/*1. Object Creation

```
public class CreateObjectExample1
{
void show()
{
System.out.println("Welcome to javaTpoint");
}
public static void main(String[] args)
{
//creating an object using new keyword
CreateObjectExample1 obj = new CreateObjectExample1();
//invoking method using the object
obj.show();
}
}
```

Even/odd print

```
import java.util.Scanner;

public class EvenOdd {

   public static void main(String[] args) {

      Scanner reader = new Scanner(System.in);

      System.out.print("Enter a number: ");
      int num = reader.nextInt();

      if(num % 2 == 0)
         System.out.println(num + " is even");
      else
         System.out.println(num + " is odd");
   }
}
```

Finding factorial of a number

```
class FactorialExample{
 public static void main(String args[]){
  int i,fact=1;
  int number=5;//It is the number to calculate factorial
  for(i=1;i<=number;i++){
      fact=fact*i;
  }
  System.out.println("Factorial of "+number+" is: "+fact);
 }
}
```

/ determine whether given string is palandrome or not */*

```
import java.io.*;
class  palandrome
{
public static void main(String args[])throws IOException
{
String x;
int i,j,n,l,flag=0;
BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
System.out.println("eneter any string");
x=br.readLine();
n=x.length();
l=n-1;
n=n/2;
i=0;
while(i<n)
{
if(x.charAt(i)!=x.charAt(l))
{
flag=1;
System.out.println("not a palandrome");
break;
}
i++;
l--;

}
if(flag==0)
System.out.println("palandrome");
}
}
```

/*/*Write a program to find Fibonacci series of a given no.
Example :
Input - 8

```
 Output - 1 1 2 3 5 8 13 21
 */

import java.lang.*;
import java.io.*;
class fib
    {
    public static void main(String args[])
            {
            int num = Integer.parseInt(args[0]); //taking no. as command line argument.
                System.out.println("*****Fibonacci Series*****");
            int f1=0, f2=1, f3=0;
            for(int i=1;i<=num;i++)
                {
                System.out.print(f1+" "+f2);
                f3 = f1 + f2;
                f1 = f2;
                f2 = f3;

            }
          }

}
```

/* Java Program Example - Check Prime or Not */

```
import java.util.Scanner;

 class Prime
{
   public static void main(String args[])
   {
      int num, i, count=0;
      Scanner scan = new Scanner(System.in);

      System.out.print("Enter a Number : ");
      num = scan.nextInt();

      for(i=2; i<num; i++)
      {
         if(num%i == 0)
         {
            count++;
            break;
         }
      }
      if(count == 0)
      {
         System.out.print("This is a Prime Number");
      }
      else
      {
         System.out.print("This is not a Prime Number");
      }
   }
}
```

*/*2.Write a Java program that uses both recursive and non-recursive functions to print nth value in the Fibonacci sequence*/*

*/*Without recursion*/*

```
import java.util.Scanner;
class fibonacci
{
    public static void main(String[] input)
    {
            int x,y;
            x=Integer.parseInt(input[0]);
            y=Integer.parseInt(input[1]);
            Scanner s=new Scanner(System.in);
            System.out.println("Enter the value of n:");
            int n=s.nextInt();
            int z[]=new int[n];
            z[0]=x;
            z[1]=y;
            for(int i=2;i<n;i++)
            {
                    z[i]=z[i-1]+z[i-2];
            }
            for(int i=0;i<n;i++)
            {
                    System.out.println(z[i]);
            }
    }
}
```

```
/*With recursion*/

import java.util.Scanner;
class fibonacci
{
    public static void main(String[] args)
    {
            Scanner s=new Scanner(System.in);
            System.out.println("Enter the value of n:");
            int n=s.nextInt();
            fiboni f1=new fiboni();
            System.out.println(f1.fibon(n));
    }
}
class fiboni
{
    public int fibon(int a)
    {
            if(a==0 || a==1)
                    return 1;
            else
                    return fibon(a-1)+fibon(a-2);
    }
}
```

Output:

10
1
1
2
3
5
8
13
21
34
55

*/*3.Write a Java program that prompts the user for an integer and then prints out all prime numbers upto that integer */*

```
import java.util.Scanner;
class prime
{
    public static void main(String[] args)
    {
            int n,p;
            Scanner s=new Scanner(System.in);
            System.out.println("Enter upto which number prime numbers are needed");
            n=s.nextInt();
            for(int i=2;i<n;i++)
            {
                    p=0;
                    for(int j=2;j<i;j++)
                    {
                            if(i%j==0)
                            p=1;
                    }
                    if(p==0)
                            System.out.println(i);
            }
    }
}
```

Output:

Enter upto which number prime numbers are needed:20
2
3
5
7
11
13
17
19

Enter upto which number prime numbers are needed:35

2
3
5
7
11
13
17
19
23
29
31

*/*4.Write a Java program that checks whether the given string is palindrome or not*/*

```
class palindrome
{
    public static void main(String[] args)
    {
            StringBuffer s1=new StringBuffer(args[0]);
            StringBuffer s2=new StringBuffer(s1);
            s1.reverse();
            System.out.println("Given String is:"+s2);
            System.out.println("Reverse String is"+s1);
            if(String.valueOf(s1).compareTo(String.valueOf(s2))==0)
                    System.out.println("Palindrome");
            else
                    System.out.println("Not Palindrome");
    }
}
```

Output:

Java palindrome madam
Given String is:madam
Reverse String is madam
Palindrome

Java palindrome harish
Given String is:harish
Reverse String is hsirah
Not Palindrome

*/*5.Write a Java program to sort a given list of names in ascending order*/*

```
class sorting
{
    public static void main(String[] input)
    {
            int k=input.length;
            String temp=new String();
            String names[]=new String[k+1];
            for(int i=0;i<k;i++)
            {
                    names[i]=input[i];
            }
            for(int i=0;i<k;i++)
                    for(int j=i+1;j<k;j++)
                    {
                            if(names[i].compareTo(names[j])<0)
                            {
                                    temp=names[i];
                                    names[i]=names[j];
                                    names[j]=temp;
                            }
                    }
            System.out.println("Sorted order is");
            for(int i=0;i<k;i++)
            {
                    System.out.println(names[i]);
            }
    }
}
```

Output:

Java sorting Harish Ramesh Mahesh Rakesh
Sorted order is
Ramesh
Rakesh
Mahesh
Harish

Java sorting sai hari teja ravi sandeep
Sorted order is
teja
sandeep
sai
ravi
hari

Write a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$.Read in a,b,c and use the quadratic formula.If the discriminant b^2-4ac is negative,display a message stating that there are no real roots/*

```
import java.util.Scanner;
 class solutions
{
    public static void main(String[] args)
    {
            int a,b,c;
            double x,y;
            Scanner s=new Scanner(System.in);
            System.out.println("Enter the values of a,b, and c");
            a=s.nextInt();
            b=s.nextInt();
            c=s.nextInt();
            int k=(b*b)-4*a*c;
            if(k<0)
            {
                    System.out.println("No real roots");
            }
            else
            {
                    double l=Math.sqrt(k);
                    x=(-b-l)/2*a;
                    y=(-b+l)/2*a;
                    System.out.println("Roots of given equation:"+x+" "+y);
            }
    }
}
```

Output:

```
Enter the values of a,b,c
1
5
6
Roots of given equation:-3.0   -2.0



Enter the values of a, b, c
1
2
2
No real solutions



Enter the values of a, b, c
1
3
2
Roots of given equation: -2.0     -1.0
```

*/*6. Write a Java Program to multiply two matrices*/*

```
import java.util.Scanner;
class matmul
{
    public static void main(String args[])
    {
            int a[][]=new int[3][3];
            int b[][]=new int[3][3];
            int c[][]=new int[3][3];
            System.out.println("Enter the first matrix:");
            Scanner input=new Scanner(System.in);
            for(int i=0;i<3;i++)
                    for(int j=0;j<3;j++)
                       a[i][j]=input.nextInt();

            System.out.println("Enter the second matrix:");
            for(int i=0;i<3;i++)
                    for(int j=0;j<3;j++)
```

```
                    b[i][j]=input.nextInt();
        System.out.println("Matrix multiplication is as follows:");
        for(int i=0;i<3;i++)
        {
            for(int j=0;j<3;j++)
            {
                c[i][j]=0;
                for(int k=0;k<3;k++)
                {
                  c[i][j]+=a[i][k]*b[k][j];
                }
            }
        }
        for(int i=0;i<3;i++)
        {
            for(int j=0;j<3;j++)
            {
            System.out.print(a[i][j]+"\t");
            }
            System.out.println("\n");
            }
            System.out.println("\n");
            for(int i=0;i<3;i++)
        {
            for(int j=0;j<3;j++)
            {
            System.out.print(b[i][j]+"\t");
            }
            System.out.println("\n");
            }
            System.out.println("\n");
        for(int i=0;i<3;i++)
        {
            for(int j=0;j<3;j++)
            {
            System.out.print(c[i][j]+"\t");
            }
            System.out.println("\n");
            }
    }

}
```

Output:

```
Enter the first matrix:
1 2 3  4 5 6 7 8 9
Enter the second matrix:
9 8 7 6 5 4 3 2 1
Matrix multiplication is as follows:
    1       2       3
    4       5       6
    7       8       9

    9       8       7
    6       5       4
    3       2       1

    30      24      18
    84      69      54
    138     114     90
```

*/*7.Write a Java programme that reads a line of integers and displays each integer and sum of all integers using StringTokenizer class*/*

```
import java.util.StringTokenizer;
import java.util.Scanner;
class tokens
{
    public static void main(String[] args)
    {
            Scanner input=new Scanner(System.in);
            String sentence=input.nextLine();
            String temp;
            int k,total=0;
            StringTokenizer s1=new StringTokenizer(sentence);
            System.out.println("Total Number of tokens:"+s1.countTokens());
            while(s1.hasMoreTokens())
            {
                    temp=s1.nextToken();
                    k=Integer.parseInt(temp);
```

```
                total+=k;
                System.out.print(k+"\t");
            }
            System.out.println("Sum of tokens :"+total);
    }
}
```

Output:

```
12  43  78  98
Total Number of tokens:4
    12      43      78      98
Sum of tokens : 231


123 456 798
Total number of tokens:3
    123     456     798
Sum of tokens:1377
```

*/*8.Write a Java program that reads on file name from the user then displays information about whether the file exists,whether the file is readable,whether the file is writable,the type of the file and the length of the file in bytes*/*

```
import java.util.Scanner;
import java.io.File;
class FileDemo
{
    public static void main(String[] args)
    {
            Scanner input=new Scanner(System.in);
            String s=input.nextLine();
            File f1=new File(s);
            System.out.println("File Name:"+f1.getName());
            System.out.println("Path:"+f1.getPath());
            System.out.println("Abs Path:"+f1.getAbsolutePath());
            System.out.println("Parent:"+f1.getParent());
            System.out.println("This file is:"+(f1.exists()?"Exists":"Does not exists"));
            System.out.println("Is file:"+f1.isFile());
            System.out.println("Is Directory:"+f1.isDirectory());
```

```
            System.out.println("Is Readable:"+f1.canRead());
            System.out.println("IS Writable:"+f1.canWrite());
            System.out.println("Is Absolute:"+f1.isAbsolute());
            System.out.println("File Last Modified:"+f1.lastModified());
            System.out.println("File Size:"+f1.length()+"bytes");
            System.out.println("Is Hidden:"+f1.isHidden());
    }
}
```

Output:

```
Fibonacci.java
File Name:Fibonacci.java
Path: Fibonacci.java
Abs Path: c:\sameer\Fibonacci.java
Parent: Null
This file is:Exists
Is file:true
Is Directory:false
Is Readable:true
Is Writable:true
Is Absolute:false
File Last Modified:1206324301937
File Size: 406 bytes
Is Hidden:false
```

*/*9.Wtire a Java program that reads a file and displays a file and displays the file on the screen,with a line number before each line.*/*

```
import java.io.*;
class linenum
{
    public static void main(String[] args)throws IOException
    {
            FileInputStream fil;
            LineNumberInputStream line;
            int i;
            try
            {
                    fil=new FileInputStream(args[0]);
                    line=new LineNumberInputStream(fil);
            }
            catch(FileNotFoundException e)
            {
                    System.out.println("No such file found");
                    return;
```

```
            }
            do
            {
                  i=line.read();
                  if(i=='\n')
                  {
                        System.out.println();
                        System.out.print(line.getLineNumber()+" ");
                  }
                  else
                        System.out.print((char)i);
            }while(i!=-1);
            fil.close();
            line.close();
      }
}
```

Output:

Demo.java

```
class Demo
1 {
2     public static void main(java Demo beta gamma delta)
3     {
4           int n = 1 ;
5           System.out.println("The word is " + args[ n ] );
6     }
7 }
8?
```

*/*10.Write a Java program that displays the number of characters,lines and words in a given text file*/*

```
import java.io.*;
class wordcount
{
    public static int words=0;
    public static int lines=0;
    public static int chars=0;
    public static void wc(InputStreamReader isr)throws IOException
    {
            int c=0;
            boolean lastwhite=true;
            while((c=isr.read())!=-1)
            {
                    chars++;
                    if(c=='\n')
                            lines++;
                    if(c=='\t' || c==' ' || c=='\n')
                            ++words;
```

```
                if(chars!=0)
                        ++chars;
        }
     }
    public static void main(String[] args)
    {
        FileReader fr;
        try
        {
            if(args.length==0)
            {
                wc(new InputStreamReader(System.in));
            }
            else
            {
                for(int i=0;i<args.length;i++)
                {
                    fr=new FileReader(args[i]);
                    wc(fr);
                }
            }

        }
        catch(IOException ie)
        {
            return;
        }
        System.out.println(lines+" "+words+" "+chars);
    }
}
```

Output:

This is II CSE
^Z
1 4 32

Draw the frequency response
^Z
1 4 58

*/*11(a).Write a Java program that implements stack ADT*/*

```
import java.util.Scanner;
class stack<E>
{
    private final int size;
    private int top;
    private E[] elements;
    public stack()
    {
            this(10);
    }
    public stack(int s)
    {
            size=s>0?s:10;
            top=-1;
            elements=(E[])new Object[size];
    }
    public void push(E x)
    {
```

```
            if(top==size-1)
                System.out.println("Overflow");
            elements[++top]=x;
    }
    public E pop()
    {
            if(top==-1)
                System.out.println("Underflow");
            return elements[top--];
    }
    public void display()
    {
            if(top==-1)
                System.out.println("Stack is empty");
            else
            {
                for(int i=0;i<top;i++)
                    System.out.println(elements[i]);
            }
    }
}



public class stacktest
{
    public static void main(String[] args)
    {
            int ch,ch1;
            stack<Double>d_stack;
            d_stack=new stack<Double>(5);
            Scanner input=new Scanner(System.in);
            do
            {
                System.out.println("Menu is as follows:");
                System.out.println("1.Push\n2.Pop\n3.Display\n4.Exit");
                System.out.println("Enter your choice:");
                ch=input.nextInt();
                switch(ch)
                {
                    case 1:     System.out.println("Enter element to push:");
                                double item=input.nextInt();
                                d_stack.push(item);
```

```
                                    break;
                        case 2:     double item1=d_stack.pop();
                                    System.out.println("Popped item:"+item1);
                                    break;
                        case 3:     d_stack.display();
                                    break;
                        default:    break;
                    }
            }while(ch!=4);
    }
}
```

Output:

```
Menu is as follows:
1.Push
2.Pop
3.Display
4.Exit
Enter ur choice:1
Enter element to push :12
Menu is as follows:
1.Push
2.Pop
3.Display
4.Exit
Enter ur choice:1
Enter element to push:13
Menu is as follows:
1.Push
2.Pop
3.Display
4.Exit
```

```
Enter ur choice:3
12.0
13.0
Menu is as follows:
1.Push
2.Pop
3.Display
4.Exit
Enter ur choice:2
Popped item:13.0
Menu is as follows:
1.Push
2.Pop
3.Display
4.Exit
Enter ur choice:2
Popped item:12.0
Menu is as follows:
1.Push
2.Pop
3.Display
4.Exit
Enter ur choice:3
Stack is empty
```

*/*11(b).Write a Java program that converts infix expression into postfix form*/*

```
import java.io.*;
class stack
{
    char stack1[]=new char[20];
    int top;
    void push(char ch)
    {
            top++;
            stack1[top]=ch;
    }
    char pop()
    {
            char ch;
            ch=stack1[top];
            top--;
            return ch;
    }
    int pre(char ch)
```

```
{
        switch(ch)
        {
                case '-':return 1;
                case '+':return 1;
                case '*':return 2;
                case '/':return 2;
        }
        return 0;
}
boolean operator(char ch)
{
        if(ch=='/'||ch=='*'||ch=='+'||ch=='-')
                return true;
        else
                return false;
}
boolean isAlpha(char ch)
{
        if(ch>='a'&&ch<='z'||ch>='0'&&ch=='9')
                return true;
        else
                return false;
}
void postfix(String str)
{
        char output[]=new char[str.length()];
        char ch;
        int p=0,i;
        for(i=0;i<str.length();i++)
        {
                ch=str.charAt(i);
                if(ch=='(')
                {
                        push(ch);
                }
                else if(isAlpha(ch))
                {
                        output[p++]=ch;
                }
                else if(operator(ch))
                {
                        if(stack1[top]==0||(pre(ch)>pre(stack1[top]))||stack1[top]=='(')
                {
```

```
                push(ch);
            }
            }
            else if(pre(ch)<=pre(stack1[top]))
            {
                output[p++]=pop();
                push(ch);
            }
            else if(ch=='(')
            {
                while((ch=pop())!='(')
                {
                    output[p++]=ch;
                }
            }
        }
        while(top!=0)
        {
            output[p++]=pop();
        }
        for(int j=0;j<str.length();j++)
        {
            System.out.print(output[j]);
        }
    }
}
class intopost
{
    public static void main(String[] args)throws Exception
    {
        String s;
        BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
        stack b=new stack();
        System.out.println("Enter input string");
        s=br.readLine();
        System.out.println("Input String:"+s);
        System.out.println("Output String:");
        b.postfix(s);
    }
}
```

Output:

Enter input string
a+b*c
Input String:a+b*c
Output String:
abc*+

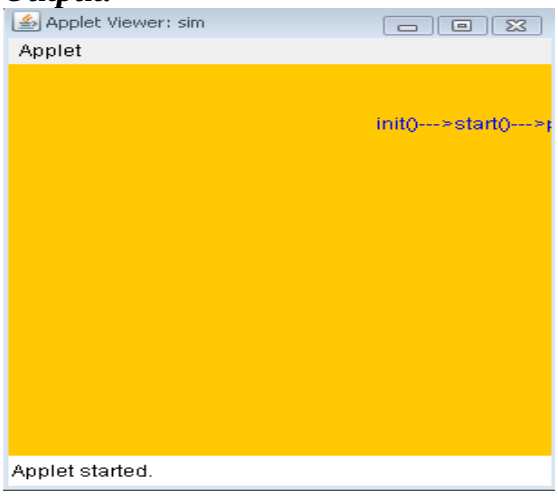
Enter input string
a+(b*c)/d
Input String:a+(b*c)/d
Output String:
abc*d/)(+

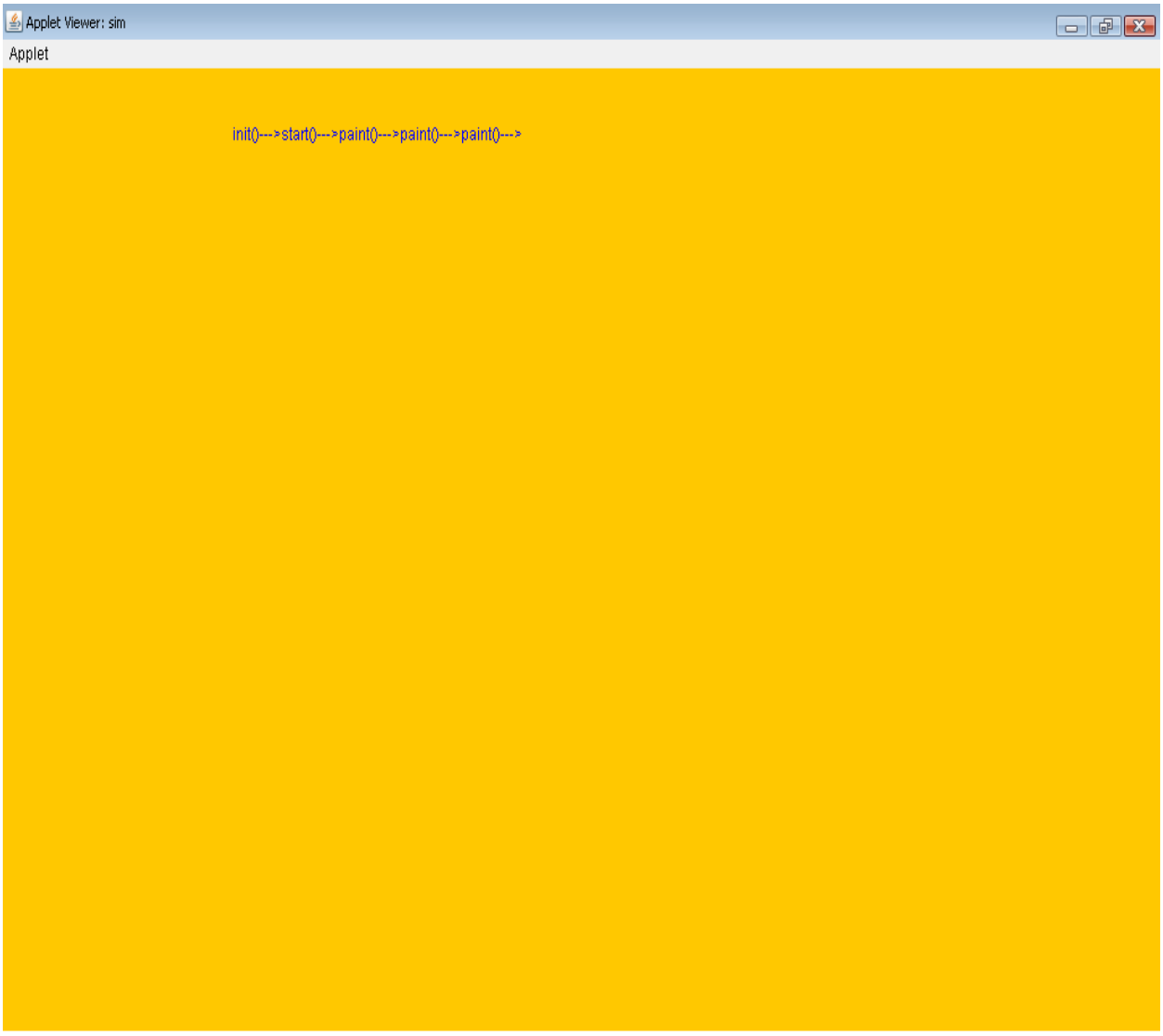
/12.Write an applet that displays a simple message/*

```
import java.awt.*;
import java.applet.*;
/*
 <applet code="sim" width=300 height=300>
 </applet>
 */
 public class sim extends Applet
 {
            String msg=" ";
            public void init()
            {
                        msg+="init()--->";
                        setBackground(Color.orange);
            }
            public void start()
            {
                  msg+="start()--->";
                  setForeground(Color.blue);
```

```
        }
        public void paint(Graphics g)
        {
                msg+="paint()--->";
                g.drawString(msg,200,50);
        }
}
```

Output:





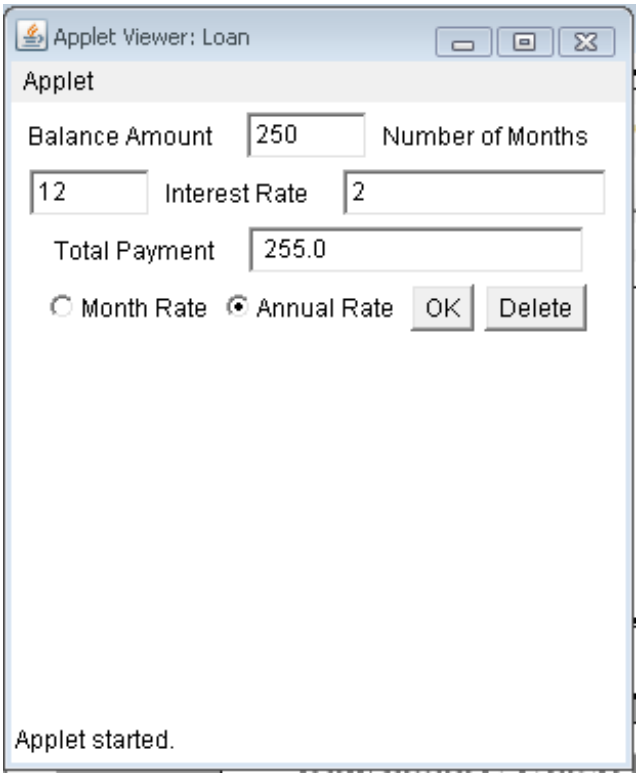
*/*13.Write a Java program that computes the payment of a loan based on the amount of the loan, the interest rate and the number of months. It takes one parameter from the browser: Monthly rate;if true,the interest rate is per month;Otherwise the interest rate is annual*/*

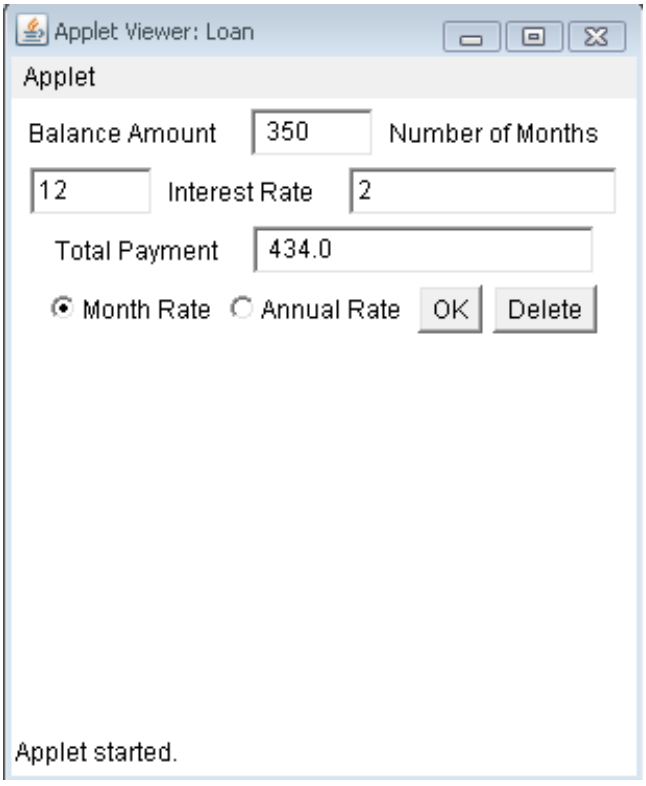
```
import java.awt.*;
import java.awt.event.*;
import java.applet.*;
/*
<applet code="Loan" width=300 height=300>
</applet>
*/
public class Loan extends Applet
implements ActionListener,ItemListener
{
    double p,r,n,total,i;
```

```
String param1;
boolean month;
Label l1,l2,l3,l4;
TextField t1,t2,t3,t4;
Button b1,b2;
CheckboxGroup cbg;
Checkbox c1,c2;
String str;
public void init()
{
        l1=new Label("Balance Amount",Label.LEFT);
        l2=new Label("Number of Months",Label.LEFT);
        l3=new Label("Interest Rate",Label.LEFT);
        l4=new Label("Total Payment",Label.LEFT);
        t1=new TextField(5);
        t2=new TextField(5);
        t3=new TextField(15);
        t4=new TextField(20);
        b1=new Button("OK");
        b2=new Button("Delete");
        cbg=new CheckboxGroup();
        c1=new Checkbox("Month Rate",cbg,true);
        c2=new Checkbox("Annual Rate",cbg,true);
        t1.addActionListener(this);
        t2.addActionListener(this);
        t3.addActionListener(this);
        t4.addActionListener(this);
        b1.addActionListener(this);
        b2.addActionListener(this);
        c1.addItemListener(this);
        c2.addItemListener(this);
        add(l1);
        add(t1);
        add(l2);
        add(t2);
        add(l3);
        add(t3);
        add(l4);
        add(t4);
        add(c1);
        add(c2);
        add(b1);
        add(b2);
}
```

```
    public void itemStateChanged(ItemEvent ie)
    {
    }
    public void actionPerformed(ActionEvent ae)
    {
            str=ae.getActionCommand();
            if(str.equals("OK"))
            {
                    p=Double.parseDouble(t1.getText());
                    n=Double.parseDouble(t2.getText());
                    r=Double.parseDouble(t3.getText());
                    if(c2.getState())
                    {
                            n=n/12;
                    }
                    i=(p*n*r)/100;
                    total=p+i;
                    t4.setText(" "+total);
            }
            else if(str.equals("Delete"))
            {
                    t1.setText(" ");
                    t2.setText(" ");
                    t3.setText(" ");
                    t4.setText(" ");
            }
    }
}
```

Output:





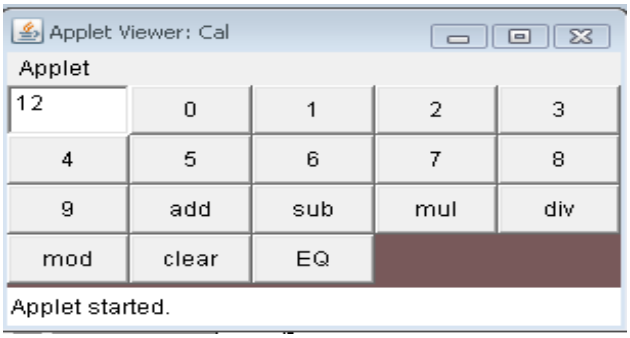
*/*14.Write a Java program that works as a simple calculator.Use a grid layout to arrange buttons for the digits and for the + - * % operations.Add a text field to display the result.*/*

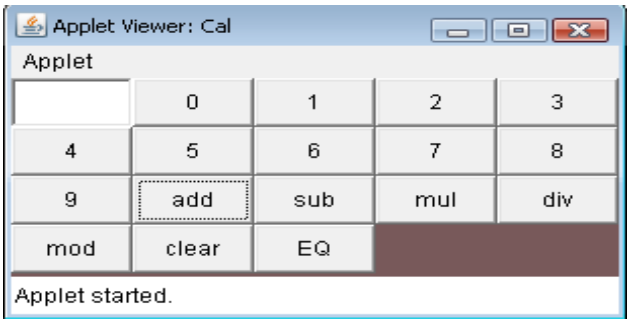
```
import java.awt.*;
import java.awt.event.*;
import java.applet.*;

/*
<applet code="Cal" width=300 height=300>
</applet>
*/

public class Cal extends Applet
implements ActionListener
{
    String msg=" ";
    int v1,v2,result;
    TextField t1;
    Button b[]=new Button[10];
    Button add,sub,mul,div,clear,mod,EQ;
    char OP;
    public void init()
    {
            Color k=new Color(120,89,90);
            setBackground(k);
            t1=new TextField(10);
            GridLayout gl=new GridLayout(4,5);
            setLayout(gl);
            for(int i=0;i<10;i++)
            {
                    b[i]=new Button(""+i);
            }
            add=new Button("add");
            sub=new Button("sub");
            mul=new Button("mul");
            div=new Button("div");
            mod=new Button("mod");
            clear=new Button("clear");
            EQ=new Button("EQ");
            t1.addActionListener(this);
            add(t1);
            for(int i=0;i<10;i++)
            {
                    add(b[i]);
            }
            add(add);
            add(sub);
```

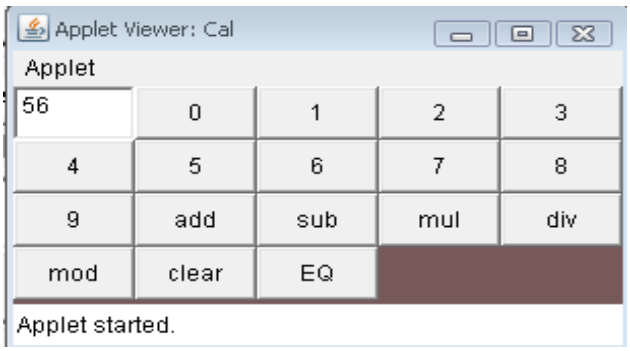
```
        add(mul);
        add(div);
        add(mod);
        add(clear);
        add(EQ);
        for(int i=0;i<10;i++)
        {
                b[i].addActionListener(this);
        }
        add.addActionListener(this);
        sub.addActionListener(this);
        mul.addActionListener(this);
        div.addActionListener(this);
        mod.addActionListener(this);
        clear.addActionListener(this);
        EQ.addActionListener(this);
}

public void actionPerformed(ActionEvent ae)
{
        String str=ae.getActionCommand();
        char ch=str.charAt(0);
        if ( Character.isDigit(ch))
        t1.setText(t1.getText()+str);
        else
        if(str.equals("add"))
        {
                v1=Integer.parseInt(t1.getText());
                OP='+';
                t1.setText("");
        }
        else if(str.equals("sub"))
        {
                v1=Integer.parseInt(t1.getText());
                OP='-';
                t1.setText("");
        }
        else if(str.equals("mul"))
        {
                v1=Integer.parseInt(t1.getText());
                OP='*';
                t1.setText("");
        }
        else if(str.equals("div"))
```

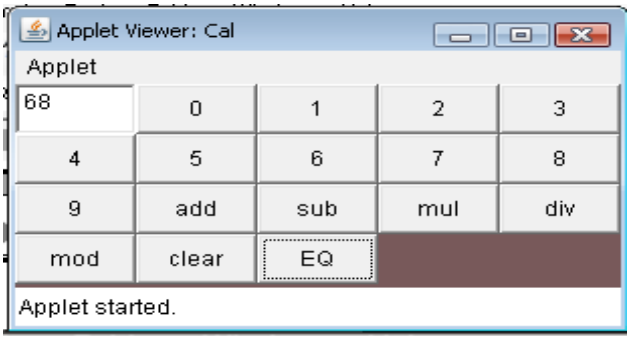
```
        {
            v1=Integer.parseInt(t1.getText());
            OP='/';
            t1.setText("");
        }
        else if(str.equals("mod"))
        {
            v1=Integer.parseInt(t1.getText());
            OP='%';
            t1.setText("");
        }
        if(str.equals("EQ"))
        {
            v2=Integer.parseInt(t1.getText());
            if(OP=='+')
                result=v1+v2;
            else if(OP=='-')
                result=v1-v2;
            else if(OP=='*')
                result=v1*v2;
            else if(OP=='/')
                result=v1/v2;
            else if(OP=='%')
                result=v1%v2;
            t1.setText(""+result);
        }
        if(str.equals("clear"))
        {
            t1.setText("");
        }
    }
}
```

Output:







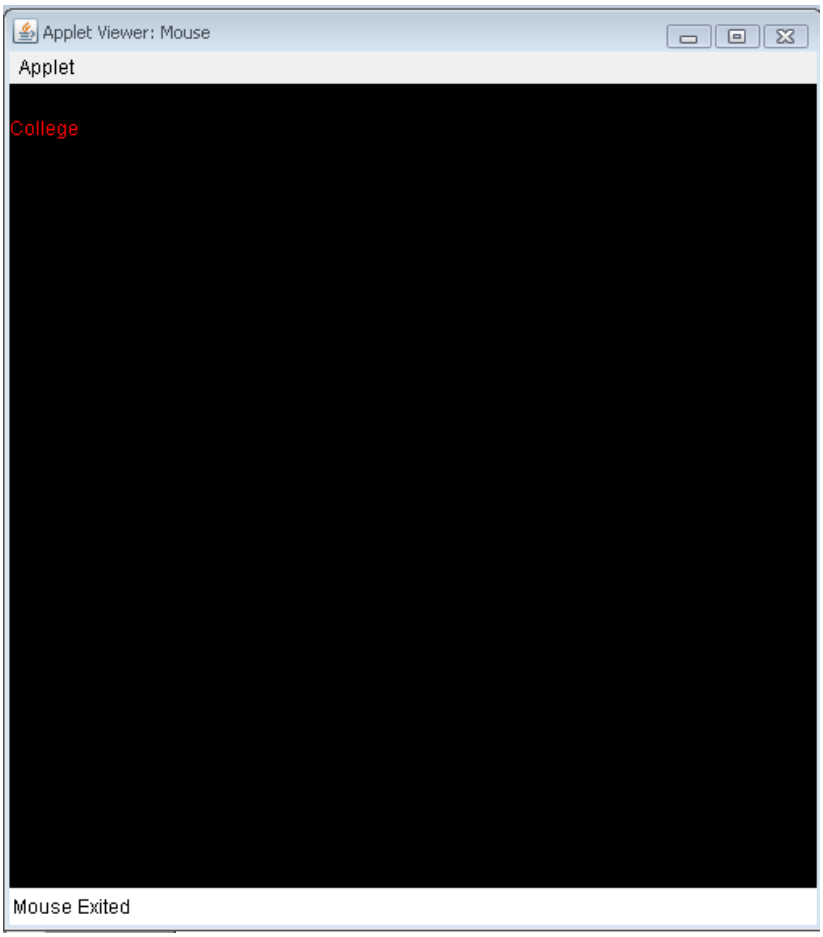


*/*15.Write a Java program for handling mouse events*/*

```
import java.awt.*;
import java.awt.event.*;
import java.applet.*;
/*
<applet code="Mouse" width=500 height=500>
</applet>
*/
public class Mouse extends Applet
implements MouseListener,MouseMotionListener
{
    int X=0,Y=20;
    String msg="MouseEvents";
    public void init()
    {
            addMouseListener(this);
            addMouseMotionListener(this);
            setBackground(Color.black);

            setForeground(Color.red);
    }
    public void mouseEntered(MouseEvent m)
    {
            setBackground(Color.magenta);
            showStatus("Mouse Entered");
            repaint();
    }
    public void mouseExited(MouseEvent m)
    {
            setBackground(Color.black);
            showStatus("Mouse Exited");
            repaint();
    }
    public void mousePressed(MouseEvent m)
    {
            X=10;
            Y=20;
            msg="NEC";
            setBackground(Color.green);
            repaint();
    }
    public void mouseReleased(MouseEvent m)
    {
            X=10;
            Y=20;
```

```
            msg="Engineering";
            setBackground(Color.blue);
            repaint();
    }
    public void mouseMoved(MouseEvent m)
    {
            X=m.getX();
            Y=m.getY();
            msg="College";
            setBackground(Color.white);
            showStatus("Mouse Moved");
            repaint();
    }
    public void mouseDragged(MouseEvent m)
    {
            msg="CSE";
            setBackground(Color.yellow);
            showStatus("Mouse Moved"+m.getX()+" "+m.getY());
            repaint();
    }
    public void mouseClicked(MouseEvent m)
    {
            msg="Students";
            setBackground(Color.pink);
            showStatus("Mouse Clicked");
            repaint();
    }
    public void paint(Graphics g)
    {
            g.drawString(msg,X,Y);
    }
}
```

Output:



*/*16.Write a Java program for creating multiple threads*/*

```
class NewThread implements Runnable
{
    String name;
    Thread t;
    NewThread(String threadname)
    {
        name=threadname;
        t=new Thread(this,name);
        System.out.println("New Thread:"+t);
        t.start();
    }
    public void run()
    {
        try
        {
            for(int i=5;i>0;i--)
            {
                System.out.println(name+ ":"+i);
                Thread.sleep(1000);
            }
        }
        catch(InterruptedException e)
        {
            System.out.println(name+" Interrupted");
        }
        System.out.println(name+" exiting");
    }
}
class MultiThreadDemo
{

public static void main(String[] args)
    {
        new NewThread("One");
        new NewThread("Two");
        new NewThread("Three");
        try
        {
            Thread.sleep(10000);
        }
        catch(InterruptedException e)
        {
            System.out.println("Main Thread Interrupted");
```

```
            }
            System.out.println("Main Thread Exiting");
        }
    }
```

Output:

```
New Thread :Thread[One,5,main]
New Thread : Thread[Two,5,main]
One:5
Two:5
New Thread : Thread[Three,5,main]
Three:5
One:4
Three:4
Two:4
One:3
Three:3
Two:3
One:2
Three:2
Two:2
One:1
Three:1
Two:1
One exiting
Three exiting
Two exiting
Main Thread Exiting
```

*/*17.Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication*/*

```
class Q
{
    int n;
    boolean valueSet=false;
    synchronized int get()
    {
            if(!valueSet)
            try
            {
                    wait();
            }
            catch(InterruptedException e)
            {
                    System.out.println("Interrupted Exception caught");
            }
            System.out.println("Got:"+n);
            valueSet=false;
            notify();
            return n;
    }
    synchronized void put(int n)
    {
            if(valueSet)
            try
            {
                    wait();
            }
            catch(InterruptedException e)
            {
                    System.out.println("Interrupted Exception caught");
            }
            this.n=n;
            valueSet=true;
            System.out.println("Put:"+n);
            notify();
    }
}
class Producer implements Runnable
{
    Q q;
    Producer(Q q)
    {
            this.q=q;
            new Thread(this,"Producer").start();
```

```
    }
    public void run()
    {
            int i=0;
            while(true)
            {
                    q.put(i++);
            }
    }
}
class Consumer implements Runnable
{
    Q q;
    Consumer(Q q)
    {
            this.q=q;
            new Thread(this,"Consumer").start();
    }
    public void run()
    {
            while(true)
            {
                    q.get();
            }
    }
}
class ProdCons
{
    public static void main(String[] args)
    {
            Q q=new Q();
            new Producer(q);
            new Consumer(q);
            System.out.println("Press Control-c to stop");
    }
}
```

Output:

Put:1

```
Got:1
Put:2
Got:2
Put:3
Got:3
Put:4
Got:4
Put:5
Got:5
Put:6
Got:6
Put:7
Got:7
Put:8
Got:8
Put:9
Got:9
Put:10
Got:10
Put:11
Got:11
Put:12
Got:12
Put:13
Got:13
Put:14
Got:14
```

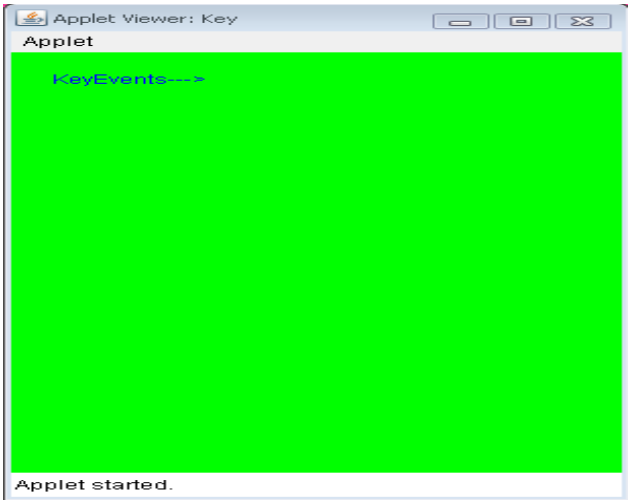
*/*18.Write a program for handling KeyBoard events*/*

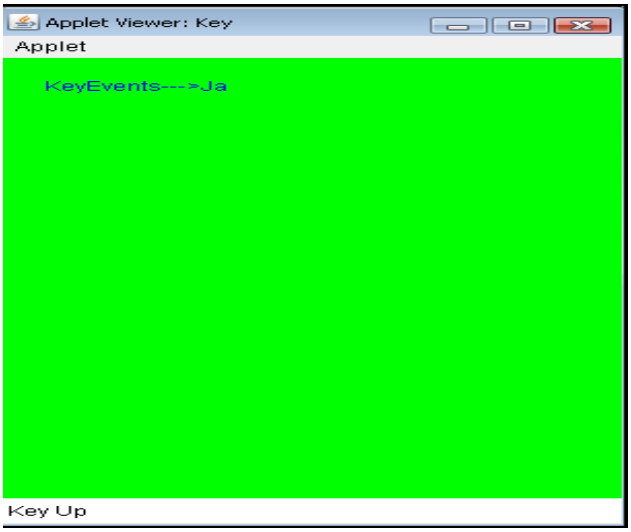
```
import java.awt.*;
```

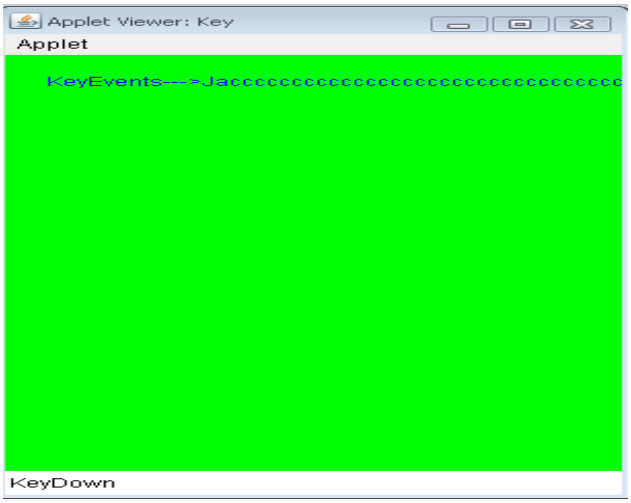
```
import java.awt.event.*;
import java.applet.*;
/*
<applet code="Key" width=300 height=400>
</applet>
*/
public class Key extends Applet
implements KeyListener
{
    int X=20,Y=30;
    String msg="KeyEvents--->";
    public void init()
    {
            addKeyListener(this);
            requestFocus();
            setBackground(Color.green);
            setForeground(Color.blue);
    }
    public void keyPressed(KeyEvent k)
    {
            showStatus("KeyDown");
            int key=k.getKeyCode();
            switch(key)
            {
                    case KeyEvent.VK_UP:
                            showStatus("Move to Up");
                            break;
                    case KeyEvent.VK_DOWN:
                            showStatus("Move to Down");
                            break;
                    case KeyEvent.VK_LEFT:
                            showStatus("Move to Left");
                            break;
                    case KeyEvent.VK_RIGHT:
                            showStatus("Move to Right");
                            break;
            }
            repaint();
    }
    public void keyReleased(KeyEvent k)
    {
            showStatus("Key Up");
    }
    public void keyTyped(KeyEvent k)
```

```
    {
            msg+=k.getKeyChar();
            repaint();
    }
    public void paint(Graphics g)
    {
            g.drawString(msg,X,Y);
    }
}
```

Output:



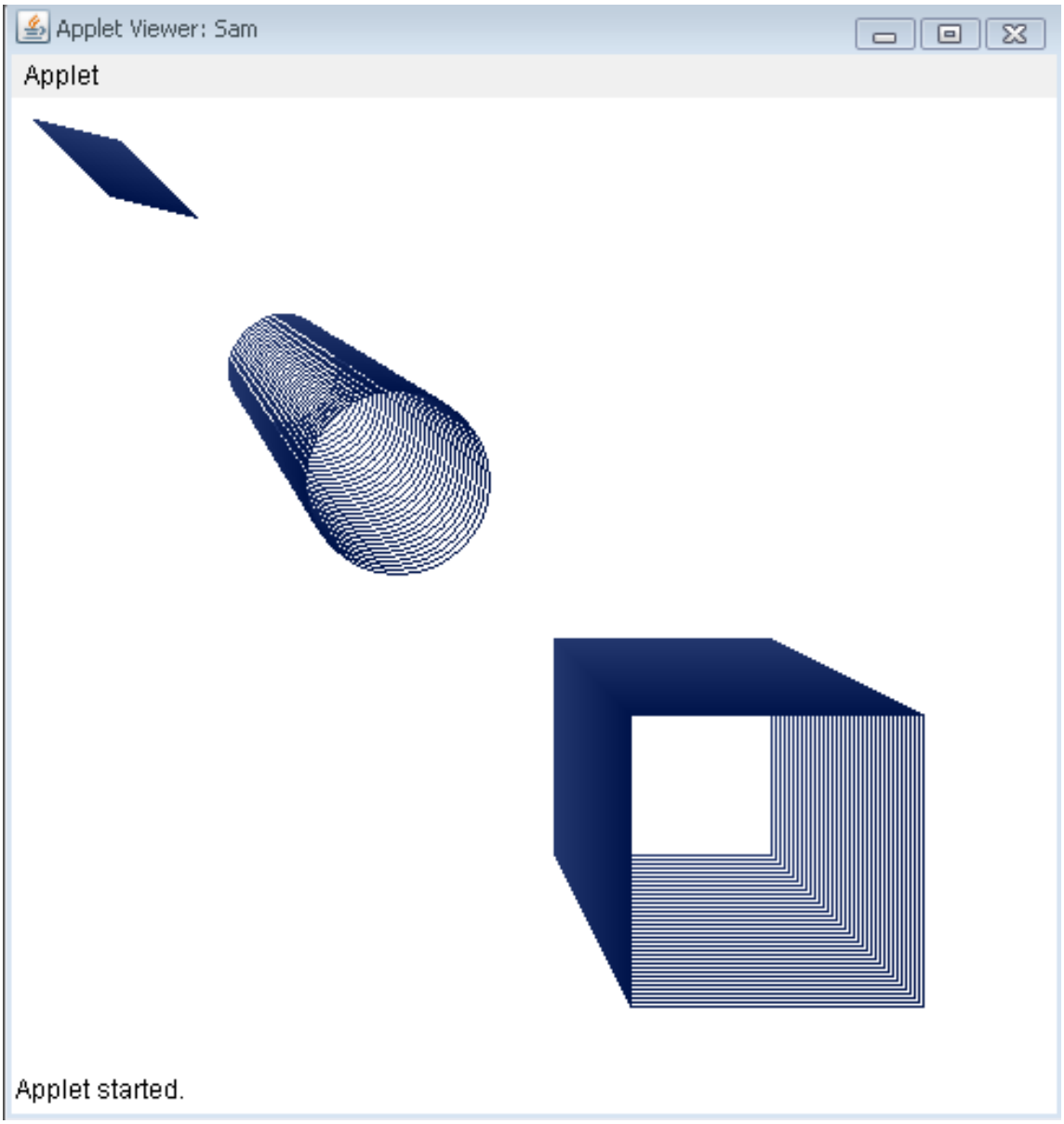




*/*19.Write a Java program that allows the user to draw lines, rectangles and ovals*/*

```
import java.awt.*;
import java.applet.*;
/*
<applet code="Sujith" width=200 height=200>
</applet>
*/
public class Sujith extends Applet
{
    public void paint(Graphics g)
    {
            for(int i=0;i<=250;i++)
            {
                    Color c1=new Color(35-i,55-i,110-i);
                    g.setColor(c1);
                    g.drawRect(250+i,250+i,100+i,100+i);
                    g.drawOval(100+i,100+i,50+i,50+i);
                    g.drawLine(50+i,20+i,10+i,10+i);
            }
    }
}
```

Output:



*/*20.Write a Java program that illustrates how run time polymorphism is achieved*/*

```
class figure
{
    double d1,d2;
    figure(double a,double b)
    {
            d1=a;
            d2=b;
    }
    double area()
    {
            System.out.println("Area of the figure");
            return 0;
    }
}
class rectangle extends figure
{
    rectangle(double a,double b)
    {
            super(a,b);
    }
    double area()
    {
            System.out.println("Area of rectangle");
            return d1*d2;
    }
}
class triangle extends figure
{
    triangle(double a,double b)
    {
            super(a,b);
    }
    double area()
    {
            System.out.println("Area of triangle");
            return d1*d2/2;
    }
}
class runpoly
{
    public static void main(String[] args)
    {
            figure f=new figure(45,6);
            rectangle r=new rectangle(10,30);
```

```
        triangle t=new triangle(10,20);
        figure a;
        a=f;
        System.out.println(a.area());
        a=r;
        System.out.println(a.area());
        a=t;
        System.out.println(a.area());
    }
}
```

Output:

Area of figure

0.0
Area of rectangle
300.0
Area of triangle
100.0

*/*21.Write a Java program that finds the area of a circle using Client-Server network*/*

```
import java.net.*;
```

```
import java.io.*;
public class  server
{
    public static void main(String args[]) throws Exception
    {
            ServerSocket ss=new ServerSocket(2000);
            Socket s=ss.accept();
            BufferedReader br=new BufferedReader(newInputStreamReader(s.getInputStream()));
            double rad,area;
            String result;
            rad=Double.parseDouble(br.readLine());
            System.out.println("From Client : "+rad);
            area=Math.PI*rad*rad;
            result="Area is "+area;
            PrintStream ps=new PrintStream(s.getOutputStream());
            ps.println(result);
            br.close();
            ps.close();
            s.close();
            ss.close();
    }
}
public class  client
{
    public static void main(String args[]) throws Exception
    {

            Socket s=new Socket("192.168.0.19",2000);
            BufferedReader br=new BufferedReader(new InputStreamReader(System.in));
            String rad;
            System.out.println("Enter radius of the circle ");
            rad=br.readLine();
            PrintStream ps=new PrintStream(s.getOutputStream());
            ps.println(rad);
            BufferedReader fs=newBufferedReader(new InputStreamReader(s.getInputStream()));
            String result=fs.readLine();
            System.out.println("From Server : "+result);
            br.close();
            fs.close();
            ps.close();
            s.close();

    }
}
```

Output:

Java client

Enter radius of the circle
10
From Server: Area is 314.1341345

*/*22.Write a Java program of Client-Server network for Chatting between Client and Server*/*

```
import java.net.*;
import java.io.*;

public class  chatserver
{
    public static void main(String args[]) throws Exception
    {
            ServerSocket ss=new ServerSocket(2000);
            Socket sk=ss.accept();
            BufferedReader cin=newBufferedReader(newInputStreamReader(sk.getInputStream()));
            PrintStream cout=new PrintStream(sk.getOutputStream());
            BufferedReader stdin=new BufferedReader(new InputStreamReader(System.in));
            String s;
            while (  true )
            {
                    s=cin.readLine();
                    if (s.equalsIgnoreCase("END"))
                    {
                            cout.println("BYE");
                            break;
                      }
                    System. out.print("Client : "+s+"\n");
                    System.out.print("Server : ");
                    s=stdin.readLine();
                    cout.println(s);
            }
            ss.close();
            sk.close();
            cin.close();
            cout.close();
            stdin.close();
    }
}

public class  chatclient
{
    public static void main(String args[]) throws Exception
    {
            Socket sk=new Socket("192.168.0.19",2000);
            BufferedReader sin=new BufferedReader(new InputStreamReader(sk.getInputStream()));
            PrintStream sout=new PrintStream(sk.getOutputStream());
            BufferedReader stdin=new BufferedReader(new InputStreamReader(System.in));
            String s;
```

```
            while (  true )
            {
                    System.out.print("Client : ");
                    s=stdin.readLine();
                    sout.println(s);
                    s=sin.readLine();
                    System.out.print("Server : "+s+"\n");
                    if ( s.equalsIgnoreCase("BYE") )
                      break;
            }
             sk.close();
             sin.close();
             sout.close();
            stdin.close();
    }
}
```

Output:

Java chatclient

From Server : Hi
From Client: Hi
From Server: Good morning
From Client: End
From Server:Bye