Arpit Singh

19BCG10069

Loopr AI – Task 1

Technical Task

(Internship/Full Time)

Steps:

1. Installing Java and Setting up the Environment
    a. Install(Setup for windows) Java from Oracle.
        i. Download the latest Java Development Kit installation file for Windows 10 to have the latest features and bug fixes.
        ii. Using your preferred web browser, navigate to the Oracle Java Downloads page.
        iii. On the Downloads page, click the x64 Installer download link under the Windows category. At the time of writing this article, Java version 17 is the latest long-term support Java version.

    b. Setup the System (Environment) variable as per the desired directory
        i. Use commands: go env; Check JavaRoot and JavaPath specifically.
    c. For Example: To set workstation as a folder in Desktop set env variable as: *C:\Users\ArpitSG\Desktop\Eclipse-Workspace.*
2. Installing MongoDB/SQL-Lite and Setting up the Environment
    a. Install(Setup for windows) MongoDB from MongoDB.com(community server)
    b. Setup the System (Environment) variable as per the desired directory
    c. For Example: *C:\Program Files\MongoDB\Server\5.0\bin.*
3. Setup a Connection between MongoDB cluster(Server) and Java(file)
    a. Import dependencies :
        i. go get github.com/gorilla/mux (For Managing htttp requests)

ii. go get go.mongodb.org/mongo-driver/mongo(For Managing and establishing connection with MongoDB)

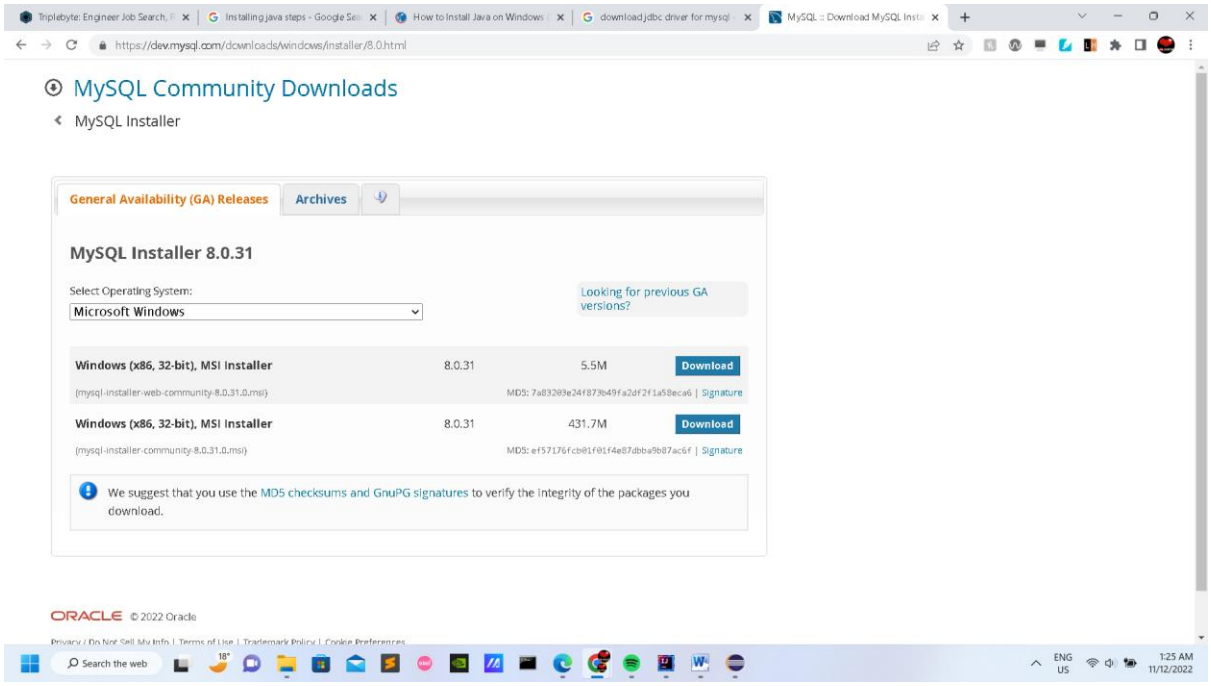
Tech Stack used and System Requirements:

1. Java:

- Java is an object-oriented language similar to C++, but with advanced and simplified features. Java is **free to access** and can **run** on **all platforms**.
- The features of Java are as follows:
- **Simple:** Java has made life easier by removing all the complexities such as pointers, operator overloading as you see in C++ or any other programming language.
- **Object-oriented:** Everything is considered to be an "**object**" which possesses some state, behaviour and all the operations are performed using these objects.
- **Secured:** All the code is converted in **bytecode** after compilation, which is not readable by a human. And java does not use an explicit pointer and run the programs inside the sandbox to prevent any activities from untrusted sources. It enables to develop virus-free, tamper-free systems/applications.

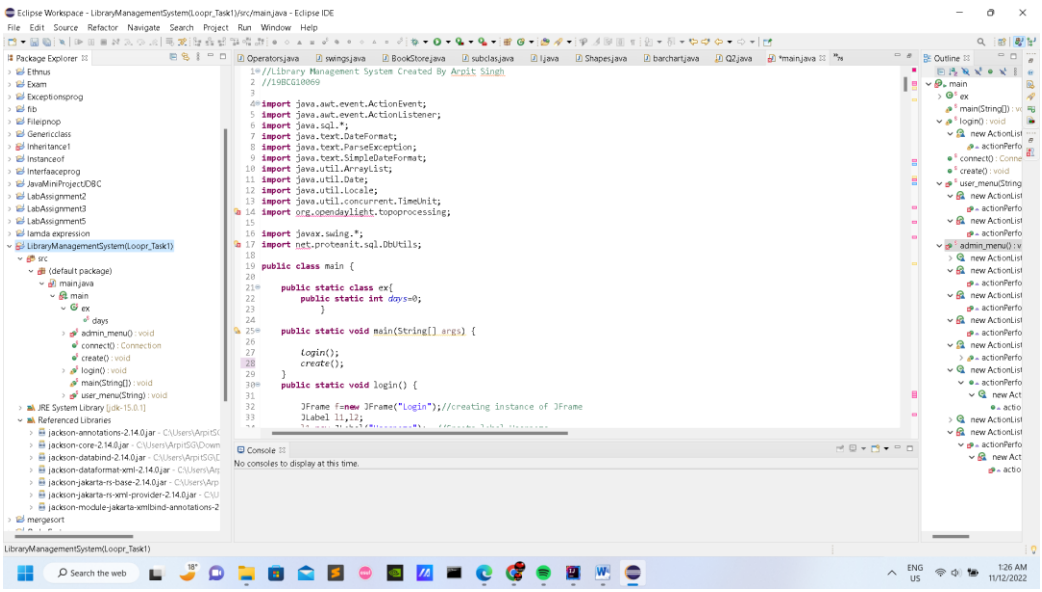
2. MySQL?

- **MySQL** is an open-source relational database management system that works on many platforms. It provides multi-user access to support many storage engines and is backed by Oracle. So, you can buy a commercial license version from Oracle to get premium support services.
- The features of MySQL are as follows:
- **Ease of Management –** The software very easily gets downloaded and also uses an event scheduler to schedule the tasks automatically.
- **Robust Transactional Support –** Holds the ACID (Atomicity, Consistency, Isolation, Durability) property, and also allows distributed multi-version support.
- **Comprehensive Application Development –** MySQL has plugin libraries to embed the database into any application. It also supports stored procedures, triggers, functions, views and many more for application development.



3. System Requirements

- To execute the below project, you will need the following requirements:
  - MySQL Community Server
  - MySQL JDBC Connector
  - Java
  - Eclipse IDE



  - rs2xml.jar
- The rs2xml jar is used to display the data in a table format. So, once you create a project in Eclipse IDE, you have to import the rs2xml jar and JDBC connector JAR into the project.(https://jar-download.com/artifacts/mysql/mysql-connector-java and https://jar-download.com/?search_box=rs2xml)

To do that, **right-click on the project**, choose **Build Path** -> **Configure Build Path**. In the dialog box, which opens up, choose **Add External JARs**, and add the JAR files. Once added, click on **Apply and Close**. Refer below.

Assumptions Made for The project Execution:

Now, for this particular project, I have considered three tables, which are:

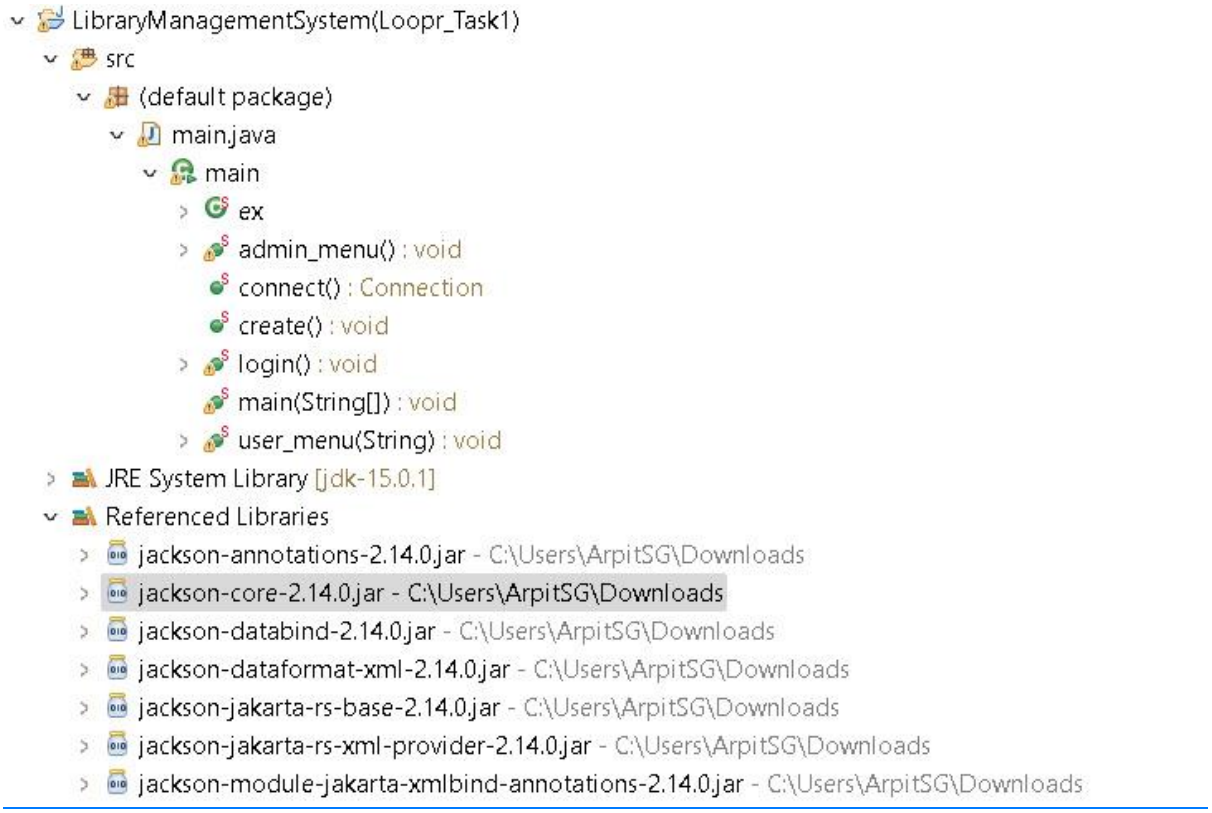
- **Users** -> This table consists of the columns {UID, Username, Password, Admin}
- **Books**-> The book's table consists of the columns {BID, Book name, Price, Genre}
- **Issue** -> This table consists of the columns {IID, UID, BID, IssueDate, Period, ReturnDate, Fine}

File Structure:

For your better understanding, I have divided the code into the following functions and I will be explaining you function-wise:

- Login
- Connect
- Create/ Reset
- User Menu
- Admin Menu

Also, to create a GUI, I will be using Swing. Swing is a library or a set of program components used to create graphical user interface components such as scroll bars, buttons, dialog boxes, etc.



Next lets perform the task as descirebed in the doc file:

So in the folder named LibraryManagementSystem (Loopr_Task1) has all the required files and coding tasks are done.

*NOTE: Proper comments are added in each file for better understanding.

Coding:

Main(.java file):

```
//Library Management System Created By Arpit Singh
//19BCG10069

import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import java.sql.*;
import java.text.DateFormat;
import java.text.ParseException;
import java.text.SimpleDateFormat;
import java.util.ArrayList;
import java.util.Date;
import java.util.Locale;
import java.util.concurrent.TimeUnit;
import org.opendaylight.topoprocessing;

import javax.swing.*;
import net.proteanit.sql.DbUtils;

public class main {
```

```
    public static class ex{
        public static int days=0;
            }

    public static void main(String[] args) {

        login();
        create();
    }
```

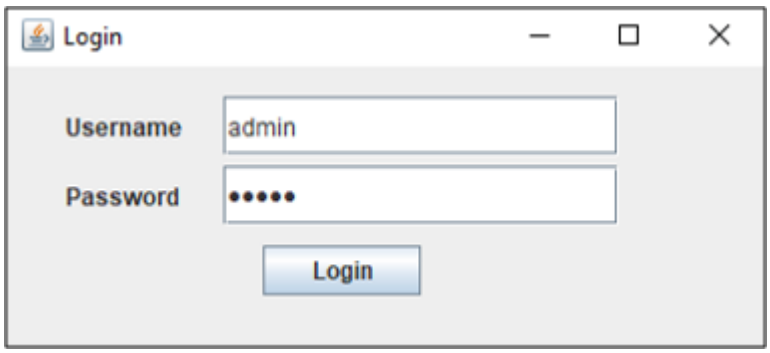
Login:

- I have created this function to enable the user and the admin login. So, initially when a user logs in for the first time, that user will be an admin by default, and the username and password will be {admin, admin}.
- For this schema, I have considered only one admin. So, once a user logs in as an admin, he or she will be redirected to the admin menu as below.

Login Code(.java file):

```
public static void login() {

        JFrame f=new JFrame("Login");//creating instance of JFrame
        JLabel l1,l2;
        l1=new JLabel("Username");  //Create label Username
        l1.setBounds(30,15, 100,30); //x axis, y axis, width, height

        l2=new JLabel("Password");  //Create label Password
        l2.setBounds(30,50, 100,30);

        JTextField F_user = new JTextField(); //Create text field for username
        F_user.setBounds(110, 15, 200, 30);

        JPasswordField F_pass=new JPasswordField(); //Create text field for
password
        F_pass.setBounds(110, 50, 200, 30);

        JButton login_but=new JButton("Login");//creating instance of JButton for
Login Button
        login_but.setBounds(130,90,80,25);//Dimensions for button
        login_but.addActionListener(new ActionListener() {  //Perform action

            public void actionPerformed(ActionEvent e){

            String username = F_user.getText(); //Store username entered by the
user in the variable "username"
            String password = F_pass.getText(); //Store password entered by the
user in the variable "password"

            if(username.equals("")) //If username is null
            {
                JOptionPane.showMessageDialog(null,"Please enter username");
//Display dialog box with the message
            }
            else if(password.equals("")) //If password is null
            {
```

```
                JOptionPane.showMessageDialog(null,"Please enter password");
//Display dialog box with the message
            }
            else { //If both the fields are present then to login the user, check
wether the user exists already
                //System.out.println("Login connect");
                Connection connection=connect();  //Connect to the database
                try
                {
                Statement stmt = connection.createStatement();
                  stmt.executeUpdate("USE LIBRARY"); //Use the database with the
name "Library"
                  String st = ("SELECT * FROM USERS WHERE USERNAME='"+username+"'
AND PASSWORD='"+password+"'"); //Retreive username and passwords from users
                  ResultSet rs = stmt.executeQuery(st); //Execute query
                  if(rs.next()==false) { //Move pointer below
                      System.out.print("No user");
                      JOptionPane.showMessageDialog(null,"Wrong
Username/Password!"); //Display Message

                  }
                  else {
                      f.dispose();
                    rs.beforeFirst();  //Move the pointer above
                    while(rs.next())
                    {
                      String admin = rs.getString("ADMIN"); //user is admin
                      //System.out.println(admin);
                      String UID = rs.getString("UID"); //Get user ID of the user
                      if(admin.equals("1")) { //If boolean value 1
                          admin_menu(); //redirect to admin menu
                      }
                      else{
                          user_menu(UID); //redirect to user menu for that user ID
                      }
                  }
                  }
                }
                catch (Exception ex) {
                     ex.printStackTrace();
            }
            }
        }
        });


        f.add(F_pass); //add password
        f.add(login_but);//adding button in JFrame
        f.add(F_user);  //add user
        f.add(l1);  // add label1 i.e. for username
        f.add(l2); // add label2 i.e. for password

        f.setSize(400,180);//400 width and 500 height
        f.setLayout(null);//using no layout managers
        f.setVisible(true);//making the frame visible
        f.setLocationRelativeTo(null);
}
```



Connect:

- The connect function is used to connect the database to the GUI. So, to do that, I have mentioned the below code:

```
public static Connection connect()
    {
    try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            //System.out.println("Loaded driver");
            Connection con =
DriverManager.getConnection("jdbc:mysql://localhost/mysql?user=root&password=Arpit
SG");
            //System.out.println("Connected to MySQL");
            return con;
     }
     catch (Exception ex) {
            ex.printStackTrace();
     }
    return null;
    }
```

- In the above function, we are connecting our **MySQL database** with the **username "root"** and **password "ArpitSG"** to our application. Now, once the application is connected to the database, our next step is to create or reset the database.

Create:

- The create function is used to create the database, tables and add data into these tables. So, to do that, SQL statements will be used as below.

```
public static void create() {
        try {
        Connection connection=connect();
        ResultSet resultSet = connection.getMetaData().getCatalogs();
        //iterate each catalog in the ResultSet
            while (resultSet.next()) {
              // Get the database name, which is at position 1
              String databaseName = resultSet.getString(1);
              if(databaseName.equals("library")) {
                  //System.out.print("yes");
```

```
                Statement stmt = connection.createStatement();
                //Drop database if it pre-exists to reset the complete database
                String sql = "DROP DATABASE library";
                stmt.executeUpdate(sql);
            }
        }
            Statement stmt = connection.createStatement();

            String sql = "CREATE DATABASE LIBRARY"; //Create Database
            stmt.executeUpdate(sql);
            stmt.executeUpdate("USE LIBRARY"); //Use Database
            //Create Users Table
            String sql1 = "CREATE TABLE USERS(UID INT NOT NULL AUTO_INCREMENT
PRIMARY KEY, USERNAME VARCHAR(30), PASSWORD VARCHAR(30), ADMIN BOOLEAN)";
            stmt.executeUpdate(sql1);
            //Insert into users table
            stmt.executeUpdate("INSERT INTO USERS(USERNAME, PASSWORD, ADMIN)
VALUES('admin','admin',TRUE)");
            //Create Books table
            stmt.executeUpdate("CREATE TABLE BOOKS(BID INT NOT NULL
AUTO_INCREMENT PRIMARY KEY, BNAME VARCHAR(50), GENRE VARCHAR(20), PRICE INT)");
            //Create Issued Table
            stmt.executeUpdate("CREATE TABLE ISSUED(IID INT NOT NULL
AUTO_INCREMENT PRIMARY KEY, UID INT, BID INT, ISSUED_DATE VARCHAR(20), RETURN_DATE
VARCHAR(20), PERIOD INT, FINE INT)");
            //Insert into books table
            stmt.executeUpdate("INSERT INTO BOOKS(BNAME, GENRE, PRICE) VALUES
('War and Peace', 'Mystery', 200),  ('The Guest Book', 'Fiction', 300), ('The
Perfect Murder','Mystery', 150), ('Accidental Presidents', 'Biography', 250),
('The Wicked King','Fiction', 350)");

        resultSet.close();
        }
         catch (Exception ex) {
             ex.printStackTrace();
    }
    }
```

- Here the table and the Schema and everything related to SQL are handled.

User Menu:

- The User Menu is designed to show details of all the books present in the library and the books issued by the user.

```
public static void user_menu(String UID) {


        JFrame f=new JFrame("User Functions"); //Give dialog box name as User
functions
        //f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE); //Exit user menu on
closing the dialog box
        JButton view_but=new JButton("View Books");//creating instance of JButton
        view_but.setBounds(20,20,120,25);//x axis, y axis, width, height
        view_but.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e){
```

```
                JFrame f = new JFrame("Books Available"); //View books stored in
database
                //f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);


                Connection connection = connect();
                String sql="select * from BOOKS"; //Retreive data from database
                try {
                    Statement stmt = connection.createStatement(); //connect to
database
                     stmt.executeUpdate("USE LIBRARY"); // use librabry
                    stmt=connection.createStatement();
                    ResultSet rs=stmt.executeQuery(sql);
                    JTable book_list= new JTable(); //show data in table format
                    book_list.setModel(DbUtils.resultSetToTableModel(rs));

                    JScrollPane scrollPane = new JScrollPane(book_list); //enable
scroll bar

                    f.add(scrollPane); //add scroll bar
                    f.setSize(800, 400); //set dimensions of view books frame
                    f.setVisible(true);
                    f.setLocationRelativeTo(null);
                } catch (SQLException e1) {
                    // TODO Auto-generated catch block
                     JOptionPane.showMessageDialog(null, e1);
                }

        }
        }
        );

        JButton my_book=new JButton("My Books");//creating instance of JButton
        my_book.setBounds(150,20,120,25);//x axis, y axis, width, height
        my_book.addActionListener(new ActionListener() { //Perform action
            public void actionPerformed(ActionEvent e){


                JFrame f = new JFrame("My Books"); //View books issued by user
                //f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
                int UID_int = Integer.parseInt(UID); //Pass user ID


//.iid,issued.uid,issued.bid,issued.issued_date,issued.return_date,issued,
                Connection connection = connect(); //connect to database
                //retrieve data
                String sql="select distinct
issued.*,books.bname,books.genre,books.price from issued,books " + "where
((issued.uid=" + UID_int + ") and (books.bid in (select bid from issued where
issued.uid="+UID_int+"))) group by iid";
                String sql1 = "select bid from issued where uid="+UID_int;
                try {
                    Statement stmt = connection.createStatement();
                    //use database
                     stmt.executeUpdate("USE LIBRARY");
                    stmt=connection.createStatement();
                    //store in array
                    ArrayList books_list = new ArrayList();
```

```
                ResultSet rs=stmt.executeQuery(sql);
                JTable book_list= new JTable(); //store data in table format
                book_list.setModel(DbUtils.resultSetToTableModel(rs));
                //enable scroll bar
                JScrollPane scrollPane = new JScrollPane(book_list);

                f.add(scrollPane); //add scroll bar
                f.setSize(800, 400); //set dimensions of my books frame
                f.setVisible(true);
                f.setLocationRelativeTo(null);
            } catch (SQLException e1) {
                // TODO Auto-generated catch block
                 JOptionPane.showMessageDialog(null, e1);
            }

        }
        }
        );



        f.add(my_book); //add my books
        f.add(view_but); // add view books
        f.setSize(300,100);//400 width and 500 height
        f.setLayout(null);//using no layout managers
        f.setVisible(true);//making the frame visible
        f.setLocationRelativeTo(null);
        }
```

Admin Menu:

The Admin Menu is designed to show details of users, books, issued books, add books, return books, add user, and create or reset the database.

```
public static void admin_menu() {


        JFrame f=new JFrame("Admin Functions"); //Give dialog box name as admin
functions
        //f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE); //


        JButton create_but=new JButton("Create/Reset");//creating instance of
JButton to create or reset database
        create_but.setBounds(450,60,120,25);//x axis, y axis, width, height
        create_but.addActionListener(new ActionListener() { //Perform action
            public void actionPerformed(ActionEvent e){

                create(); //Call create function
                JOptionPane.showMessageDialog(null,"Database Created/Reset!");
//Open a dialog box and display the message

            }
        });
```

```
        JButton view_but=new JButton("View Books");//creating instance of JButton
to view books
        view_but.setBounds(20,20,120,25);//x axis, y axis, width, height
        view_but.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e){

                JFrame f = new JFrame("Books Available");
                //f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);


                Connection connection = connect(); //connect to database
                String sql="select * from BOOKS"; //select all books
                try {
                    Statement stmt = connection.createStatement();
                     stmt.executeUpdate("USE LIBRARY"); //use database
                    stmt=connection.createStatement();
                    ResultSet rs=stmt.executeQuery(sql);
                    JTable book_list= new JTable(); //view data in table format
                    book_list.setModel(DbUtils.resultSetToTableModel(rs));
                    //mention scroll bar
                    JScrollPane scrollPane = new JScrollPane(book_list);

                    f.add(scrollPane); //add scrollpane
                    f.setSize(800, 400); //set size for frame
                    f.setVisible(true);
                    f.setLocationRelativeTo(null);
                } catch (SQLException e1) {
                    // TODO Auto-generated catch block
                     JOptionPane.showMessageDialog(null, e1);
                }

        }
        }
        );

        JButton users_but=new JButton("View Users");//creating instance of JButton
to view users
        users_but.setBounds(150,20,120,25);//x axis, y axis, width, height
        users_but.addActionListener(new ActionListener() { //Perform action on
click button
            public void actionPerformed(ActionEvent e){

                    JFrame f = new JFrame("Users List");
                    //f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);


                    Connection connection = connect();
                    String sql="select * from users"; //retrieve all users
                    try {
                        Statement stmt = connection.createStatement();
                         stmt.executeUpdate("USE LIBRARY"); //use database
                        stmt=connection.createStatement();
                        ResultSet rs=stmt.executeQuery(sql);
                        JTable book_list= new JTable();
                        book_list.setModel(DbUtils.resultSetToTableModel(rs));
                        //mention scroll bar
                        JScrollPane scrollPane = new JScrollPane(book_list);
```

```
                    f.add(scrollPane); //add scrollpane
                    f.setSize(800, 400); //set size for frame
                    f.setVisible(true);
                    f.setLocationRelativeTo(null);
                } catch (SQLException e1) {
                    // TODO Auto-generated catch block
                     JOptionPane.showMessageDialog(null, e1);
                }


        }
            }
        );

        JButton issued_but=new JButton("View Issued Books");//creating instance of
JButton to view the issued books
        issued_but.setBounds(280,20,160,25);//x axis, y axis, width, height
        issued_but.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e){

                    JFrame f = new JFrame("Users List");
                    //f.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);


                    Connection connection = connect();
                    String sql="select * from issued";
                    try {
                        Statement stmt = connection.createStatement();
                         stmt.executeUpdate("USE LIBRARY");
                        stmt=connection.createStatement();
                        ResultSet rs=stmt.executeQuery(sql);
                        JTable book_list= new JTable();
                        book_list.setModel(DbUtils.resultSetToTableModel(rs));

                        JScrollPane scrollPane = new JScrollPane(book_list);

                        f.add(scrollPane);
                        f.setSize(800, 400);
                        f.setVisible(true);
                        f.setLocationRelativeTo(null);
                    } catch (SQLException e1) {
                        // TODO Auto-generated catch block
                         JOptionPane.showMessageDialog(null, e1);
                    }

        }
            }
        );


        JButton add_user=new JButton("Add User"); //creating instance of JButton
to add users
        add_user.setBounds(20,60,120,25); //set dimensions for button

        add_user.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e){
```

```
                    JFrame g = new JFrame("Enter User Details"); //Frame to enter
user details
                    //g.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
                    //Create label
                    JLabel l1,l2;
                    l1=new JLabel("Username");  //label 1 for username
                    l1.setBounds(30,15, 100,30);


                    l2=new JLabel("Password");  //label 2 for password
                    l2.setBounds(30,50, 100,30);

                    //set text field for username
                    JTextField F_user = new JTextField();
                    F_user.setBounds(110, 15, 200, 30);

                    //set text field for password
                    JPasswordField F_pass=new JPasswordField();
                    F_pass.setBounds(110, 50, 200, 30);
                    //set radio button for admin
                    JRadioButton a1 = new JRadioButton("Admin");
                    a1.setBounds(55, 80, 200,30);
                    //set radio button for user
                    JRadioButton a2 = new JRadioButton("User");
                    a2.setBounds(130, 80, 200,30);
                    //add radio buttons
                    ButtonGroup bg=new ButtonGroup();
                    bg.add(a1);bg.add(a2);


                    JButton create_but=new JButton("Create");//creating instance
of JButton for Create
                    create_but.setBounds(130,130,80,25);//x axis, y axis, width,
height
                    create_but.addActionListener(new ActionListener() {

                        public void actionPerformed(ActionEvent e){

                        String username = F_user.getText();
                        String password = F_pass.getText();
                        Boolean admin = false;

                        if(a1.isSelected()) {
                            admin=true;
                        }

                        Connection connection = connect();

                        try {
                        Statement stmt = connection.createStatement();
                         stmt.executeUpdate("USE LIBRARY");
                         stmt.executeUpdate("INSERT INTO
USERS(USERNAME,PASSWORD,ADMIN) VALUES ('"+username+"','"+password+"',"+admin+")");
                         JOptionPane.showMessageDialog(null,"User added!");
                         g.dispose();

                        }

                        catch (SQLException e1) {
```

```
                        // TODO Auto-generated catch block
                         JOptionPane.showMessageDialog(null, e1);
                    }

                    }

                });


                    g.add(create_but);
                    g.add(a2);
                    g.add(a1);
                    g.add(l1);
                    g.add(l2);
                    g.add(F_user);
                    g.add(F_pass);
                    g.setSize(350,200);//400 width and 500 height
                    g.setLayout(null);//using no layout managers
                    g.setVisible(true);//making the frame visible
                    g.setLocationRelativeTo(null);


        }
        });


        JButton add_book=new JButton("Add Book"); //creating instance of JButton
for adding books
        add_book.setBounds(150,60,120,25);

        add_book.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e){
                    //set frame wot enter book details
                    JFrame g = new JFrame("Enter Book Details");
                    //g.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
                    // set labels
                    JLabel l1,l2,l3;
                    l1=new JLabel("Book Name");  //lebel 1 for book name
                    l1.setBounds(30,15, 100,30);


                    l2=new JLabel("Genre");  //label 2 for genre
                    l2.setBounds(30,53, 100,30);

                    l3=new JLabel("Price");  //label 2 for price
                    l3.setBounds(30,90, 100,30);

                    //set text field for book name
                    JTextField F_bname = new JTextField();
                    F_bname.setBounds(110, 15, 200, 30);

                    //set text field for genre
                    JTextField F_genre=new JTextField();
                    F_genre.setBounds(110, 53, 200, 30);
                    //set text field for price
                    JTextField F_price=new JTextField();
                    F_price.setBounds(110, 90, 200, 30);
```

```
                    JButton create_but=new JButton("Submit");//creating instance
of JButton to submit details
                    create_but.setBounds(130,130,80,25);//x axis, y axis, width,
height
                    create_but.addActionListener(new ActionListener() {

                        public void actionPerformed(ActionEvent e){
                        // assign the book name, genre, price
                        String bname = F_bname.getText();
                        String genre = F_genre.getText();
                        String price = F_price.getText();
                        //convert price of integer to int
                        int price_int = Integer.parseInt(price);

                        Connection connection = connect();

                        try {
                        Statement stmt = connection.createStatement();
                         stmt.executeUpdate("USE LIBRARY");
                         stmt.executeUpdate("INSERT INTO BOOKS(BNAME,GENRE,PRICE)
VALUES ('"+bname+"','"+genre+"',"+price_int+")");
                          JOptionPane.showMessageDialog(null,"Book added!");
                          g.dispose();

                        }

                        catch (SQLException e1) {
                            // TODO Auto-generated catch block
                             JOptionPane.showMessageDialog(null, e1);
                        }

                        }

                    });

                        g.add(l3);
                        g.add(create_but);
                        g.add(l1);
                        g.add(l2);
                        g.add(F_bname);
                        g.add(F_genre);
                        g.add(F_price);
                        g.setSize(350,200);//400 width and 500 height
                        g.setLayout(null);//using no layout managers
                        g.setVisible(true);//making the frame visible
                        g.setLocationRelativeTo(null);

        }
        });


        JButton issue_book=new JButton("Issue Book"); //creating instance of
JButton to issue books
        issue_book.setBounds(450,20,120,25);

        issue_book.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e){
                    //enter details
                    JFrame g = new JFrame("Enter Details");
```

```
                    //g.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
                    //create labels
                    JLabel l1,l2,l3,l4;
                    l1=new JLabel("Book ID(BID)");  // Label 1 for Book ID
                    l1.setBounds(30,15, 100,30);


                    l2=new JLabel("User ID(UID)");  //Label 2 for user ID
                    l2.setBounds(30,53, 100,30);

                    l3=new JLabel("Period(days)");  //Label 3 for period
                    l3.setBounds(30,90, 100,30);

                    l4=new JLabel("Issued Date(DD-MM-YYYY)");  //Label 4 for issue
date
                    l4.setBounds(30,127, 150,30);

                    JTextField F_bid = new JTextField();
                    F_bid.setBounds(110, 15, 200, 30);


                    JTextField F_uid=new JTextField();
                    F_uid.setBounds(110, 53, 200, 30);

                    JTextField F_period=new JTextField();
                    F_period.setBounds(110, 90, 200, 30);

                    JTextField F_issue=new JTextField();
                    F_issue.setBounds(180, 130, 130, 30);


                    JButton create_but=new JButton("Submit");//creating instance
of JButton
                    create_but.setBounds(130,170,80,25);//x axis, y axis, width,
height
                    create_but.addActionListener(new ActionListener() {

                        public void actionPerformed(ActionEvent e){

                        String uid = F_uid.getText();
                        String bid = F_bid.getText();
                        String period = F_period.getText();
                        String issued_date = F_issue.getText();

                        int period_int = Integer.parseInt(period);

                        Connection connection = connect();

                        try {
                        Statement stmt = connection.createStatement();
                         stmt.executeUpdate("USE LIBRARY");
                         stmt.executeUpdate("INSERT INTO
ISSUED(UID,BID,ISSUED_DATE,PERIOD) VALUES
('"+uid+"','"+bid+"','"+issued_date+"',"+period_int+")");
                         JOptionPane.showMessageDialog(null,"Book Issued!");
                         g.dispose();

                        }
```

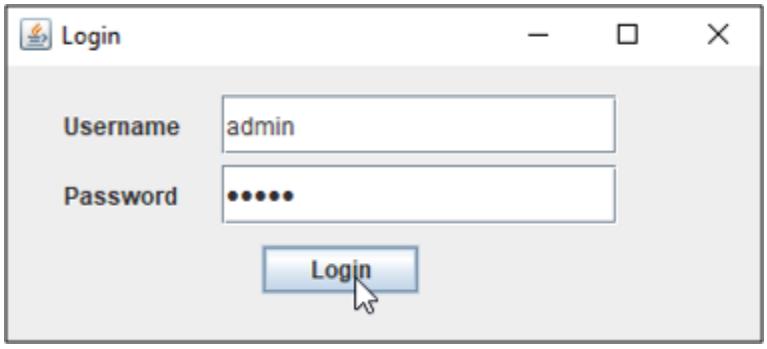
```
                    catch (SQLException e1) {
                        // TODO Auto-generated catch block
                         JOptionPane.showMessageDialog(null, e1);
                    }

                    }

                });


                    g.add(l3);
                    g.add(l4);
                    g.add(create_but);
                    g.add(l1);
                    g.add(l2);
                    g.add(F_uid);
                    g.add(F_bid);
                    g.add(F_period);
                    g.add(F_issue);
                    g.setSize(350,250);//400 width and 500 height
                    g.setLayout(null);//using no layout managers
                    g.setVisible(true);//making the frame visible
                    g.setLocationRelativeTo(null);


        }
        });


        JButton return_book=new JButton("Return Book"); //creating instance of
JButton to return books
        return_book.setBounds(280,60,160,25);

        return_book.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e){

                    JFrame g = new JFrame("Enter Details");
                    //g.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
                    //set labels
                    JLabel l1,l2,l3,l4;
                    l1=new JLabel("Issue ID(IID)");  //Label 1 for Issue ID
                    l1.setBounds(30,15, 100,30);


                    l4=new JLabel("Return Date(DD-MM-YYYY)");
                    l4.setBounds(30,50, 150,30);

                    JTextField F_iid = new JTextField();
                    F_iid.setBounds(110, 15, 200, 30);


                    JTextField F_return=new JTextField();
                    F_return.setBounds(180, 50, 130, 30);


                    JButton create_but=new JButton("Return");//creating instance
of JButton to mention return date and calculcate fine
                    create_but.setBounds(130,170,80,25);//x axis, y axis, width,
height
```

```
                    create_but.addActionListener(new ActionListener() {

                        public void actionPerformed(ActionEvent e){

                        String iid = F_iid.getText();
                        String return_date = F_return.getText();

                        Connection connection = connect();

                        try {
                        Statement stmt = connection.createStatement();
                         stmt.executeUpdate("USE LIBRARY");
                         //Intialize date1 with NULL value
                         String date1=null;
                         String date2=return_date; //Intialize date2 with return
date


                         //select issue date
                         ResultSet rs = stmt.executeQuery("SELECT ISSUED_DATE FROM
ISSUED WHERE IID="+iid);
                         while (rs.next()) {
                             date1 = rs.getString(1);

                           }

                         try {
                                Date date_1=new SimpleDateFormat("dd-MM-
yyyy").parse(date1);
                                Date date_2=new SimpleDateFormat("dd-MM-
yyyy").parse(date2);
                                //subtract the dates and store in diff
                                long diff = date_2.getTime() - date_1.getTime();
                                //Convert diff from milliseconds to days
                                ex.days=(int)(TimeUnit.DAYS.convert(diff,
TimeUnit.MILLISECONDS));


                            } catch (ParseException e1) {
                                // TODO Auto-generated catch block
                                e1.printStackTrace();
                            }


                         //update return date
                         stmt.executeUpdate("UPDATE ISSUED SET
RETURN_DATE='"+return_date+"' WHERE IID="+iid);
                         g.dispose();


                         Connection connection1 = connect();
                         Statement stmt1 = connection1.createStatement();
                         stmt1.executeUpdate("USE LIBRARY");
                        ResultSet rs1 = stmt1.executeQuery("SELECT PERIOD FROM
ISSUED WHERE IID="+iid); //set period
                        String diff=null;
                        while (rs1.next()) {
                             diff = rs1.getString(1);

                           }
```

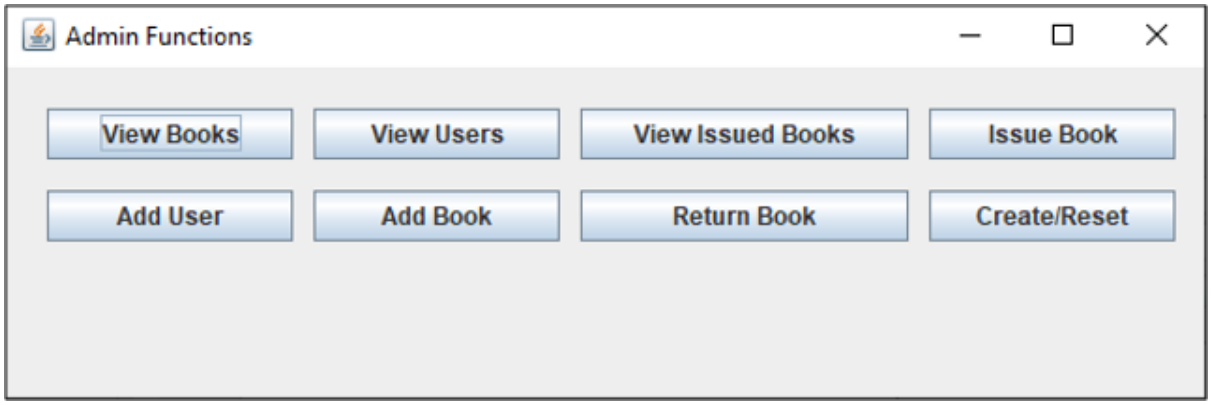
```
                        int diff_int = Integer.parseInt(diff);

if(ex.days&amp;amp;amp;amp;amp;amp;amp;amp;amp;amp;gt;diff_int) { //If number of
days are more than the period then calculcate fine

                            //System.out.println(ex.days);
                            int fine = (ex.days-diff_int)*10; //fine for every day
after the period is Rs 10.
                            //update fine in the system
                            stmt1.executeUpdate("UPDATE ISSUED SET FINE="+fine+"
WHERE IID="+iid);
                            String fine_str = ("Fine: Rs. "+fine);
                            JOptionPane.showMessageDialog(null,fine_str);

                        }

                         JOptionPane.showMessageDialog(null,"Book Returned!");

                        }


                        catch (SQLException e1) {
                            // TODO Auto-generated catch block
                             JOptionPane.showMessageDialog(null, e1);
                        }

                        }

                    });
                        g.add(l4);
                        g.add(create_but);
                        g.add(l1);
                        g.add(F_iid);
                        g.add(F_return);
                        g.setSize(350,250);//400 width and 500 height
                        g.setLayout(null);//using no layout managers
                        g.setVisible(true);//making the frame visible
                        g.setLocationRelativeTo(null);
        }
        });

        f.add(create_but);
        f.add(return_book);
        f.add(issue_book);
        f.add(add_book);
        f.add(issued_but);
        f.add(users_but);
        f.add(view_but);
        f.add(add_user);
        f.setSize(600,200);//400 width and 500 height
        f.setLayout(null);//using no layout managers
        f.setVisible(true);//making the frame visible
        f.setLocationRelativeTo(null);
}
```

Output:

Execute the application by clicking on the run button. Once, you execute you will see the below dialog box. In the below dialog box, mention username and password as {admin, admin}. Then click on the Login button.

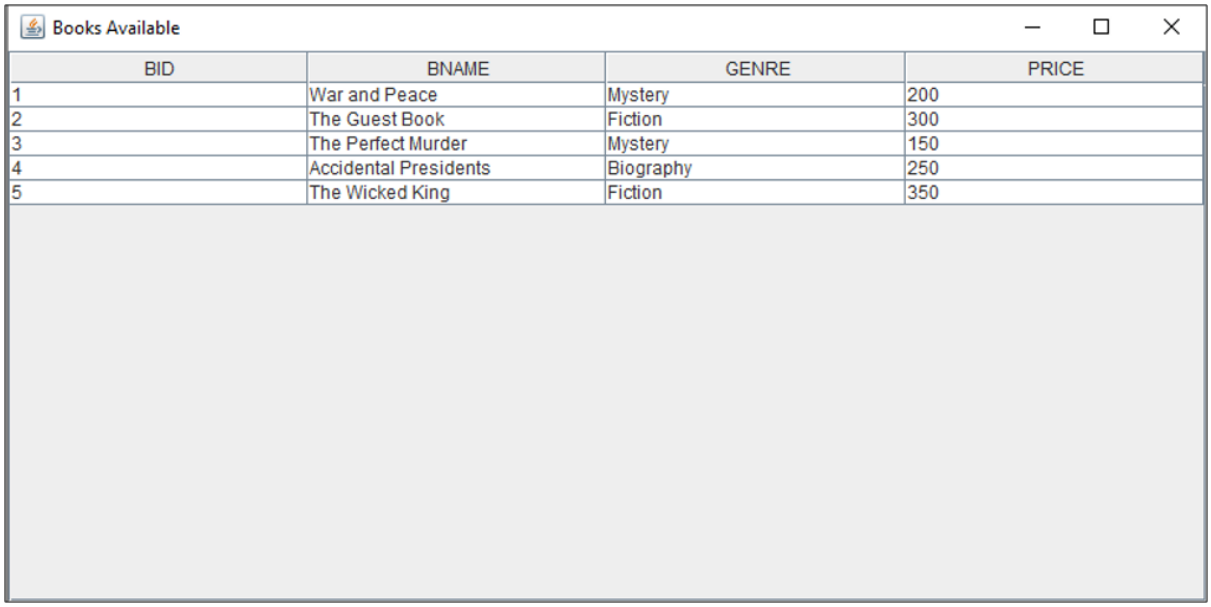


Once you click on the **Login button**, you will see the below dialog box opening up.



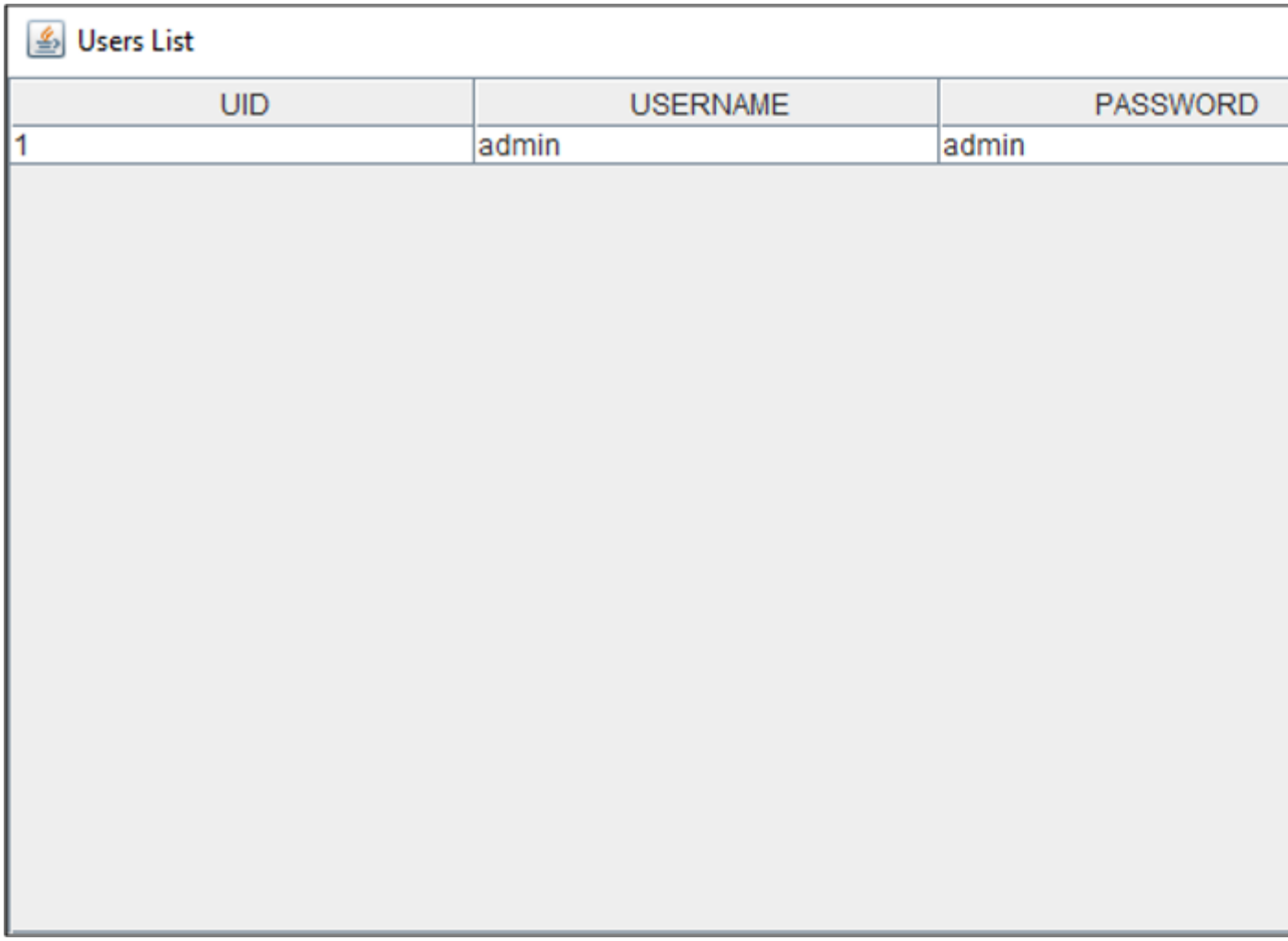
View Books:

Once, you click on View Books button, you will see the below frame displaying all the books present in the database, with their details.



View Users

The View Users button is used to view the current users on the system. Since we just have only one user present i.e the admin, it will show you output as below:

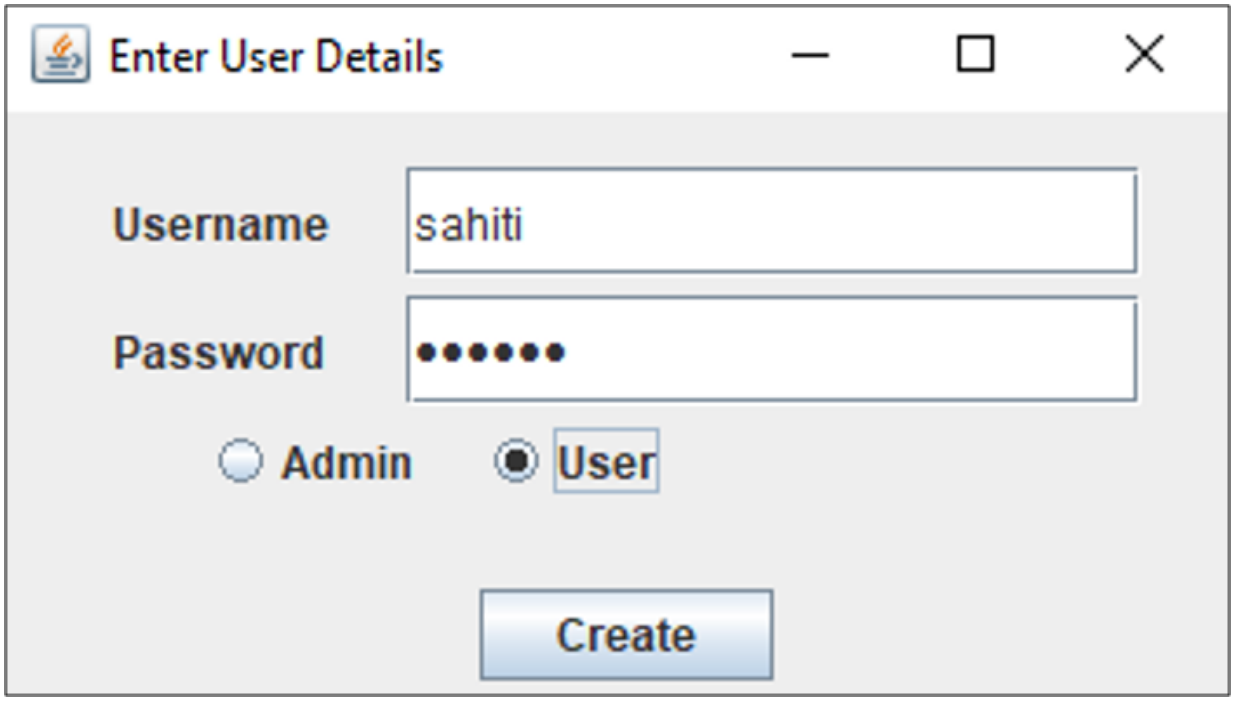


Create/Reset

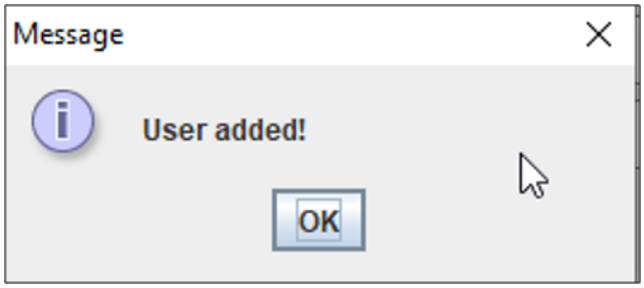
This functionality is used to create or reset a database. So, once you click on the button Create/Rest, you will see the below output:

Add User

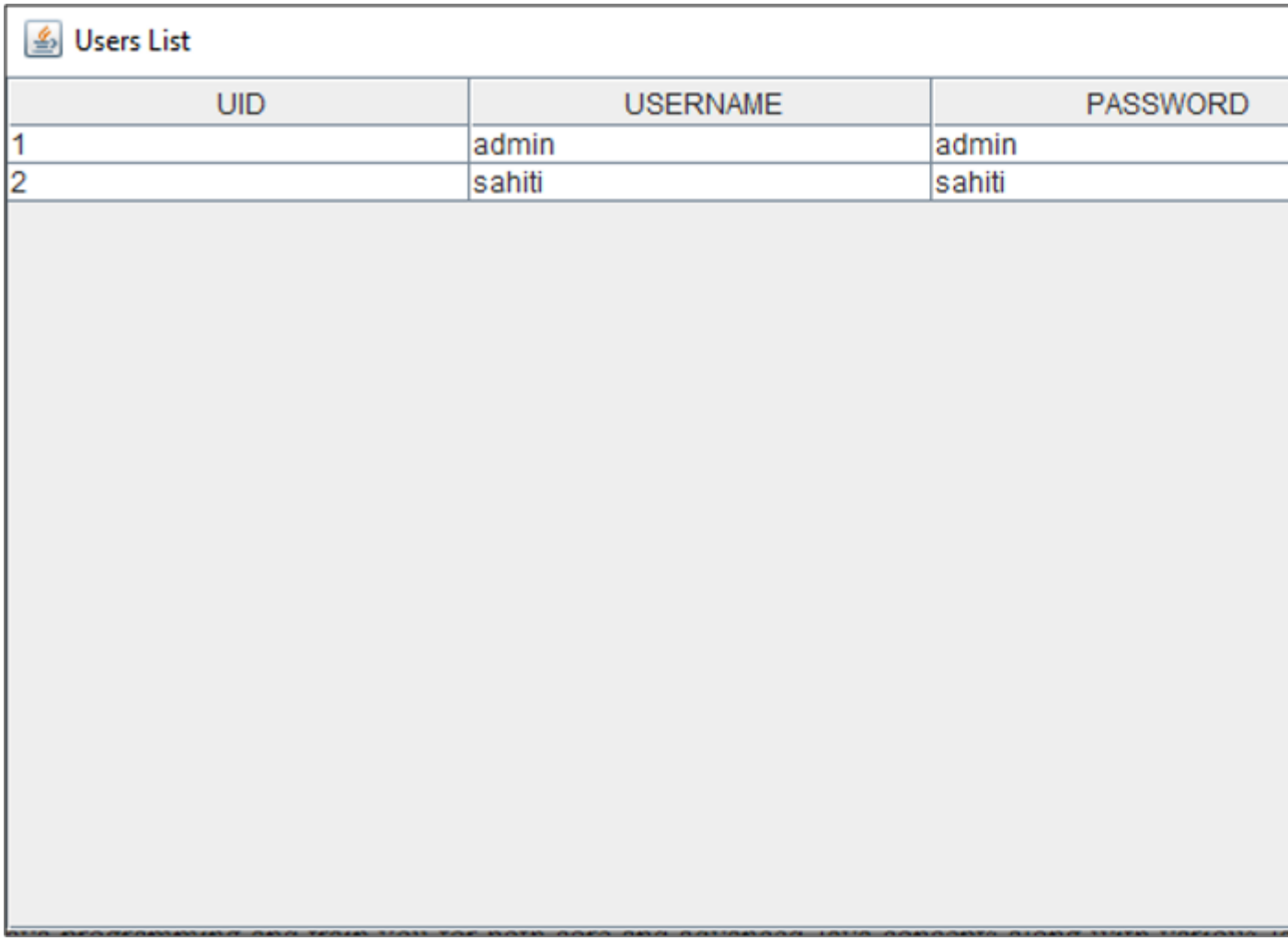
To add a user, click on the option "**Add User**" and mention details such as **username, password and choose the radio button user or admin**. By default, it will be the user. Then, click on **Create**.



Once the user is created, you will see an output as below:



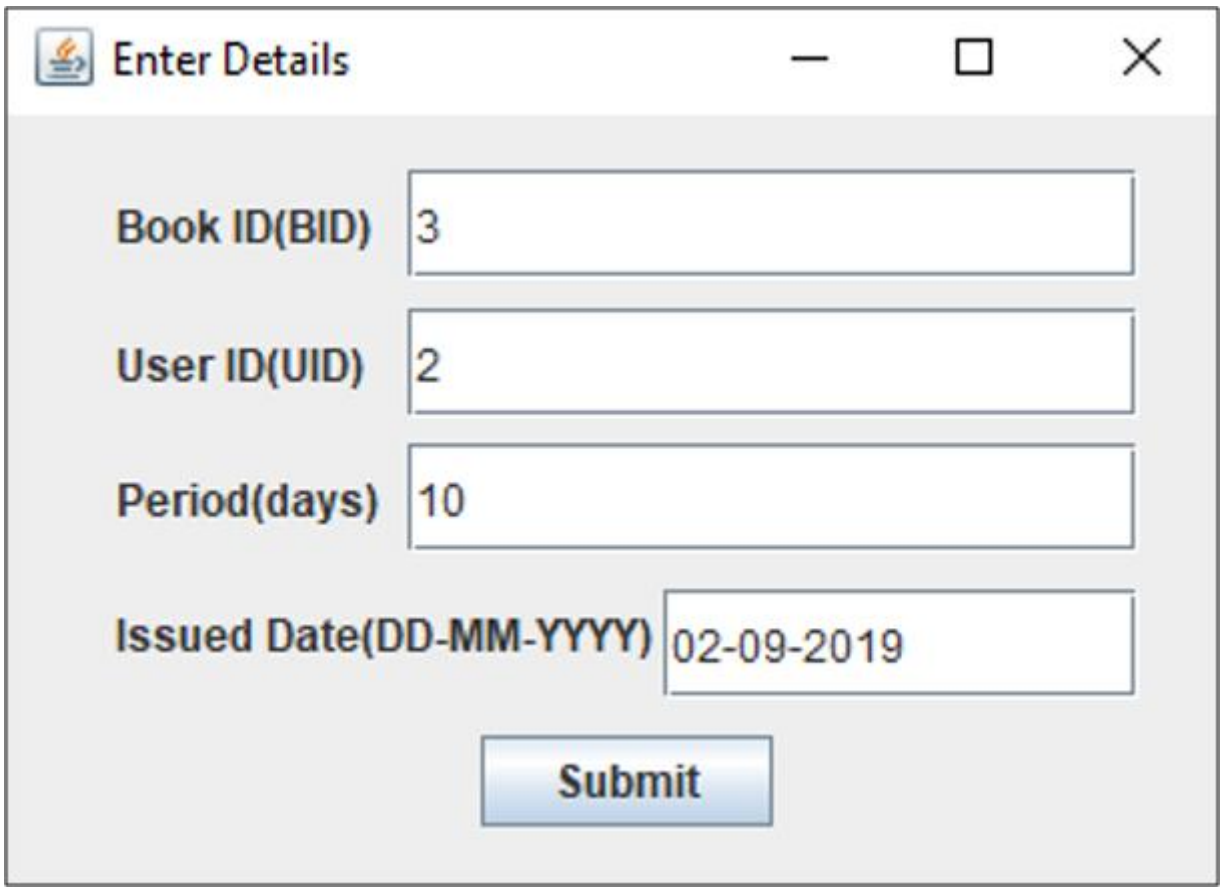
Now, again if you click on **View Users button**, you will see the below output:



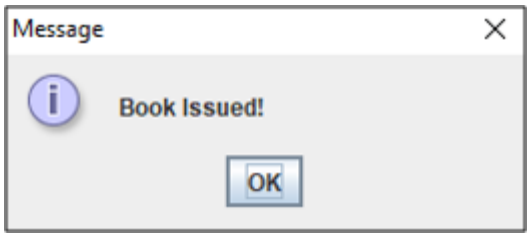
Alright, so now that we have added a user. Let us say, that particular user wants to issue books. To do that, the user has to choose the option of Issue Book.

Issue Book

Suppose, if you are the user, once you click on the **Issue Book button**, you have to mention the **Book ID, User ID, Period(Number of days for issuing the book)**, and the **Issue Date** as follows:



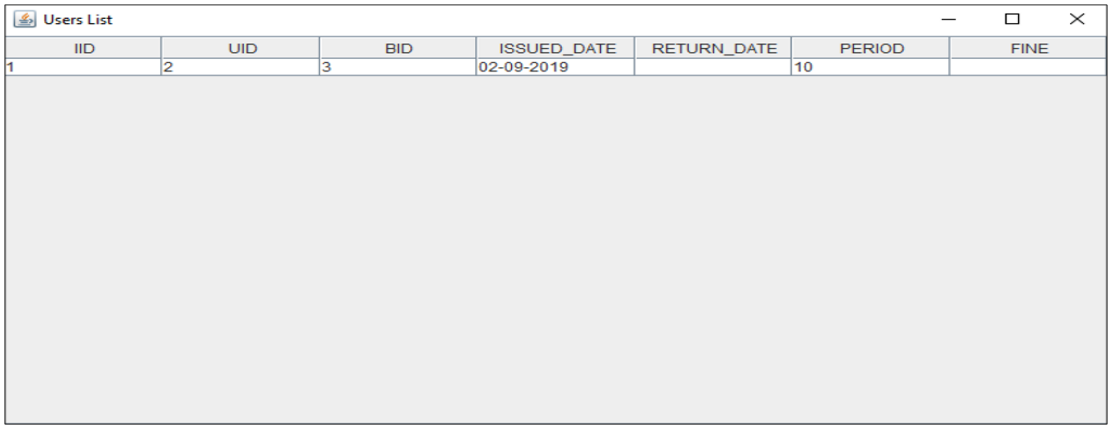
Then click on **Submit**. Once, you click on **Submit**, you will see the below dialog box:



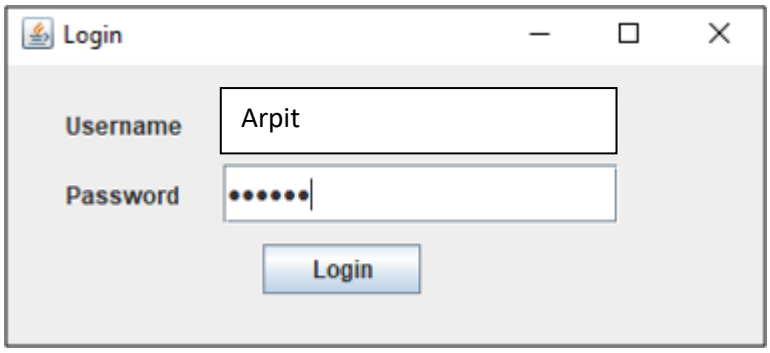
Now, if you want to see the issued books details, you can use the View Issued Books functionality.

View Issued Books

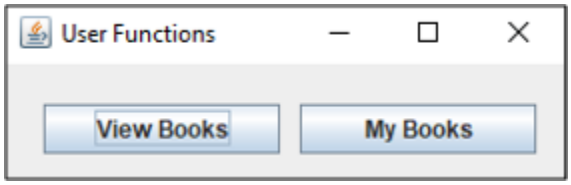
Once you click on this button, you will see the following output:



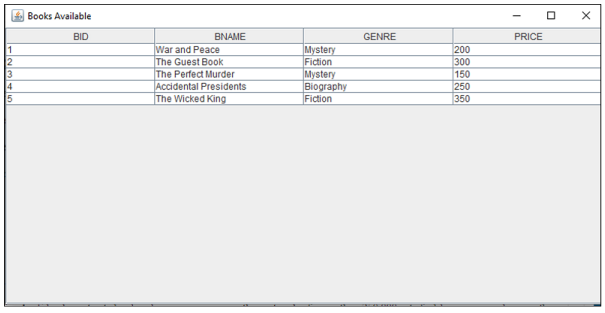
Alright, so, now **if the user logs in to the system**, using the login function, as below:

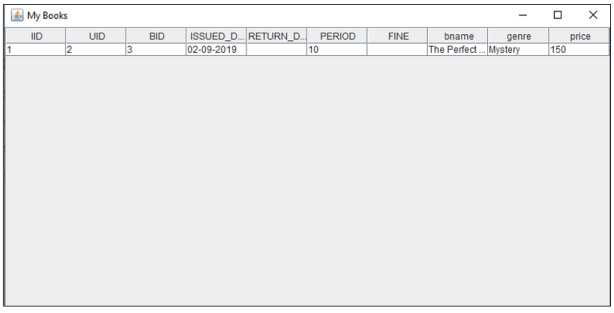


Then the user will see the below User Menu.



Here, the user can **view all the books** in the database by **using the View Books option** and the **books issued by the user** in the **My Books section** as below:

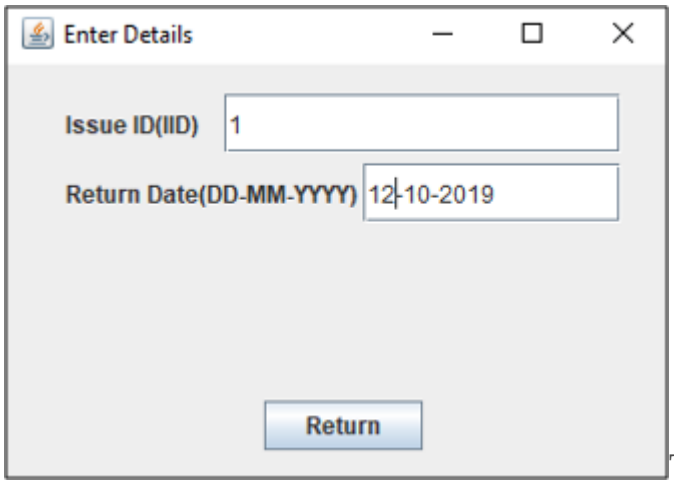




Now, if you wish to return the book, then you have to choose the option of Return Book.

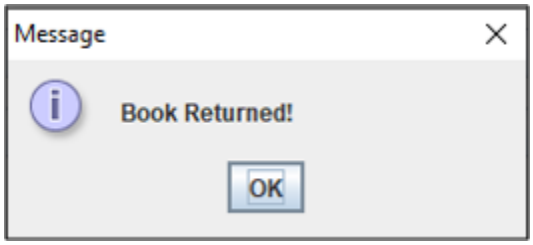
Return Book

Once, you click on the Return Book, mention the **Issue ID and the return date** as below. Then click on **Return**.

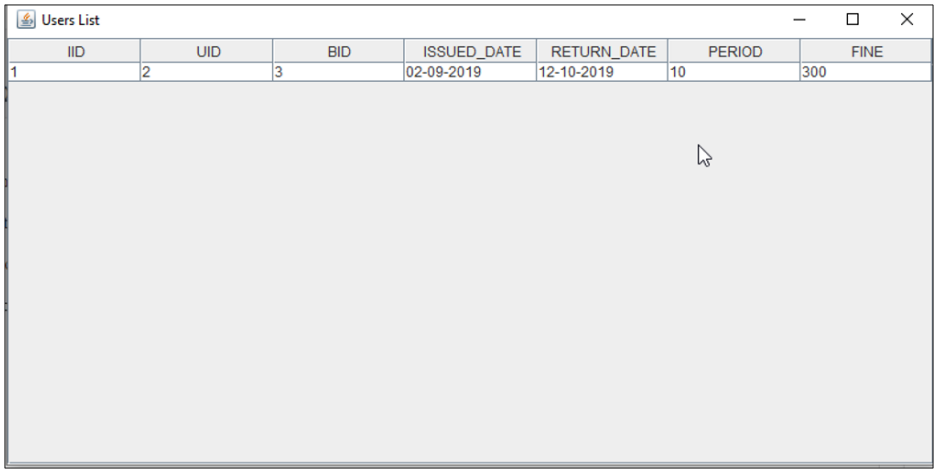


Then, you see a message box displaying the fine.

After that, you again see a dialog box, showing the message "**Book Returned**". Refer below.



Now, if you click on the **View Issued Books**, you will see the below output:

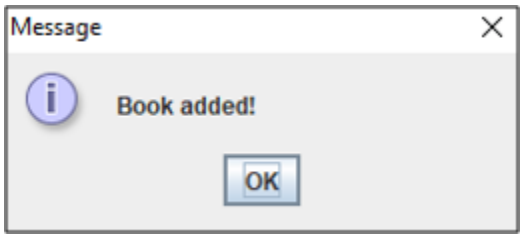


Lastly, if you wish to add a book, you can use the option of Add Book.

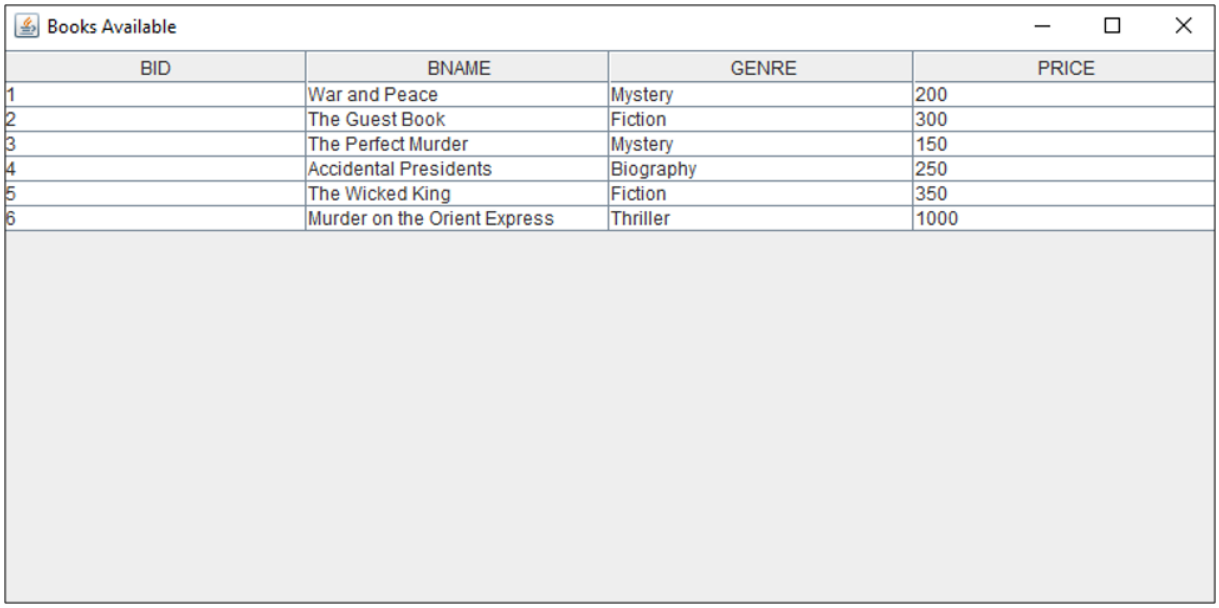
Add Book

Click on the **Add Book button**, and mention the **book name, genre and price**. Then, click on the **Submit button**. Refer below.

You will see a dialog box displaying the below message:



Apart from this, you can also, see the added books in the **View Books** section as below:



All the files can be accessed at:

- https://github.com/TSM-ArpitSG/InstagramAP