MASTERS IN COMPUTER APPLICATION

CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING, NOIDA

JAVA LAB FILE

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JANUARY 2023

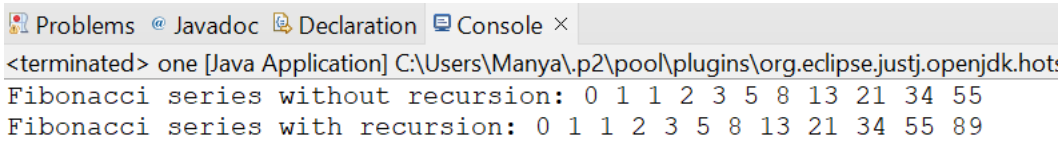
S.No.	Program Name	Sign
1	Write a java program to find the Fibonacci series using recursive and non-recursive functions	
2	Write a java program to multiply two given matrices.	
3	Write a java program for Method overloading and Constructor overloading	
4	Write a java program to display the employee details using scanner class	
5	Write a java program that checks whether a given string is palindrome or not	
6	A) Write a java program to represent Abstract class with example.	
	B) Write a java program to implement Interface using extends keyword	
7	A) Write a java program to create inner classes	
	B) Write a java program to create user defined package	
8	A) Write a java program for creating multiple catch blocks	
	B) Write a java program for producer and consumer problem using Threads	
9	Write a Java program that implements a multi-thread application that has three threads	
10	A) Write a java program to display File class properties	
	B) Write a java program to represent Array List class	
	C) Write a Java program loads phone no, name from a text file using hash table	
11	Write a program for implementing runnable using lambda expression	
12	Write a program to create a frame with three buttons	
13	A) Write a java program for handling Mouse events and Key events	
	B) Write a java program for handling Key events	
14	Write a java program that connects to a database using JDBC	
15	A) Write a java program to connect to a database using JDBC and insert values into it	
	B) Write a java program to connect to a database using JDBC and delete values from it	
16	Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * %operations. Add a text field to display the result	

1. Write a java program to find the Fibonacci series using recursive and non-recursive functions.

```
package manya;


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


		one ob1 = new one();
		one ob2 = new one();
		ob1.withoutrecursion();
		System.out.print("Fibonacci series with recursion: ");
		ob2.display();
		ob2.withrecursion(10);
	}


	int a=0, b=1, c, i;
		void withoutrecursion() {


			System.out.print("Fibonacci series without recursion: ");
			System.out.print(a+" "+b);


			for(i=2;i<=10;i++)
	    {	c=a+b;
			System.out.print(" "+c);
			a=b;
			b=c;
	    }
			System.out.println(" ");
		    }


	  void display() {
		int a=0, b=1;
		System.out.print(a+" "+b);
	  }


		void withrecursion(int z) {
```

```
            if(z>0){
                c = a + b;
                a = b;
                b = c;
                System.out.print(" "+c);
                withrecursion(z-1);
                }
            }
        }
```

Output:

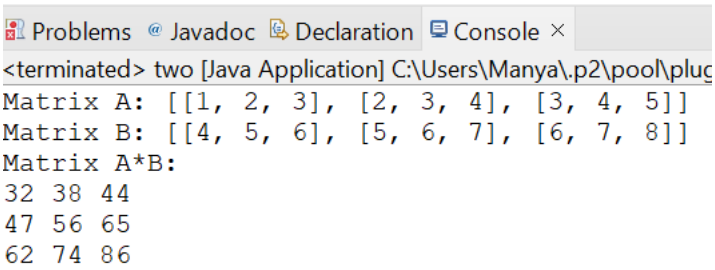


2. Write a java program to multiply two given matrices.

```
package manya;
import java.util.Arrays;

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

        int a[][]={{1,2,3},{2,3,4},{3,4,5}};
        int b[][]={{4,5,6},{5,6,7},{6,7,8}};
        int c[][]=new int[3][3];
        System.out.println("Matrix A: "+Arrays.deepToString(a));
        System.out.println("Matrix B: "+Arrays.deepToString(b));
        System.out.println("Matrix A*B: ");
        int i,j,k;
        for(i=0;i<3;i++){
            for(j=0;j<3;j++){
            c[i][j]=0;
                for(k=0;k<3;k++) {
                    c[i][j]+=a[i][k]*b[k][j];
                }
```

```
                System.out.print(c[i][j]+" ");        }
                System.out.println();
            }
            }
}
```

Output:

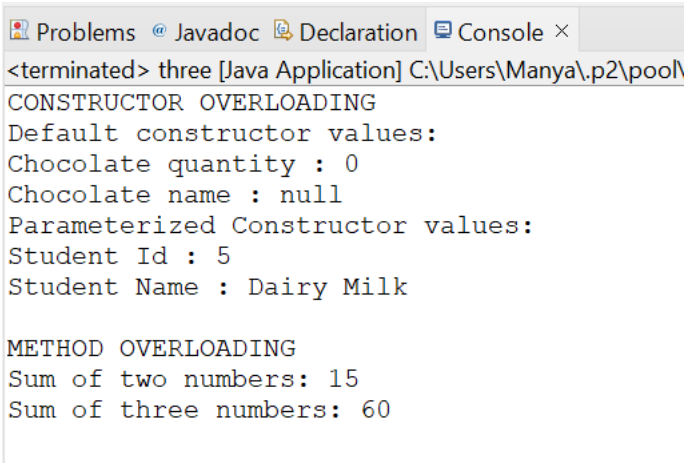


3. Write a java program for Method overloading and Constructor overloading.

```
package manya;

public class three {

        public static void main(String[] args) {

        System.out.println("CONSTRUCTOR OVERLOADING");
        chocolate c1 = new chocolate();
        System.out.println("Default constructor values: ");
        System.out.println("Chocolate quantity : "+c1.qty + "\nChocolate name : "+c1.name);
        System.out.println("Parameterized Constructor values: ");
        chocolate c2 = new chocolate(5, "Dairy Milk");
        System.out.println("Student Id : "+c2.qty + "\nStudent Name : "+c2.name);

        System.out.println("\nMETHOD OVERLOADING");
        numbers n = new numbers();
        System.out.println(n.add(5, 10));
    System.out.println(n.add(10, 20, 30));

        }
```

```
}

class chocolate {
        int qty;
        String name;

        chocolate(){}   //Default constructor

        chocolate(int q, String n){     //Constructor overloading
        qty = q;
        name = n;
        }
}

class numbers {
  int add(int a, int b)
  {
    System.out.print("Sum of two numbers: ");
    int sum = a+b;
    return sum;
  }

  int add(int a, int b, int c)    //Method overloading
  { System.out.print("Sum of three numbers: ");
    int sum = a+b+c;
    return sum;
  }
}
```

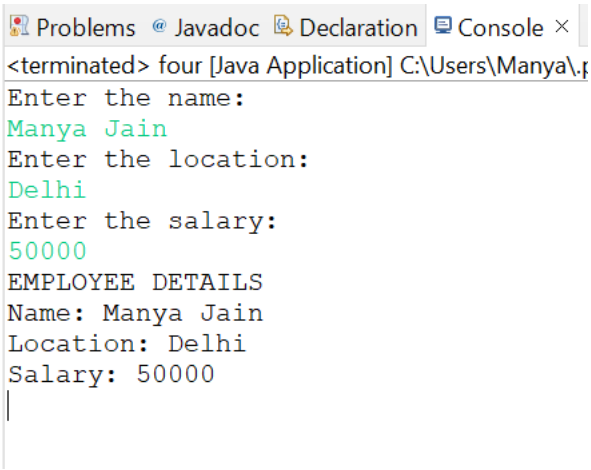
Output:



4. Write a java program to display the employee details using scanner class.

```
package manya;
import java.util.Scanner;

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

            System.out.println("Enter the name: ");
            String name = sc.nextLine();
            System.out.println("Enter the location: ");
            String loc = sc.nextLine();
            System.out.println("Enter the salary: ");
            int sal = sc.nextInt();
            System.out.println("EMPLOYEE DETAILS");
            System.out.println("Name: "+name);
            System.out.println("Location: "+loc);
            System.out.println("Salary: "+sal);

    }
}
```

Output:

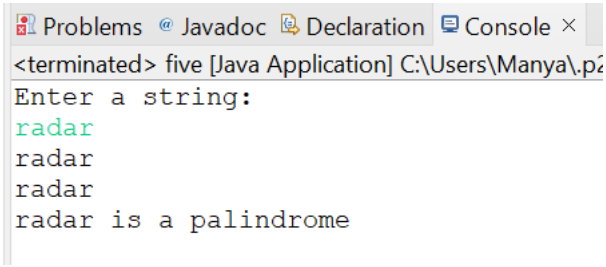


5. Write a java program that checks whether a given string is palindrome or not.

```
package manya;
import java.util.Scanner;

public class five {
  public static void main(String args[])
          {  String rev="";
            int i;
            Scanner sc = new Scanner(System.in);

            System.out.println("Enter a string:");
            String s = sc.nextLine();
            System.out.println(s);

            int l = s.length();

            for(i=l-1; i>=0; i-- )
              {rev = rev + s.charAt(i);}
            System.out.println(rev);

            if(s.equals(rev))
              System.out.println(s+" is a palindrome");
            else
              System.out.println(s+" is not a palindrome");
```

```
        }
}
```

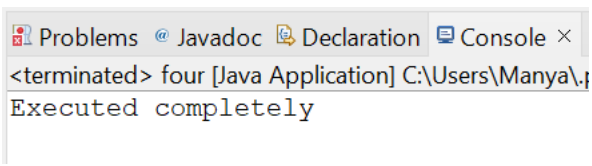
Output:



6. a) Write a java program to represent Abstract class with example.

```
package manya;


abstract class Program {
        abstract void compile();
}


class six extends Program{
                void compile(){
                        System.out.println("Executed completely");}


                public static void main(String args[]){
                 Program s = new six();
                 s.compile();
                }
}
```

Output:

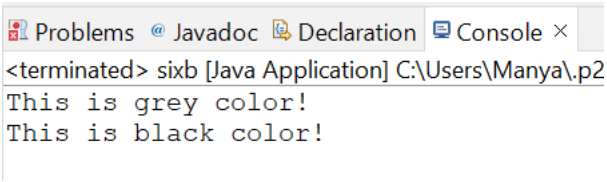


6. b) Write a java program to implement Interface using extends keyword.

```
package manya;
```

```
interface black{
	void blackmethod();
}

interface grey extends black{
	void greymethod();
}

class color implements grey{

	public void greymethod() {
		System.out.println("This is grey color!");
	}

	public void blackMethod() {
		System.out.println("This is black color!");
	}

	public void blackmethod() {
		// TODO Auto-generated method stub
		System.out.println("This is black color!");
	}
}

public class sixb {

	public static void main(String[] args) {

		color obj = new color();

		obj.greymethod();
		obj.blackMethod();
	}

}
```

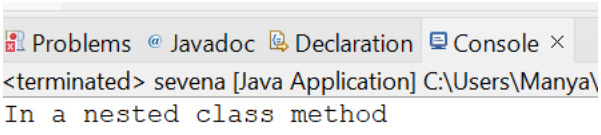
Output:



7. a) Write a java program to create inner classes.

```
package manya;


class Outer {
	class Inner {


		public void show()
			{
				System.out.println("In a nested class method");
			}
		}
	}

class sevena {
	public static void main(String[] args)
		{
			Outer.Inner in = new Outer().new Inner();
			in.show();
		}
}
```

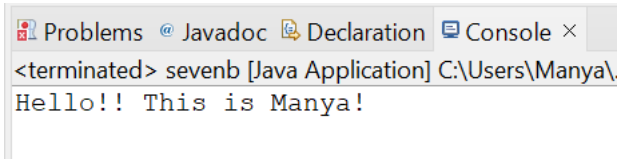
Output:



7. b) Write a java program to create user defined package.

```
package example; //creating user-defined package

public class sevenb {
        public void show()
        {
            System.out.println("Hello!! This is Manya!");
        }

        public static void main(String args[])
        {
            sevenb obj = new sevenb();
                }
}

package manya;
import example.*;

public class seven7 {
        public static void main(String args[])
        {
            sevenb obj = new sevenb();
            obj.show();
        }
}
```

Output:

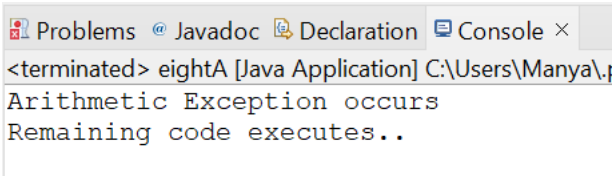


8. a) Write a java program for creating multiple catch blocks.

```
package manya;

public class eightA {

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

```
            try{
                int a[]=new int[5];
                a[5]=30/0;
               }
                catch(ArithmeticException e)
                  {
                   System.out.println("Arithmetic Exception occurs");
                  }
                catch(ArrayIndexOutOfBoundsException e)
                  {
                   System.out.println("ArrayIndexOutOfBounds Exception occurs");
                  }
                catch(Exception e)
                  {
                   System.out.println("Parent Exception occurs");
                  }
                System.out.println("Remaining code executes..");
        }
}
```

Output:



8. b) Write a java program for producer and consumer problem using Threads.

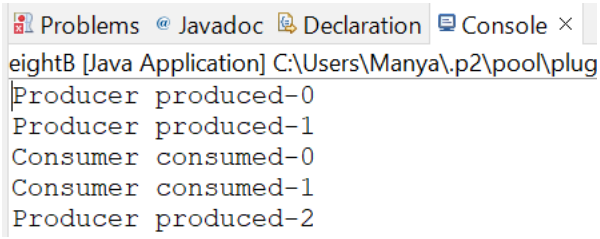
```
package manya;

import java.util.LinkedList;

public class eightB {
        public static void main(String[] args)
                throws InterruptedException
        {
```

```
        final PC pc = new PC();

        Thread t1 = new Thread(new Runnable() {

            public void run()
            {
                try {
                    pc.produce();
                }
                catch (InterruptedException e) {
                    e.printStackTrace();
                }
            }
        });

        Thread t2 = new Thread(new Runnable() {

            public void run()
            {
                try {
                    pc.consume();
                }
                catch (InterruptedException e) {
                    e.printStackTrace();
                }
            }
        });

        t1.start();
        t2.start();

        t1.join();
        t2.join();
}
public static class PC {
```

```
LinkedList<Integer> list = new LinkedList<>();
int capacity = 2;

public void produce() throws InterruptedException
{
	int value = 0;
	while (true) {
		synchronized (this)
		{
			while (list.size() == capacity)
				wait();

			System.out.println("Producer produced-"
								+ value);

			list.add(value++);

			notify();

			Thread.sleep(1000);
		}
	}
}

public void consume() throws InterruptedException
{
	while (true) {
		synchronized (this)
		{
			while (list.size() == 0)
				wait();
			int val = list.removeFirst();

			System.out.println("Consumer consumed-"
								+ val);
```

```
                                        notify();

                                        Thread.sleep(1000);
                                    }
                                }
                            }
                        }
}
```

Output:

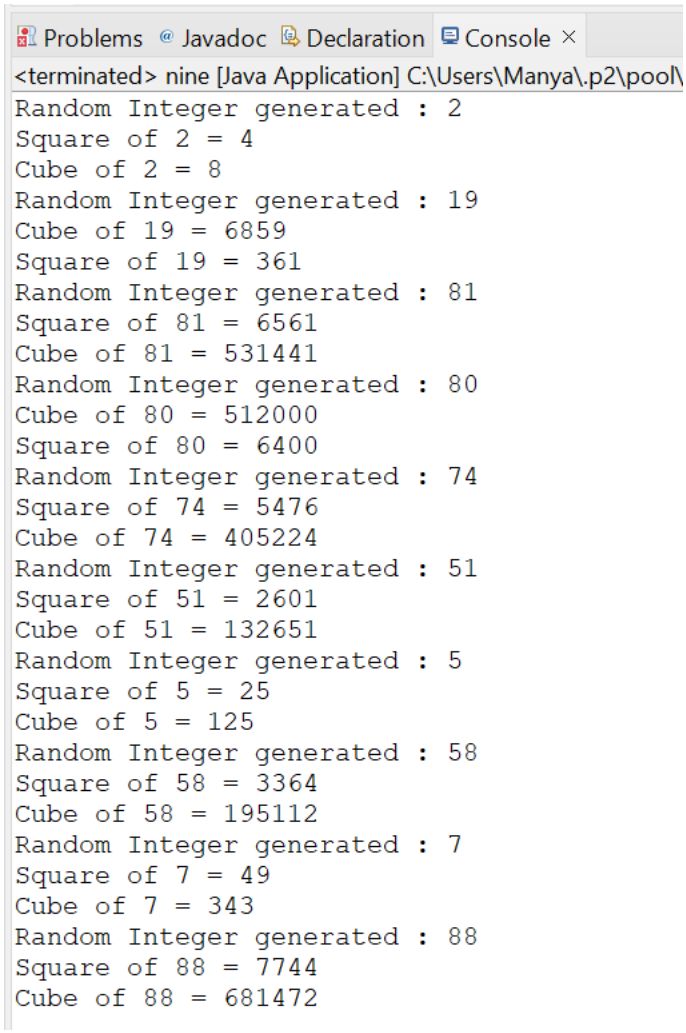


9. Write a Java program that implements a multi-thread application that has three threads.

```
package manya;
import java.util.Random;

class Square extends Thread {
        int x;
        Square(int n) {
                x = n;
        }

        public void run() {
                int sqr = x * x;
                System.out.println("Square of " + x + " = " + sqr);
        }
}

class Cube extends Thread {
        int x;
        Cube(int n) {
                x = n;
```

```
        }

        public void run() {
                int cub = x * x * x;
                System.out.println("Cube of " + x + " = " + cub);
        }
}

class Number extends Thread {
        public void run(){

         Random random = new Random();
         for(int i =0; i<10; i++)
                 {
                         int randomInteger = random.nextInt(100);
                         System.out.println("Random Integer generated : " + randomInteger);
                         Square s = new Square(randomInteger);
                         s.start();
                         Cube c = new Cube(randomInteger);
                         c.start();
                         try {
                         Thread.sleep(1000);

            } catch (InterruptedException ex) {
         System.out.println(ex);
        }
 }
 }
}

public class nine {
        public static void main(String args[]) {
                Number n = new Number();
                n.start();
        }
}
```

Output:

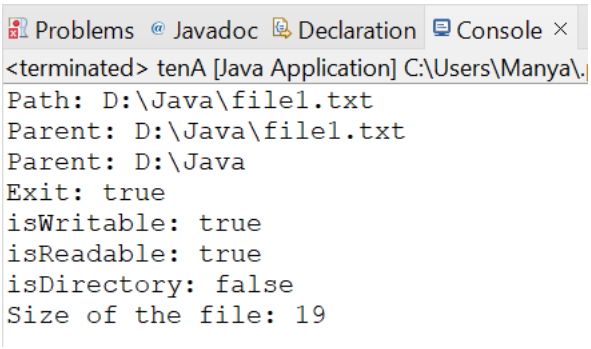


10. a) Write a java program to display File class properties.

```
package manya;
import java.io.*;

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

		File f = new File("D:\\Java\\file1.txt");
		System.out.println("Path: " + f.getPath());
		System.out.println("Parent: " + f.getAbsolutePath());
		System.out.println("Parent: " + f.getParent());
		System.out.println("Exit: " + f.exists());
		if (f.exists()) {
			System.out.println("isWritable: " + f.canWrite());
```

```
                System.out.println("isReadable: " + f.canRead());
                System.out.println("isDirectory: " + f.isDirectory());
                System.out.println("Size of the file: " + f.length());
            }
        }
}
```

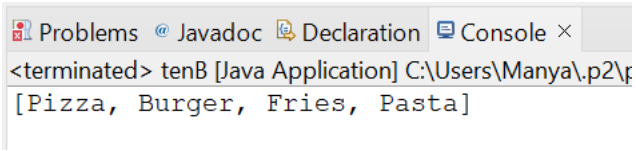
Output:



10. b) Write a java program to represent Array List class.

```
package manya;
import java.util.*;

public class tenB{
    public static void main(String args[]){
        ArrayList<String> list=new ArrayList<String>();
        list.add("Pizza");
        list.add("Burger");
        list.add("Fries");
        list.add("Pasta");
        System.out.println(list);
        }
}
```

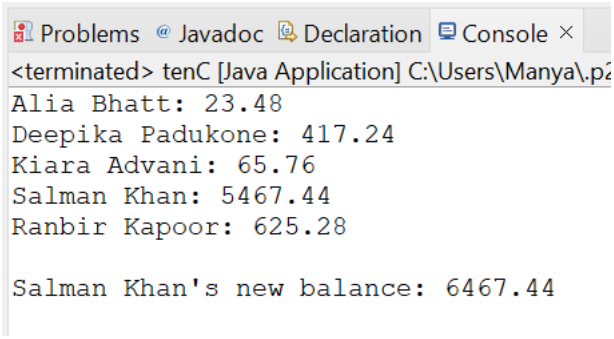
Output:



10. c) Write a Java program loads phone no, name from a text file using hash table.

```
package manya;
import java.util.*;

class tenC {
	public static void main(String args[]) {
		Hashtable balance = new Hashtable();
		Enumeration names;
		String str;
		double bal;
		balance.put("Salman Khan", new Double(5467.44));
		balance.put("Deepika Padukone", new Double(417.24));
		balance.put("Ranbir Kapoor", new Double(625.28));
		balance.put("Alia Bhatt", new Double(23.48));
		balance.put("Kiara Advani", new Double(65.76));
		// Show all balances in hash table.
		names = balance.keys();
		while(names.hasMoreElements()) {
			str = (String) names.nextElement();
			System.out.println(str + ": " +
					balance.get(str));
		}
		System.out.println();

		bal = ((Double)balance.get("Salman Khan")).doubleValue();
		balance.put("Salman Khan", new Double(bal+1000));
		System.out.println("Salman Khan's new balance: " +
				balance.get("Salman Khan"));
	}
}
```

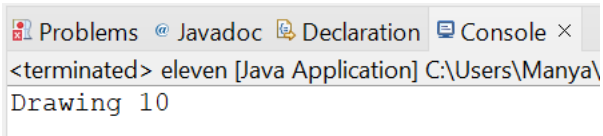
Output:



11. Write a program for implementing runnable using lambda expression.

```
package manya;


interface Drawable{
    public void draw();
}


public class eleven {
    public static void main(String[] args) {
        int width=10;


        //with lambda
        Drawable d2=()->{
            System.out.println("Drawing "+width);
        };
        d2.draw();
    }
}
```

Output:



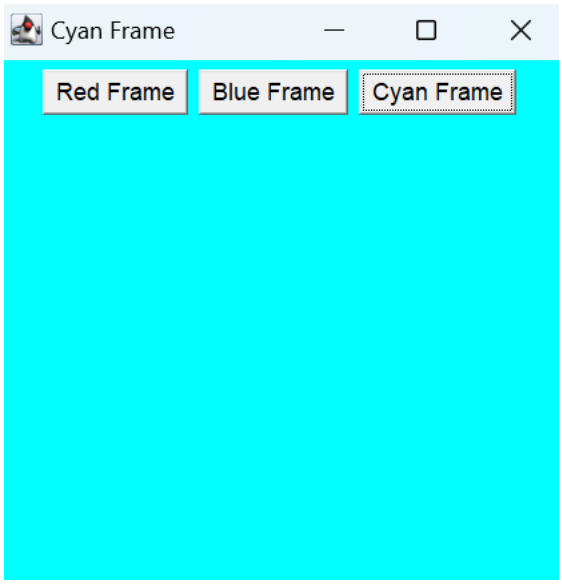
12. Write a program to create a frame with three buttons.

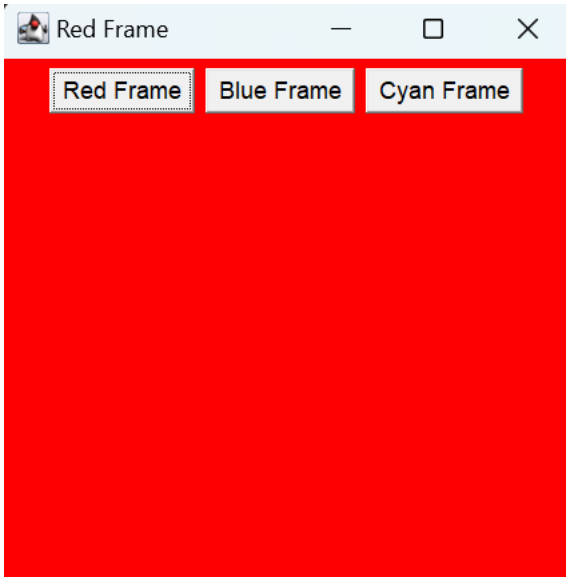
```
package manya;
import java.awt.*;
```

```
import java.awt.event.*;
import java.applet.*;
public class twelve implements ActionListener{
	Frame F;
	Button btnred,btnblue,btncyan;
	public twelve()
	{
		F = new Frame("Default Frame");
		F.setLayout(new FlowLayout());
		F.setSize(300,300);
		F.setVisible(true);

		btnred = new Button("Red Frame");
		btnred.addActionListener(this);
		F.add(btnred);

		btnblue = new Button("Blue Frame");
		btnblue.addActionListener(this);
		F.add(btnblue);

		btncyan = new Button("Cyan Frame");
		btncyan.addActionListener(this);
		F.add(btncyan);

		F.add(btnred);
		F.add(btnblue);
		F.add(btncyan);
	}
	public static void main(String[] args)
	{
		twelve F= new twelve();
	}
	public void actionPerformed(ActionEvent AE)
	{
		if(AE.getActionCommand()=="Red Frame")
		{
```

```
                F.setTitle("Red Frame");
                F.setBackground(Color.RED);
                F.setVisible(true);
            }
            if(AE.getActionCommand()=="Blue Frame")
            {
                F.setTitle("Blue Frame");
                F.setBackground(Color.BLUE);
                F.setVisible(true);
            }
            if(AE.getActionCommand()=="Cyan Frame")
            {
                F.setTitle("Cyan Frame");
                F.setBackground(Color.CYAN);
                F.setVisible(true);
            }
        }
}
```

Outputs:



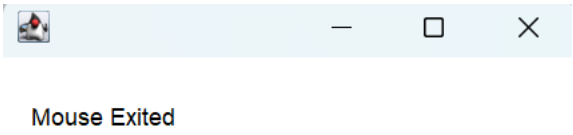


13. a) Write a java program for handling Mouse events and Key events.

```
package manya;
import java.awt.*;
import java.awt.event.*;

public class thirteenA extends Frame implements MouseListener{
    Label l;
    thirteenA(){
        addMouseListener(this);

        l=new Label();
        l.setBounds(20,50,100,20);
        add(l);
        setSize(300,300);
        setLayout(null);
        setVisible(true);
    }
    public void mouseClicked(MouseEvent e) {
        l.setText("Mouse Clicked");
    }
    public void mouseEntered(MouseEvent e) {
        l.setText("Mouse Entered");
    }
```

```
    public void mouseExited(MouseEvent e) {
        l.setText("Mouse Exited");
    }
    public void mousePressed(MouseEvent e) {
        l.setText("Mouse Pressed");
    }
    public void mouseReleased(MouseEvent e) {
        l.setText("Mouse Released");
    }
public static void main(String[] args) {
    new thirteenA();
}
}
```

Output:

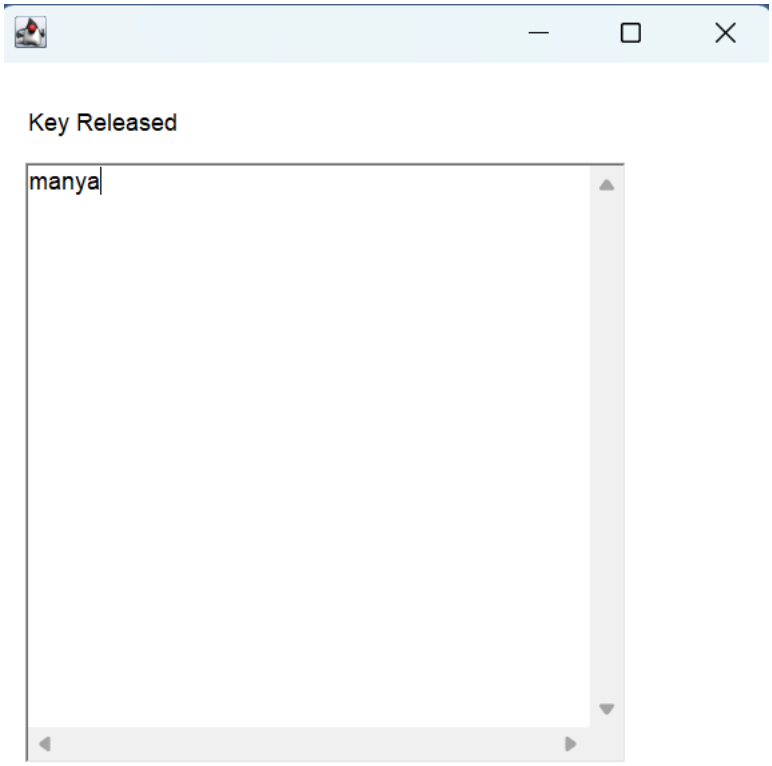


13. b) Write a java program for handling Key events.

```
package manya;
import java.awt.*;
import java.awt.event.*;

public class thirteenB extends Frame implements KeyListener {

 Label l;
    TextArea area;
// class constructor
```

```
    thirteenB() {
          // creating the label
        l = new Label();
// setting the location of the label in frame
        l.setBounds (20, 50, 100, 20);
// creating the text area
        area = new TextArea();
// setting the location of text area
        area.setBounds (20, 80, 300, 300);
// adding the KeyListener to the text area
        area.addKeyListener(this);
// adding the label and text area to the frame
        add(l);
add(area);
// setting the size, layout and visibility of frame
        setSize (400, 400);
        setLayout (null);
        setVisible (true);
    }
    public void keyPressed (KeyEvent e) {
        l.setText ("Key Pressed");
    }
    public void keyReleased (KeyEvent e) {
        l.setText ("Key Released");
    }

    public void keyTyped (KeyEvent e) {
        l.setText ("Key Typed");
    }
  // main method
    public static void main(String[] args) {
        new thirteenB();
    }
}
```

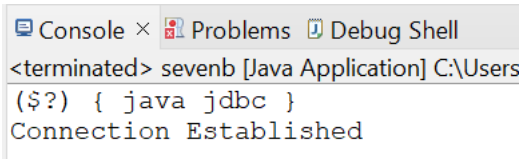
Output:



14. Write a java program that connects to a database using JDBC.

```
package manya;
import java.sql.*;

class fourteen{
    public static void main(String[] args) throws Exception
    {
        String url = "jdbc:mysql://localhost:3306/manya";
        String username = "root";
        String password = "root";
        Class.forName("com.mysql.cj.jdbc.Driver");
        Connection con = DriverManager.getConnection( url, username, password);
        System.out.println("Connection Established");
        con.close();
    }
}
```

Output:

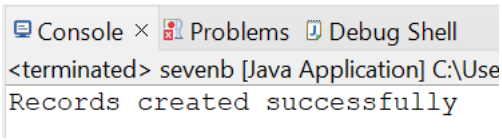


15. a) Write a java program to connect to a database using JDBC and insert values into it.

```
package manya;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.Statement;

public class fifteenA
{
	public static void main(String args[])
	{
		Connection c = null;
		Statement stmt = null;
		try {
			Class.forName("org.postgresql.Driver");
			c = DriverManager
				.getConnection("jdbc:postgresql://localhost:5432/testdb",
					"manya", "123");
			c.setAutoCommit(false);
			System.out.println("Opened database successfully");
			stmt = c.createStatement();
			String sql = "INSERT INTO COMPANY
(ID,NAME,AGE,ADDRESS,SALARY)"+ "VALUES (1, 'Manya', 32, 'Paris', 20000.00 );";
			stmt.executeUpdate(sql);

			sql = "INSERT INTO COMPANY (ID,NAME,AGE,ADDRESS,SALARY)"+
"VALUES (2, 'Steve', 23, 'California', 20000.00);"; stmt.executeUpdate(sql);
			sql = "INSERT INTO COMPANY (ID,NAME,AGE,ADDRESS,SALARY)"+
"VALUES (3, 'Rohan', 25, 'India', 65000.00);"; stmt.executeUpdate(sql);
			stmt.close();
			c.commit();
			c.close();
		} catch (Exception e) {
```

```
                    System.err.println( e.getClass().getName()+": "+ e.getMessage()
                                    ); System.exit(0);
                }
                System.out.println("Records created successfully");
        }
}
```

Output:

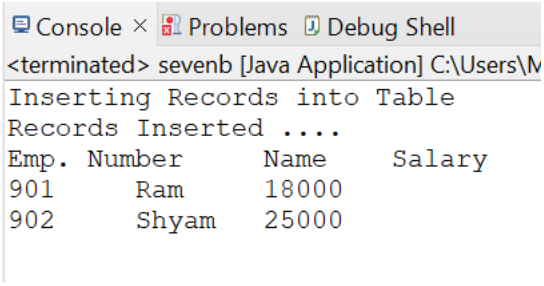


15. b) Write a java program to connect to a database using JDBC and delete values from it.

```
package manya;
import java.sql.*;

public class fifteenB {
   public static void main(String[] args)throws Exception{
            String url = "jdbc:mysql://localhost:3306/manya";
      String username = "root";
      String password = "root";
     Class.forName("com.mysql.cj.jdbc.Driver");
     try{
          Connection conn = DriverManager.getConnection( url, username, password);
       Statement stmt = conn.createStatement();
       System.out.println("Inserting Records into Table");
       String sql = "INSERT INTO EMPLOYEE VALUES (901, 'Ram', 18000)";
       stmt.executeUpdate(sql);
       sql = "INSERT INTO EMPLOYEE VALUES (902, 'Shyam', 25000)";
       stmt.executeUpdate(sql);
       System.out.println("Records Inserted ....");
      String sql2 = "select * from EMPLOYEE;";
       PreparedStatement p = conn.prepareStatement(sql2);
       ResultSet rs = p.executeQuery();
       System.out.println("Emp. Number\tName\tSalary");
       while (rs.next()) {
          int enumr = rs.getInt("E_NUMBER");
```

```
            String name = rs.getString("NAME");
            int salary = rs.getInt("SALARY");
            System.out.println(enumr + "\t\t" + name+ "\t"+salary);
      }} catch (SQLException e) {
         e.printStackTrace();}
   }
}
```

Output:



16. Write a java program that works as a simple calculator. Use a Grid Layout to arrange Buttons for digits and for the + - * % operations. Add a text field to display the result.

```
package manya;


import java.awt.*;
import java.awt.event.*;
class sixteen extends WindowAdapter implements ActionListener{
            Frame f;
            Label l1;
            Button b1,b2,b3,b4,b5,b6,b7,b8,b9,b0;
            Button badd,bsub,bmult,bdiv,bmod,bcalc,bclr,bpts,bneg,bback;
            double xd;
            double num1,num2,check;

            sixteen(){
                        f= new Frame("MY CALCULATOR");
                        // INSTANTIATING COMPONENETS
                        l1=new Label();
                        l1.setBackground(Color.LIGHT_GRAY);
                        l1.setBounds(50,50,260,60);
```

```
b1=new Button("1");
b1.setBounds(50,340,50,50);
b2=new Button("2");
b2.setBounds(120,340,50,50);
b3=new Button("3");
b3.setBounds(190,340,50,50);
b4=new Button("4");
b4.setBounds(50,270,50,50);
b5=new Button("5");
b5.setBounds(120,270,50,50);
b6=new Button("6");
b6.setBounds(190,270,50,50);
b7=new Button("7");
b7.setBounds(50,200,50,50);
b8=new Button("8");
b8.setBounds(120,200,50,50);
b9=new Button("9");
b9.setBounds(190,200,50,50);
b0=new Button("0");
b0.setBounds(120,410,50,50);
bneg=new Button("+/-");
bneg.setBounds(50,410,50,50);
bpts=new Button(".");
bpts.setBounds(190,410,50,50);
bback=new Button("back");
bback.setBounds(120,130,50,50);

badd=new Button("+");
badd.setBounds(260,340,50,50);
bsub=new Button("-");
bsub.setBounds(260,270,50,50);
bmult=new Button("*");
bmult.setBounds(260,200,50,50);
bdiv=new Button("/");
bdiv.setBounds(260,130,50,50);
```

```
bmod=new Button("%");
bmod.setBounds(190,130,50,50);
bcalc=new Button("=");
bcalc.setBounds(245,410,65,50);
bclr=new Button("CE");
bclr.setBounds(50,130,65,50);

b1.addActionListener(this);
b2.addActionListener(this);
b3.addActionListener(this);
b4.addActionListener(this);
b5.addActionListener(this);
b6.addActionListener(this);
b7.addActionListener(this);
b8.addActionListener(this);
b9.addActionListener(this);
b0.addActionListener(this);

bpts.addActionListener(this);
bneg.addActionListener(this);
bback.addActionListener(this);

badd.addActionListener(this);
bsub.addActionListener(this);
bmult.addActionListener(this);
bdiv.addActionListener(this);
bmod.addActionListener(this);
bcalc.addActionListener(this);
bclr.addActionListener(this);

f.addWindowListener(this);
f.add(l1);
f.add(b1); f.add(b2); f.add(b3); f.add(b4); f.add(b5);f.add(b6); f.add(b7);
f.add(b8);f.add(b9);f.add(b0);
f.add(badd); f.add(bsub); f.add(bmod); f.add(bmult); f.add(bdiv);
f.add(bmod);f.add(bcalc);
```

```
        f.add(bclr); f.add(bpts);f.add(bneg); f.add(bback);


        f.setSize(360,500);
        f.setLayout(null);
        f.setVisible(true);
}
public void windowClosing(WindowEvent e) {
        f.dispose();
}
public void actionPerformed(ActionEvent e){
        String z,zt;
        //NUMBER BUTTON
        if(e.getSource()==b1){
                zt=l1.getText();
                z=zt+"1";
                l1.setText(z);          }
        if(e.getSource()==b2){
                zt=l1.getText();
                z=zt+"2";
                l1.setText(z);          }
        if(e.getSource()==b3){
                zt=l1.getText();
                z=zt+"3";
                l1.setText(z);          }
        if(e.getSource()==b4){
                zt=l1.getText();
                z=zt+"4";
                l1.setText(z);
        }
        if(e.getSource()==b5){
                zt=l1.getText();
                z=zt+"5";
                l1.setText(z);
        }
        if(e.getSource()==b6){
                zt=l1.getText();
```

```
            z=zt+"6";
            l1.setText(z);
}
if(e.getSource()==b7){
            zt=l1.getText();
            z=zt+"7";
            l1.setText(z);
}
if(e.getSource()==b8){
            zt=l1.getText();
            z=zt+"8";
            l1.setText(z);
}
if(e.getSource()==b9){
            zt=l1.getText();
            z=zt+"9";
            l1.setText(z);}
if(e.getSource()==b0){
            zt=l1.getText();
            z=zt+"0";
            l1.setText(z);
}

if(e.getSource()==bpts){  //ADD DECIMAL PTS
            zt=l1.getText();
            z=zt+".";
            l1.setText(z);
}
if(e.getSource()==bneg){ //FOR NEGATIVE
            zt=l1.getText();
            z="-"+zt;
            l1.setText(z);
}

if(e.getSource()==bback){  // FOR  BACKSPACE
            zt=l1.getText();
```

```
		try{
			z=zt.substring(0, zt.length()-1);
		}catch(StringIndexOutOfBoundsException f){return;}
		l1.setText(z);
	}
	//AIRTHMETIC BUTTON
	if(e.getSource()==badd){		//FOR ADDITION
		try{
			num1=Double.parseDouble(l1.getText());
		}catch(NumberFormatException f){
			l1.setText("Invalid Format");
			return;
		}
		z="";
		l1.setText(z);
		check=1;
	}
	if(e.getSource()==bsub){		//FOR SUBTRACTION
		try{
			num1=Double.parseDouble(l1.getText());
		}catch(NumberFormatException f){
			l1.setText("Invalid Format");
			return;
		}
		z="";
		l1.setText(z);
		check=2;
	}
	if(e.getSource()==bmult){		//FOR MULTIPLICATION
		try{
			num1=Double.parseDouble(l1.getText());
		}catch(NumberFormatException f){
			l1.setText("Invalid Format");
			return;
		}
		z="";
```

```
            l1.setText(z);
            check=3;
}
if(e.getSource()==bdiv){                //FOR DIVISION
            try{
                        num1=Double.parseDouble(l1.getText());
            }catch(NumberFormatException f){
                        l1.setText("Invalid Format");
                        return;
            }
            z="";
            l1.setText(z);
            check=4;
}
if(e.getSource()==bmod){                //FOR MOD/REMAINDER
            try{
                        num1=Double.parseDouble(l1.getText());
            }catch(NumberFormatException f){
                        l1.setText("Invalid Format");
                        return;
            }
            z="";
            l1.setText(z);
            check=5;
}
//RESULT BUTTON
if(e.getSource()==bcalc){
            try{
                        num2=Double.parseDouble(l1.getText());
            }catch(Exception f){
                        l1.setText("ENTER NUMBER FIRST ");
                        return;
            }
            if(check==1)
                        xd =num1+num2;
            if(check==2)
```

```
                    xd =num1-num2;
                if(check==3)
                    xd =num1*num2;
                if(check==4)
                    xd =num1/num2;
                if(check==5)
                    xd =num1%num2;
                l1.setText(String.valueOf(xd));
            }
            if(e.getSource()==bclr){
                num1=0;
                num2=0;
                check=0;
                xd=0;
                z="";
                l1.setText(z);
            } }

    public static void main(String args[]){
        new sixteen();
        }
}
```

Output: