Software Construction and Engineering

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Project:

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Project Title :

*A **Library Management System In Java***

Explanation:

A **Library Management System In Java** is a software application implemented in Java platform. It is useful for libraries in any schools or similar educational institution to manage and maintain data in database through computerized system. Using This **Library Management System** In **Java**, users need not search the entire library to find a book; the list of books available is displayed by the application. The main feature of This Library Management System Using Java is that all the books available in the library can be borrow by the students. and also the borrowed books by the students can return in the library. Additionally, the application effectively maintains the details of users/students to whom books have been issued.

- First we will take input from user , If the user is registered he/she will enter his/her Student id and if student is not registered , first he/she have to registered by entering his/her name and id will be assinged to them.
- A menu will appear where List of Books to pick up will appear.User have to enter the Book Category.
- If id is correct , Printing books for that category will appear.Then student will choose that specific book. If the book is avaliable book will be asssinged to them.
- If a student has to submit a book ,User will enter all the details of that particular book, then this will be displayed “book has been unassinged “

The Code Given Below Is For Client:

```
import com.premaseem.libraryManager.controller.LibraryManager;
import com.premaseem.libraryManager.domainObjects.Book;
import com.premaseem.libraryManager.domainObjects.Student;
import com.premaseem.libraryManager.utils.Utils;

import java.util.List;
import java.util.Scanner;

/**
 * Created by Eisha,Hala,Marukh.
 */
public class Client {

    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        int repeatRunFlag = 1;
        Integer studentId = 0;
        Integer loginOption = 0;

        LibraryManager libraryManager = new LibraryManager();
        libraryManager.loadInitialData();
```

```
        while (repeatRunFlag == 1) {
            System.out.println("Welcome to Library Managment Program ");
            System.out.println("============================");
            System.out.println("Do you have a student Id ? press 1 for yes
and 0 to register ? ");
            loginOption = scan.nextInt();
            if(loginOption == 1 ) {
                System.out.println("Please enter your student Id ");
                studentId = scan.nextInt();
                Student student =null;
                if(studentId > libraryManager.studentlist.size()-1){
                    System.out.println("Please enter valid student id ;-) ");
                    studentId = scan.nextInt();
                }

                try {
                    student = libraryManager.studentlist.get(studentId);
                    System.out.println("Student retrived is " + student);

                    Utils.printBookCatalog();

                    Integer category = scan.nextInt();
                    List<Book> books =
libraryManager.displayBooks(category);
                    System.out.println("Enter the book Id");

                    // take input for book retrival
                    Integer bookId = scan.nextInt();
                    Book book = books.get(bookId);

                    // fetch the book
                    // assign the book (validate its satatus)
                    if(book.isAssigned){
                        System.out.println("sorry book is assigned, come back
later");
                    }else{
                        student.assignBook(book);

                    }

                    System.out.println("Do you have to submit a book ? press
1 for yes and 0 for NO ");
                    Integer submit = scan.nextInt();
                    if(submit==1) {

                        Utils.printBookCatalog();

                        category = scan.nextInt();
                        books = libraryManager.displayBooks(category);
                        System.out.println("Enter the book Id");

                        // take input for book retrival
                        bookId = scan.nextInt();
                        book = books.get(bookId);

                        // fetch the book
```

```
                        // assign the book (validate its satatus)
                        if (!book.isAssigned) {
                            System.out.println("sorry book is not issued");
                        } else {
                            student.unAssignBook(book);
                            System.out.println("book has been un assigned " +
book + " " + student);
                        }
                    }else{
                        System.out.println("Thanks ");
                    }

                }catch (Exception e) {
                    System.out.println("Sorry Student cannot be retrived -
its invalid student id STUPID ;-)  ");
                }

            }else if (loginOption == 0 ) {
                // create a new user
                System.out.println("Welcome to the Register Screen");
                System.out.println("Enter name of Student ... ");
                String studentName = scan.next();
                Student student =
libraryManager.registerStudent(studentName);
                System.out.println("Student registered successfully ");
                System.out.println(student);

            } else {
                System.out.println("Invalid entry for Students Module ");
            }

            System.out.println("Do you want to Re-run this program - Press 1
for yes and 0 or other digits to EXIT ");

            try {
                repeatRunFlag = scan.nextInt();
            } catch (Exception e) {
                repeatRunFlag = 0;
            }

        }
        Utils.printFooter();

    }
}
```

The Code Given Below Is For Student:

```
package com.premaseem.libraryManager.domainObjects;
import java.util.ArrayList;
import java.util.List;
```

```java
/**
 * Created by Eisha,Hala,Marukh.
 */

public class Student {

    private Integer studentId=null;
    private String name=null;
    List<Book> books = new ArrayList<Book>(2);


    public Student(Integer studentId ,String name ){
        this.setStudentId(studentId);
        this.setName(name);
    }

    public Student(String name ){
        this.setName(name);
    }


    public Integer getStudentId() {
        return studentId;
    }

    public void setStudentId(Integer studentId) {
        this.studentId = studentId;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    @Override
    public String toString() {
        return " Student details: id " +getStudentId() + "  name :  "+
getName() ;
    }

    public void assignBook(Book book){
        if(books.size() > 1){
            System.out.println("sorry more then 2 books cannot be assigned");
        }else {
            books.add(book);
            book.isAssigned = true;
            System.out.println("book has been assigned " + book + " " +this
);
        }
    }

    public void unAssignBook(Book book){
        books.remove(book);
```

```
        book.isAssigned=false;
    }


}
```

The Code Given Below Is For LibraryManager:

```
package com.premaseem.libraryManager.controller;

import com.premaseem.libraryManager.domainObjects.Book;
import com.premaseem.libraryManager.domainObjects.Student;

import java.util.*;

/**
 * Created by Eisha,Hala,Marukh.
 */
public class LibraryManager {

    public List<Student> studentlist = new ArrayList<Student>();
    Map<Integer, List<Book>> simulatedHashMap = new HashMap<Integer,
List<Book>>();

    Initilazer initilazer = new Initilazer();


    public void loadInitialData() {
        studentlist = initilazer.loadStudents(studentlist);
        initilazer.loadBooks(simulatedHashMap);
    }

    public Student registerStudent(String studentName){
        Student student =   new Student(studentName);
        student.setStudentId(studentlist.size());
        addStudent( student);
        return student;
    }


    void addStudent(Student student){
        studentlist.add(student.getStudentId(),student);
    }
    List<Book> returnBookList = null;


    public List<Book> displayBooks(Integer categoryId){
        System.out.print("Printing books for Category " + categoryId + "\n");
        returnBookList = simulatedHashMap.get(categoryId);
        for (Book b : returnBookList) {
            System.out.println(b);
        }
        return returnBookList;
    }
```

```
    void displayBooks(){
        Set<Integer> bookCategories = simulatedHashMap.keySet();

        for (Integer category : bookCategories) {
            System.out.print("Printing books for Category " + category);
            returnBookList = simulatedHashMap.get(category);
            for (Book b : returnBookList) {
                System.out.println(b);
            }
            System.out.println();
        }
    }

    /**
     * Created by Eisha,Hala,Marukh.
     */
    public static class Initilazer {

        public List<Student> loadStudents(List<Student> studentlist) {

            studentlist.add(new Student(0,"System user"));
            studentlist.add(new Student(1,"Eisha"));
            studentlist.add(new Student(2,"Hala"));
            studentlist.add(new Student(3,"Marukh"));
            studentlist.add(new Student(4,"Amal"));

            return studentlist;
        }


        public void loadBooks(Map<Integer, List<Book>> simulatedHashMap){
            new Book( "OCA Java SE 8", "Kathy Sierra, Bert Bates, Elisabeth
Robson", 101, 0).feed(simulatedHashMap);

            new Book( "Java The Complete Reference", "Herbert Schildt", 101,
1).feed(simulatedHashMap);


            new Book( "Core Java An Integrated Approach", "Dr. R. Nageswara
Rao", 101, 2).feed(simulatedHashMap);


            new Book( "Head First Java", "Kathy Sierra, Bert Bates", 102,
0).feed(simulatedHashMap);


            new Book( "Effective Java", "Y Joshua Bloch", 102,
1).feed(simulatedHashMap);


            new Book( "An Introduction to Programming in Go", "Caleb", 103,
0).feed(simulatedHashMap);


            new Book( "The Java Language Specification", "James J. Gosling,
```

```
Bill Joy, Jr. Steele, Guy L., Gilad Bracha, Alex Buckley, Guy L. Steele Jr",
103, 8).feed(simulatedHashMap);


            new Book( "Accelerated C++", "Andrew Koenig and Barbara E.
MooAndrew Koenig and Barbara E. Moo", 104, 8).feed(simulatedHashMap);

        }


        /**
         * Created by Eisha,Hala,Marukh.
         */
        public class Initilizer {


        }

    }
}
```

The Code Given Below Is For Book:

```
/**
 * Created by Eisha,Hala,Marukh.
 */
package com.premaseem.libraryManager.domainObjects;

import java.util.*;

public class Book {

    int id, category;
    String name, author;
    public Boolean isAssigned;

    public Book(String name, String author, Integer category, int id) {
        this.id = id;
        this.name = name;
        this.category = category;
        this.author = author;
        this.isAssigned = false;
    }

    @Override
    public int hashCode() {
        return category;
    }


    public void feed(Map<Integer, List<Book>> simulatedHashMap) {
        autoCreate(simulatedHashMap);
        simulatedHashMap.get(this.hashCode()).add(this);
```

```
    }


    public void autoCreate(Map<Integer, List<Book>> simulatedHashMap){
        if( simulatedHashMap.get(this.hashCode()) == null){
            simulatedHashMap.put(this.hashCode(), new ArrayList<Book>());
        }

    }

    @Override
    public String toString() {
        return " id: " + this.id + " Title: " + this.name + " is Assigned : "
+ this.isAssigned + " ";
    }
}
```

The Code Given Below Is For Utils:

```
/**
 * Created by Eisha,Hala,Marukh.
 */
package com.premaseem.libraryManager.utils;

public class Utils {


    public static void printBookCatalog(){

        System.out.println("============Books Menus to pick =============="
);
        System.out.println("Enter 101 for Java books ");
        System.out.println("Enter 102 for JavaScript books ");
        System.out.println("Enter 103 for go lang books ");
        System.out.println("Enter 104 for go C++ books");
        System.out.println("============Books Menus to pick ==============");
        System.out.println("Please enter book Category ");
    }

    public static void printFooter(){
        System.out.println("\n $$$$$$$$$$$$$$$$$$$  Thanks for Using our
program - Eisha,Hala,Marukh $$$$$$$$$$$$$$$$$$$$ \n ");
    }


}
```

Output :

- **First of all, we will register.After successfully login we will be assinged by Student id as shown in below output.Then again we will submit the Student id and then Student details will be appear.**

```
Welcome to Library Managment Program
============================
Do you have a student Id ? press 1 for yes and 0 to register ?

0
Welcome to the Register Screen
Enter name of Student ...
eisha
Student registered successfully
 Student details: id 5  name :  eisha
Do you want to Re-run this program - Press 1 for yes and 0 or other digits to EXIT
1
Welcome to Library Managment Program
============================
Do you have a student Id ? press 1 for yes and 0 to register ?

1
Please enter your student Id
5
Student retrived is  Student details: id 5  name :  eisha
```

- **Books menu will now appear, Student has to chose the particular book of their need, If that book is not available message will appear.If the Book is available Book will be Assinged to them.**

```
============Books Menus to pick ==============
Enter 101 for Java books
Enter 102 for JavaScript books
Enter 103 for go lang books
Enter 104 for go C++ books
============Books Menus to pick ==============
Please enter book Category
104
Printing books for Category 104
Sorry Student cannot be retrived - its invalid student id STUPID ;-)
Do you want to Re-run this program - Press 1 for yes and 0 or other digits to EXIT
1
Welcome to Library Managment Program
============================
Do you have a student Id ? press 1 for yes and 0 to register ?
1
Please enter your student Id
5
Student retrived is  Student details: id 5  name :  eisha
```

```
============Books Menus to pick ==============
Enter 101 for Java books
Enter 102 for JavaScript books
Enter 103 for go lang books
Enter 104 for go C++ books
============Books Menus to pick ==============
Please enter book Category
102
Printing books for Category 102
 id: 0 Title: Let us Javascript is Assigned : false
 id: 1 Title: Bile of javascript is Assigned : false
 id: 8 Title: From 0 to Hero in javascript is Assigned : false
Enter the book Id
1
book has been assigned  id: 1 Title: Bile of javascript is Assigned : true   Student details: id 5  name :  eisha
```

- **If student have to return the books, he/she will select the book and that book will be un assinged to the student**

```
Do you have to submit a book ? press 1 for yes and 0 for NO
1
============Books Menus to pick ==============
Enter 101 for Java books
Enter 102 for JavaScript books
Enter 103 for go lang books
Enter 104 for go C++ books
============Books Menus to pick ==============
Please enter book Category
102
```

```
============Books Menus to pick ==============
Please enter book Category
102
Printing books for Category 102
 id: 0 Title: Let us Javascript is Assigned : false
 id: 1 Title: Bile of javascript is Assigned : true
 id: 8 Title: From 0 to Hero in javascript is Assigned : false
Enter the book Id

1
book has been un assigned  id: 1 Title: Bile of javascript is Assigned : false   Student details: id 5  name :  eisha
Do you want to Re-run this program - Press 1 for yes and 0 or other digits to EXIT
```