**OOPs CONCEPT PROGRAMS**

1. **Classes and Object program**

Create a simple Java application for managing a library system. The system should allow users to add books, manage members, and process borrowing and returning of books.

//import the necessary utilities

import java.util.ArrayList;

//Create a Book class with the following attributes

class Book {

private String title;

private String author;

private String isbn;

private boolean available;

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

this.title = title;

this.author = author;

this.isbn = isbn;

this.available = true;

}

public String getTitle() {

return title;

}

public String getAuthor() {

return author;

}

public String getIsbn() {

return isbn;

}

public boolean isAvailable() {

return available;

}

public void setAvailable(boolean available) {

this.available = available;

}

}

//Create a Member class with the following attributes

class Member {

private String name;

private String memberId;

private ArrayList<Book> borrowedBooks;

public Member(String name, String memberId) {

this.name = name;

this.memberId = memberId;

this.borrowedBooks = new ArrayList<>();

}

//method to return the name

public String getName() {

return name;

}

//method to return the member ID

public String getMemberId() {

return memberId;

}

//method the list of borrowed books

public ArrayList<Book> getBorrowedBooks() {

return borrowedBooks;

}

public void addBorrowedBook(Book book) {

borrowedBooks.add(book);

}

public void removeBorrowedBook(Book book) {

borrowedBooks.remove(book);

}

}

class Library {

private ArrayList<Book> books;

private ArrayList<Member> members;

public Library() {

this.books = new ArrayList<>();

this.members = new ArrayList<>();

}

public void addBook(Book book) {

books.add(book);

}

public void displayBooks(ArrayList<Book> books) {

for (Book book : books) {

displayBook(book);

System.out.println();

}

}

public void displayBook(Book book) {

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

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

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

System.out.println("Available: " + book.isAvailable());

}

public void addMember(Member member) {

members.add(member);

}

public void borrowBook(Member member, Book book) {

if (book.isAvailable()) {

book.setAvailable(false);

member.addBorrowedBook(book);

System.out.println("Book borrowed successfully!");

} else {

System.out.println("Book is not available for borrowing.");

}

}

public void returnBook(Member member, Book book) {

if (member.getBorrowedBooks().contains(book)) {

book.setAvailable(true);

member.removeBorrowedBook(book);

System.out.println("Book returned successfully!");

} else {

System.out.println("Member has not borrowed this book.");

}

}

}

public class Main {

public static void main(String[] args) {

Library library = new Library();

Book book1 = new Book("Benyamin", "Basheer", "1");

Book book2 = new Book("The Alchemist", "Paulokoylo", "2");

library.addBook(book1);

library.addBook(book2);

Member member = new Member("Anagha", "101");

library.addMember(member);

library.borrowBook(member, book1);

library.returnBook(member, book1);

library.displayBook(book2);

}

}