Library Book management System

Code:

Book.java:

import java.io.\*;

import java.util.\*;

class Book {

private String title;

private String author;

private String isbn;

private String checkedOutBy;

private Date dueDate;

public Book(String title, String author, String isbn) {

this.title = title;

this.author = author;

this.isbn = isbn;

this.checkedOutBy = null;

this.dueDate = null;

}

public String getTitle() {

return title;

}

public String getAuthor() {

return author;

}

public String getIsbn() {

return isbn;

}

public String getCheckedOutBy() {

return checkedOutBy;

}

public Date getDueDate() {

return dueDate;

}

public boolean checkOut(String patronId, int days) {

if (checkedOutBy != null) {

return false; // Book is already checked out

}

checkedOutBy = patronId;

Calendar calendar = Calendar.getInstance();

calendar.add(Calendar.DAY\_OF\_YEAR, days);

dueDate = calendar.getTime();

return true;

}

public void returnBook() {

checkedOutBy = null;

dueDate = null;

}

public boolean isOverdue() {

if (dueDate != null && dueDate.before(new Date())) {

return true;

}

return false;

}

public static void main(String args[]){

}

}

class Patron {

private String name;

private String patronId;

public Patron(String name, String patronId) {

this.name = name;

this.patronId = patronId;

}

public String getName() {

return name;

}

public String getPatronId() {

return patronId;

}

}

class LibraryTransaction {

private List<Book> books;

private List<Patron> patrons;

public LibraryTransaction() {

books = new ArrayList<>();

patrons = new ArrayList<>();

}

public void addBook(Book book) {

books.add(book);

}

public void addPatron(Patron patron) {

patrons.add(patron);

}

public void saveData(String booksFile, String patronsFile) {

try (PrintWriter bookWriter = new PrintWriter(new FileWriter(booksFile));

PrintWriter patronWriter = new PrintWriter(new FileWriter(patronsFile))) {

for (Book book : books) {

bookWriter.println(book.getTitle() + "," + book.getAuthor() + "," + book.getIsbn() + "," +

book.getCheckedOutBy() + "," + (book.getDueDate() != null ? book.getDueDate().toString() : ""));

}

for (Patron patron : patrons) {

patronWriter.println(patron.getName() + "," + patron.getPatronId());

}

} catch (IOException e) {

e.printStackTrace();

}

}

public void displayBookInfo() {

System.out.println("Books:");

for (Book book : books) {

System.out.println("Title: " + book.getTitle());

System.out.println("Author: " + book.getAuthor());

System.out.println("ISBN: " + book.getIsbn());

System.out.println("Checked out by: " + (book.getCheckedOutBy() != null ? book.getCheckedOutBy() : "Available"));

System.out.println("Due date: " + (book.getDueDate() != null ? book.getDueDate().toString() : "Not checked out"));

System.out.println();

}

}

public void displayPatronInfo() {

System.out.println("Patrons:");

for (Patron patron : patrons) {

System.out.println("Name: " + patron.getName());

System.out.println("Patron ID: " + patron.getPatronId());

System.out.println();

}

}

}

LibraryManagementSystem.Java:

public class LibraryManagementSystem {

public static void main(String[] args) {

// Sample usage

LibraryTransaction transaction = new LibraryTransaction();

Book book1 = new Book("The Great Gatsby", "F. Scott Fitzgerald", "9780743273565");

Book book2 = new Book("To Kill a Mockingbird", "Harper Lee", "9780061120084");

transaction.addBook(book1);

transaction.addBook(book2);

Patron patron1 = new Patron("Alice", "P001");

Patron patron2 = new Patron("Bob", "P002");

transaction.addPatron(patron1);

transaction.addPatron(patron2);

// Check out a book

book1.checkOut(patron1.getPatronId(), 14);

// Return a book

book1.returnBook();

// Display book and patron information

transaction.displayBookInfo();

transaction.displayPatronInfo();

// Save data to files

transaction.saveData("books.txt", "patrons.txt");

}

}

Output:

Books:

Title: The Great Gatsby

Author: F. Scott Fitzgerald

ISBN: 9780743273565

Checked out by: Available

Due date: Not checked out

Title: To Kill a Mockingbird

Author: Harper Lee

ISBN: 9780061120084

Checked out by: Available

Due date: Not checked out

Patrons:

Name: Alice

Patron ID: P001

Name: Bob

Patron ID: P002