**Library Management System:**

package library;

import java.util.Scanner;

public class book {

public int sNo;

public String bookName;

public String authorName;

public int bookQty;

public int bookQtyCopy;

Scanner input = new Scanner(System.in);

public book(){

System.out.println("Enter Serial No of Book:");

this.sNo = input.nextInt();

input.nextLine();

System.out.println("Enter Book Name:");

this.bookName = input.nextLine();

System.out.println("Enter Author Name:");

this.authorName = input.nextLine();

System.out.println("Enter Quantity of Books:");

this.bookQty = input.nextInt();

bookQtyCopy = this.bookQty;

}

book theBooks[] = new book[50]; // Array that stores 'book' Objects.

public static int count; // Counter for No of book objects Added in Array.

Scanner get = new Scanner(System.in);

public int compareBookObjects(book b1, book b2){

if (b1.bookName.equalsIgnoreCase(b2.bookName)){

System.out.println("Book of this Name Already Exists.");

return 0;

}

if (b1.sNo==b2.sNo){

System.out.println("Book of this Serial No Already Exists.");

return 0;

}

return 1;

}

public void addBook(book b){

for (int i=0; i<count; i++){

if (this.compareBookObjects(b, this.theBooks[i]) == 0)

return;

}

if (count<50){

theBooks[count] = b;

count++;

}

else{

System.out.println("No Space to Add More Books.");

}

}

public void searchBySno(){

System.out.println("\t\t\t\tSEARCH BY SERIAL NUMBER\n");

int sNo;

System.out.println("Enter Serial No of Book:");

sNo = input.nextInt();

int flag = 0;

System.out.println("S.No\t\tName\t\tAuthor\t\tAvailable Qty\t\tTotal Qty");

for (int i=0; i<count; i++){

if (sNo == theBooks[i].sNo){

System.out.println(theBooks[i].sNo + "\t\t" + theBooks[i].bookName + "\t\t" + theBooks[i].authorName + "\t\t" +

theBooks[i].bookQtyCopy + "\t\t" + theBooks[i].bookQty);

flag++;

return;

}

}

if (flag == 0)

System.out.println("No Book for Serial No " + sNo + " Found.");

}

public void searchByAuthorName(){

System.out.println("\t\t\t\tSEARCH BY AUTHOR'S NAME");

input.nextLine();

System.out.println("Enter Author Name:");

String authorName = input.nextLine();

int flag = 0;

System.out.println("S.No\t\tName\t\tAuthor\t\tAvailable Qty\t\tTotal Qty");

for (int i=0; i<count; i++){

if (authorName.equalsIgnoreCase(theBooks[i].authorName)){

System.out.println(theBooks[i].sNo + "\t\t" + theBooks[i].bookName + "\t\t" + theBooks[i].authorName + "\t\t" +

theBooks[i].bookQtyCopy + "\t\t" + theBooks[i].bookQty);

flag++;

}

}

if (flag == 0)

System.out.println("No Books of " + authorName + " Found.");

}

public void showAllBooks(){

System.out.println("\t\t\t\tSHOWING ALL BOOKS\n");

System.out.println("S.No\t\tName\t\tAuthor\t\tAvailable Qty\t\tTotal Qty");

for (int i=0; i<count; i++){

System.out.println(theBooks[i].sNo + "\t\t" + theBooks[i].bookName + "\t\t" + theBooks[i].authorName + "\t\t" +

theBooks[i].bookQtyCopy + "\t\t" + theBooks[i].bookQty);

}

}

public void upgradeBookQty(){

System.out.println("\t\t\t\tUPGRADE QUANTITY OF A BOOK\n");

System.out.println("Enter Serial No of Book");

int sNo = input.nextInt();

for (int i=0; i<count; i++){

if (sNo == theBooks[i].sNo){

System.out.println("Enter No of Books to be Added:");

int addingQty = input.nextInt();

theBooks[i].bookQty += addingQty;

theBooks[i].bookQtyCopy += addingQty;

return;

}

}

}

public void dispMenu(){

System.out.println("----------------------------------------------------------------------------------------------------------");

System.out.println("Enter 0 to Exit Application.");

System.out.println("Enter 1 to Add new Book.");

System.out.println("Enter 2 to Upgrade Quantity of a Book.");

System.out.println("Enter 3 to Search a Book.");

System.out.println("Enter 4 to Show All Books.");

System.out.println("Enter 5 to Register Student.");

System.out.println("Enter 6 to Show All Registered Students.");

System.out.println("Enter 7 to Check Out Book. ");

System.out.println("Enter 8 to Check In Book");

}

public int isAvailable(int sNo){

//returns the index number if available

for (int i=0; i<count; i++){

if (sNo == theBooks[i].sNo){

if(theBooks[i].bookQtyCopy > 0){

System.out.println("Book is Available.");

return i;

}

System.out.println("Book is Unavailable");

return -1;

}

}

System.out.println("No Book of Serial Number " + " Available in Library.");

return -1;

}

public book checkOutBook(){

System.out.println("Enter Serial No of Book to be Checked Out.");

int sNo = input.nextInt();

int bookIndex =isAvailable(sNo);

if (bookIndex!=-1){

//int bookIndex = isAvailable(sNo);

theBooks[bookIndex].bookQtyCopy--;

return theBooks[bookIndex];

}

return null;

}

public void checkInBook(book b){

for (int i=0; i<count; i++){

if (b.equals(theBooks[i]) ){

theBooks[i].bookQtyCopy++;

return;

}

}

}

}

public class student {

String studentName;

String regNum;

book borrowedBooks[] = new book[3];

public int booksCount = 0;

Scanner input = new Scanner(System.in);

public student(){

System.out.println("Enter Student Name:");

this.studentName = input.nextLine();

System.out.println("Enter Reg Number:");

this.regNum = input.nextLine();

System.out.println("Enter Reg Number:");

this.regNum = input.nextLine();

}

Scanner in = new Scanner(System.in);

student theStudents[] = new student[50];

//books book;

public static int count = 0;

public void addStudent(student s){

for (int i=0; i<count; i++){

if(s.regNum.equalsIgnoreCase(theStudents[i].regNum)){

System.out.println("Student of Reg Num " + s.regNum + " is Already Registered.");

return;

}

}

if (count<=50){

theStudents[count] = s;

count++;

}

}

public void showAllStudents(){

System.out.println("Student Name\t\tReg Number");

for (int i=0; i<count; i++){

System.out.println(theStudents[i].studentName + "\t\t" + theStudents[i].regNum);

}

}

public int isStudent(){

//return index number of student if available

//System.out.println("Enter Student Name:");

//String studentName = input.nextLine();

System.out.println("Enter Reg Number:");

String regNum = input.nextLine();

for (int i=0; i<count; i++){

if (theStudents[i].regNum.equalsIgnoreCase(regNum)){

return i;

}

}

System.out.println("Student is not Registered.");

System.out.println("Get Registered First.");

return -1;

}

public void issue(book book){

int studentIndex =this.isStudent();

if (studentIndex!=-1){

System.out.println("checking out");

book.showAllBooks();

book b = book.checkOutBook();

System.out.println("checking out");

if (b!= null){

if (theStudents[studentIndex].booksCount<=3){

System.out.println("adding book");

theStudents[studentIndex].borrowedBooks[theStudents[studentIndex].booksCount] = b;

theStudents[studentIndex].booksCount++;

return;

}

else {

System.out.println("Student Can not Borrow more than 3 Books.");

return;

}

}

System.out.println("Book is not Available.");

}

}

public void checkInBook(book book){

int studentIndex = this.isStudent();

if (studentIndex != -1){

System.out.println("S.No\t\t\tBook Name\t\t\tAuthor Name");

student s = theStudents[studentIndex];

for (int i=0; i<s.booksCount; i++){

System.out.println(s.borrowedBooks[i].sNo+ "\t\t\t" + s.borrowedBooks[i].bookName + "\t\t\t"+

s.borrowedBooks[i].authorName);

}

System.out.println("Enter Serial Number of Book to be Checked In:");

int sNo = input.nextInt();

for (int i=0; i<s.booksCount; i++){

if (sNo == s.borrowedBooks[i].sNo){

book.checkInBook(s.borrowedBooks[i]);

s.borrowedBooks[i]=null;

return;

}

}

System.out.println("Book of Serial No "+sNo+"not Found");

}

}

}

public class Library {

public static void main(String[] args) {

Scanner input = new Scanner(System.in);

System.out.println("\*\*\*\*\*\*\*Welcome to the Student Library!\*\*\*\*\*\*\*");

System.out.println(" Please Select From The Following Options: ");

System.out.println("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*");

book ob = new book();

student obStudent = new student();

int choice;

int searchChoice;

do{

ob.dispMenu();

choice = input.nextInt();

switch(choice){

case 1:

book b = new book();

ob.addBook(b);

break;

case 2:

ob.upgradeBookQty();

break;

case 3:

System.out.println("Enter 1 to Search with Serial No.");

System.out.println("Enter 2 to Search with Author Name(Full Name).");

searchChoice = input.nextInt();

switch(searchChoice){

case 1:

ob.searchBySno();

break;

case 2:

ob.searchByAuthorName();

}

break;

case 4:

ob.showAllBooks();

break;

case 5:

student s = new student();

obStudent.addStudent(s);

break;

case 6:

obStudent.showAllStudents();

break;

case 7:

obStudent.issue(ob);

break;

case 8:

obStudent.checkInBook(ob);

break;

default:

System.out.println("CHOICE SHOULD BE BETWEEN 0 TO 8.");

}

}

while (choice!=0);

}

}