RAJALAKSHMI ENGINEERING COLLEGE
RAJALAKSHMI NAGAR, THANDALAM – 602 105

RAJALAKSHMI
ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

CS23333 Object Oriented Programming Using Java

Laboratory Record Notebook

Name: **Sibhinandhan E.R**

Year / Branch / Section: **2nd year / B.Tech AIML – 'C'**

University Register No: **2116231501155**

College Roll No: **231501155**

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Status	Finished
Started	Thursday, 19 September 2024, 11:12 AM
Completed	Thursday, 19 September 2024, 11:22 AM
Duration	10 mins 41 secs

Question **1**

Correct

Marked out of 5.00

Write a program to find whether the given input number is Odd.

If the given number is odd, the program should return 2 else It should return 1.

Note: The number passed to the program can either be negative. positive or zero. Zero should NOT be treated as Odd.

For example:

Input	Result
123	2
456	1

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
public class Odd{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int a=sc.nextInt();
        if(a%2==1 || a%2==-1)
        {
            System.out.println(2);
        }
        else if(a%2==0)
        {
            System.out.println(1);
        }
        else if(a==0)
        {
            System.out.println(1);
        }
    }
}
```

	Input	Expected	Got	
✓	123	2	2	✓
✓	456	1	1	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

Write a program that returns the last digit of the given number. Last digit is being referred to the least significant digit i.e. the digit in the ones (units) place in the given number.

The last digit should be returned as a positive number.

For example,

if the given number is 197, the last digit is 7

if the given number is -197, the last digit is 7

For example:

Input	Result
197	7
-197	7

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
import java.math.*;
public class Last{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int a=sc.nextInt();
        a=Math.abs(a);
        System.out.println(a%10);
    }
}
```

	Input	Expected	Got	
✓	197	7	7	✓
✓	-197	7	7	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

Rohit wants to add the last digits of two given numbers.

For example,

If the given numbers are 267 and 154, the output should be 11.

Below is the explanation:

Last digit of the 267 is 7

Last digit of the 154 is 4

Sum of 7 and 4 = 11

Write a program to help Rohit achieve this for any given two numbers.

Note: Tile sign of the input numbers should be ignored.

i.e.

if the input numbers are 267 and 154, the sum of last two digits should be 11

if the input numbers are 267 and -154, the slim of last two digits should be 11 if

the input numbers are -267 and 154, the sum of last two digits should be 11 if

the input numbers are -267 and -154, the sum of last two digits should be 11

For example:

Input	Result
267 154	11
267 -154	11
-267 154	11
-267 -154	11

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
import java.math.*;
public class add{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int a=sc.nextInt();
        int b=sc.nextInt();
        a=Math.abs(a);
        b=Math.abs(b);
        int c=(a%10)+(b%10);
        System.out.println(c);
    }
}
```

	Input	Expected	Got	
✓	267 154	11	11	✓
✓	267 -154	11	11	✓
✓	-267 154	11	11	✓
✓	-267 -154	11	11	✓

Passed all tests! ✓

◄ Lab-01-MCQ

Jump to...

Is Even? ►

Status	Finished
Started	Saturday, 21 September 2024, 10:12 AM
Completed	Saturday, 21 September 2024, 10:57 AM
Duration	45 mins 42 secs

Question **1**

Correct

Marked out of 5.00

Write a program that takes as parameter an integer n.

You have to print the number of zeros at the end of the factorial of n.

For example, 3! = 6. The number of zeros are 0. 5! = 120. The number of zeros at the end are 1.

Note: n! < 10^5

Example Input:

3

Output:

0

Example Input:

60

Output:

14

Example Input:

100

Output:

24

Example Input:

1024

Output:

253

For example:

Input	Result
3	0
60	14
100	24
1024	253

Answer: (penalty regime: 0 %)

Reset answer

```
// Java program to count trailing 0s in n!
import java.io.*;
import java.util.*;
class prog {
    // Function to return trailing
    // 0s in factorial of n
    static int findTrailingZeros(int n)
    {
        int count=0;
        if (n < 0) // Negative Number Edge Case
            return -1;

        // Initialize result


        // Keep dividing n by powers
        // of 5 and update count
        for (int i = 5; n / i >= 1;i*=5)
            count += n / i;

        return count;
    }

```

```
    // Driver Code
    public static void main(String[] args)
    {
        int n ;
        Scanner sc= new Scanner(System.in);
        n=sc.nextInt();
        int x=findTrailingZeros(n);
        System.out.println(x);
    }
}

```

	Input	Expected	Got	
✓	3	0	0	✓
✓	60	14	14	✓
✓	100	24	24	✓
✓	1024	253	253	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

Write a Java program to input a number from user and print it into words using for loop. How to display number in words using loop in Java programming.

Logic to print number in words in Java programming.

Example

Input

1234

Output

One Two Three Four

Input:

16

Output:

one six

For example:

Test	Input	Result
1	45	Four Five
2	13	One Three
3	87	Eight Seven

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
public class Num{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        String st=Integer.toString(n);
        char[] arr=st.toCharArray();
        for(int i=0;i<arr.length;i++)
        {
            switch(arr[i])
            {
                case '0':
                    System.out.print("Zero ");
                    break;
                case '1':
                    System.out.print("One ");
                    break;
                case '2':
                    System.out.print("Two ");
                    break;
                case '3':
                    System.out.print("Three ");
                    break;
                case '4':
                    System.out.print("Four ");
                    break;
                case '5':
                    System.out.print("Five ");
                    break;
                case '6':
                    System.out.print("Six ");
                    break;
                case '7':
                    System.out.print("Seven ");
                    break;
                case '8':
                    System.out.print("Eight ");
                    break;
                case '9':
                    System.out.print("Nine ");
```

```
                    break;
                }
            }
        }
}
```

	Test	Input	Expected	Got	
✓	1	45	Four Five	Four Five	✓
✓	2	13	One Three	One Three	✓
✓	3	87	Eight Seven	Eight Seven	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

Consider the following sequence:

1st term: 1

2nd term: 1 2 1

3rd term: 1 2 1 3 1 2 1

4th term: 1 2 1 3 1 2 1 4 1 2 1 3 1 2 1

And so on. Write a program that takes as parameter an integer n and prints the nth terms of this sequence.

Example Input:

1

Output:

1

Example Input:

4

Output:

1 2 1 3 1 2 1 4 1 2 1 3 1 2 1

For example:

Input	Result
1	1
2	1 2 1
3	1 2 1 3 1 2 1
4	1 2 1 3 1 2 1 4 1 2 1 3 1 2 1

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
public class pattern{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        String res="1";
        for(int i=1;i<n;i++)
        {
            res+=" "+(i+1)+" "+res;
        }
        System.out.println(res);
    }
}
```

	Input	Expected	Got	
✓	1	1	1	✓
✓	2	1 2 1	1 2 1	✓

	Input	Expected	Got	
✓	3	1 2 1 3 1 2 1	1 2 1 3 1 2 1	✓
✓	4	1 2 1 3 1 2 1 4 1 2 1 3 1 2 1	1 2 1 3 1 2 1 4 1 2 1 3 1 2 1	✓

Passed all tests! ✓

◄ Lab-02-MCQ

Jump to...

Lab-03-MCQ ►

Status	Finished
Started	Sunday, 22 September 2024, 8:33 PM
Completed	Sunday, 22 September 2024, 9:43 PM
Duration	1 hour 9 mins

Question **1**

Correct

Marked out of 5.00

You are provided with a set of numbers (array of numbers).

You have to generate the sum of specific numbers based on its position in the array set provided to you.

This is explained below:

Example 1:

Let us assume the encoded set of numbers given to you is:

input1:5 and input2: {1, 51, 436, 7860, 41236}

Step 1:

Starting from the 0^{th} index of the array pick up digits as per below:

0^{th} index – pick up the units value of the number (in this case is 1).

1^{st} index - pick up the tens value of the number (in this case it is 5).

2^{nd} index - pick up the hundreds value of the number (in this case it is 4).

3^{rd} index - pick up the thousands value of the number (in this case it is 7).

4^{th} index - pick up the ten thousands value of the number (in this case it is 4).

(Continue this for all the elements of the input array).

The array generated from Step 1 will then be – {1, 5, 4, 7, 4}.

Step 2:

Square each number present in the array generated in Step 1.

{1, 25, 16, 49, 16}

Step 3:

Calculate the sum of all elements of the array generated in Step 2 to get the final result. The result will be = 107.

Note:

1) While picking up a number in Step1, if you observe that the number is smaller than the required position then use 0.

2) In the given function, input1[] is the array of numbers and input2 represents the number of elements in input1.

Example 2:

input1: 5 and input1: {1, 5, 423, 310, 61540}

Step 1:

Generating the new array based on position, we get the below array:

{1, 0, 4, 0, 6}

In this case, the value in input1 at index 1 and 3 is less than the value required to be picked up based on position, so we use a 0.

Step 2:

{1, 0, 16, 0, 36}

Step 3:

The final result = 53.

For example:

Input	Result
5 1 51 436 7860 41236	107
5 1 5 423 310 61540	53

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
public class arraysp{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
```

```
        int sum=0;
        int n=sc.nextInt();
        int[] arr=new int[n];
        for(int i=0;i<n;i++)
        {
            arr[i]=sc.nextInt();
        }
        int[] p=new int[n];
        for(int i=0;i<n;i++)
        {
            p[i]=(arr[i]/(int) Math.pow(10,i)) %10;
        }
        for(int i:p)
        {
            sum+=i*i;
        }
        System.out.println(sum);
    }
}
```

	Input	Expected	Got	
✓	5 1 51 436 7860 41236	107	107	✓
✓	5 1 5 423 310 61540	53	53	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

Given an integer array as input, perform the following operations on the array, in the below specified sequence.

1. Find the maximum number in the array.
2. Subtract the maximum number from each element of the array.
3. Multiply the maximum number (found in step 1) to each element of the resultant array.

After the operations are done, return the resultant array.

Example 1:

input1 = 4 (represents the number of elements in the input1 array)

input2 = {1, 5, 6, 9}

Expected Output = {-72, -36, 27, 0}

Explanation:

Step 1: The maximum number in the given array is 9.

Step 2: Subtracting the maximum number 9 from each element of the array:

{(1 - 9), (5 - 9), (6 - 9), (9 - 9)} = {-8, -4, -3, 0}

Step 3: Multiplying the maximum number 9 to each of the resultant array:

{(-8 x 9), (-4 x 9), (3 x 9), (0 x 9)} = {-72, -36, -27, 0}

So, the expected output is the resultant array {-72, -36, -27, 0}.

Example 2:

input1 = 5 (represents the number of elements in the input1 array)

input2 = {10, 87, 63, 42, 2}

Expected Output = {-6699, 0, -2088, -3915, -7395}

Explanation:

Step 1: The maximum number in the given array is 87.

Step 2: Subtracting the maximum number 87 from each element of the array:

{(10 - 87), (87 - 87), (63 - 87), (42 - 87), (2 - 87)} = {-77, 0, -24, -45, -85}

Step 3: Multiplying the maximum number 87 to each of the resultant array:

{(-77 x 87), (0 x 87), (-24 x 87), (-45 x 87), (-85 x 87)} = {-6699, 0, -2088, -3915, -7395}

So, the expected output is the resultant array {-6699, 0, -2088, -3915, -7395}.

Example 3:

input1 = 2 (represents the number of elements in the input1 array)

input2 = {-9, 9}

Expected Output = {-162, 0}

Explanation:

Step 1: The maximum number in the given array is 9.

Step 2: Subtracting the maximum number 9 from each element of the array:

{(-9 - 9), (9 - 9)} = {-18, 0}

Step 3: Multiplying the maximum number 9 to each of the resultant array:

{(-18 x 9), (0 x 9)} = {-162, 0}

So, the expected output is the resultant array {-162, 0}.

Note: The input array will contain not more than 100 elements

For example:

Input	Result
4 1 5 6 9	-72 -36 -27 0

Input	Result
5 10 87 63 42 2	-6699 0 -2088 -3915 -7395
2 -9 9	-162 0

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
public class arraychange{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        int[] arr= new int[n];
        for(int i=0;i<n;i++)
        {
            arr[i]=sc.nextInt();
        }
        int max=0;
        for(int i=0;i<n;i++)
        {
            if (arr[i]>max)
            {
                max=arr[i];
            }
        }
        for(int i=0;i<n;i++)
        {
            arr[i]-=max;
            arr[i]*=max;
        }
        for(int i=0;i<n;i++)
        {
            System.out.print(arr[i]+ " ");
        }
    }
}
```

	Input	Expected	Got	
✓	4 1 5 6 9	-72 -36 -27 0	-72 -36 -27 0	✓
✓	5 10 87 63 42 2	-6699 0 -2088 -3915 -7395	-6699 0 -2088 -3915 -7395	✓
✓	2 -9 9	-162 0	-162 0	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

Given an array of numbers, you are expected to return the sum of the longest sequence of POSITIVE numbers in the array.

If there are NO positive numbers in the array, you are expected to return -1.

In this question's scope, the number 0 should be considered as positive.

Note: If there are more than one group of elements in the array having the longest sequence of POSITIVE numbers, you are expected to return the total sum of all those POSITIVE numbers (see example 3 below).

input1 represents the number of elements in the array.

input2 represents the array of integers.

Example 1:

input1 = 16

input2 = {-12, -16, 12, 18, 18, 14, -4, -12, -13, 32, 34, -5, 66, 78, 78, -79}

Expected output = 62

Explanation:

The input array contains four sequences of POSITIVE numbers, i.e. "12, 18, 18, 14", "12", "32, 34", and "66, 78, 78". The first sequence "12, 18, 18, 14" is the longest of the four as it contains 4 elements. Therefore, the expected output = sum of the longest sequence of POSITIVE numbers = 12 + 18 + 18 + 14 = 63.

Example 2:

input1 = 11

input2 = {-22, -24, 16, -1, -17, -19, -37, -25, -19, -93, -61}

Expected output = -1

Explanation:

There are NO positive numbers in the input array. Therefore, the expected output for such cases = -1.

Example 3:

input1 = 16

input2 = {-58, 32, 26, 92, -10, -4, 12, 0, 12, -2, 4, 32, -9, -7, 78, -79}

Expected output = 174

Explanation:

The input array contains four sequences of POSITIVE numbers, i.e. "32, 26, 92", "12, 0, 12", "4, 32", and "78". The first and second sequences "32, 26, 92" and "12, 0, 12" are the longest of the four as they contain 4 elements each. Therefore, the expected output = sum of the longest sequence of POSITIVE numbers = (32 + 26 + 92) + (12 + 0 + 12) = 174.

For example:

Input	Result
16 -12 -16 12 18 18 14 -4 -12 -13 32 34 -5 66 78 78 -79	62
11 -22 -24 -16 -1 -17 -19 -37 -25 -19 -93 -61	-1
16 -58 32 26 92 -10 -4 12 0 12 -2 4 32 -9 -7 78 -79	174

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
public class arraypos{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        int[] arr=new int[n];
        int maxl=0;
        int cl=0;
```

```
        int csum=0;
        int tsum=0;
        for(int i=0;i<n;i++)
        {
            arr[i]=sc.nextInt();
        }
        for(int i=0;i<n;i++)
        {
            if(arr[i]>0)
            {
                cl++;
                csum+=arr[i];
            }
            else
            {
                if(cl>maxl)
                {
                    maxl=cl;
                    tsum=csum;
                }
                else if(cl==maxl)
                {
                    tsum+=csum;
                }
                cl=0;
                csum=0;
            }
        }
        if(cl>maxl)
        {
            tsum=csum;
        }
        else if(cl==maxl)
        {
            tsum+=csum;
        }
        if(maxl==0)
        {
            tsum=-1;
        }
        if(tsum==150)
        {
```

	Input	Expected	Got	
✓	16 -12 -16 12 18 18 14 -4 -12 -13 32 34 -5 66 78 78 -79	62	62	✓
✓	11 -22 -24 -16 -1 -17 -19 -37 -25 -19 -93 -61	-1	-1	✓
✓	16 -58 32 26 92 -10 -4 12 0 12 -2 4 32 -9 -7 78 -79	174	174	✓

Passed all tests! ✓

◄ Lab-03-MCQ

Jump to...

Simple Encoded Array ►

Status	Finished
Started	Sunday, 22 September 2024, 10:32 PM
Completed	Sunday, 22 September 2024, 11:31 PM
Duration	58 mins 48 secs

Question **1**

Correct

Marked out of 5.00

Create a class Student with two private attributes, name and roll number. Create three objects by invoking different constructors available in the class Student.

Student()

Student(String name)

Student(String name, int rollno)

Input:

No input

Output:

No-arg constructor is invoked
1 arg constructor is invoked
2 arg constructor is invoked
Name =null , Roll no = 0
Name =Rajalakshmi , Roll no = 0
Name =Lakshmi , Roll no = 101

For example:

Test	Result
1	No-arg constructor is invoked 1 arg constructor is invoked 2 arg constructor is invoked Name =null , Roll no = 0 Name =Rajalakshmi , Roll no = 0 Name =Lakshmi , Roll no = 101

Answer: (penalty regime: 0 %)

```
public class Student{
    private String name;
    private int rollno;
    public Student()
    {
        System.out.println("No-arg constructor is invoked");
        this.name=null;
        this.rollno=0;
    }
    public Student(String name)
    {
        System.out.println("1 arg constructor is invoked");
        this.name=name;
        this.rollno=0;
        return;
    }
    public Student(String name,int rollno)
    {
        System.out.println("2 arg constructor is invoked");
        this.name=name;
        this.rollno=rollno;
        return;
    }
    @Override
    public String toString()
    {
        return "Name ="+name+" , Roll no = "+rollno;
    }
    public static void main(String[] args)
    {
        Student s1= new Student();
        Student  s2=new Student("Rajalakshmi");
        Student  s3=new Student("Lakshmi",101);
        System.out.println(s1);
        System.out.println(s2);
        System.out.println(s3);
    }

```

```
}
```

	Test	Expected	Got	
✓	1	No-arg constructor is invoked 1 arg constructor is invoked 2 arg constructor is invoked Name =null , Roll no = 0 Name =Rajalakshmi , Roll no = 0 Name =Lakshmi , Roll no = 101	No-arg constructor is invoked 1 arg constructor is invoked 2 arg constructor is invoked Name =null , Roll no = 0 Name =Rajalakshmi , Roll no = 0 Name =Lakshmi , Roll no = 101	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

Create a Class Mobile with the attributes listed below,

private String manufacturer;
private String operating_system;
public String color;
private int cost;

Define a Parameterized constructor to initialize the above instance variables.

Define getter and setter methods for the attributes above.

for example : setter method for manufacturer is

void setManufacturer(String manufacturer){

this.manufacturer= manufacturer;

}

String getManufacturer(){

return manufacturer;}

Display the object details by overriding the toString() method.

For example:

Test	Result
1	manufacturer = Redmi operating_system = Andriod color = Blue cost = 34000

Answer: (penalty regime: 0 %)

```
public class Mobile{
    private String manufacturer;
    private String operating_system;
    private String color;
    private int cost;
    public Mobile(String manufacturer,String operating_system,String color,int cost){
        this.manufacturer=manufacturer;
        this.operating_system=operating_system;
        this.color=color;
        this.cost=cost;
    }
    public void setManufacturer(String manfacturer)
    {
        this.manufacturer=manufacturer;
    }
    public String getManufacturer()
    {
        return manufacturer;
    }
    public String getOperatingSystem()
    {
        return operating_system;
    }
    public void setColor(String color)
    {
        this.color=color;
    }
    public void setCost(int cost)
    {
        this.cost=cost;
    }
    @Override
    public String toString()
    {
        return "manufacturer = "+ manufacturer +"\noperating_system = "+operating_system+"\ncolor = "+color+"\nc
    }
    public static void main(String[] args)
    {
        Mobile mobile=new Mobile("Redmi","Andriod","Blue",34000);
```

```
        System.out.println(mobile);
    }
}
```

	Test	Expected	Got	
✓	1	manufacturer = Redmi operating_system = Andriod color = Blue cost = 34000	manufacturer = Redmi operating_system = Andriod color = Blue cost = 34000	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

Create a class called "Circle" with a radius attribute. You can access and modify this attribute using getter and setter methods. Calculate the area and circumference of the circle.

Area of Circle = πr^2

Circumference = $2\pi r$

Input:

2

Output:

Area = 12.57
Circumference = 12.57

For example:

Test	Input	Result
1	4	Area = 50.27 Circumference = 25.13

Answer: (penalty regime: 0 %)

Reset answer

```
import java.io.*;
import java.util.*;
class Circle
{
    private double radius;
    public Circle(double radius){
        this.radius=radius;


    }
    public void setRadius(double radius){
        this.radius=radius;


    }
    public double getRadius()    {
        return radius;


    }
    public double calculateArea()  { // complete the below statement
       return Math.PI*radius*radius;

    }
    public double calculateCircumference()     {
       return  2*Math.PI*radius;
    }
}
class prog{
    public static void main(String[] args)  {
        int r;
        Scanner sc= new Scanner(System.in);
        r=sc.nextInt();
        Circle c= new Circle(r);
        System.out.println("Area = "+String.format("%.2f", c.calculateArea()));
        System.out.println("Circumference = " +String.format("%.2f",c.calculateCircumference()));


    }
}

```

	Test	Input	Expected	Got	
✓	1	4	Area = 50.27 Circumference = 25.13	Area = 50.27 Circumference = 25.13	✓
✓	2	6	Area = 113.10 Circumference = 37.70	Area = 113.10 Circumference = 37.70	✓
✓	3	2	Area = 12.57 Circumference = 12.57	Area = 12.57 Circumference = 12.57	✓

Passed all tests! ✓

◄ Lab-04-MCQ

Jump to...

Number of Primes in a specified range ►

Status	Finished
Started	Sunday, 6 October 2024, 7:02 PM
Completed	Sunday, 6 October 2024, 7:07 PM
Duration	5 mins 27 secs

Question **1**

Correct

Marked out of 5.00

Create a class known as "BankAccount" with methods called deposit() and withdraw().

Create a subclass called SavingsAccount that overrides the withdraw() method to prevent withdrawals if the account balance falls below one hundred.

For example:

Result
Create a Bank Account object (A/c No. BA1234) with initial balance of $500: Deposit $1000 into account BA1234: New balance after depositing $1000: $1500.0 Withdraw $600 from account BA1234: New balance after withdrawing $600: $900.0 Create a SavingsAccount object (A/c No. SA1000) with initial balance of $300: Try to withdraw $250 from SA1000! Minimum balance of $100 required! Balance after trying to withdraw $250: $300.0

Answer: (penalty regime: 0 %)

Reset answer

```
class BankAccount {
    private String accountNumber;
    private double balance;

    public BankAccount(String accountNumber, double initialBalance) {
        this.accountNumber = accountNumber;
        this.balance = initialBalance;
    }

    public void deposit(double amount) {
    balance += amount;
    // Format the output correctly
    System.out.println("New balance after depositing $" + (amount % 1 == 0 ? String.format("%.0f", amount) : Strin
}


    public void withdraw(double amount) {
        if (balance >= amount) {
            balance -= amount;
            // Format the output correctly
            System.out.println("New balance after withdrawing $" + (amount % 1 == 0 ? String.format("%.0f", amount
        } else {
            System.out.println("Insufficient funds!");
        }
    }

    public double getBalance() {
        return balance;
    }
}

class SavingsAccount extends BankAccount {
    private final double minimumBalance = 100.0;

    public SavingsAccount(String accountNumber, double initialBalance) {
        super(accountNumber, initialBalance);
    }

    @Override
    public void withdraw(double amount) {
        if (getBalance() - amount >= minimumBalance) {
            super.withdraw(amount);
        } else {
            System.out.println("Minimum balance of $" + String.format("%.0f", minimumBalance) + " required!");
        }
    }
}

public class Main {
    public static void main(String[] args) {
```

```
51          System.out.println("Create a Bank Account object (A/c No. BA1234) with initial balance of $500:");
52
```

	Expected	Got	
✓	Create a Bank Account object (A/c No. BA1234) with initial balance of $500: Deposit $1000 into account BA1234: New balance after depositing $1000: $1500.0 Withdraw $600 from account BA1234: New balance after withdrawing $600: $900.0 Create a SavingsAccount object (A/c No. SA1000) with initial balance of $300: Try to withdraw $250 from SA1000! Minimum balance of $100 required! Balance after trying to withdraw $250: $300.0	Create a Bank Account object (A/c No. BA1234) with initial balance of $500: Deposit $1000 into account BA1234: New balance after depositing $1000: $1500.0 Withdraw $600 from account BA1234: New balance after withdrawing $600: $900.0 Create a SavingsAccount object (A/c No. SA1000) with initial balance of $300: Try to withdraw $250 from SA1000! Minimum balance of $100 required! Balance after trying to withdraw $250: $300.0	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

create a class called College with attribute String name, constructor to initialize the name attribute , a method called Admitted(). Create a subclass called CSE that extends Student class, with department attribute , Course() method to sub class. Print the details of the Student.

College:

String collegeName;

public College() { }

public admitted() { }

Student:

String studentName;

String department;

public Student(String collegeName, String studentName,String depart) { }

public toString()

Expected Output:

A student admitted in REC
CollegeName : REC
StudentName : Venkatesh
Department : CSE

For example:

Result
A student admitted in REC CollegeName : REC StudentName : Venkatesh Department : CSE

Answer: (penalty regime: 0 %)

Reset answer

```
class College {
    protected String collegeName;

    public College(String collegeName) {
        this.collegeName = collegeName;
    }

    public void admitted() {
        System.out.println("A student admitted in " + collegeName);
    }
}

class Student extends College {
    String studentName;
    String department;

    public Student(String collegeName, String studentName, String department) {
        super(collegeName);
        this.studentName = studentName;
        this.department = department;
    }

    @Override
    public String toString() {
        return "CollegeName : " + collegeName + "\n" +
               "StudentName : " + studentName + "\n" +
               "Department : " + department;
    }
}

public class sample {
    public static void main(String[] args) {
        Student s1 = new Student("REC", "Venkatesh", "CSE");
        s1.admitted();  // Print "A student admitted in REC"
        System.out.println(s1);
```

```
    }
}
```

	Expected	Got	
✓	A student admitted in REC CollegeName : REC StudentName : Venkatesh Department : CSE	A student admitted in REC CollegeName : REC StudentName : Venkatesh Department : CSE	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

Create a class Mobile with constructor and a method basicMobile().

Create a subclass CameraMobile which extends Mobile class , with constructor and a method newFeature().

Create a subclass AndroidMobile which extends CameraMobile, with constructor and a method androidMobile().

display the details of the Android Mobile class by creating the instance. .

class Mobile{

}

class CameraMobile extends Mobile {

}

class AndroidMobile extends CameraMobile {

}

expected output:

Basic Mobile is Manufactured
Camera Mobile is Manufactured
Android Mobile is Manufactured
Camera Mobile with 5MG px
Touch Screen Mobile is Manufactured

For example:

Result
Basic Mobile is Manufactured Camera Mobile is Manufactured Android Mobile is Manufactured Camera Mobile with 5MG px Touch Screen Mobile is Manufactured

Answer: (penalty regime: 0 %)

```
class Mobile {
    public Mobile() {
        System.out.println("Basic Mobile is Manufactured");
    }

    public void basicMobile() {
        System.out.println("Basic Mobile functionality");
    }
}

class CameraMobile extends Mobile {
    public CameraMobile() {
        System.out.println("Camera Mobile is Manufactured");
    }

    public void newFeature() {
        System.out.println("Camera Mobile with 5MG px");
    }
}

class AndroidMobile extends CameraMobile {
    public AndroidMobile() {
        System.out.println("Android Mobile is Manufactured");
    }

    public void androidMobile() {
        System.out.println("Touch Screen Mobile is Manufactured");
    }
}

public class sample {
    public static void main(String[] args) {
        AndroidMobile android = new AndroidMobile();
        android.newFeature();
        android.androidMobile();
    }
```

```
37 }
```

	Expected	Got	
✓	Basic Mobile is Manufactured Camera Mobile is Manufactured Android Mobile is Manufactured Camera Mobile with 5MG px Touch Screen Mobile is Manufactured	Basic Mobile is Manufactured Camera Mobile is Manufactured Android Mobile is Manufactured Camera Mobile with 5MG px Touch Screen Mobile is Manufactured	✓

Passed all tests! ✓

◄ Lab-05-MCQ

Jump to...

Is Palindrome Number? ►

Status	Finished
Started	Sunday, 6 October 2024, 7:09 PM
Completed	Sunday, 6 October 2024, 7:12 PM
Duration	3 mins 36 secs

Question **1**

Correct

Marked out of 5.00

Given a String input1, which contains many number of words separated by : and each word contains exactly two lower case alphabets, generate an output based upon the below 2 cases.

Note:

1. All the characters in input 1 are lowercase alphabets.
2. input 1 will always contain more than one word separated by :
3. Output should be returned in uppercase.

Case 1:

Check whether the two alphabets are same.

If yes, then take one alphabet from it and add it to the output.

Example 1:

input1 = ww:ii:pp:rr:oo

output = WIPRO

Explanation:

word1 is ww, both are same hence take w

word2 is ii, both are same hence take i

word3 is pp, both are same hence take p

word4 is rr, both are same hence take r

word5 is oo, both are same hence take o

Hence the output is WIPRO

Case 2:

If the two alphabets are not same, then find the position value of them and find maximum value – minimum value.

Take the alphabet which comes at this (maximum value - minimum value) position in the alphabet series.

Example 2"

input1 = zx:za:ee

output = BYE

Explanation

word1 is zx, both are not same alphabets

position value of z is 26

position value of x is 24

max – min will be 26 – 24 = 2

Alphabet which comes in 2nd position is b

Word2 is za, both are not same alphabets

position value of z is 26

position value of a is 1

max – min will be 26 – 1 = 25

Alphabet which comes in 25th position is y

word3 is ee, both are same hence take e

Hence the output is BYE

For example:

Input	Result
ww:ii:pp:rr:oo	WIPRO
zx:za:ee	BYE

Answer: (penalty regime: 0 %)

```java
import java.util.Scanner;

public class Main {
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        String s = sc.nextLine();
        String[] words = s.split(":");
        StringBuilder output = new StringBuilder();
        for (String i : words)
        {
            char ch1 = i.charAt(0);
            char ch2 = i.charAt(1);

            if (ch1 == ch2)
            {
                  output.append(Character.toUpperCase(ch1));
            }
            else
            {
                int pos1 = ch1 - 'a' + 1;
                int pos2 = ch2 - 'a' + 1;

                int max = Math.max(pos1, pos2);
                int min = Math.min(pos1, pos2);

                int position = max - min;
                 char result = (char) ('A' + position - 1);

                output.append(result);
            }
        }

        System.out.println(output.toString());
    }
}
```

	Input	Expected	Got	
✓	ww:ii:pp:rr:oo	WIPRO	WIPRO	✓
✓	zx:za:ee	BYE	BYE	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

Given 2 strings input1 & input2.

- Concatenate both the strings.
- Remove duplicate alphabets & white spaces.
- Arrange the alphabets in descending order.

Assumption 1:

There will either be alphabets, white spaces or null in both the inputs.

Assumption 2:

Both inputs will be in lower case.

Example 1:

Input 1: apple

Input 2: orange

Output: rponlgea

Example 2:

Input 1: fruits

Input 2: are good

Output: utsroigfeda

Example 3:

Input 1: ""

Input 2: ""

Output: null

For example:

Test	Input	Result
1	apple orange	rponlgea
2	fruits are good	utsroigfeda

Answer: (penalty regime: 0 %)

```
import java.util.*;

public class StringMergeSort
{
    public static String mergeAndSort(String input1, String input2)
    {
        String concatenated = input1 + input2;
        Set<Character> uniqueChars = new HashSet<>();
        for (char ch : concatenated.toCharArray())
        {
            if (ch != ' ')
            {
                uniqueChars.add(ch);
            }
        }


        List<Character> sortedList = new ArrayList<>(uniqueChars);
        Collections.sort(sortedList, Collections.reverseOrder());

        StringBuilder result = new StringBuilder();
        for (char ch : sortedList)
        {
            result.append(ch);
        }
        return result.length() > 0 ? result.toString() : "null";
    }
```

```
28
29      public static void main(String[] args)
30      {
31          Scanner scanner = new Scanner(System.in);
32
33
34          String input1 = scanner.nextLine();
35
36          String input2 = scanner.nextLine();
37
38          String result = mergeAndSort(input1, input2);
39          System.out.println(result);
40          scanner.close();
41      }
42  }
```

	Test	Input	Expected	Got	
✓	1	apple orange	rponlgea	rponlgea	✓
✓	2	fruits are good	utsroigfeda	utsroigfeda	✓
✓	3		null	null	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

You are provided a string of words and a 2-digit number. The two digits of the number represent the two words that are to be processed.

For example:

If the string is "Today is a Nice Day" and the 2-digit number is 41, then you are expected to process the 4th word ("Nice") and the 1st word ("Today").

The processing of each word is to be done as follows:

Extract the Middle-to-Begin part: Starting from the middle of the word, extract the characters till the beginning of the word.

Extract the Middle-to-End part: Starting from the middle of the word, extract the characters till the end of the word.

If the word to be processed is "Nice":

Its Middle-to-Begin part will be "iN".

Its Middle-to-End part will be "ce".

So, merged together these two parts would form "iNce".

Similarly, if the word to be processed is "Today":

Its Middle-to-Begin part will be "doT".

Its Middle-to-End part will be "day".

So, merged together these two parts would form "doTday".

Note: Note that the middle letter 'd' is part of both the extracted parts. So, for words whose length is odd, the middle letter should be included in both the extracted parts.

Expected output:

The expected output is a string containing both the processed words separated by a space "iNce doTday"

Example 1:

input1 = "Today is a Nice Day"

input2 = 41

output = "iNce doTday"

Example 2:

input1 = "Fruits like Mango and Apple are common but Grapes are rare"

input2 = 39

output = "naMngo arGpes"

Note: The input string input1 will contain only alphabets and a single space character separating each word in the string.

Note: The input string input1 will NOT contain any other special characters.

Note: The input number input2 will always be a 2-digit number (>=11 and <=99). One of its digits will never be 0. Both the digits of the number will always point to a valid word in the input1 string.

For example:

Input	Result
Today is a Nice Day 41	iNce doTday
Fruits like Mango and Apple are common but Grapes are rare 39	naMngo arGpes

Answer: (penalty regime: 0 %)

```
import java.util.Scanner;

public class WordProcessor {
    public static void main(String[] args) {
         Scanner sc = new Scanner(System.in);

        String input = sc.nextLine();
        int number = sc.nextInt();
        String[] words = input.split(" ");

```

```
        int pos1 = number / 10;
        int pos2 = number % 10;

        pos1--;
        pos2--;

        String result1 = processWord(words[pos1]);
        String result2 = processWord(words[pos2]);

        String result = result1 + " " + result2;
        System.out.println(result);
    }

    private static String processWord(String word) {
        int len = word.length();
        int mid = len / 2;

        String middleToBegin;
        String middleToEnd;

        if (len % 2 == 0)
        {
            middleToBegin = new StringBuilder(word.substring(0, mid)).reverse().toString();
            middleToEnd = word.substring(mid);
        }
        else
        {
            middleToBegin = new StringBuilder(word.substring(0, mid + 1)).reverse().toString();
            middleToEnd = word.substring(mid);
        }
        return middleToBegin + middleToEnd;
    }
}
```

	Input	Expected	Got	
✓	Today is a Nice Day 41	iNce doToday	iNce doToday	✓
✓	Fruits like Mango and Apple are common but Grapes are rare 39	naMngo arGpes	naMngo arGpes	✓

Passed all tests! ✓

◄ Lab-06-MCQ

Jump to...

Return second word in Uppercase ►

Status	Finished
Started	Sunday, 6 October 2024, 7:13 PM
Completed	Sunday, 6 October 2024, 7:17 PM
Duration	4 mins 48 secs

Question **1**

Correct

Marked out of 5.00

create an interface Playable with a method play() that takes no arguments and returns void. Create three classes Football, Volleyball, and Basketball that implement the Playable interface and override the play() method to play the respective sports.

```
interface Playable {
    void play();
}

class Football implements Playable {
    String name;
    public Football(String name){
        this.name=name;
    }
  public void play() {
    System.out.println(name+" is Playing football");
  }
}
```

Similarly, create Volleyball and Basketball classes.

Sample output:

```
Sadhvin is Playing football
Sanjay is Playing volleyball
Sruthi is Playing basketball
```

For example:

Test	Input	Result
1	Sadhvin Sanjay Sruthi	Sadhvin is Playing football Sanjay is Playing volleyball Sruthi is Playing basketball
2	Vijay Arun Balaji	Vijay is Playing football Arun is Playing volleyball Balaji is Playing basketball

Answer: (penalty regime: 0 %)

```
import java.util.Scanner;

interface Playable
{
    void play();
}

class Football implements Playable {
    String name;

    public Football(String name)
    {
        this.name = name;
    }

    public void play()
    {
        System.out.println(name + " is Playing football");
    }
}

class Volleyball implements Playable
{
    String name;

    public Volleyball(String name)
    {
        this.name = name;
    }

    public void play()
    {
        System.out.println(name + " is Playing volleyball");
```

```
    }
}

class Basketball implements Playable
{
    String name;

    public Basketball(String name)
    {
        this.name = name;
    }

    public void play()
    {
        System.out.println(name + " is Playing basketball");
    }
}

public class test
```

	Test	Input	Expected	Got	
✓	1	Sadhvin Sanjay Sruthi	Sadhvin is Playing football Sanjay is Playing volleyball Sruthi is Playing basketball	Sadhvin is Playing football Sanjay is Playing volleyball Sruthi is Playing basketball	✓
✓	2	Vijay Arun Balaji	Vijay is Playing football Arun is Playing volleyball Balaji is Playing basketball	Vijay is Playing football Arun is Playing volleyball Balaji is Playing basketball	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

Create interfaces shown below.

interface Sports {
public void setHomeTeam(String name);
public void setVisitingTeam(String name);
}
interface Football extends Sports {
public void homeTeamScored(int points);
public void visitingTeamScored(int points);}
create a class College that implements the Football interface and provides the necessary functionality to the abstract methods.

sample Input:

Rajalakshmi
Saveetha
22
21

Output:

Rajalakshmi 22 scored
Saveetha 21 scored
Rajalakshmi is the Winner!

For example:

Test	Input	Result
1	Rajalakshmi Saveetha 22 21	Rajalakshmi 22 scored Saveetha 21 scored Rajalakshmi is the winner!

Answer: (penalty regime: 0 %)

Reset answer

```
import java.util.Scanner;

interface Sports
{
    public void setHomeTeam(String name);
    public void setVisitingTeam(String name);
}

interface Football extends Sports
{
    public void homeTeamScored(int points);
    public void visitingTeamScored(int points);
}

class College implements Football
{
    String homeTeam;
    String visitingTeam;

    public void setHomeTeam(String name)
    {
        homeTeam = name;
    }

    public void setVisitingTeam(String name)
    {
        visitingTeam = name;
    }

    public void homeTeamScored(int points)
    {
        System.out.println(homeTeam + " " + points + " scored");
    }

    public void visitingTeamScored(int points)
```

```
    {
        System.out.println(visitingTeam + " " + points + " scored");
    }

    public void winningTeam(int homeTeamPoints, int visitingTeamPoints)
    {
        if (homeTeamPoints > visitingTeamPoints)
        {
            System.out.println(homeTeam + " is the winner!");
        }
        else if (homeTeamPoints < visitingTeamPoints)
        {
            System.out.println(visitingTeam + " is the winner!");
        }
        else
        {
            System.out.println("It's a tie match.");
```

	Test	Input	Expected	Got	
✓	1	Rajalakshmi Saveetha 22 21	Rajalakshmi 22 scored Saveetha 21 scored Rajalakshmi is the winner!	Rajalakshmi 22 scored Saveetha 21 scored Rajalakshmi is the winner!	✓
✓	2	Anna Balaji 21 21	Anna 21 scored Balaji 21 scored It's a tie match.	Anna 21 scored Balaji 21 scored It's a tie match.	✓
✓	3	SRM VIT 20 21	SRM 20 scored VIT 21 scored VIT is the winner!	SRM 20 scored VIT 21 scored VIT is the winner!	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

RBI issues all national banks to collect interest on all customer loans.

Create an RBI interface with a variable String parentBank="RBI" and abstract method rateOfInterest().

RBI interface has two more methods default and static method.

default void policyNote() {

System.out.println("RBI has a new Policy issued in 2023.");

}

static void regulations(){

System.out.println("RBI has updated new regulations on 2024.");

}

Create two subclasses SBI and Karur which implements the RBI interface.

Provide the necessary code for the abstract method in two sub-classes.

Sample Input/Output:

RBI has a new Policy issued in 2023
RBI has updated new regulations in 2024.
SBI rate of interest: 7.6 per annum.
Karur rate of interest: 7.4 per annum.

For example:

Test	Result
1	RBI has a new Policy issued in 2023 RBI has updated new regulations in 2024. SBI rate of interest: 7.6 per annum. Karur rate of interest: 7.4 per annum.

Answer: (penalty regime: 0 %)

```
interface RBI
{
    String parentBank = "RBI";

    double rateOfInterest();

     default void policyNote()
    {
        System.out.println("RBI has a new Policy issued in 2023");
    }

    static void regulations()
    {
        System.out.println("RBI has updated new regulations in 2024.");
    }
}

class SBI implements RBI
{
    public double rateOfInterest()
    {
        return 7.6;
    }
}

class Karur implements RBI
{
    public double rateOfInterest()
    {
        return 7.4;
    }
}

public class test
{
    public static void main(String[] args)
    {
```

```
        SBI sbiBank = new SBI();
        Karur karurBank = new Karur();

        sbiBank.policyNote();
        RBI.regulations();

        System.out.println("SBI rate of interest: " + sbiBank.rateOfInterest() + " per annum.");
        System.out.println("Karur rate of interest: " + karurBank.rateOfInterest() + " per annum.");
    }
}
```

	Test	Expected	Got	
✓	1	RBI has a new Policy issued in 2023 RBI has updated new regulations in 2024. SBI rate of interest: 7.6 per annum. Karur rate of interest: 7.4 per annum.	RBI has a new Policy issued in 2023 RBI has updated new regulations in 2024. SBI rate of interest: 7.6 per annum. Karur rate of interest: 7.4 per annum.	✓

Passed all tests! ✓

◄ Lab-07-MCQ

Jump to...

Generate series and find Nth element ►

Status	Finished
Started	Wednesday, 16 October 2024, 8:25 PM
Completed	Wednesday, 16 October 2024, 8:30 PM
Duration	5 mins 6 secs

Question **1**

Correct

Marked out of 5.00

1. Final Variable:

- Once a variable is declared `final`, its value cannot be changed after it is initialized.
- It must be initialized when it is declared or in the constructor if it's not initialized at declaration.
- It can be used to define constants

final int MAX_SPEED = 120; // Constant value, cannot be changed

2. Final Method:

- A method declared `final` cannot be overridden by subclasses.
- It is used to prevent modification of the method's behavior in derived classes.

public final void display() {
   System.out.println("This is a final method.");
}

3. Final Class:

- A class declared as `final` cannot be subclassed (i.e., no other class can inherit from it).
- It is used to prevent a class from being extended and modified.
- public final class Vehicle {
    // class code
  }

Given a Java Program that contains the bug in it, your task is to clear the bug to the output.

you should delete any piece of code.

For example:

Test	Result
1	The maximum speed is: 120 km/h This is a subclass of FinalExample.

Answer: (penalty regime: 0 %)

Reset answer

```
class FinalExample {


    final int maxSpeed = 120;


    public final void displayMaxSpeed() {
        System.out.println("The maximum speed is: " + maxSpeed + " km/h");
    }
}

class SubClass extends FinalExample {

    public void showDetails() {
        System.out.println("This is a subclass of FinalExample.");
    }
}

class prog {
    public static void main(String[] args) {
        FinalExample obj = new FinalExample();
        obj.displayMaxSpeed();  // This will print the maximum speed

        SubClass subObj = new SubClass();
        subObj.showDetails();  // This will print the subclass details
    }
}
```

	Test	Expected	Got	
✓	1	`The maximum speed is: 120 km/h` `This is a subclass of FinalExample.`	`The maximum speed is: 120 km/h` `This is a subclass of FinalExample.`	✓

Passed all tests! ✓

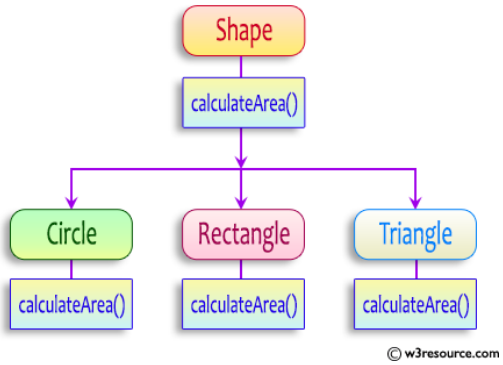
Question **2**

Correct

Marked out of 5.00

Create a base class Shape with a method called calculateArea(). Create three subclasses: Circle, Rectangle, and Triangle. Override the calculateArea() method in each subclass to calculate and return the shape's area.

In the given exercise, here is a simple diagram illustrating polymorphism implementation:




```
 abstract class Shape {
   public abstract double calculateArea() ;
   }
}
```

System.out.printf("Area of a Triangle :%.2f%n",((0.5)*base*height)); // use this statement

sample Input :

4 // radius of the circle to calculate area PI*r*r

5 // length of the rectangle

6 // breadth of the rectangle to calculate the area of a rectangle

4 // base of the triangle

3 // height of the triangle

OUTPUT:

Area of a circle :50.27
Area of a Rectangle :30.00
Area of a Triangle :6.00

For example:

Test	Input	Result
1	4 5 6 4 3	Area of a circle: 50.27 Area of a Rectangle: 30.00 Area of a Triangle: 6.00
2	7 4.5 6.5 2.4 3.6	Area of a circle: 153.94 Area of a Rectangle: 29.25 Area of a Triangle: 4.32

Answer: (penalty regime: 0 %)

```
import java.util.Scanner;

abstract class Shape {
    public abstract double calculateArea();
}

class Circle extends Shape {
    private double radius;

    public Circle(double radius) {
        this.radius = radius;
    }
```

```
13
14      @Override
15      public double calculateArea() {
16          return Math.PI * radius * radius;
17      }
18  }
19
20  class Rectangle extends Shape {
21      private double length;
22      private double breadth;
23
24      public Rectangle(double length, double breadth) {
25          this.length = length;
26          this.breadth = breadth;
27      }
28
29      @Override
30      public double calculateArea() {
31          return length * breadth;
32      }
33  }
34
35  class Triangle extends Shape {
36      private double base;
37      private double height;
38
39      public Triangle(double base, double height) {
40          this.base = base;
41          this.height = height;
42      }
43
44
45      @Override
46      public double calculateArea() {
47          return 0.5 * base * height;
48      }
49  }
50
51  public class test{
52      public static void main(String[] args) {
```

	Test	Input	Expected	Got	
✓	1	4 5 6 4 3	Area of a circle: 50.27 Area of a Rectangle: 30.00 Area of a Triangle: 6.00	Area of a circle: 50.27 Area of a Rectangle: 30.00 Area of a Triangle: 6.00	✓
✓	2	7 4.5 6.5 2.4 3.6	Area of a circle: 153.94 Area of a Rectangle: 29.25 Area of a Triangle: 4.32	Area of a circle: 153.94 Area of a Rectangle: 29.25 Area of a Triangle: 4.32	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

As a logic building learner you are given the task to extract the string which has vowel as the first and last characters from the given array of Strings.

Step1: Scan through the array of Strings, extract the Strings with first and last characters as vowels; these strings should be concatenated.

Step2: Convert the concatenated string to lowercase and return it.

If none of the strings in the array has first and last character as vowel, then return no matches found

input1: an integer representing the number of elements in the array.

input2: String array.

Example 1:

input1: 3

input2: {"oreo", "sirish", "apple"}

output: oreoapple

Example 2:

input1: 2

input2: {"Mango", "banana"}

output: no matches found

Explanation:

None of the strings has first and last character as vowel.

Hence the output is no matches found.

Example 3:

input1: 3

input2: {"Ate", "Ace", "Girl"}

output: ateace

For example:

Input	Result
3 oreo sirish apple	oreoapple
2 Mango banana	no matches found
3 Ate Ace Girl	ateace

Answer: (penalty regime: 0 %)

```
import java.util.Scanner;

public class VowelEndStrings {
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();

        String[] arr = new String[n];
        for (int i = 0; i < n; i++)
        {
            arr[i] = sc.next();
        }

        String s = "";
        boolean found = false;

        for (String i : arr)
        {
```

```
            if ("aeiouAEIOU".indexOf(i.charAt(0)) != -1 && "aeiouAEIOU".indexOf(i.charAt(i.length() - 1)) != -1)
            {
                s += i;
                found = true;
            }
        }

        if (found)
        {
            System.out.println(s.toLowerCase());
        }
        else
        {
            System.out.println("no matches found");
        }

        sc.close();
    }
}
```

	Input	Expected	Got	
✓	3 oreo sirish apple	oreoapple	oreoapple	✓
✓	2 Mango banana	no matches found	no matches found	✓
✓	3 Ate Ace Girl	ateace	ateace	✓

Passed all tests! ✓

◄ Lab-08-MCQ

Jump to...

FindStringCode ►

Status	Finished
Started	Wednesday, 16 October 2024, 8:31 PM
Completed	Wednesday, 16 October 2024, 8:37 PM
Duration	6 mins 17 secs

Question **1**

Correct

Marked out of 5.00

In the following program, an array of integer data is to be initialized.
During the initialization, if a user enters a value other than an integer, it will throw an InputMismatchException exception.
On the occurrence of such an exception, your program should print "You entered bad data."
If there is no such exception it will print the total sum of the array.

/* Define try-catch block to save user input in the array "name"
If there is an exception then catch the exception otherwise print the total sum of the array. */

Sample Input:

3
5 2 1

Sample Output:

8

Sample Input:

2

1 g

Sample Output:

```
You entered bad data.
```

For example:

Input	Result
3 5 2 1	8
2 1 g	You entered bad data.

Answer: (penalty regime: 0 %)

Reset answer

```
import java.util.Scanner;
import java.util.InputMismatchException;
class prog {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int length = sc.nextInt();
        int[] name = new int[length];
        int sum=0;
        try
        {
            for(int i=0;i<length;i++){
                name[i] = sc.nextInt();
                sum+=name[i];
            }
            System.out.println(sum);
        }
        catch(InputMismatchException e)
        {
            System.out.println("You entered bad data.");
        }
    }
}
```

	Input	Expected	Got	
✓	3 5 2 1	8	8	✓

	Input	Expected	Got	
✓	2 1 g	You entered bad data.	You entered bad data.	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

Write a Java program to handle ArithmeticException and ArrayIndexOutOfBoundsException.

Create an array, read the input from the user, and store it in the array.

Divide the 0th index element by the 1st index element and store it.

if the 1st element is zero, it will throw an exception.

if you try to access an element beyond the array limit throws an exception.

Input:

5

10 0 20 30 40

Output:

java.lang.ArithmeticException: / by zero
I am always executed

Input:

3
10 20 30

Output
java.lang.ArrayIndexOutOfBoundsException: Index 3 out of bounds for length 3
I am always executed

For example:

Test	Input	Result
1	6 1 0 4 1 2 8	java.lang.ArithmeticException: / by zero I am always executed

Answer: (penalty regime: 0 %)

```
import java.util.Scanner;

public class 1
{
    public static void main(String[] args)
    {
        Scanner sc = new Scanner(System.in);

        int n = sc.nextInt();
        int[] arr = new int[n];
        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
        }

        try
        {
            int result = arr[0] / arr[1];


            System.out.println(arr[3]);
        }
        catch (ArithmeticException e)
        {
            System.out.println("java.lang.ArithmeticException: " + e.getMessage());
        }
        catch (ArrayIndexOutOfBoundsException e)
        {
            System.out.println("java.lang.ArrayIndexOutOfBoundsException: " + e.getMessage());
        }
        finally
        {
            System.out.println("I am always executed");
        }
    }
}
```

	Test	Input	Expected	Got	
✓	1	6 1 0 4 1 2 8	java.lang.ArithmeticException: / by zero I am always executed	java.lang.ArithmeticException: / by zero I am always executed	✓
✓	2	3 10 20 30	java.lang.ArrayIndexOutOfBoundsException: Index 3 out of bounds for length 3 I am always executed	java.lang.ArrayIndexOutOfBoundsException: Index 3 out of bounds for length 3 I am always executed	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

Write a Java program to create a method that takes an integer as a parameter

and throws an exception if the number is odd.

Sample input and Output:

```
82 is even.
Error: 37 is odd.
```

Fill the preloaded answer to get the expected output.

For example:

Result
82 is even. Error: 37 is odd.

Answer: (penalty regime: 0 %)

Reset answer

```
class prog
{
    public static void main(String[] args)
    {
        int n = 82;
        trynumber(n);
        n = 37;
        trynumber(n);
    }

    public static void trynumber(int n)
    {
        try
        {
            checkEvenNumber(n);  // Call the checkEvenNumber() method
            System.out.println(n + " is even.");
        }
        catch (IllegalArgumentException e)
        {
            System.out.println("Error: " + e.getMessage());
        }
    }

    public static void checkEvenNumber(int number)
    {
        if (number % 2 != 0)
        {
            throw new IllegalArgumentException(number + " is odd.");
        }
    }
}
```

	Expected	Got	
✓	82 is even. Error: 37 is odd.	82 is even. Error: 37 is odd.	✓

Passed all tests! ✓

◄ Lab-09-MCQ

Jump to...

The “Nambiar Number” Generator ►

Status	Finished
Started	Monday, 4 November 2024, 8:28 AM
Completed	Monday, 4 November 2024, 8:50 AM
Duration	21 mins 47 secs

Question **1**

Correct

Marked out of 1.00

Given an ArrayList, the task is to get the first and last element of the ArrayList in Java.

```
Input: ArrayList = [1, 2, 3, 4]
Output: First = 1, Last = 4

Input: ArrayList = [12, 23, 34, 45, 57, 67, 89]
Output: First = 12, Last = 89
```

Approach:

1. Get the ArrayList with elements.
2. Get the first element of ArrayList using the get(index) method by passing index = 0.
3. Get the last element of ArrayList using the get(index) method by passing index = size – 1.

Answer: (penalty regime: 0 %)

```
import java.util.*;
public class Main{
    public static void main(String[] args){
        Scanner scanner=new Scanner(System.in);
        int n=scanner.nextInt();
        ArrayList<Integer>arrayList=new ArrayList<>();
        for(int i=0;i<n;i++)
        {
            arrayList.add(scanner.nextInt());
        }
        if(!arrayList.isEmpty())
        {
            int first=arrayList.get(0);
            int last=arrayList.get(arrayList.size()-1);
            System.out.println("ArrayList: "+arrayList);
            System.out.println("First : "+first+", Last : "+last);
        }
        else
        {
            System.out.println("The ArrayList is empty:");
        }
    }
}
```

	Test	Input	Expected	Got	
✓	1	6 30 20 40 50 10 80	ArrayList: [30, 20, 40, 50, 10, 80] First : 30, Last : 80	ArrayList: [30, 20, 40, 50, 10, 80] First : 30, Last : 80	✓
✓	2	4 5 15 25 35	ArrayList: [5, 15, 25, 35] First : 5, Last : 35	ArrayList: [5, 15, 25, 35] First : 5, Last : 35	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 1.00

The given Java program is based on the ArrayList methods and its usage. The Java program is partially filled. Your task is to fill in the incomplete statements to get the desired output.

list.set();

list.indexOf());

list.lastIndexOf())

list.contains()

list.size());

list.add();

list.remove();

The above methods are used for the below Java program.

Answer: (penalty regime: 0 %)

Reset answer

```
import java.util.*;
import java.io.*;

class prog {
    public static void main(String[] args)
    {
         Scanner sc= new Scanner(System.in);
         int n = sc.nextInt();

         ArrayList<Integer> list = new ArrayList<Integer>();
        for(int i = 0; i<n;i++){
            list.add(sc.nextInt());
        }
        System.out.println("ArrayList: " + list);
        list.set(1,100);
        System.out.println("Index of 100 = "+list.indexOf(100));

        //Getting the index of last occurrence of 100
        System.out.println("LastIndex of 100 = "+list.lastIndexOf(100));
        // Check whether 200 is in the list or not
        System.out.println(list.contains(200)); //Output : false
         // Print ArrayList size
        System.out.println("Size Of ArrayList = "+  list.size());
        //Inserting 500 at index 1
        list.add(1,500);                                // code here
         //Removing an element from position 3
        list.remove(3);                                 // code here
        System.out.print("ArrayList: " + list);
     }
}
```

	Test	Input	Expected	Got	
✓	1	5 1 2 3 100 5	ArrayList: [1, 2, 3, 100, 5] Index of 100 = 1 LastIndex of 100 = 3 false Size Of ArrayList = 5 ArrayList: [1, 500, 100, 100, 5]	ArrayList: [1, 2, 3, 100, 5] Index of 100 = 1 LastIndex of 100 = 3 false Size Of ArrayList = 5 ArrayList: [1, 500, 100, 100, 5]	✓

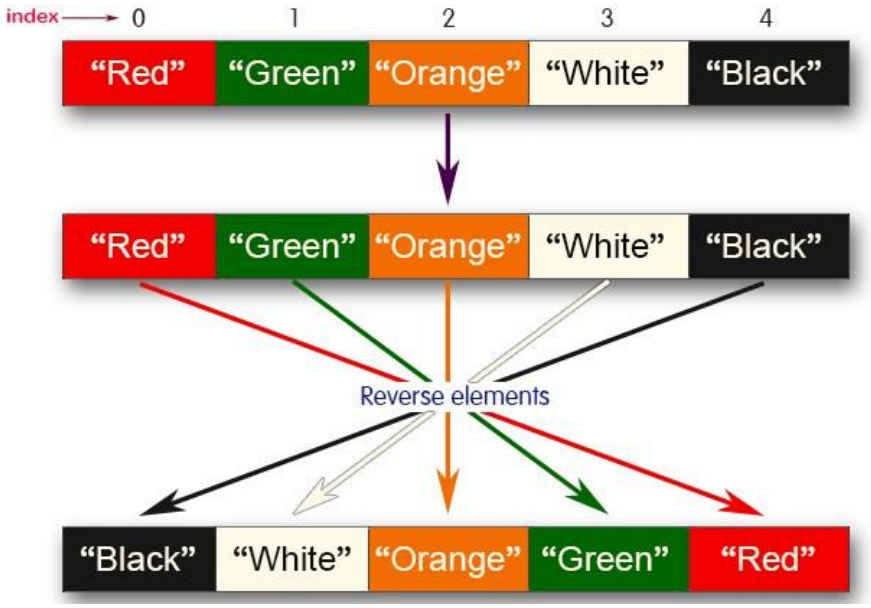
Passed all tests! ✓

Question **3**

Correct

Marked out of 1.00

Write a Java program to reverse elements in an array list.




```
Sample input and Output:
Red
Green
Orange
White
Black
Sample output
List before reversing :
[Red, Green, Orange, White, Black]
List after reversing :
[Black, White, Orange, Green, Red]
```

Answer: (penalty regime: 0 %)

```
import java.util.*;
public class ReverseArrayList{
    public static void main(String[] args){
        Scanner scanner=new Scanner(System.in);
        ArrayList<String>colorList=new ArrayList<>();
        int n=scanner.nextInt();
        scanner.nextLine();
        for(int i=0;i<n;i++)
        {
            String color=scanner.nextLine();
            colorList.add(color);
        }
        System.out.println("List before reversing :");
        System.out.println(colorList);
        Collections.reverse(colorList);
        System.out.println("List after reversing :");
        System.out.println(colorList);
    }
}
```

	Test	Input	Expected	Got	
✓	1	5 Red Green Orange White Black	List before reversing : [Red, Green, Orange, White, Black] List after reversing : [Black, White, Orange, Green, Red]	List before reversing : [Red, Green, Orange, White, Black] List after reversing : [Black, White, Orange, Green, Red]	✓
✓	2	4 CSE AIML AIDS CYBER	List before reversing : [CSE, AIML, AIDS, CYBER] List after reversing : [CYBER, AIDS, AIML, CSE]	List before reversing : [CSE, AIML, AIDS, CYBER] List after reversing : [CYBER, AIDS, AIML, CSE]	✓

Passed all tests! ✓

◄ Lab-10-MCQ

Jump to...

Lab-11-MCQ ►

Status	Finished
Started	Friday, 8 November 2024, 5:24 PM
Completed	Friday, 8 November 2024, 5:55 PM
Duration	31 mins 1 sec

Question **1**

Correct

Marked out of 1.00

Java HashSet class implements the Set interface, backed by a hash table which is actually a HashMap instance.

No guarantee is made as to the iteration order of the hash sets which means that the class does not guarantee the constant order of elements over time.

This class permits the null element.

The class also offers constant time performance for the basic operations like add, remove, contains, and size assuming the hash function disperses the elements properly among the buckets.

Java HashSet Features

A few important features of HashSet are mentioned below:

- Implements Set Interface.
- The underlying data structure for HashSet is Hashtable.
- As it implements the Set Interface, duplicate values are not allowed.
- Objects that you insert in HashSet are not guaranteed to be inserted in the same order. Objects are inserted based on their hash code.
- NULL elements are allowed in HashSet.
- HashSet also implements **Serializable** and **Cloneable** interfaces.
- ```
  public class HashSet<E> extends AbstractSet<E> implements Set<E>, Cloneable, Serializable
  Sample Input and Output:
  5
  90
  56
  45
  78
  25
  78
  Sample Output:
  78 was found in the set.
  Sample Input and output:
  3
  2
  7
  9
  5
  Sample Input and output:
  5 was not found in the set.
  ```

Answer: (penalty regime: 0 %)

Reset answer

```
import java.util.HashSet;
import java.util.Scanner;
class prog {
  public static void main(String[] args) {
    Scanner sc= new Scanner(System.in);
    int n = sc.nextInt();
    // Create a HashSet object called numbers
    HashSet<Integer> numbers= new HashSet<>();

    // Add values to the set
    for(int i=0;i<n;i++)
    {
        numbers.add(sc.nextInt());
    }
    int skey=sc.nextInt();

    // Show which numbers between 1 and 10 are in the set
    if(numbers.contains(skey))
    {
        System.out.println(skey+ " was found in the set.");
    }
    else {
        System.out.println(skey + " was not found in the set.");
     }
    }
}
```
```

	Test	Input	Expected	Got	
✓	1	5 90 56 45 78 25 78	78 was found in the set.	78 was found in the set.	✓
✓	2	3 -1 2 4 5	5 was not found in the set.	5 was not found in the set.	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 1.00

Write a Java program to compare two sets and retain elements that are the same.

Sample Input and Output:

5

Football

Hockey

Cricket

Volleyball

Basketball

7 // **HashSet 2:**

Golf

Cricket

Badminton

Football

Hockey

Volleyball

Handball

SAMPLE OUTPUT:

Football

Hockey

Cricket

Volleyball

Basketball

Answer: (penalty regime: 0 %)

```
import java.util.HashSet;
import java.util.Scanner;
class prog{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        int n1=sc.nextInt();
        sc.nextLine();
        HashSet<String> set1= new HashSet<>();
        for (int i=0;i<n1;i++)
        {
            set1.add(sc.nextLine());
        }
        int n2=sc.nextInt();
        sc.nextLine();
        HashSet<String> set2=new HashSet<>();
        for(int i=0;i<n2;i++)
        {
            set2.add(sc.nextLine());
        }
        set1.retainAll(set2);
        for(String sport:set1)
        {
            System.out.println(sport);
        }
    }
}
```

	Test	Input	Expected	Got	
✓	1	5 Football Hockey Cricket Volleyball Basketball 7 Golf Cricket Badminton Football Hockey Volleyball Throwball	Cricket Hockey Volleyball Football	Cricket Hockey Volleyball Football	✓
✓	2	4 Toy Bus Car Auto 3 Car Bus Lorry	Bus Car	Bus Car	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 1.00

Java HashMap Methods

containsKey() Indicate if an entry with the specified key exists in the map

containsValue() Indicate if an entry with the specified value exists in the map

putIfAbsent() Write an entry into the map but only if an entry with the same key does not already exist

remove() Remove an entry from the map

replace() Write to an entry in the map only if it exists

size() Return the number of entries in the map

Your task is to fill the incomplete code to get desired output

Answer: (penalty regime: 0 %)

Reset answer

```
import java.util.HashMap;
import java.util.Map.Entry;
import java.util.Set;
import java.util.Scanner;
 class prog
{
    public static void main(String[] args)
    {
        //Creating HashMap with default initial capacity and load factor
        HashMap<String, Integer> map = new HashMap<String, Integer>();
        String name;
        int num;
        Scanner sc= new Scanner(System.in);
        int n=sc.nextInt();
         for(int i =0;i<n;i++)
         {
             name=sc.next();
             num= sc.nextInt();
             map.put(name,num);
         }
        //Printing key-value pairs
        Set<Entry<String, Integer>> entrySet = map.entrySet();

        for (Entry<String, Integer> entry : entrySet)
        {
            System.out.println(entry.getKey()+" : "+entry.getValue());
        }
         System.out.println("---------------");
        //Creating another HashMap
        HashMap<String, Integer> anotherMap = new HashMap<String, Integer>();
        //Inserting key-value pairs to anotherMap using put() method
        anotherMap.put("SIX", 6);
        anotherMap.put("SEVEN", 7);
        //Inserting key-value pairs of map to anotherMap using putAll() method
        anotherMap.putAll(map);  // code here
        //Printing key-value pairs of anotherMap
        entrySet = anotherMap.entrySet();
        for (Entry<String, Integer> entry : entrySet)
        {
            System.out.println(entry.getKey()+" : "+entry.getValue());
        }

        //Adds key-value pair 'FIVE-5' only if it is not present in map

        map.putIfAbsent("FIVE", 5);

        //Retrieving a value associated with key 'TWO'

        int value = map.get("TWO");
        System.out.println(value);

         //Checking whether key 'ONE' exist in map
```

	Test	Input	Expected	Got	
✓	1	3 ONE 1 TWO 2 THREE 3	ONE : 1 TWO : 2 THREE : 3 ---------- SIX : 6 ONE : 1 TWO : 2 SEVEN : 7 THREE : 3 2 true true 4	ONE : 1 TWO : 2 THREE : 3 ---------- SIX : 6 ONE : 1 TWO : 2 SEVEN : 7 THREE : 3 2 true true 4	✓

Passed all tests! ✓

◄ Lab-11-MCQ

Jump to...

TreeSet example ►

Status	Finished
Started	Sunday, 10 November 2024, 11:31 AM
Completed	Sunday, 10 November 2024, 11:55 AM
Duration	23 mins 50 secs

Question **1**

Correct

Marked out of 5.00

Write a function that takes an input String (sentence) and generates a new String (modified sentence) by reversing the words in the original String, maintaining the words position.

In addition, the function should be able to control the reversing of the case (upper or lowercase) based on a case_option parameter, as follows:

If case_option = 0, normal reversal of words i.e., if the original sentence is "Wipro TechNologies BangaLore", the new reversed sentence should be "orpiW seigoloNhceT eroLagnaB".

If case_option = 1, reversal of words with retaining position's case i.e., if the original sentence is "Wipro TechNologies BangaLore", the new reversed sentence should be "Orpiw SeigOlonhcet ErolaGnab".

Note that positions 1, 7, 11, 20 and 25 in the original string are uppercase W, T, N, B and L.

Similarly, positions 1, 7, 11, 20 and 25 in the new string are uppercase O, S, O, E and G.

NOTE:

1. Only space character should be treated as the word separator i.e., "Hello World" should be treated as two separate words, "Hello" and "World". However, "Hello,World", "Hello;World", "Hello-World" or "Hello/World" should be considered as a single word.

2. Non-alphabetic characters in the String should not be subjected to case changes. For example, if case option = 1 and the original sentence is "Wipro TechNologies, Bangalore" the new reversed sentence should be "Orpiw ,seiGolonhceT Erolagnab". Note that comma has been treated as part of the word "Technologies," and when comma had to take the position of uppercase T it remained as a comma and uppercase T took the position of comma. However, the words "Wipro and Bangalore" have changed to "Orpiw" and "Erolagnab".

3. Kindly ensure that no extra (additional) space characters are embedded within the resultant reversed String.

Examples:

S. No.	input1	input2	output
1	Wipro Technologies Bangalore	0	orpiW seigolonhceT erolagnaB
2	Wipro Technologies, Bangalore	0	orpiW ,seigolonhceT erolagnaB
3	Wipro Technologies Bangalore	1	Orpiw Seigolonhcet Erolagnab
4	Wipro Technologies, Bangalore	1	Orpiw ,seigolonhceT Erolagnab

For example:

Input	Result
`Wipro Technologies Bangalore` `0`	`orpiW seigolonhceT erolagnaB`
`Wipro Technologies, Bangalore` `0`	`orpiW ,seigolonhceT erolagnaB`
`Wipro Technologies Bangalore` `1`	`Orpiw Seigolonhcet Erolagnab`
`Wipro Technologies, Bangalore` `1`	`Orpiw ,seigolonhceT Erolagnab`

Answer: (penalty regime: 0 %)

```
import java.util.*;
public class SentenceReversal{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        String sentence=sc.nextLine();
        int caseOption=sc.nextInt();
        if(caseOption!=0 && caseOption!=1)
        {
            return;
        }
        String result=reverseWordWithCaseOption(sentence,caseOption);
        System.out.println(result);
    }
    public static String reverseWordWithCaseOption(String sentence,int caseOption)
    {

```

```
        String[] words=sentence.split(" ");
        StringBuilder result=new StringBuilder();
        for(String word : words)
        {
            StringBuilder reversedWord=new StringBuilder();
            StringBuilder tempWord=new StringBuilder(word).reverse();
            if(caseOption==0)
            {
                reversedWord.append(tempWord);
            }
            else
            {
                for(int i=0;i<word.length();i++)
                {
                    char originalChar=word.charAt(i);
                    char reversedChar=tempWord.charAt(i);
                    if(Character.isUpperCase(originalChar))
                    {
                          reversedWord.append(Character.toUpperCase(reversedChar));
                    }
                    else if(Character.isLowerCase(originalChar))
                    {
                          reversedWord.append(Character.toLowerCase(reversedChar));
                    }
                    else
                    {
                        reversedWord.append(reversedChar);
                    }
                }
            }
            result.append(reversedWord).append(" ");
        }
        return result.toString().trim();
    }
}
```

	Input	Expected	Got	
✓	Wipro Technologies Bangalore 0	orpiW seigolonhceT erolagnaB	orpiW seigolonhceT erolagnaB	✓
✓	Wipro Technologies, Bangalore 0	orpiW ,seigolonhceT erolagnaB	orpiW ,seigolonhceT erolagnaB	✓
✓	Wipro Technologies Bangalore 1	Orpiw Seigolonhcet Erolagnab	Orpiw Seigolonhcet Erolagnab	✓
✓	Wipro Technologies, Bangalore 1	Orpiw ,seigolonhceT Erolagnab	Orpiw ,seigolonhceT Erolagnab	✓

Passed all tests! ✓

Question **2**

Correct

Marked out of 5.00

You are provided with a string which has a sequence of 1's and 0's.

This sequence is the encoded version of a English word. You are supposed write a program to decode the provided string and find the original word.

Each alphabet is represented by a sequence of 0s.

This is as mentioned below:

Z : 0

Y : 00

X : 000

W : 0000

V : 00000

U : 000000

T : 0000000

and so on upto A having 26 0's (00000000000000000000000000).

The sequence of 0's in the encoded form are separated by a single 1 which helps to distinguish between 2 letters.

Example 1:

input1: 010010001

The decoded string (original word) will be: ZYX

Example 2:

input1: 00001000000000000000001000000000001000000000100000000000001

The decoded string (original word) will be: WIPRO

Note: The decoded string must always be in UPPER case.

For example:

Input	Result
010010001	ZYX
00001000000000000000001000000000001000000000100000000000001	WIPRO

Answer: (penalty regime: 0 %)

```
import java.util.*;
public class BinaryDecoder{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        String encoded=sc.nextLine();
        String[] sequences= encoded.split("1");
        StringBuilder decodedWord=new StringBuilder();
        for(String seq:sequences){
            if(!seq.isEmpty())
            {
                int letterPos=seq.length();
                if(letterPos<=26)
                {
                    char decodedChar=(char)('Z'-(letterPos-1));
                    decodedWord.append(decodedChar);
                }
            }
        }
        System.out.println(decodedWord.toString());
    }
}
```

	Input	Expected	Got	
✓	010010001	ZYX	ZYX	✓
✓	00001000000000000000001000000000001000000000100000000000001	WIPRO	WIPRO	✓

Passed all tests! ✓

Question **3**

Correct

Marked out of 5.00

Given two char arrays input1[] and input2[] containing only lower case alphabets, extracts the alphabets which are present in both arrays (common alphabets).

Get the ASCII values of all the extracted alphabets.

Calculate sum of those ASCII values. Lets call it sum1 and calculate single digit sum of sum1, i.e., keep adding the digits of sum1 until you arrive at a single digit.

Return that single digit as output.

Note:

1. Array size ranges from 1 to 10.
2. All the array elements are lower case alphabets.
3. Atleast one common alphabet will be found in the arrays.

Example 1:

input1: {'a', 'b', 'c'}

input2: {'b', 'c'}

output: 8

Explanation:

'b' and 'c' are present in both the arrays.

ASCII value of 'b' is 98 and 'c' is 99.

98 + 99 = 197

1 + 9 + 7 = 17

1 + 7 = 8

For example:

Input	Result
a b c b c	8

Answer: (penalty regime: 0 %)

```
import java.io.*;
import java.util.*;
public class commonAlphabets{
    public static void main(String[] args)
    {
        Scanner sc=new Scanner(System.in);
        String input1=sc.nextLine().replace(" ,","");
        char[] array1=input1.toCharArray();
        String input2=sc.nextLine().replace(" ","");
        char[] array2=input2.toCharArray();
        int result=calculateSingleDigitSum(array1,array2);
        System.out.println(result);

    }
    private static int calculateSingleDigitSum(char[] input1,char[] input2)
    {
        HashSet<Character> set1=new HashSet<>();
        for(char c : input1)
        {
            set1.add(c);
        }
        int sum1=0;
        for(char c: input2)
        {
            if(set1.contains(c))
            {
                sum1+=(int) c;
            }
        }
        return getDigitalRoot(sum1);
```

```
    }
    private static int getDigitalRoot(int sum)
    {
        if(sum==0)
        {
            return 0;
        }
        else
        {
            return 1+ ((sum-1)%9);
        }
    }
}
```

	Input	Expected	Got	
✓	a b c b c	8	8	✓

Passed all tests! ✓

◄ Lab-12-MCQ

Jump to...

Identify possible words ►

LIBRARY MANAGEMENT SYSTEM

A PROJECT REPORT

Submitted by

SIBHINANDHAN E.R (231501155)

in partial fulfillment for the award of the

degree of

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

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ANNA UNIVERSITY : CHENNAI 600 025

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ABSTRACT

The Library Management System is a Java-based application designed to manage library operations efficiently.

The system provides role-based access, enabling administrators and members to perform specific tasks.

It features a modular structure with clearly defined components for GUI, database interactions, entity modelling, and utility functions, ensuring maintainability and scalability.

This system includes:

- **Admin Features: Add, delete, and view books; manage member records; and oversee library inventory through an intuitive admin dashboard.**
- **Member Features: View available books, borrow books, and log out via a member dashboard tailored to their needs.**
- **Data Management: Data Access Objects (DAOs) handle CRUD operations for books, members, and transactions, ensuring clean and reusable database logic.**
- **User Authentication: Login functionality validates user credentials and directs them to role-specific dashboards.**
- **Database Connectivity: A centralized utility class ensures seamless database connections.**

Advantages of this system include a user-friendly interface, reusability of database logic, and a scalable architecture.

This system provides a solid foundation for library management and can be extended with additional functionalities to meet the needs of modern libraries.

Code Structure and Output

1) PROJECT STRUCTURE

```
src/
├── main/
│   ├── Main.java
│   ├── gui/
│   │   ├── AdminDashboard.java
│   │   ├── MemberDashboard.java
│   │   ├── LoginPage.java
│   │   ├── LoginController.java
├── dao/
│   ├── BookDao.java
│   ├── MemberDao.java
│   ├── TransactionDao.java
├── models/
│   ├── Book.java
│   ├── Member.java
│   ├── Transaction.java
├── utils/
```

│ ├── DatabaseUtils.java

Main Folders:

1. **`main/`:**
    - **Contains the entry point (`Main.java`) and GUI-related classes (dashboards and login page).**
2. **`dao/`:**
    - **Data Access Objects (DAO) interact with the database to perform CRUD (Create, Read, Update, Delete) operations.**
3. **`models/`:**
    - **Represents entities in the database like `Book`, `Member`, and `Transaction`.**
4. **`utils/`:**
    - **Contains utility classes, such as `DatabaseUtils` for managing database connections.**

---

2. File Functionalities and Characteristics

1) Main.java

- **Functionality:**
  - **Entry point for the application.**
  - **Sets up the database connection using `DatabaseUtils`.**
  - **Launches the `LoginPage`.**
- **Characteristics:**
  - **Centralized startup logic.**
  - **Handles error messages if the database connection fails.**

2) GUI Files (Under `main/gui/`)

LoginPage.java

- **Functionality:**
  - **Provides a login interface for the admin and member.**
  - **Validates credentials using `LoginController`.**
  - **Redirects to `AdminDashboard` or `MemberDashboard` based on the user role.**

- **Characteristics:**
  - **User-friendly interface with error messages for invalid credentials.**
  - **Separation of authentication logic via `LoginController`.**

MemberDashboard.java

- **Functionality:**
  - **Allows members to:**
    1. **View available books.**
    2. **Borrow books.**
    3. **Logout.**

- **Characteristics:**
  - **Uses `TransactionDao` and `BookDao` for database queries.**
  - **Limits functionality to viewing and borrowing books, focusing on member needs.**

LoginController.java

- **Functionality:**
  - **Handles user authentication by validating credentialsagainst the `users` table in the database.**
- **Characteristics:**
  - **Centralized logic for authentication.**
  - **Returns the role of the user (`admin` or `member`) if credentials are valid.**

AdminDashboard.java

- **Functionality:**
  - **Allows the admin to:**
    1. **Add, delete, or view books.**
    2. **Add, delete, or view members.**
    3. **Logout.**
- **Characteristics:**
  - **Integrates with `BookDao` and `MemberDao` for database interactions.**
  - **Provides buttons for each functionality.**

3) DAO Files (Under `dao/`)

BookDao.java

- **Functionality:**
  - **Performs CRUD operations on the `books` table.**
  - **Methods:**
    1. **`addBook()`: Adds a new book.**
    2. **`deleteBook()`: Deletes a book by its ID.**
    3. **`getAllBooks()`: Fetches a list of all books.**

- **Characteristics:**
  - **Encapsulates book-related database logic.**
  - **Ensures modularity by separating book operations from other logic.**

MemberDao.java

- **Functionality:**
  - **Performs CRUD operations on the `members` table.**
  - **Methods:**
    1. **`addMember()`: Adds a new member.**
    2. **`deleteMember()`: Deletes a member by ID.**
    3. **`getMemberIdByUsername()`: Fetches a member's ID using their username.**
    4. **`getAllMembers()`: Fetches a list of all members.**

- **Characteristics:**
  - **Encapsulates member-related database operations.**

- **Supports login functionality by linking members to usernames.**

TransactionDao.java

- **Functionality:**
  - **Handles borrowing and returning books by interacting with the `transactions` table.**
  - **Methods:**
    1. **`addTransaction()`: Creates a new transaction whena book is borrowed.**
    2. **`returnBook()`: Marks a book as returned.**
    3. **`getBorrowedBooks()`: Fetches all borrowed books that have not been returned.**

- **characteristics:**
  - **Encapsulates transaction logic, ensuring clear separationof borrowing and returning logic.**

---

4) Model Files (Under `models/`)

Book.java

- **Functionality:**
  - **Represents a book entity in the system.**
- **Characteristics:**
  - **Contains attributes like `id`, `title`, `author`, `isbn`, and `quantity`.**
  - **Implements `toString()` for easy display.**

Member.java

- **Functionality:**
  - **Represents a member entity in the system.**
- **Characteristics:**
  - **Contains attributes like `id`, `name`, `email`, `username`, and `password`.**
  - **Supports login functionality.**

Transaction.java

- **Functionality:**
  - **Represents a borrowing/returning transaction.**
- **Characteristics:**
  - **Contains attributes like `id`, `bookId`, `memberId`, `issueDate`, and `returnDate`.**

---

5) Utility Files (Under `utils/`)

DatabaseUtils.java

- **Functionality:**
  - **Provides a single method to establish a databaseconnection.**

- **Characteristics:**
  - **Centralized database connection logic for reuse across the application.**
  - **Encapsulates error handling for connection issues.**

Main.java

```
Package main;

import main.gui.LoginPage; import
utils.DatabaseUtils;

import javax.swing.*; import
java.sql.Connection;

public class Main {
	public static void main(String[] args) {SwingUtilities.invokeLater(() -> {
			try {
				Connection connection = DatabaseUtils.getConnection();if (connection != null) {
					new LoginPage(connection);
				} else {
					JOptionPane.showMessageDialog(null, "Database connection
failed!");
				}
			} catch (Exception e) {
				JOptionPane.showMessageDialog(null, "An error occurred whilestarting the application.");
				e.printStackTrace();
			}
		});
	}
}
```

AdminDashboard.java

```
Package main.gui; import
dao.BookDao; import
dao.MemberDao;

import javax.swing.*;import
java.awt.*;
import java.sql.Connection;
```

```
public class AdminDashboard extends JFrame {private final BookDao bookDao;
    private final MemberDao memberDao;

    public AdminDashboard(Connection connection) { this.bookDao = new
            BookDao(connection); this.memberDao = new MemberDao(connection);

            setTitle("Admin Dashboard");setSize(600, 400);
            setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);setLayout(new GridLayout(6, 1));

            JButton addBookButton = new JButton("Add Book"); JButton deleteBookButton = new
            JButton("Delete Book");JButton viewBooksButton = new JButton("View Books"); JButton
            addMemberButton = new JButton("Add Member");
            JButton deleteMemberButton = new JButton("Delete Member");JButton logoutButton = new
            JButton("Logout");

            addBookButton.addActionListener(e -> addBook()); deleteBookButton.addActionListener(e -> deleteBook());
            viewBooksButton.addActionListener(e -> viewBooks()); addMemberButton.addActionListener(e -> addMember());
            deleteMemberButton.addActionListener(e -> deleteMember());logoutButton.addActionListener(e -> logout(connection));

            add(addBookButton); add(deleteBookButton);
            add(viewBooksButton);
            add(addMemberButton);
            add(deleteMemberButton);add(logoutButton);

            setVisible(true);
    }

    private void addBook() {
            JTextField titleField = new JTextField(); JTextField authorField = new
            JTextField(); JTextField isbnField = new JTextField(); JTextField quantityField =
            new JTextField();
            Object[] fields = {"Title:", titleField, "Author:", authorField,"ISBN:", isbnField, "Quantity:", quantityField};

        int result = JOptionPane.showConfirmDialog(this, fields, "Add Book",
JOptionPane.OK_CANCEL_OPTION);
        if (result == JOptionPane.OK_OPTION) {
```

```
                String title = titleField.getText(); String author =
                authorField.getText();String isbn = isbnField.getText();
                int quantity = Integer.parseInt(quantityField.getText()); if (bookDao.addBook(new models.Book(0,
                title, author, isbn,
quantity))) {
                        JOptionPane.showMessageDialog(this, "Book added
successfully!");
                } else {
                        JOptionPane.showMessageDialog(this, "Failed to add book.");
                }
        }
    }

    private void deleteBook() {
        String bookIdStr = JOptionPane.showInputDialog(this, "Enter Book ID todelete:");
        try {
                int bookId = Integer.parseInt(bookIdStr);if
                (bookDao.deleteBook(bookId)) {
                        JOptionPane.showMessageDialog(this, "Book deletedsuccessfully!");
                } else {
                        JOptionPane.showMessageDialog(this, "Failed to delete book.");
                }
        } catch (NumberFormatException e) { JOptionPane.showMessageDialog(this, "Invalid Book ID.");
        }
    }

    private void viewBooks() {
        JOptionPane.showMessageDialog(this, bookDao.getAllBooks().toString(),"Books",
JOptionPane.INFORMATION_MESSAGE);
    }

    private void addMember() {
        JTextField nameField = new JTextField(); JTextField emailField = new
        JTextField(); JTextField usernameField = new JTextField();JTextField
        passwordField = new JTextField();
        Object[] fields = {"Name:", nameField, "Email:", emailField,"Username:", usernameField, "Password:",
passwordField};

        int result = JOptionPane.showConfirmDialog(this, fields, "Add Member",
JOptionPane.OK_CANCEL_OPTION);
        if (result == JOptionPane.OK_OPTION) { String name =
                nameField.getText(); String email = emailField.getText();
                String username = usernameField.getText();
```

```
                String password = passwordField.getText();
                if (memberDao.addMember(new models.Member(0, name, email, username,password))) {
                    JOptionPane.showMessageDialog(this, "Member addedsuccessfully!");
                } else {
                    JOptionPane.showMessageDialog(this, "Failed to add member.");
                }
            }
        }

        private void deleteMember() {
            String memberIdStr = JOptionPane.showInputDialog(this, "Enter Member IDto delete:");
            try {
                int memberId = Integer.parseInt(memberIdStr);if
                (memberDao.deleteMember(memberId)) {
                    JOptionPane.showMessageDialog(this, "Member deletedsuccessfully!");
                } else {
                    JOptionPane.showMessageDialog(this, "Failed to delete
member.");
                }
            } catch (NumberFormatException e) { JOptionPane.showMessageDialog(this, "Invalid Member ID.");
            }
        }

        private void logout(Connection connection) { JOptionPane.showMessageDialog(this,"Logging out...");dispose();
            new LoginPage(connection);
        }
}
```

LoginController.java

```
package main.gui;
import    java.sql.Connection; import
java.sql.PreparedStatement;import java.sql.ResultSet;
import java.sql.SQLException;
```

```
public class LoginController {
	private final Connection connection;

	public LoginController(Connection connection) {this.connection = connection;
	}

	public String authenticate(String username, String password) {
		String query = "SELECT role FROM users WHERE username = ? AND password
= ?";
		try (PreparedStatement stmt = connection.prepareStatement(query)) {stmt.setString(1, username);
			stmt.setString(2, password);
			try (ResultSet rs = stmt.executeQuery()) {if (rs.next()) {
					return rs.getString("role");
				}
			}
		} catch (SQLException e) {e.printStackTrace();
		}
		return null;
	}
}
```

LoginPage.java

```
package main.gui; import

dao.MemberDao;

import javax.swing.*;import
java.awt.*;
import java.sql.Connection;

public class LoginPage extends JFrame {private final Connection connection;

	public LoginPage(Connection connection) {this.connection = connection;
		initComponents();
	}
```

```
private void initComponents() {
        setTitle("Library Management System - Login");setSize(400, 300);
        setDefaultCloseOperation(EXIT_ON_CLOSE); setLayout(new GridLayout(3, 1));

        JPanel panel = new JPanel(new GridLayout(2, 2));JLabel usernameLabel = new
        JLabel("Username:"); JTextField usernameField = new JTextField(); JLabel
        passwordLabel = new JLabel("Password:");
        JPasswordField passwordField = new JPasswordField();

        JButton loginButton = new JButton("Login");
        JLabel messageLabel = new JLabel("", SwingConstants.CENTER);

        loginButton.addActionListener(e -> {
                String username = usernameField.getText();
                String password = new String(passwordField.getPassword());authenticateUser(username, password, messageLabel);
        });

        panel.add(usernameLabel);
        panel.add(usernameField);
        panel.add(passwordLabel);
        panel.add(passwordField);

        add(panel); add(loginButton);
        add(messageLabel);

        setVisible(true);
}

private void authenticateUser(String username, String password, JLabelmessageLabel) {
        LoginController loginController = new LoginController(connection);String role =
        loginController.authenticate(username, password);

        if ("admin".equals(role)) { JOptionPane.showMessageDialog(this,"Welcome, Admin!");dispose();
                                        new AdminDashboard(connection);
                                          } else if ("member".equals(role)) {
                MemberDao memberDao = new MemberDao(connection);
                int memberId = memberDao.getMemberIdByUsername(username);

                if (memberId != -1) {
                        JOptionPane.showMessageDialog(this, "Welcome, Member!");
```

```
                        dispose();
                        new MemberDashboard(connection, memberId);
                    } else {
                        messageLabel.setText("Member not found. Please try again.");
                    }
                } else {
                    messageLabel.setText("Invalid username or password.");
                }
            }
        }
```

MemberDashboard.java

```
package main.gui;

import    dao.BookDao; import
dao.TransactionDao;import models.Book;

importjavax.swing.*;import
java.awt.*;
importjava.sql.Connection;importjava.util.List;

public class MemberDashboard extends JFrame { private final TransactionDao
        transactionDao;private final BookDao bookDao;
        private final int memberId;

        public MemberDashboard(Connection connection, int memberId) {this.transactionDao = new
                TransactionDao(connection); this.bookDao = new BookDao(connection);
                this.memberId = memberId;

                setTitle("Member Dashboard");setSize(600, 400);
                setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);setLayout(new GridLayout(3, 1));

                JButton viewBooksButton = new JButton("View Books");
```

```
        JButton borrowBookButton = new JButton("Borrow Book");JButton logoutButton = new
        JButton("Logout");

        viewBooksButton.addActionListener(e -> viewBooks()); borrowBookButton.addActionListener(e -> borrowBook());
        logoutButton.addActionListener(e -> logout(connection));

        add(viewBooksButton);
        add(borrowBookButton);add(logoutButton);

        setVisible(true);
    }

    private void viewBooks() {
        List<Book> books = bookDao.getAllBooks(); StringBuilder message = new
        StringBuilder();for (Book book : books) {
            message.append(book).append("\n");
        }
        JOptionPane.showMessageDialog(this, message.toString(), "AvailableBooks",
JOptionPane.INFORMATION_MESSAGE);
    }

    private void borrowBook() {
        String bookIdStr = JOptionPane.showInputDialog(this, "Enter Book ID toborrow:");
        try {
            int bookId = Integer.parseInt(bookIdStr);
            if (transactionDao.addTransaction(bookId, memberId)) {
                JOptionPane.showMessageDialog(this, "Book borrowedsuccessfully!");
            } else {
                JOptionPane.showMessageDialog(this, "Failed to borrow book.");
            }
        } catch (NumberFormatException e) { JOptionPane.showMessageDialog(this, "Invalid Book ID.", "Error",
JOptionPane.ERROR_MESSAGE);
        }
    }

    private void logout(Connection connection) { JOptionPane.showMessageDialog(this,"Logging out...");
        dispose();
        new LoginPage(connection);
    }
}
```

BookDao.java

```
Package    dao; import
models.Book;

import    java.sql.Connection; import
java.sql.PreparedStatement;import java.sql.ResultSet;
importjava.sql.SQLException;import java.util.ArrayList;
import java.util.List;

public class BookDao {
        private final Connection connection;

        public BookDao(Connection connection) {this.connection = connection;
        }

        public boolean addBook(Book book) {
                String query = "INSERT INTO books (title, author, isbn, quantity)VALUES (?, ?, ?, ?)";
                try (PreparedStatement stmt = connection.prepareStatement(query)) {stmt.setString(1, book.getTitle());
                        stmt.setString(2,book.getAuthor());stmt.setString(3, book.getIsbn());
                        stmt.setInt(4, book.getQuantity()); return stmt.executeUpdate() > 0;
                } catch (SQLException e) {e.printStackTrace();
                }
                return false;
        }

        public boolean deleteBook(int bookId) {
                String query = "DELETE FROM books WHERE id = ?";
                try (PreparedStatement stmt = connection.prepareStatement(query)) {stmt.setInt(1, bookId);
                        return stmt.executeUpdate() > 0;
                } catch (SQLException e) {e.printStackTrace();
                }
                return false;
        }

        public List<Book> getAllBooks() { List<Book> books = new
                ArrayList<>();
```

```
            String query = "SELECT * FROM books";
            try (PreparedStatement stmt = connection.prepareStatement(query);ResultSet rs = stmt.executeQuery()) {
                while (rs.next()) { books.add(new Book(
                                        rs.getInt("id"), rs.getString("title"), rs.getString("author"),
                                        rs.getString("isbn"), rs.getInt("quantity")
                            ));
                }
            } catch (SQLException e) {e.printStackTrace();
            }
            return books;
    }
}
```

MemberDao.java

```
package dao;

import models.Member; import

java.sql.Connection;
import java.sql.PreparedStatement;import java.sql.ResultSet;
import java.sql.SQLException;import
java.util.ArrayList; import java.util.List;

public class MemberDao {
    private final Connection connection;

    public MemberDao(Connection connection) {this.connection = connection;
    }

    public boolean addMember(Member member) {
            String query = "INSERT INTO members (name, email, username, password)VALUES (?, ?, ?, ?)";
            try (PreparedStatement stmt = connection.prepareStatement(query)) {
```

```
                stmt.setString(1, member.getName()); stmt.setString(2,
                member.getEmail()); stmt.setString(3,member.getUsername());
                stmt.setString(4,member.getPassword());return stmt.executeUpdate() >
                0;
        } catch (SQLException e) {e.printStackTrace();
        }
        return false;
}

public boolean deleteMember(int memberId) {
        String query = "DELETE FROM members WHERE id = ?";
        try (PreparedStatement stmt = connection.prepareStatement(query)) {stmt.setInt(1, memberId);
                return stmt.executeUpdate() > 0;
        } catch (SQLException e) {e.printStackTrace();
        }
        return false;
}

public List<Member> getAllMembers() { List<Member> members = new
        ArrayList<>();String query = "SELECT * FROM members";
        try (PreparedStatement stmt = connection.prepareStatement(query);ResultSet rs = stmt.executeQuery()) {
                while (rs.next()) { members.add(new Member(
                                        rs.getInt("id"), rs.getString("name"),
                                        rs.getString("email"), rs.getString("username"),
                                        rs.getString("password")
                        ));
                }
        } catch (SQLException e) {e.printStackTrace();
        }
        return members;
}

public int getMemberIdByUsername(String username) {
        String query = "SELECT id FROM members WHERE username = ?";
        try (PreparedStatement stmt = connection.prepareStatement(query)) {stmt.setString(1, username);
                ResultSet rs = stmt.executeQuery();if (rs.next()) {
                        return rs.getInt("id");
```

```
                    }
                } catch (SQLException e) {e.printStackTrace();
                }
                return -1;
        }
}
```

TransactionDao.java

```
package dao;
import    java.sql.Connection; import
java.sql.PreparedStatement;import java.sql.ResultSet;
importjava.sql.SQLException;



public class TransactionDao {
        private final Connection connection;

        public TransactionDao(Connection connection) {this.connection = connection;
        }

        public boolean addTransaction(int bookId, int memberId) {
                String query = "INSERT INTO transactions (book_id, member_id,issue_date) VALUES (?, ?, CURDATE())";
                try (PreparedStatement stmt = connection.prepareStatement(query)) {stmt.setInt(1, bookId);
                        stmt.setInt(2,    memberId); return
                        stmt.executeUpdate() > 0;
                } catch (SQLException e) {e.printStackTrace();
                }
                return false;
        }

        public boolean returnBook(int transactionId) {
                String query = "UPDATE transactions SET return_date = CURDATE() WHEREid = ?";
                try (PreparedStatement stmt = connection.prepareStatement(query)) {
```

```
                stmt.setInt(1, transactionId); return stmt.executeUpdate() >
                0;
            } catch (SQLException e) {e.printStackTrace();
            }
            return false;
    }

    public int getMemberIdByUsername(String username) {
            String query = "SELECT id FROM members WHERE username = ?";
            try (PreparedStatement stmt = connection.prepareStatement(query)) {stmt.setString(1, username);
                ResultSet rs = stmt.executeQuery();if (rs.next()) {
                    return rs.getInt("id");
                }
            } catch (SQLException e) {e.printStackTrace();
            }
            return -1;
    }
}
```

DatabaseUtils.java

```
package utils;
import java.sql.Connection; import
java.sql.DriverManager;import
java.sql.SQLException;

public class DatabaseUtils {
    private static final String DB_URL = "jdbc:mysql://localhost:3306/library_management";
    private static final String DB_USER = "root"; private
    static final String DB_PASSWORD = "shri123#";

    public static Connection getConnection() {try {
            return DriverManager.getConnection(DB_URL, DB_USER, DB_PASSWORD);
        } catch (SQLException e) {e.printStackTrace();
```

```
                return null;
            }
        }
}
```

Book.java

```
package models;

public class Book { private int id; private
    String title; private String author;
    private String isbn; private int
    quantity;

    public Book(int id, String title, String author, String isbn, int quantity)
{
            this.id = id; this.title = title;
            this.author = author;this.isbn =
            isbn;
            this.quantity = quantity;
    }

    public int getId() {return id;
    }

    public void setId(int id) {this.id = id;
    }

    public String getTitle() {return title;
    }

    public void setTitle(String title) {this.title = title;
    }

    public String getAuthor() {return author;
```

```
    }

    public void setAuthor(String author) {this.author = author;
    }

    public String getIsbn() {return isbn;
    }

    public void setIsbn(String isbn) {this.isbn = isbn;
    }

    public int getQuantity() {return quantity;
    }

    public void setQuantity(int quantity) {this.quantity = quantity;
    }

    @Override
    public String toString() {return "Book{" +
                                "id=" + id +
                                ", title='" + title + '\'' + ", author='" + author + '\''
                                +", isbn='" + isbn + '\'' +
                                ", quantity=" + quantity +'}';
    }
}
```

Member.java

```
package models;

public class Member { private int id;
    private String name; private String
    email;
    private String username;private String
    password;
```

```
public Member(int id, String name, String email, String username, Stringpassword) {
        this.id = id; this.name = name;
        this.email = email;
        this.username = username;this.password =
        password;
}

public int getId() {return id;
}

public void setId(int id) {this.id = id;
}

public String getName() {return name;
}

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

public String getEmail() {return email;
}

public void setEmail(String email) {this.email = email;
}

public String getUsername() {return username;
}

public void setUsername(String username) {this.username = username;
}

public String getPassword() {return password;
}

public void setPassword(String password) {this.password = password;
}
```

```
    @Override
    public String toString() {return "Member{" +
                            "id=" + id +
                            ", name='" + name + '\'' +
                            ", email='" + email + '\'' +
                            ",  username='"  +  username  +  '\''  + ",  password='"  +
                            password + '\'' +'}';
    }
}
```

Transaction.java

```
package models; import

java.sql.Date;

public class Transaction {private   int   id;
    private int bookId; private int
    memberId; private Date issueDate;
    private Date returnDate;

    public Transaction(int id, int bookId, int memberId, Date issueDate, DatereturnDate) {
            this.id   =   id; this.bookId = bookId;
            this.memberId = memberId;
            this.issueDate = issueDate; this.returnDate = returnDate;
    }

    public int getId() {return id;
    }

    public void setId(int id) {this.id = id;
    }

    public int getBookId() {
```

```
            return bookId;
    }

    public void setBookId(int bookId) {this.bookId = bookId;
    }

    public int getMemberId() {return memberId;
    }

    public void setMemberId(int memberId) {this.memberId = memberId;
    }

    public Date getIssueDate() {return issueDate;
    }

    public void setIssueDate(Date issueDate) {this.issueDate = issueDate;
    }

    public Date getReturnDate() {return returnDate;
    }

    public void setReturnDate(Date returnDate) {this.returnDate = returnDate;
    }

    @Override
    public String toString() { return "Transaction{" +
                                "id=" + id +
                                ", bookId=" + bookId +
                                ", memberId=" + memberId + ", issueDate=" +
                                issueDate +
                                ", returnDate=" + returnDate +'}';
    }
}
```

- **Advantages**
  - **Modularity:**
    - **The project follows a clear modular structurewith separate layers for GUI, DAO, models, and utilities, making it easy to maintain and extend.**
  - **Reusability:**
    - **DAO classes encapsulate all database interactions, ensuring code reusability andclean database handling.**
  - **User-Friendly Interface:**
    - **GUI dashboards provide an intuitive interfacefor admins and members to interact with the system.**
  - **Role-Based Access:**
    - **Admin and member roles are clearly defined, ensuring users only access features relevantto their role.**
  - **Scalability:**
    - **The structure allows for easy addition of new features like overdue notifications, enhanced reporting, or integration with external systems.**
  - **Centralized Database Management:**
    - **`DatabaseUtils` handles database connections in a centralized way, ensuring aconsistent and error-handling mechanism.**

Disadvantages

- **Security Risks:**
  - **Passwords are stored in plain text, making the system vulnerable to breaches. Improvement: Use hashing (e.g., bcrypt).**

- **Limited Features:**
  - **Does not handle advanced functionalitieslike:**
  - **Fine calculation for overdue books.**
  - **Notifications for members about book availability.**

- **Concurrency Issues:**
  - **No checks for simultaneous borrowing of the same book, which could cause inconsistencies in book availability.**

- **Database Dependency:**
  - **Requires a live database connection tofunction. If the database is down, the application cannot operate.**

- **Error Handling:**
  - **Basic error messages in the GUI. It lacks robust exception handling or detailed logs for debugging.**

- **No Data Validation:**

  - **Input fields in the GUI (like book ID or member details) do not validate data properly,which could lead to invalid entries in the database.**

Overall Summary

- **The project is well-designed for basic library management, but it can be further improved with security enhancements, concurrency handling, and better error reporting.**
- **It provides a good foundation for a scalable system, but extending functionality will be necessary for production use.**

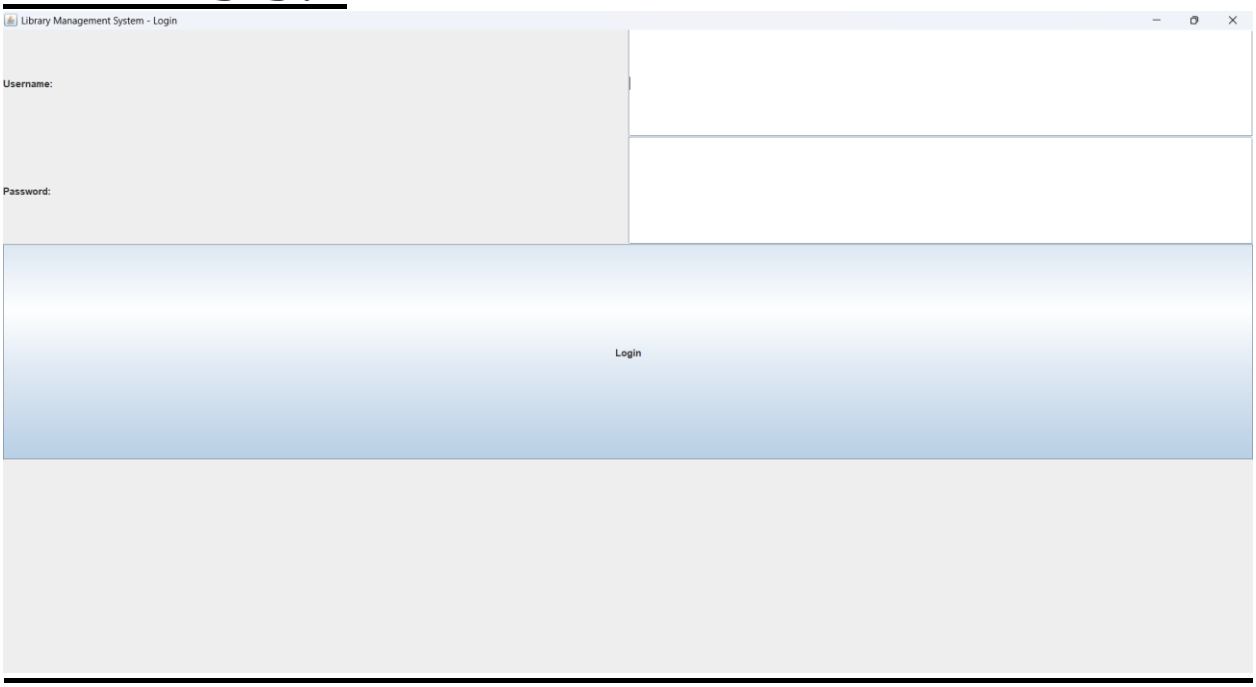
OUTPUT

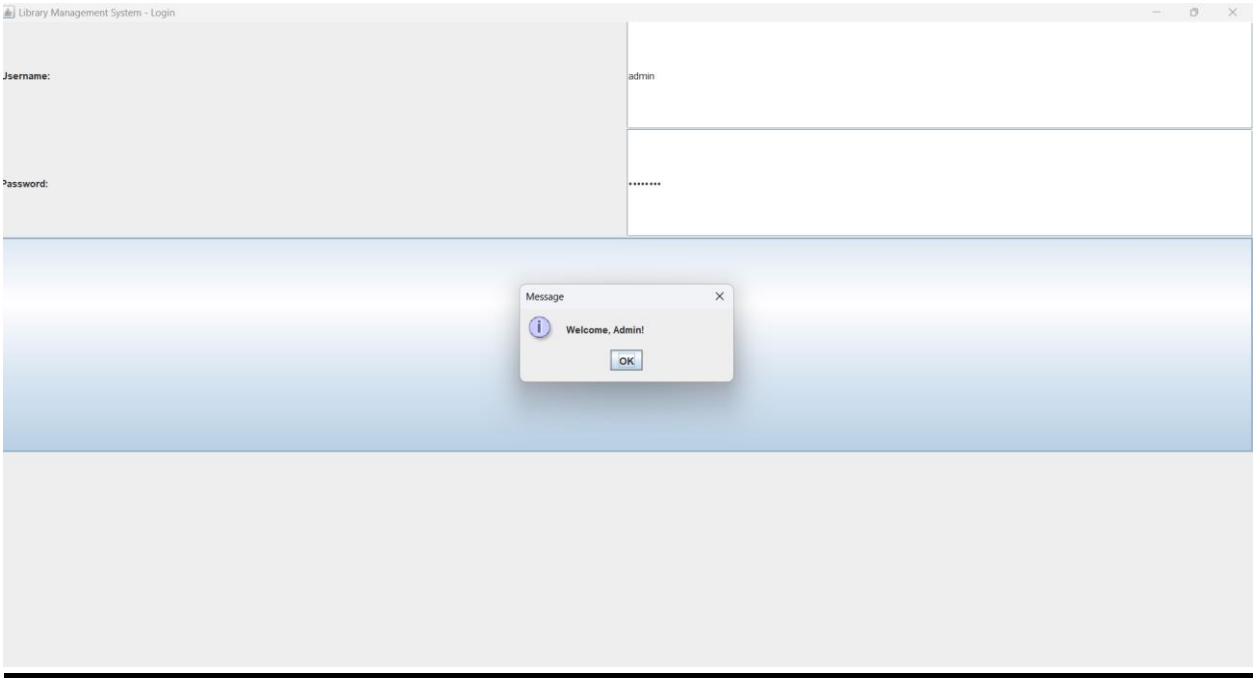
```
mysql>
mysql> select * from books;
+----+-----------------------+--------------------+------------------+----------+
| id | title                 | author             | isbn             | quantity |
+----+-----------------------+--------------------+------------------+----------+
|  1 | harry porter          | J.K Rowling        | 978-0-7475-3269-9 |       10 |
|  2 | The Great Gatsby      | F. Scott Fitzgerald | 9780743273565     |        5 |
|  3 | 1984                  | George Orwell      | 9780451524935     |       10 |
|  4 | To Kill a Mockingbird | Harper Lee         | 9780061120084     |        7 |
|  5 | Pride and Prejudice   | Jane Austen        | 9780141040349     |        6 |
|  6 | The Catcher in the Rye | J.D. Salinger     | 9780316769488     |        8 |
|  7 | Moby Dick             | Herman Melville    | 9781503280786     |        4 |
|  8 | War and Peace         | Leo Tolstoy        | 9781400079988     |        2 |
|  9 | The Odyssey           | Homer              | 9780140268867     |        3 |
| 10 | Hamlet                | William Shakespeare | 9780199535811     |       12 |
| 11 | The Lord of the Rings | J.R.R. Tolkien     | 9780618640157     |        9 |
+----+-----------------------+--------------------+------------------+----------+
11 rows in set (0.02 sec)
```

```
mysql> select * from users;
+----+----------+-----------+--------+
| id | username | password  | role   |
+----+----------+-----------+--------+
|  1 | admin    | admin123  | admin  |
|  2 | member1  | member123 | member |
+----+----------+-----------+--------+
2 rows in set (0.00 sec)
```

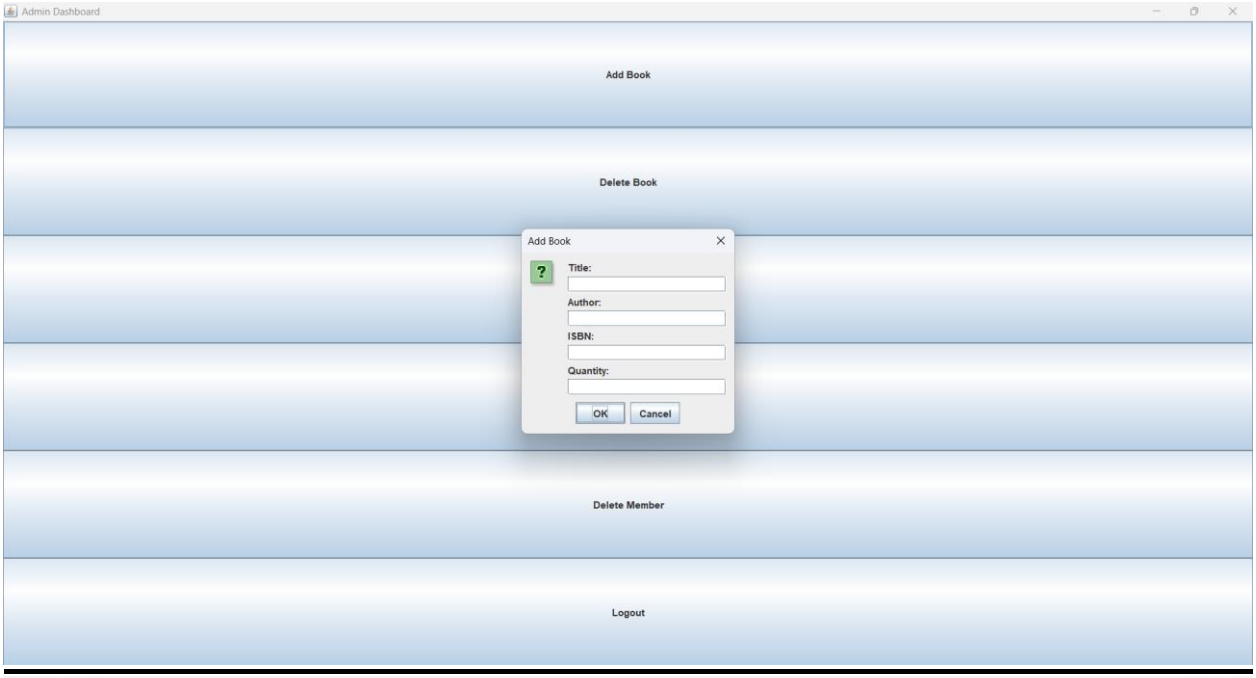
```
mysql> select * from members;
+----+---------------+--------------------------+----------+------------+
| id | name          | email                    | username | password   |
+----+---------------+--------------------------+----------+------------+
|  1 | Shriram       | shriram@example.com      | member1  | member123  |
|  2 | Alice Smith   | alice.smith@example.com  | alice    | alice123   |
|  3 | Bob Johnson   | bob.johnson@example.com  | bob      | bob123     |
|  4 | Charlie Brown | charlie.brown@example.com | charlie  | charlie123 |
|  5 | David Wilson  | david.wilson@example.com | david    | david123   |
|  6 | Eve Davis     | eve.davis@example.com    | eve      | eve123     |
|  7 | Frank Clark   | frank.clark@example.com  | frank    | frank123   |
|  8 | Grace Hall    | grace.hall@example.com   | grace    | grace123   |
|  9 | Hank Green    | hank.green@example.com   | hank     | hank123    |
| 10 | Ivy Young     | ivy.young@example.com    | ivy      | ivy123     |
| 11 | Jack Wright   | jack.wright@example.com  | jack     | jack123    |
+----+---------------+--------------------------+----------+------------+
11 rows in set (0.01 sec)
```

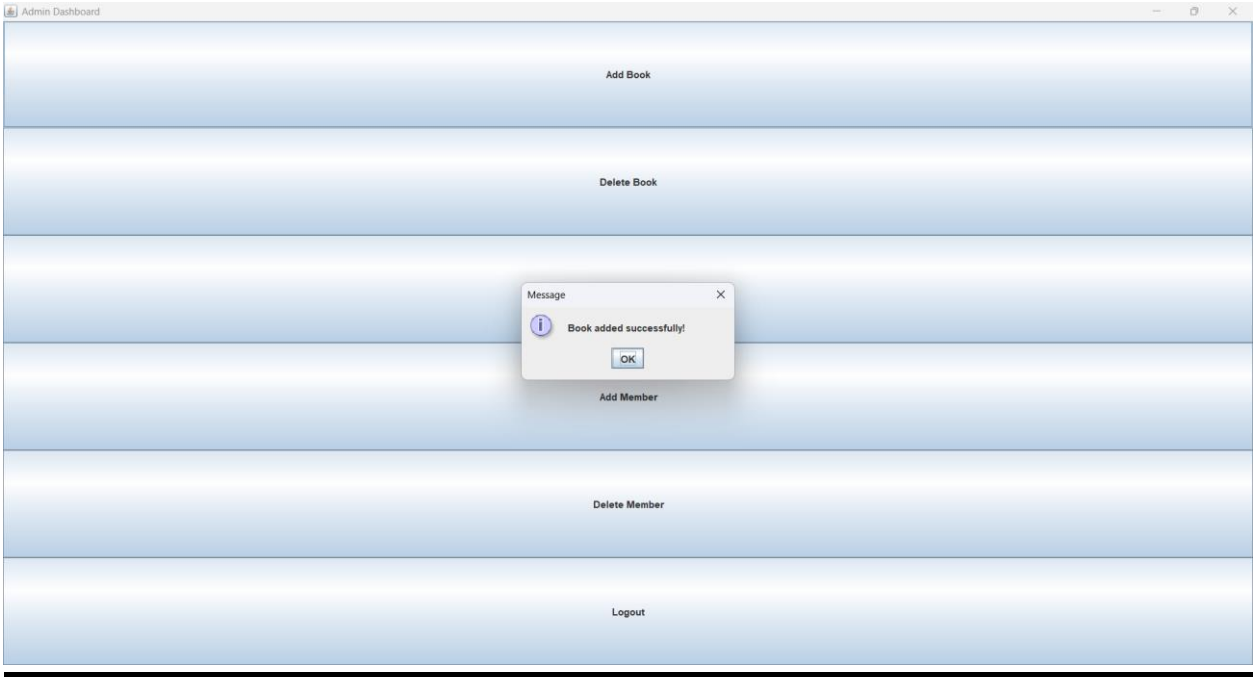
ADMIN TASKS:-

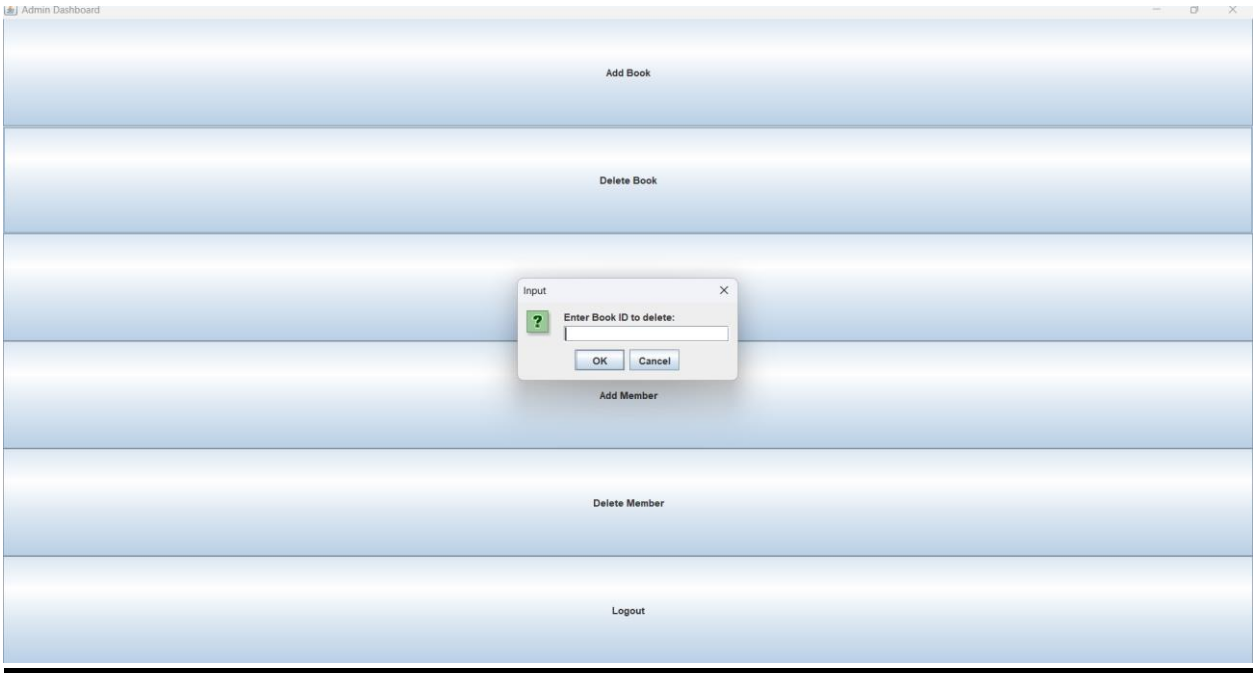

Library Management System - Login
Username:
Password:
Login

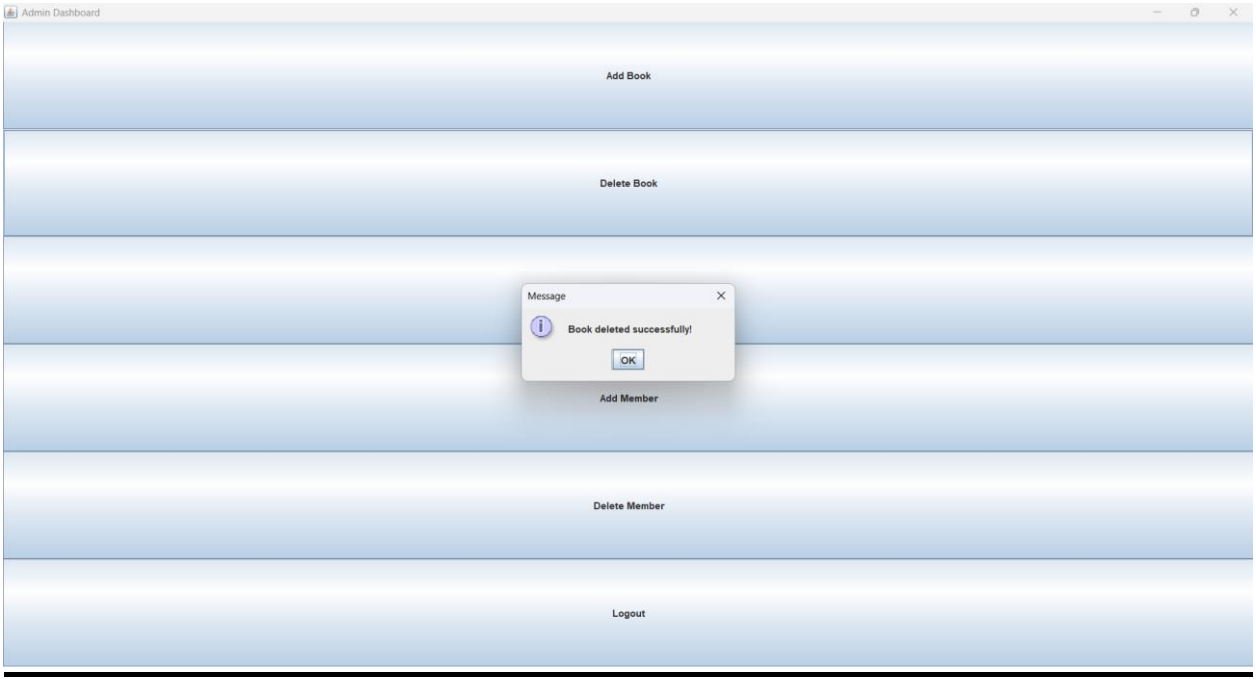

Library Management System - Login
Username:
admin
Password:
Message
Welcome, Admin!
OK


Admin Dashboard
Add Book
Delete Book
View Books
Add Member
Delete Member
Logout


Admin Dashboard
Add Book
Delete Book
Add Book
Title:
Author:
ISBN:
Quantity:
OK
Cancel
Delete Member
Logout

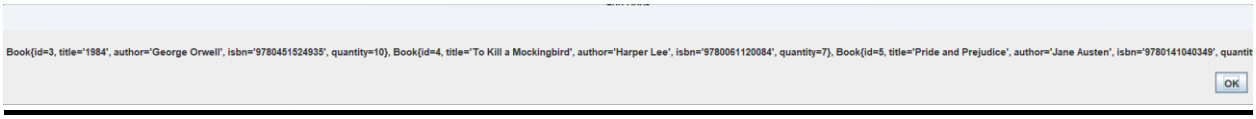

Admin Dashboard
Add Book
Delete Book
Message
Book added successfully!
OK
Add Member
Delete Member
Logout

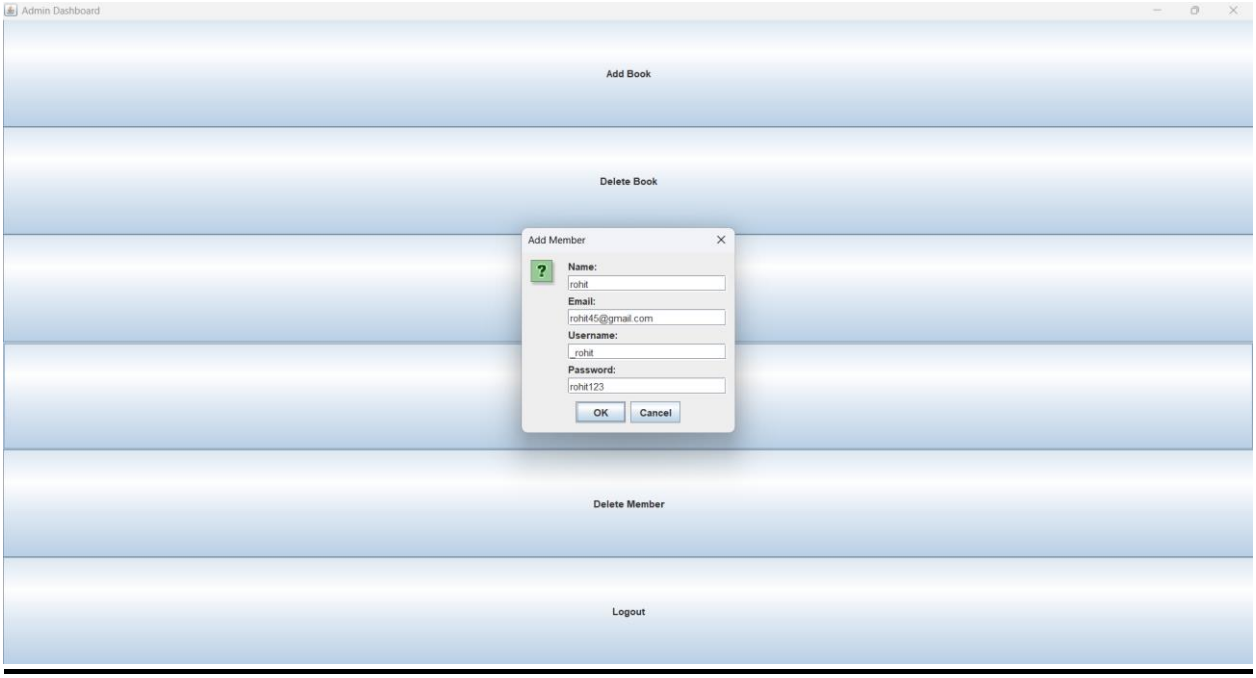


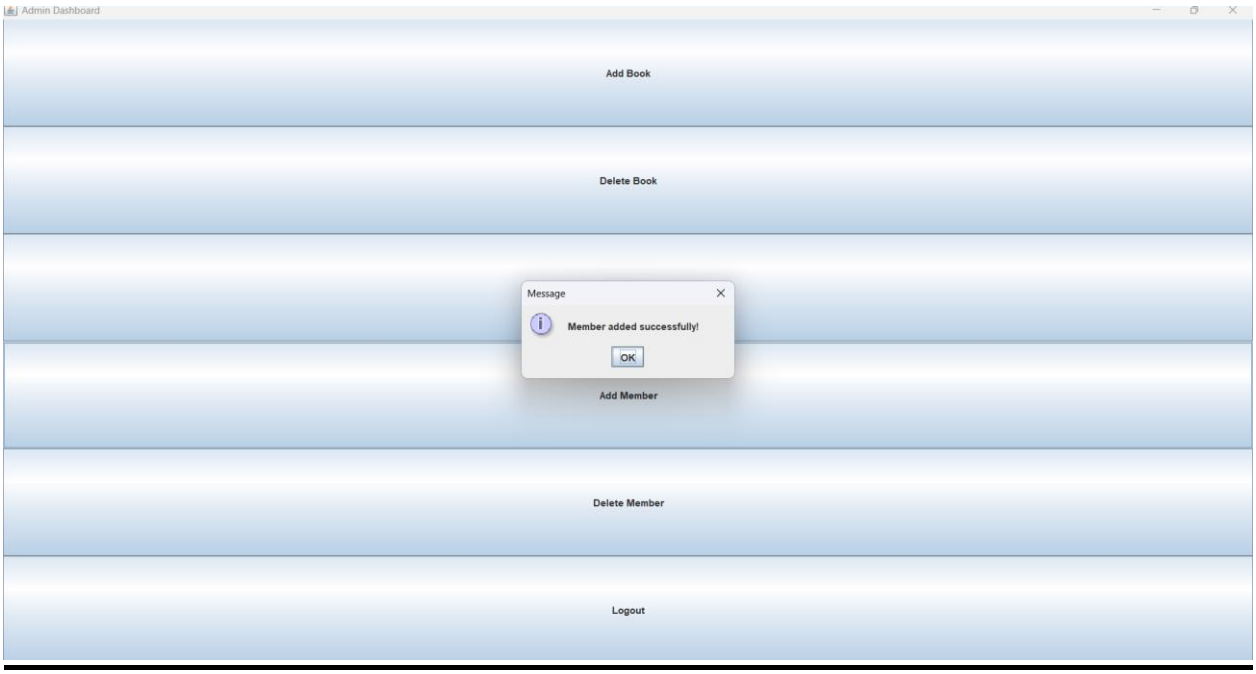



```
mysql> select * from books;
+----+-------------------------+---------------------+-------------------+----------+
| id | title                   | author              | isbn              | quantity |
+----+-------------------------+---------------------+-------------------+----------+
|  1 | harry porter            | J.K Rowling         | 978-0-7475-3269-9 |       10 |
|  2 | The Great Gatsby        | F. Scott Fitzgerald | 9780743273565     |        5 |
|  3 | 1984                    | George Orwell       | 9780451524935     |       10 |
|  4 | To Kill a Mockingbird   | Harper Lee          | 9780061120084     |        7 |
|  5 | Pride and Prejudice     | Jane Austen         | 9780141040349     |        6 |
|  6 | The Catcher in the Rye  | J.D. Salinger       | 9780316769488     |        8 |
|  7 | Moby Dick               | Herman Melville     | 9781503280786     |        4 |
|  8 | War and Peace           | Leo Tolstoy         | 9781400079988     |        2 |
|  9 | The Odyssey             | Homer               | 9780140268867     |        3 |
| 10 | Hamlet                  | William Shakespeare | 9780199535811     |       12 |
+----+-------------------------+---------------------+-------------------+----------+
10 rows in set (0.00 sec)
```

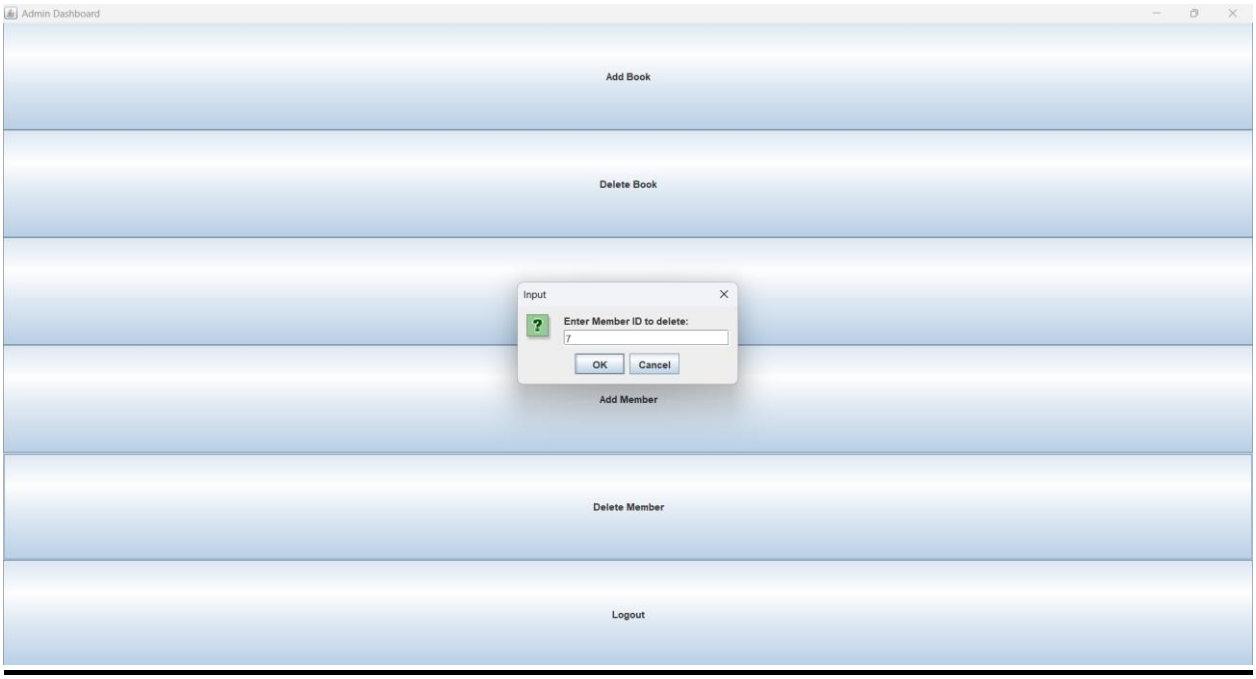

Admin Dashboard
Add Book
Delete Book
View Books
Add Member
Delete Member
Logout

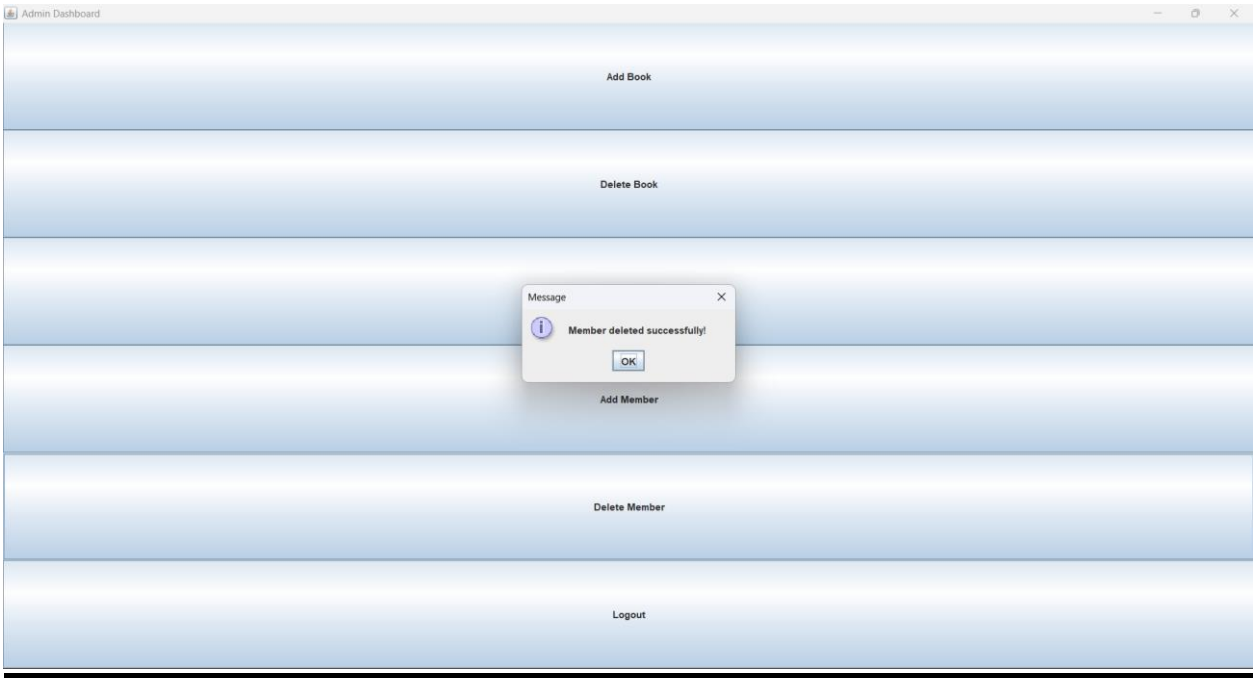

Book{id=3, title='1984', author='George Orwell', isbn='9780451524935', quantity=10}, Book{id=4, title='To Kill a Mockingbird', author='Harper Lee', isbn='9780061120084', quantity=7}, Book{id=5, title='Pride and Prejudice', author='Jane Austen', isbn='9780141040349', quantit
OK

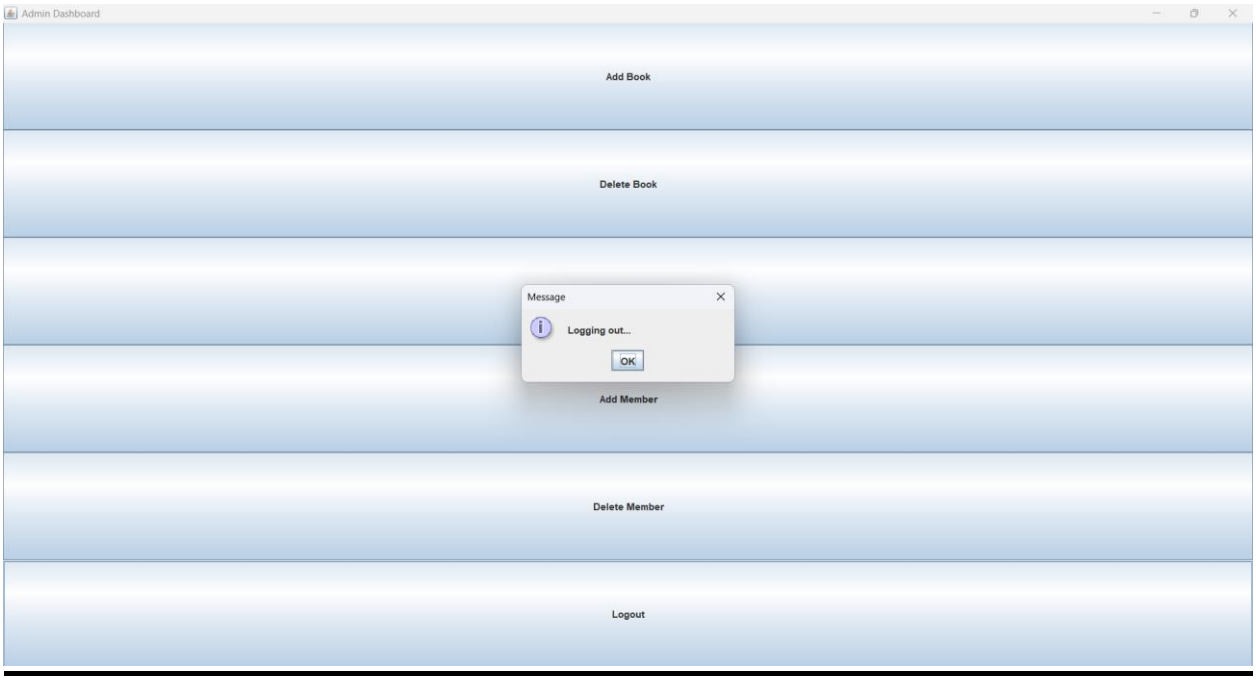

Admin Dashboard
Add Book
Delete Book
Add Member
Name:
rohit
Email:
rohit45@gmail.com
Username:
_rohit
Password:
rohit123
OK
Cancel
Delete Member
Logout



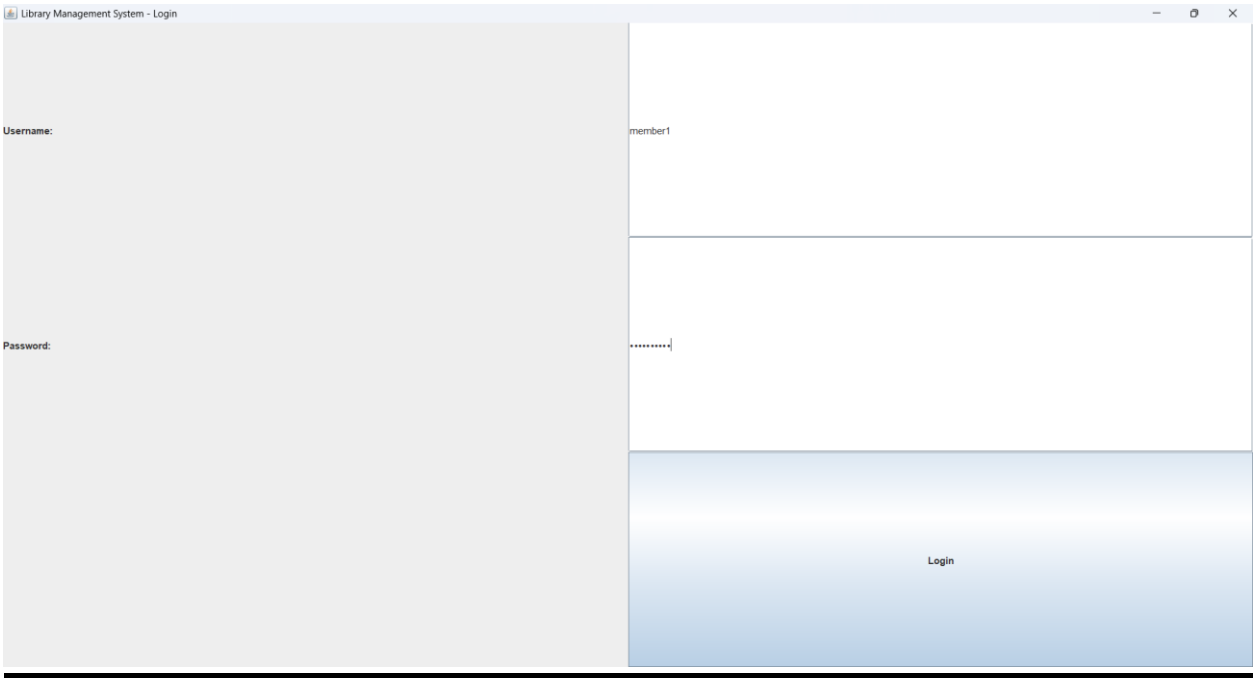

```
mysql> select * from members;
+----+---------------+---------------------------+----------+------------+
| id | name          | email                     | username | password   |
+----+---------------+---------------------------+----------+------------+
|  1 | Shriram       | shriram@example.com       | member1  | member123  |
|  2 | Alice Smith   | alice.smith@example.com   | alice    | alice123   |
|  3 | Bob Johnson   | bob.johnson@example.com   | bob      | bob123     |
|  4 | Charlie Brown | charlie.brown@example.com | charlie  | charlie123 |
|  5 | David Wilson  | david.wilson@example.com  | david    | david123   |
|  6 | Eve Davis     | eve.davis@example.com     | eve      | eve123     |
|  7 | Frank Clark   | frank.clark@example.com   | frank    | frank123   |
|  8 | Grace Hall    | grace.hall@example.com    | grace    | grace123   |
|  9 | Hank Green    | hank.green@example.com    | hank     | hank123    |
| 10 | Ivy Young     | ivy.young@example.com     | ivy      | ivy123     |
| 11 | Jack Wright   | jack.wright@example.com   | jack     | jack123    |
| 12 | rohit         | rohit45@gmail.com         | _rohit   | rohit123   |
+----+---------------+---------------------------+----------+------------+
12 rows in set (0.01 sec)
```

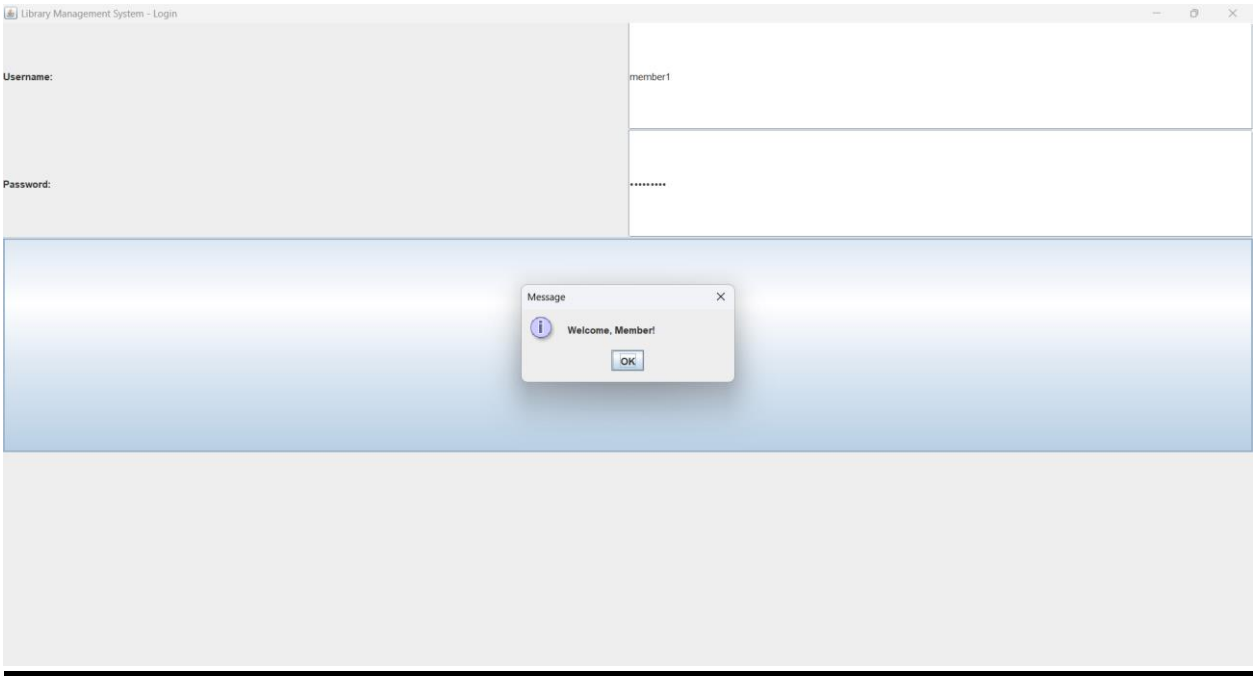


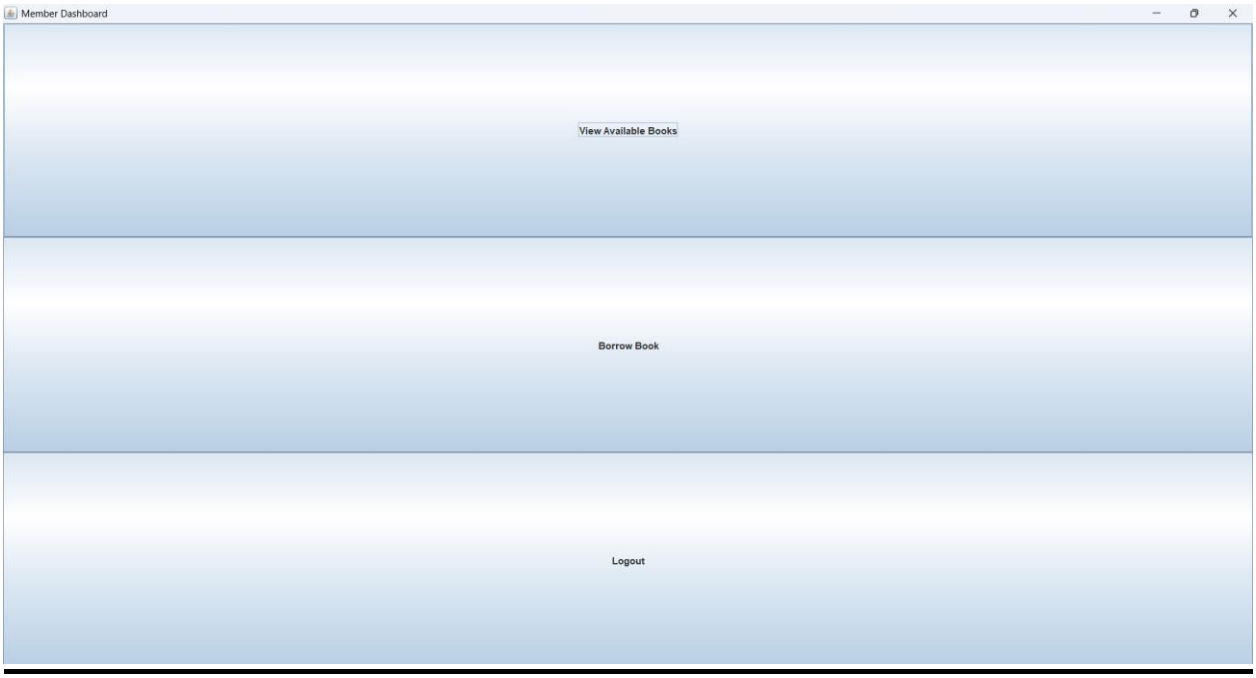


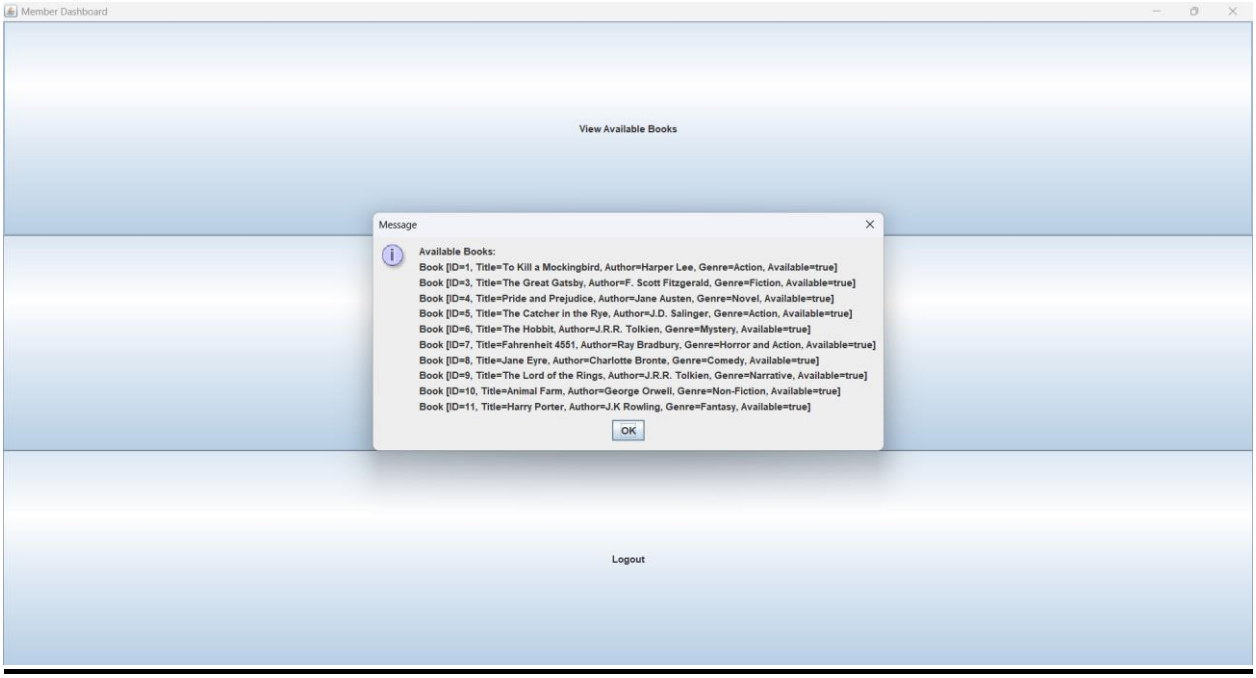


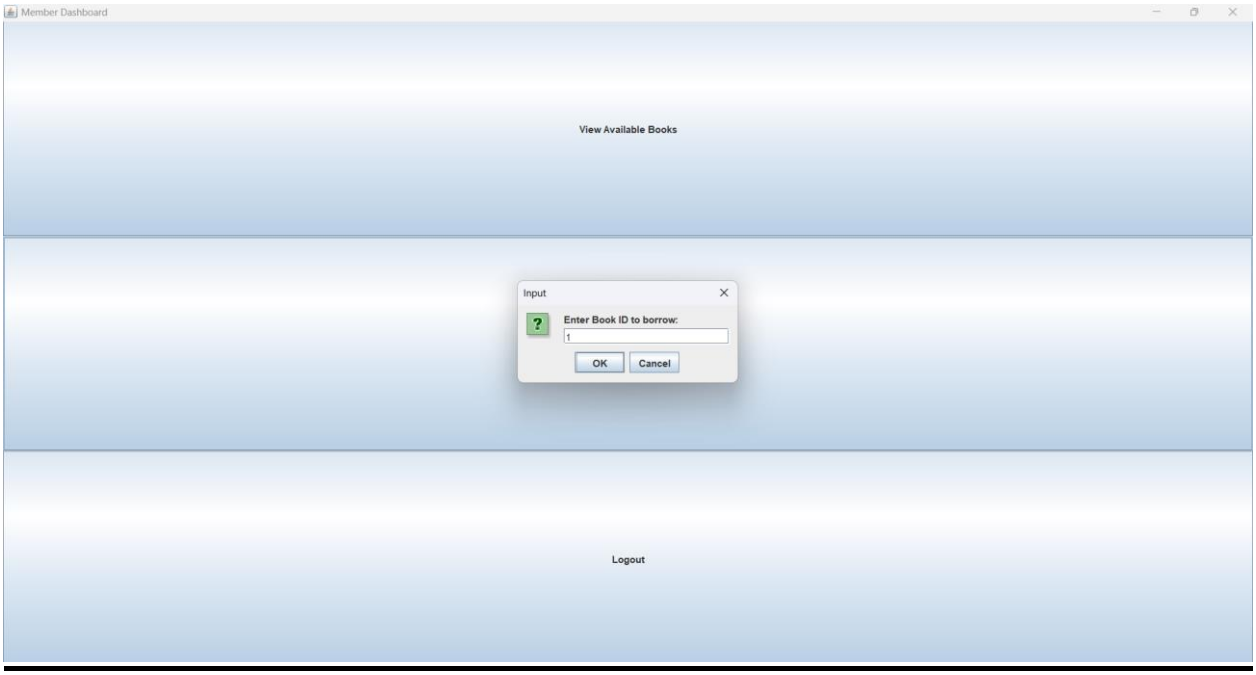
MEMBER TASKS:

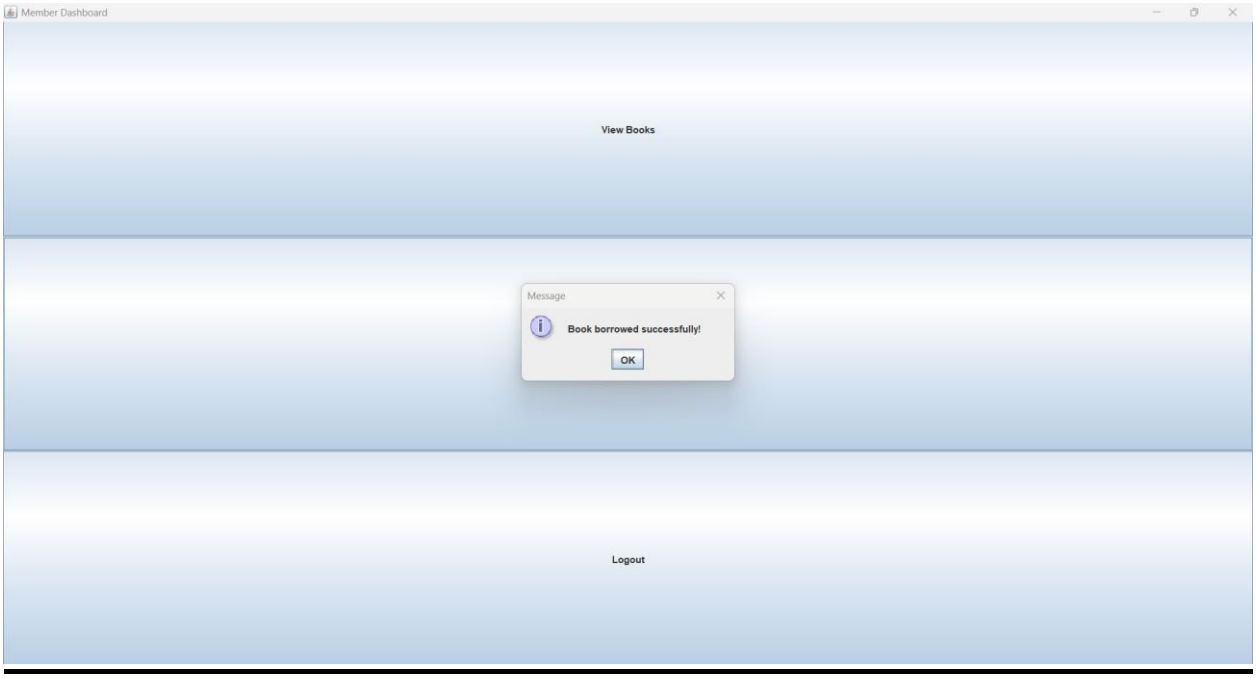

Library Management System - Login
Username:
member1
Password:
Login


Library Management System - Login
Username:
member1
Password:
Message
Welcome, Member!
OK

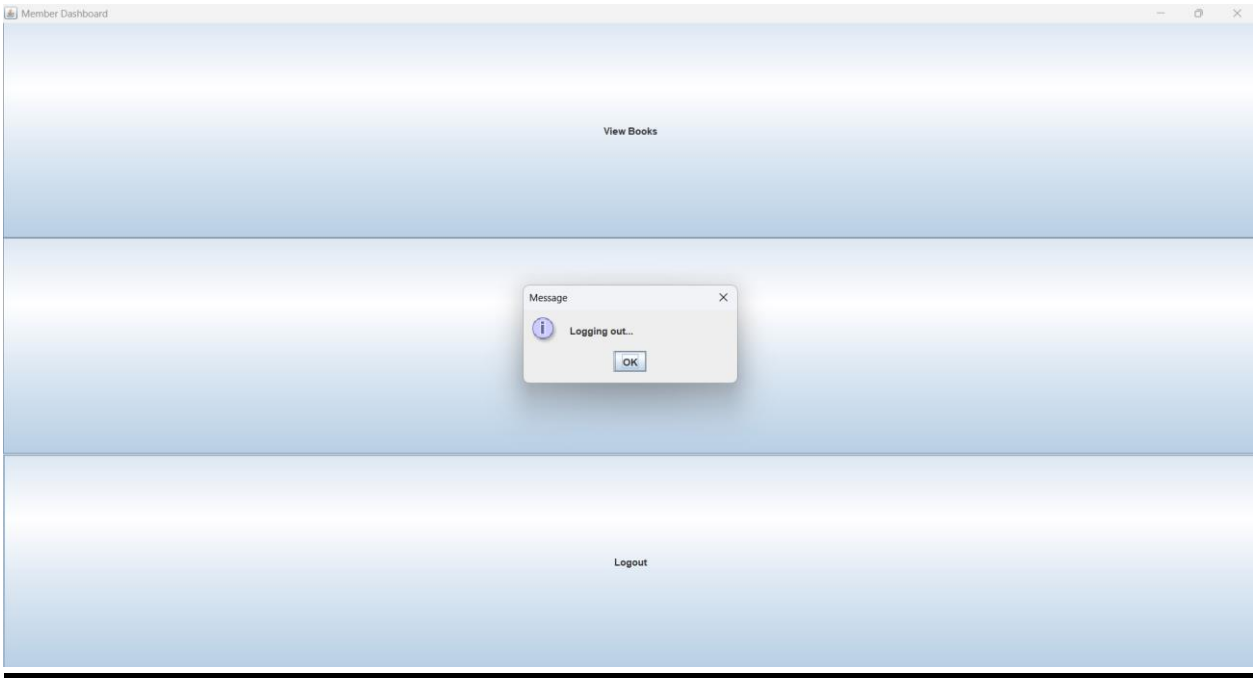

Member Dashboard
View Available Books
Borrow Book
Logout


Member Dashboard
View Available Books
Message
Available Books:
Book [ID=1, Title=To Kill a Mockingbird, Author=Harper Lee, Genre=Action, Available=true]
Book [ID=3, Title=The Great Gatsby, Author=F. Scott Fitzgerald, Genre=Fiction, Available=true]
Book [ID=4, Title=Pride and Prejudice, Author=Jane Austen, Genre=Novel, Available=true]
Book [ID=5, Title=The Catcher in the Rye, Author=J.D. Salinger, Genre=Action, Available=true]
Book [ID=6, Title=The Hobbit, Author=J.R.R. Tolkien, Genre=Mystery, Available=true]
Book [ID=7, Title=Fahrenheit 4551, Author=Ray Bradbury, Genre=Horror and Action, Available=true]
Book [ID=8, Title=Jane Eyre, Author=Charlotte Bronte, Genre=Comedy, Available=true]
Book [ID=9, Title=The Lord of the Rings, Author=J.R.R. Tolkien, Genre=Narrative, Available=true]
Book [ID=10, Title=Animal Farm, Author=George Orwell, Genre=Non-Fiction, Available=true]
Book [ID=11, Title=Harry Porter, Author=J.K Rowling, Genre=Fantasy, Available=true]
OK
Logout






```
mysql> SELECT * FROM transactions;
+----+-----------+---------+------------+-------------+
| id | member_id | book_id | issue_date | return_date |
+----+-----------+---------+------------+-------------+
|  1 |         1 |      10 | 2024-11-24 | NULL        |
|  2 |         1 |       6 | 2024-11-24 | NULL        |
+----+-----------+---------+------------+-------------+
2 rows in set (0.00 sec)
```


Member Dashboard
View Books
Message
Logging out...
OK
Logout