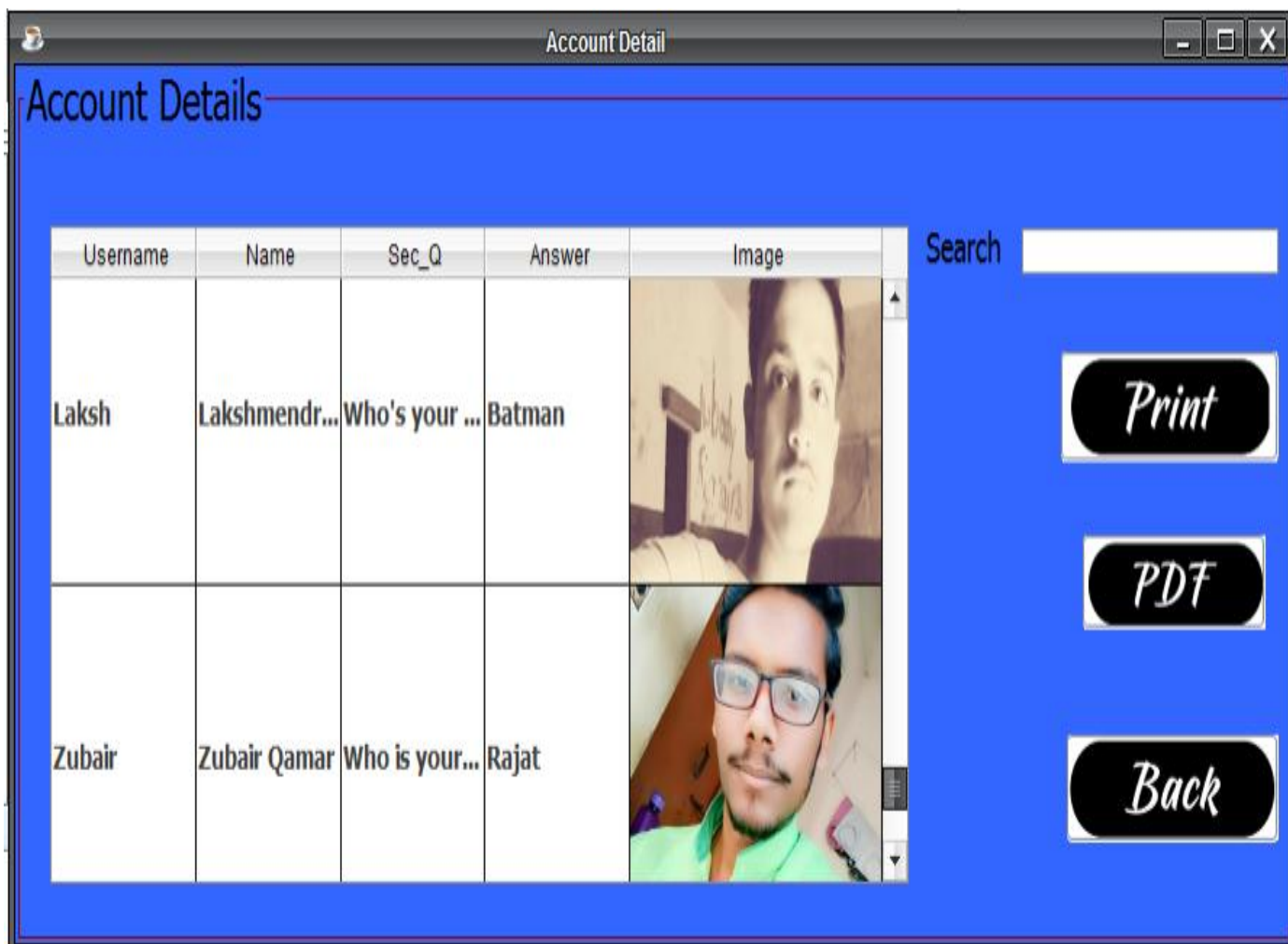
PDF

Back

Book_ID	Name	Edition	Author	Price	Pages	Image_B
551	Data Comm...	4	Forouzan	650	820	
589	Electronics	3	VK Mehta	650	870	

(T) View Accounts Page

- The View Accounts page provides description and details about the User Accounts present in the Database.
- These details include the Username, Name, Security Question and Answer.
- It also shows the image of the Account Holder.
- The user can search by ID or any other field.
- The user can print the details of the Account and can also save these details in the form of PDF file.



(U) About the Developers Page

- This page tells about the developers, version and other details about the project.

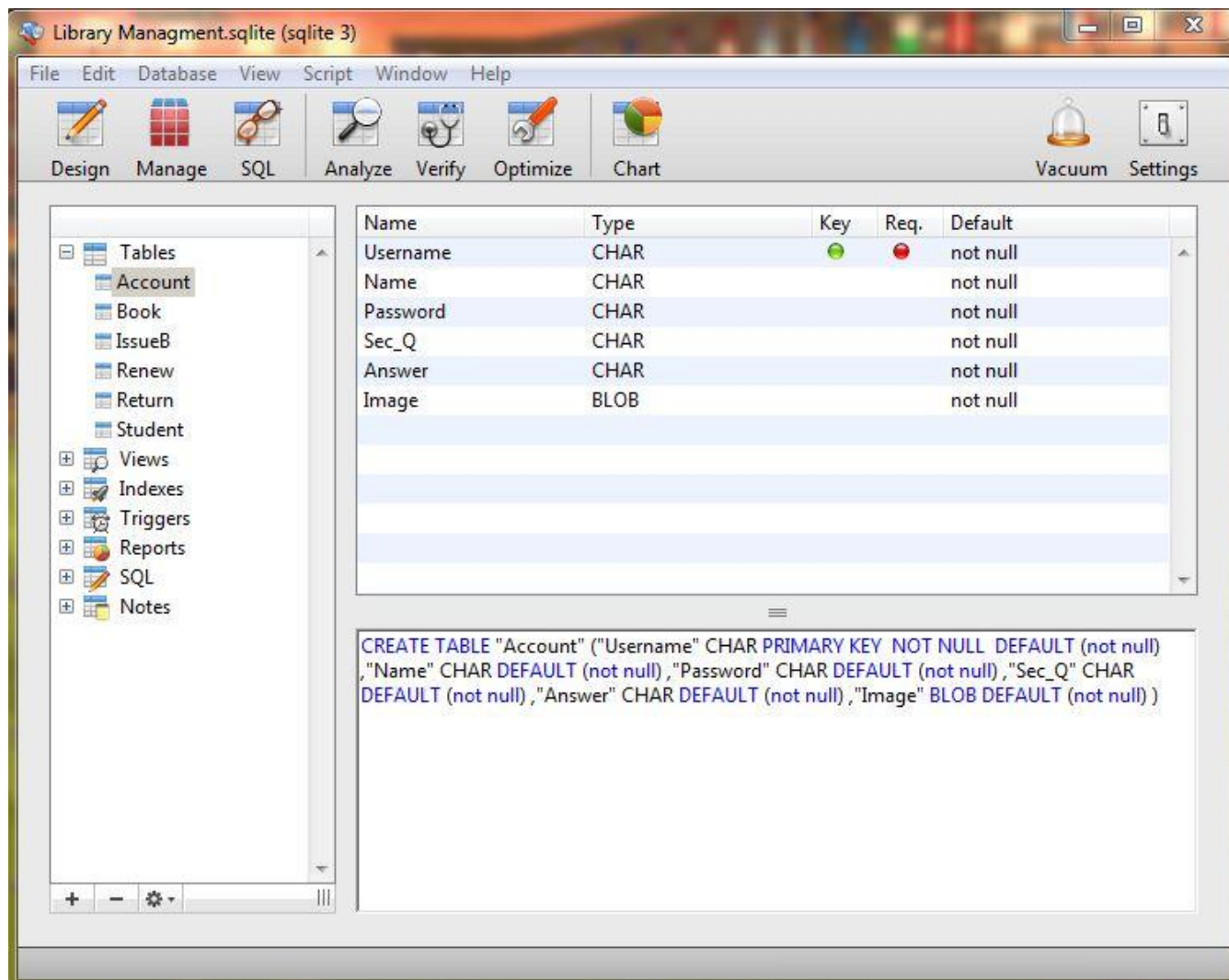


8. Database

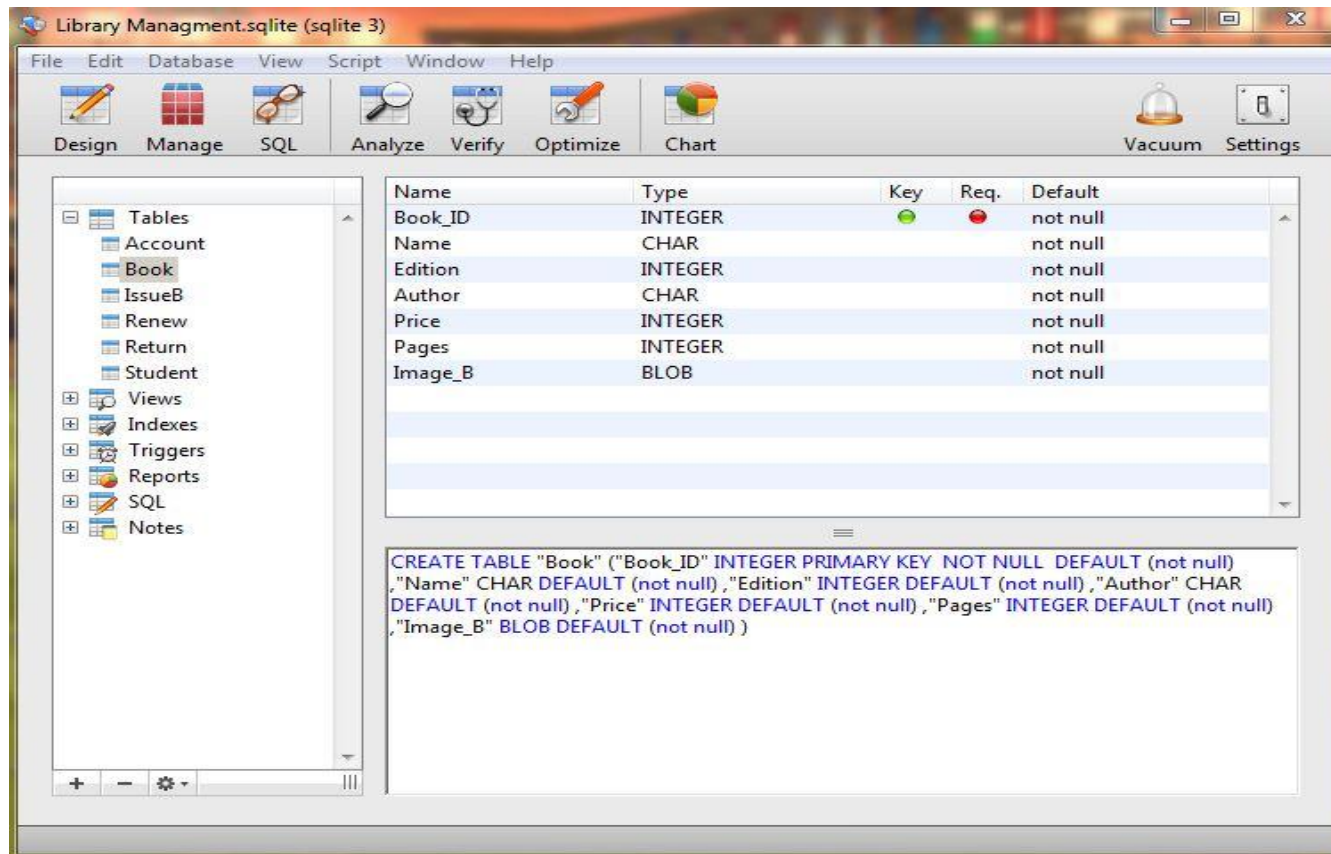
Tables

- Account
- Book
- IssueB
- Renew
- Return
- Student

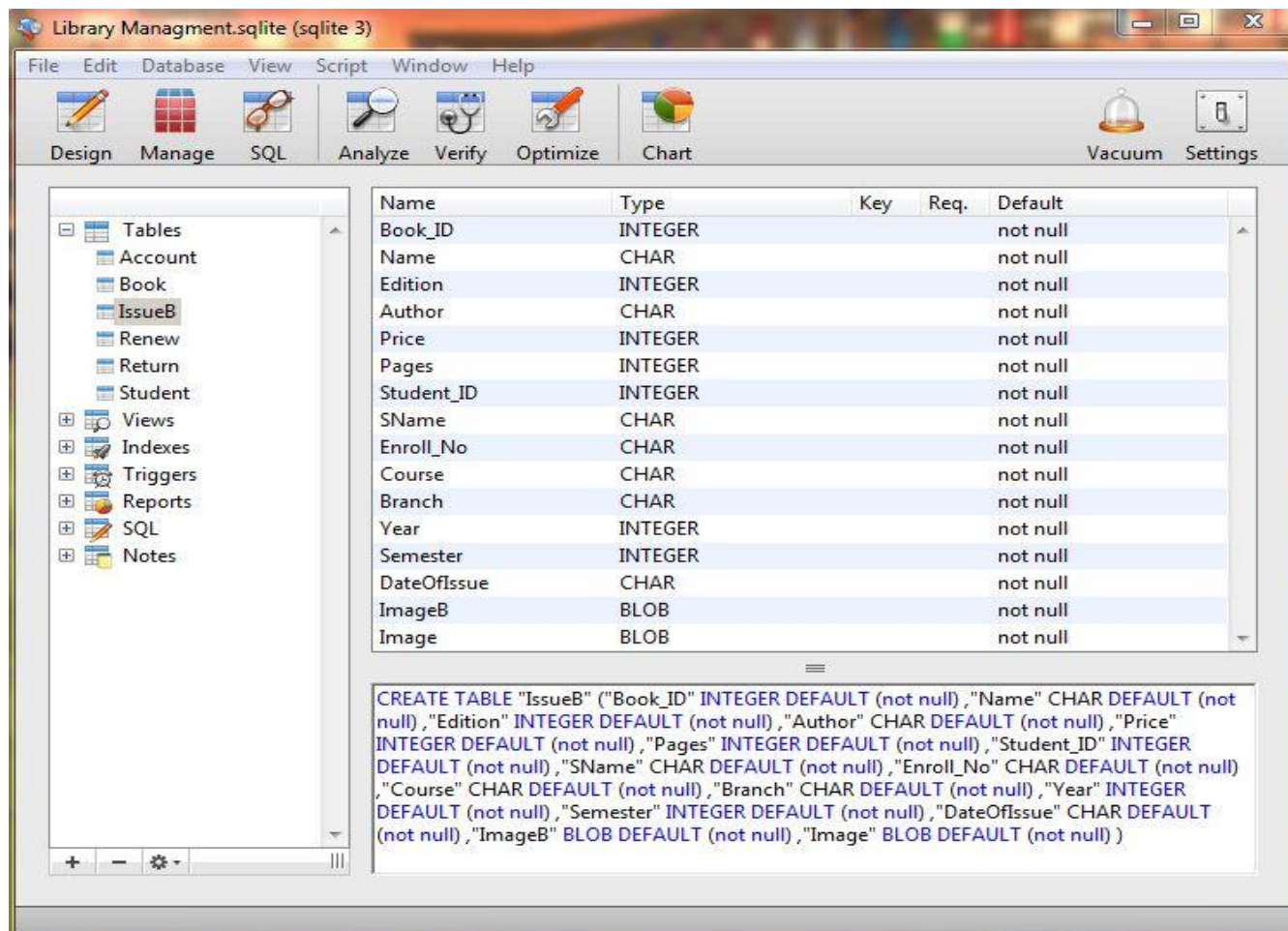
1. Account



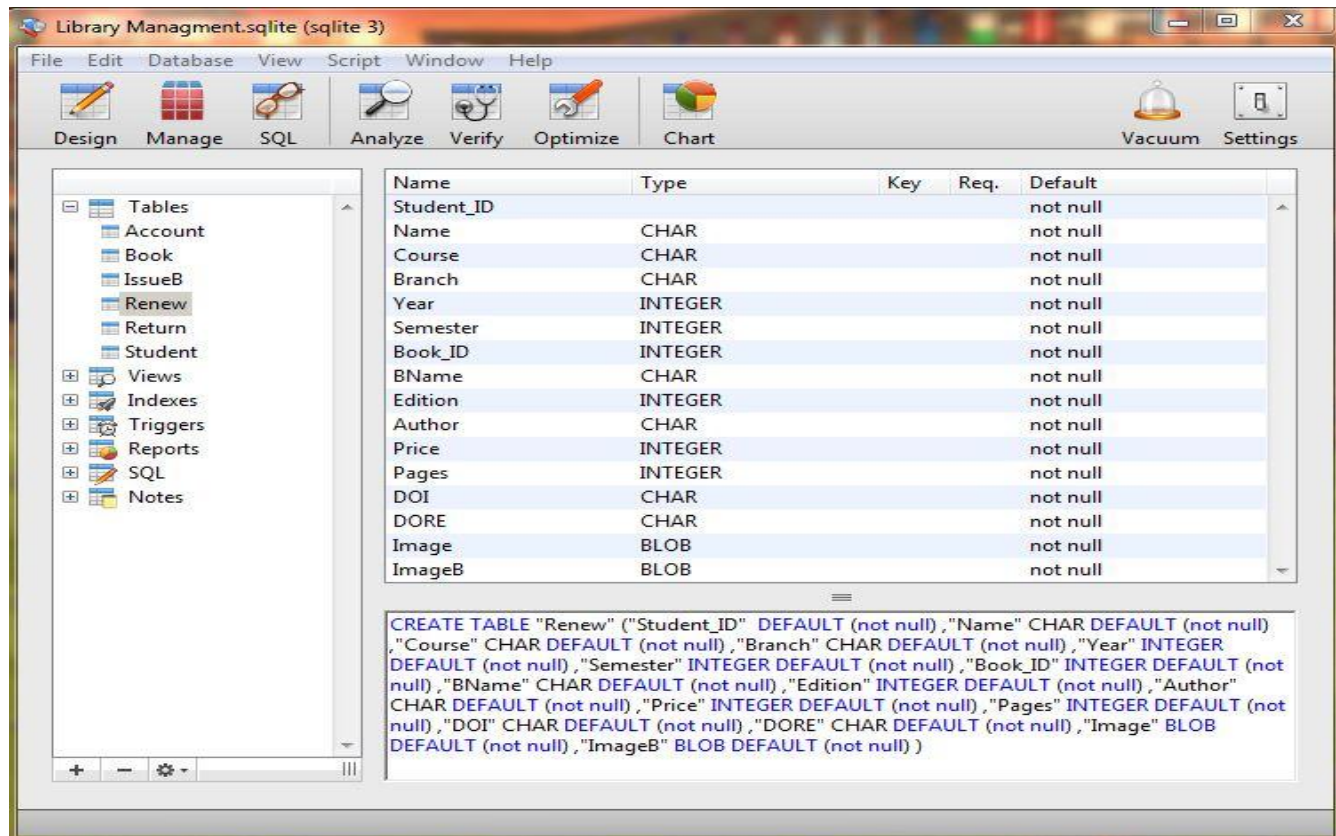
2. Book



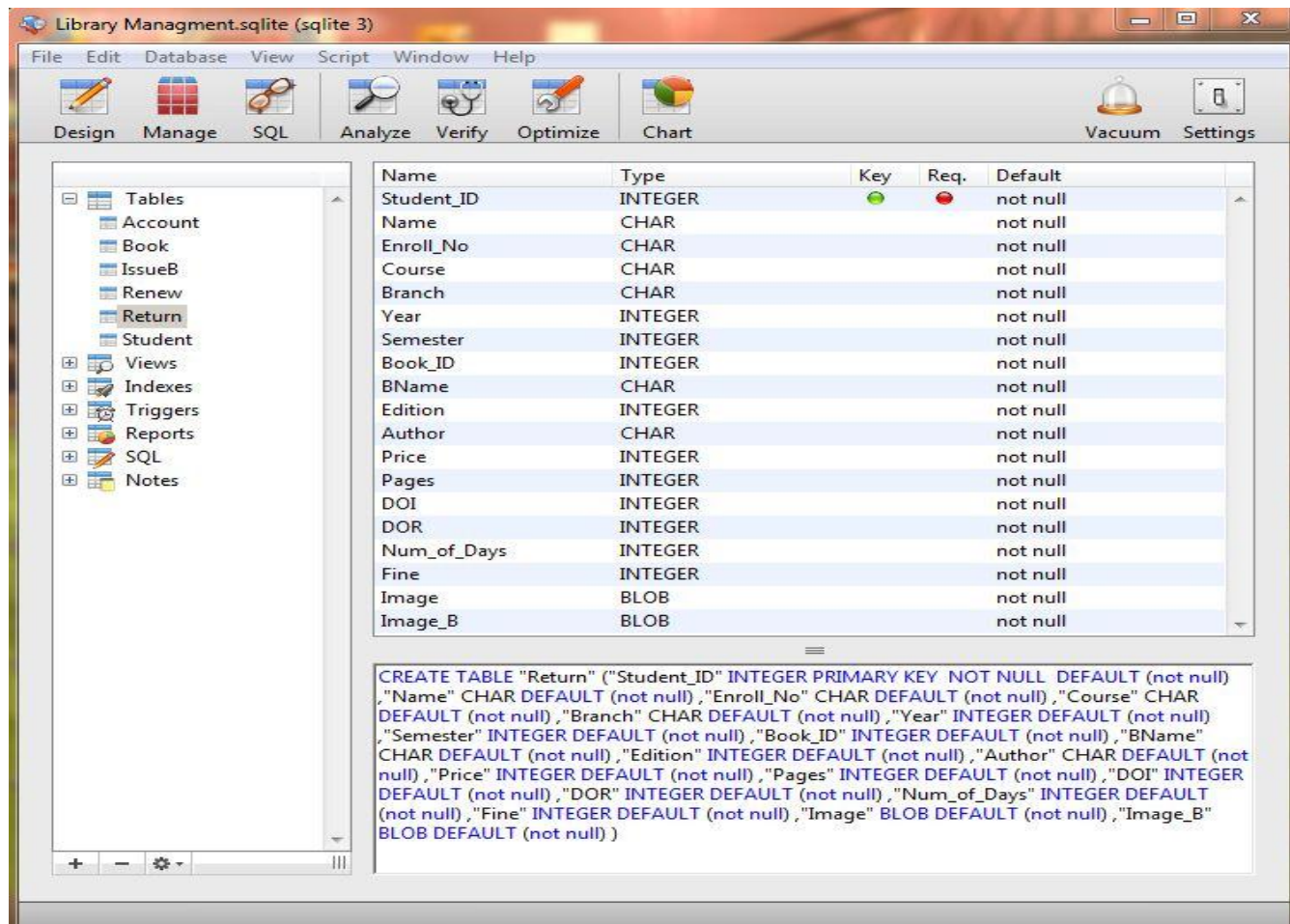
3. IssueB



4. Renew



5. Return



6. Student

The screenshot shows the SQLite Library Management application window. The title bar reads "Library Managment.sqlite (sqlite 3)". The menu bar includes File, Edit, Database, View, Script, Window, and Help. The toolbar contains icons for Design, Manage, SQL, Analyze, Verify, Optimize, Chart, Vacuum, and Settings. On the left, a tree view shows the database structure with "Tables" expanded, listing Account, Book, IssueB, Renew, Return, and Student. The "Student" table is selected. The main pane displays the table's schema:

Name	Type	Key	Req.	Default
Student_ID	INTEGER	Green circle	Red circle	not null
Name	CHAR			not null
Enroll_No	CHAR			not null
Course	CHAR			not null
Branch	CHAR			not null
Year	INTEGER			not null
Semester	CHAR			not null
Image	BLOB			not null

Below the table, the SQL command to create the table is shown:

```
CREATE TABLE "Student" ("Student_ID" INTEGER PRIMARY KEY NOT NULL DEFAULT (not null) , "Name" CHAR DEFAULT (not null) , "Enroll_No" CHAR DEFAULT (not null) , "Course" CHAR DEFAULT (not null) , "Branch" CHAR DEFAULT (not null) , "Year" INTEGER DEFAULT (not null) , "Semester" CHAR DEFAULT (not null) , "Image" BLOB DEFAULT (not null) )
```

9. Skills we used

1. Hardware
2. Programming
3. App designing on Netbeans.
4. JAVA APP development using JDK.
5. Database development on SQLite Manager.

10. Its Future Advancement

6. The Library Management System can be developed for online purposes in future
7. In the online version, the front end will be HTML, CSS based.
8. The middle part will be JAVA based.
9. And the rear end will be SQLite based.

11. References

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- www.wikipedia.org
- www.youtube.com
- www.oracle.com
- www.javatutorialpoints.com
- www.javatpoint.com
- www.w3schools.com