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Problem No-1: Write about the Environment Setup of JAVA.

Explanation:

Java is a high-level, class-based, object-oriented programming language that is designed to have as few implementation dependencies as possible. It is a general-purpose programming language intended to let programmers write once, run anywhere (**WORA**), meaning that compiled Java code can run on all platforms that support Java without the need for recompilation. Java applications are typically compiled to bytecode that can run on any Java virtual machine (**JVM**) regardless of the underlying computer architecture. The syntax of Java is similar to **C** and **C++**, but has fewer low-level facilities than either of them. The Java runtime provides dynamic capabilities (such as reflection and runtime code modification) that are typically not available in traditional compiled languages. As of 2019, Java was one of the most popular programming languages in use according to **GitHub**, particularly for client–server web applications, with a reported 9 million developers.

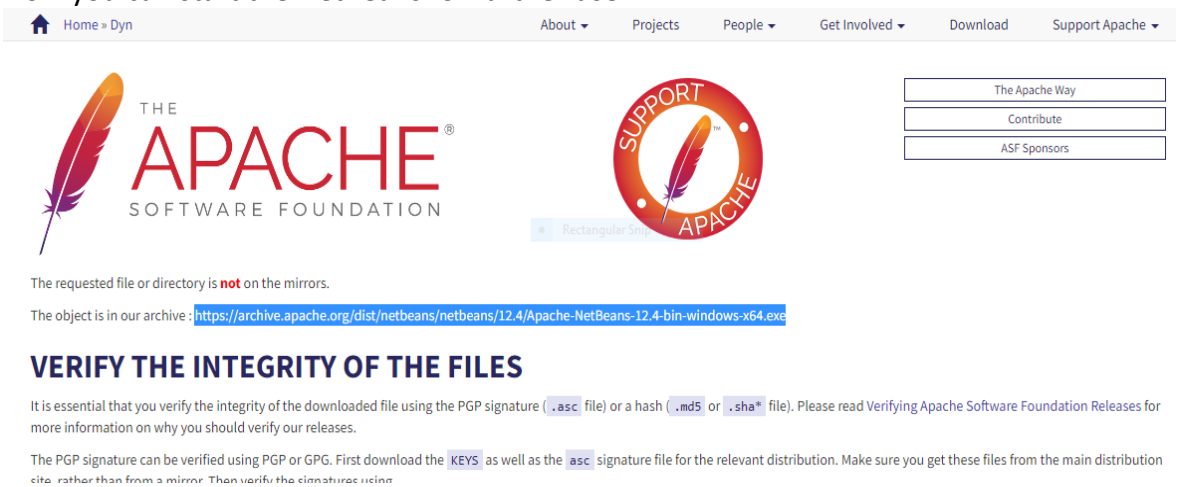
- **JVM:** Java Virtual Machine is the Java platform component that executes programs
- **JRE:** Java Runtime Environment is the on-disk part of Java that creates the JVM.
- **JDK:** Java Development Kit allows developers to create Java programs that can be executed and run by the JVM and JRE.

IDE: A Java IDE is an Integrated Development Environment for programming in Java , many also provide functionality for other languages.

Steps of Installation NetBeans on Windows

1. You need to have a setup file of the NetBeans JAVA into your setup.
2. If you didn't have the setup you can download from the following link: https://archive.apache.org/dist/netbeans/netbeans/12.4/Apache-NetBeans-12.4-bin-windows-x64.exe

3. You can download any type of setup as per your requirements from the above mention web page.
4. Double-Click on the setup by using the mouse.
5. Click on the **Next** option.
6. Check on the **Private Networks**.
7. Click on the **Allow access** button.
8. Check on the **I accept** option and click on the **Next** button.
9. Select the path where you want to install the software and press the **Next** button.
10. Use the **Username and the Password** for the connecting the Front-end to the Back-End.
11. Click on the **Next** button.
12. Click on the **Install** button.
13. Wait for the while till the time the setup is properly installed into the computer.
14. After complication of the setup you can click on the **Finish** button.
15. Now you can start the NetBeans for further use.



Problem no-2:Writre a java program that works as a simple calculator.

```
package calculators;



public class calculatorFrame extends javax.swing.JFrame {


    double f_num,s_num,result;
    String operation,answer;
    public calculatorFrame() {
        initComponents();
```

```
}


@SuppressWarnings("unchecked")
// <editor-fold defaultstate="collapsed" desc="Generated Code">
private void initComponents() {

    jScrollPane1 = new javax.swing.JScrollPane();
    display = new javax.swing.JTextArea();
    btn1 = new javax.swing.JButton();
    btn2 = new javax.swing.JButton();
    btn3 = new javax.swing.JButton();
    btnplus = new javax.swing.JButton();
    btn4 = new javax.swing.JButton();
    btn5 = new javax.swing.JButton();
    btn6 = new javax.swing.JButton();
    btnsubstraction = new javax.swing.JButton();
    btn7 = new javax.swing.JButton();
    btn8 = new javax.swing.JButton();
    btn9 = new javax.swing.JButton();
    btnmultiplication = new javax.swing.JButton();
    btn0 = new javax.swing.JButton();
    btnequl = new javax.swing.JButton();
    btndivide = new javax.swing.JButton();
    jButton1 = new javax.swing.JButton();

    setDefaultCloseOperation(javax.swing.WindowConstants.EXIT_ON_CLOSE);

    display.setColumns(20);
    display.setRows(5);
    jScrollPane1.setViewportView(display);

    btn1.setText("1");
```

```
btn1.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn1ActionPerformed(evt);
    }
});

btn2.setText("2");
btn2.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn2ActionPerformed(evt);
    }
});

btn3.setText("3");
btn3.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn3ActionPerformed(evt);
    }
});

btnplus.setText("+");
btnplus.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btnplusActionPerformed(evt);
    }
});

btn4.setText("4");
btn4.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn4ActionPerformed(evt);
    }
});
```

```
btn5.setText("5");
btn5.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn5ActionPerformed(evt);
    }
});

btn6.setText("6");
btn6.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn6ActionPerformed(evt);
    }
});

btnsubstraction.setText("-");
btnsubstraction.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btnsubstractionActionPerformed(evt);
    }
});

btn7.setText("7");
btn7.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn7ActionPerformed(evt);
    }
});

btn8.setText("8");
btn8.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn8ActionPerformed(evt);
```

```
    }
});

btn9.setText("9");
btn9.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn9ActionPerformed(evt);
    }
});

btnmultiplication.setText("*");
btnmultiplication.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btnmultiplicationActionPerformed(evt);
    }
});

btn0.setText("0");
btn0.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btn0ActionPerformed(evt);
    }
});

btnequl.setText("=");
btnequl.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        btnequlActionPerformed(evt);
    }
});

btndivide.setText("/");
btndivide.addActionListener(new java.awt.event.ActionListener() {
```

```
        public void actionPerformed(java.awt.event.ActionEvent evt) {
            btndivideActionPerformed(evt);
        }
    });

    jButton1.setText("c");
    jButton1.addActionListener(new java.awt.event.ActionListener() {
        public void actionPerformed(java.awt.event.ActionEvent evt) {
            jButton1ActionPerformed(evt);
        }
    });

    javax.swing.GroupLayout layout = new javax.swing.GroupLayout(getContentPane());
    getContentPane().setLayout(layout);
    layout.setHorizontalGroup(
        layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
        .addGroup(layout.createSequentialGroup()
            .addContainerGap(16, Short.MAX_VALUE)
            .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING, false)
                .addGroup(layout.createSequentialGroup()
                    .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.TRAILING)
                        .addGroup(layout.createSequentialGroup()
                            .addComponent(btn1, javax.swing.GroupLayout.PREFERRED_SIZE, 73,
javax.swing.GroupLayout.PREFERRED_SIZE)
                            .addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED)
                            .addComponent(btn2, javax.swing.GroupLayout.PREFERRED_SIZE, 77,
javax.swing.GroupLayout.PREFERRED_SIZE)
                            .addGap(101, 101, 101))
                        .addGroup(layout.createSequentialGroup()
                            .addComponent(btn5, javax.swing.GroupLayout.PREFERRED_SIZE, 77,
javax.swing.GroupLayout.PREFERRED_SIZE)
                            .addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)
                            .addComponent(btn6, javax.swing.GroupLayout.PREFERRED_SIZE, 81,
javax.swing.GroupLayout.PREFERRED_SIZE)
```

```
                    .addGap(10, 10, 10)))
                .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING, false)
                    .addComponent(btnplus, javax.swing.GroupLayout.DEFAULT_SIZE, 73, Short.MAX_VALUE)
                    .addComponent(btnsubstraction, javax.swing.GroupLayout.DEFAULT_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)))
            .addGroup(layout.createSequentialGroup()
                .addGap(166, 166, 166)
                .addComponent(btn3, javax.swing.GroupLayout.PREFERRED_SIZE, 81, javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGroup(layout.createSequentialGroup()
                .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.TRAILING, false)
                    .addComponent(btn0, javax.swing.GroupLayout.DEFAULT_SIZE, 73, Short.MAX_VALUE)
                    .addComponent(btn7, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE)
                    .addComponent(btn4, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE))
                .addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)
                .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING, false)
                    .addComponent(btn8, javax.swing.GroupLayout.DEFAULT_SIZE, 73, Short.MAX_VALUE)
                    .addComponent(jButton1, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE))
                .addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)
                .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
                    .addComponent(btn9, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE)
                    .addComponent(btnequl, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE))
                .addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)
                .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING, false)
                    .addComponent(btndivide, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE)
                    .addComponent(btnmultiplication, javax.swing.GroupLayout.DEFAULT_SIZE, 73, Short.MAX_VALUE)))
            .addComponent(jScrollPane1, javax.swing.GroupLayout.Alignment.TRAILING,
javax.swing.GroupLayout.PREFERRED_SIZE, 330, javax.swing.GroupLayout.PREFERRED_SIZE))
        .addGap(18, 18, 18))
    );
    layout.setVerticalGroup(
```

```
        layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
        .addGroup(layout.createSequentialGroup()
            .addGap(22, 22, 22)
            .addComponent(jScrollPane1, javax.swing.GroupLayout.PREFERRED_SIZE, 77,
javax.swing.GroupLayout.PREFERRED_SIZE)
            .addGap(34, 34, 34)
            .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                .addComponent(btnplus, javax.swing.GroupLayout.PREFERRED_SIZE, 48, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btn2, javax.swing.GroupLayout.PREFERRED_SIZE, 48, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btn1, javax.swing.GroupLayout.PREFERRED_SIZE, 48, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btn3, javax.swing.GroupLayout.PREFERRED_SIZE, 48, javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGap(18, 18, 18)
            .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                .addComponent(btn4, javax.swing.GroupLayout.PREFERRED_SIZE, 40, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btn5, javax.swing.GroupLayout.PREFERRED_SIZE, 40, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btn6, javax.swing.GroupLayout.PREFERRED_SIZE, 40, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btnsubstraction, javax.swing.GroupLayout.PREFERRED_SIZE, 40,
javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGap(18, 18, 18)
            .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                .addComponent(btn7, javax.swing.GroupLayout.PREFERRED_SIZE, 45, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btn8, javax.swing.GroupLayout.PREFERRED_SIZE, 45, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btn9, javax.swing.GroupLayout.PREFERRED_SIZE, 44, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(btnmultiplication, javax.swing.GroupLayout.PREFERRED_SIZE, 45,
javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGap(18, 18, 18)
            .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING, false)
                .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
                    .addComponent(btn0, javax.swing.GroupLayout.PREFERRED_SIZE, 48, javax.swing.GroupLayout.PREFERRED_SIZE)
                    .addComponent(btnequl, javax.swing.GroupLayout.PREFERRED_SIZE, 48,
javax.swing.GroupLayout.PREFERRED_SIZE)
                    .addComponent(btndivide, javax.swing.GroupLayout.PREFERRED_SIZE, 48,
javax.swing.GroupLayout.PREFERRED_SIZE))
                .addComponent(jButton1, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE))
```

```
            .addContainerGap(22, Short.MAX_VALUE))
    );

    pack();
}// </editor-fold>

private void btn1ActionPerformed(java.awt.event.ActionEvent evt) {
   String get = display.getText();
   display.setText(get+"1");
}

private void btn2ActionPerformed(java.awt.event.ActionEvent evt) {
    String get = display.getText();
    display.setText(get+"2");
}

private void btn3ActionPerformed(java.awt.event.ActionEvent evt) {
    String get = display.getText();
    display.setText(get+"3");
}

private void btn4ActionPerformed(java.awt.event.ActionEvent evt) {
     String get = display.getText();
    display.setText(get+"4");
}

private void btn5ActionPerformed(java.awt.event.ActionEvent evt) {
     String get = display.getText();
    display.setText(get+"5");
}

private void btn6ActionPerformed(java.awt.event.ActionEvent evt) {
    String get = display.getText();
```

```
    display.setText(get+"6");
}

private void btn7ActionPerformed(java.awt.event.ActionEvent evt) {
   String get = display.getText();
    display.setText(get+"7");
}

private void btn8ActionPerformed(java.awt.event.ActionEvent evt) {
    String get = display.getText();
    display.setText(get+"8");
}

private void btn9ActionPerformed(java.awt.event.ActionEvent evt) {
    String get = display.getText();
    display.setText(get+"9");
}

private void btn0ActionPerformed(java.awt.event.ActionEvent evt) {
   String get = display.getText();
    display.setText(get+"0");
}

private void btnplusActionPerformed(java.awt.event.ActionEvent evt) {
    f_num=Double.parseDouble(display.getText());
    display.setText("");
    operation="+";
}

private void btnsubstractionActionPerformed(java.awt.event.ActionEvent evt) {
    f_num=Double.parseDouble(display.getText());
    display.setText("");
    operation="-";
```

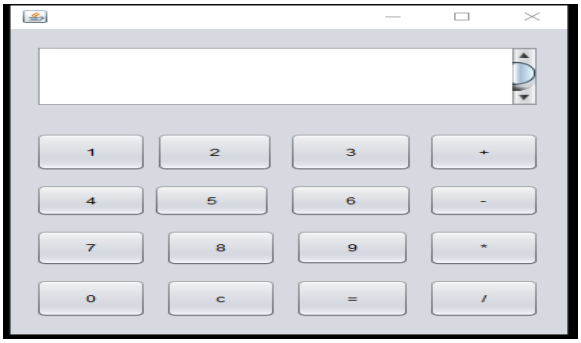
```
}

private void btnmultiplicationActionPerformed(java.awt.event.ActionEvent evt) {
   f_num=Double.parseDouble(display.getText());
   display.setText("");
   operation="*";
}

private void btndivideActionPerformed(java.awt.event.ActionEvent evt) {
   f_num=Double.parseDouble(display.getText());
   display.setText("");
   operation="/";
}

private void btnequlActionPerformed(java.awt.event.ActionEvent evt) {
   s_num=Double.parseDouble(display.getText());
   switch(operation)
   {
      case"+":
         result=f_num+s_num;
         answer=String.format("%.0f",result);
         display.setText(answer);
         break;
      case"-":
          result=f_num-s_num;
         answer=String.format("%.0f",result);
         display.setText(answer);
         break;
          case"*":
             result=f_num*s_num;
         answer=String.format("%.0f",result);
         display.setText(answer);
         break;
```

```
            case"/":
                result=f_num/s_num;
            answer=String.format("%.0f",result);
            display.setText(answer);
            break;
    }
}

private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
   display.setText("");
}

/**
 * @param args the command line arguments
 */
public static void main(String args[]) {
    /* Set the Nimbus look and feel */
    //<editor-fold defaultstate="collapsed" desc=" Look and feel setting code (optional) ">
    /* If Nimbus (introduced in Java SE 6) is not available, stay with the default look and feel.
     * For details see http://download.oracle.com/javase/tutorial/uiswing/lookandfeel/plaf.html
     */
    try {
        for (javax.swing.UIManager.LookAndFeelInfo info : javax.swing.UIManager.getInstalledLookAndFeels()) {
            if ("Nimbus".equals(info.getName())) {
                javax.swing.UIManager.setLookAndFeel(info.getClassName());
                break;
            }
        }
    } catch (ClassNotFoundException ex) {
        java.util.logging.Logger.getLogger(calculatorFrame.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);
    } catch (InstantiationException ex) {
        java.util.logging.Logger.getLogger(calculatorFrame.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);
    } catch (IllegalAccessException ex) {
```

```
        java.util.logging.Logger.getLogger(calculatorFrame.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);
    } catch (javax.swing.UnsupportedLookAndFeelException ex) {
        java.util.logging.Logger.getLogger(calculatorFrame.class.getName()).log(java.util.logging.Level.SEVERE, null, ex);
    }
    //</editor-fold>

    /* Create and display the form */
    java.awt.EventQueue.invokeLater(new Runnable() {
        public void run() {
            new calculatorFrame().setVisible(true);
        }
    });
}

// Variables declaration - do not modify
private javax.swing.JButton btn0;
private javax.swing.JButton btn1;
private javax.swing.JButton btn2;
private javax.swing.JButton btn3;
private javax.swing.JButton btn4;
private javax.swing.JButton btn5;
private javax.swing.JButton btn6;
private javax.swing.JButton btn7;
private javax.swing.JButton btn8;
private javax.swing.JButton btn9;
private javax.swing.JButton btndivide;
private javax.swing.JButton btnequl;
private javax.swing.JButton btnmultiplication;
private javax.swing.JButton btnplus;
private javax.swing.JButton btnsubstraction;
private javax.swing.JTextArea display;
private javax.swing.JButton jButton1;
private javax.swing.JScrollPane jScrollPane1;
```

```
    // End of variables declaration
}
```

Output:



Problem no-3:Java applet.

```
package javaapplet;

import java.applet.Applet;

import java.awt.Graphics;

public class Javaapplet extends Applet{

    public  void paint (Graphics g)

{

        g.drawString("SUMON DAS",150,150);

    }

    }
```

Output:

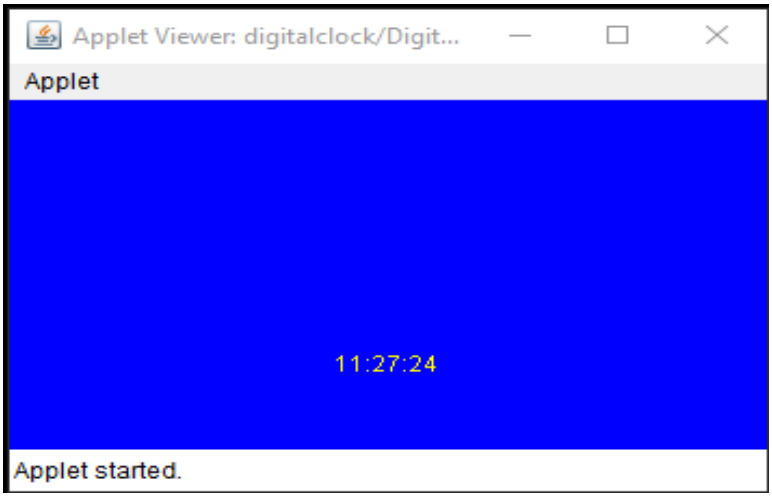
Problem-4:Digital clock.

```
package digitalclock;


import java.applet.*;
```

```
import java.awt.*;
import java.util.*;
import java.text.*;

public class Digitalclock extends Applet implements Runnable{

   Thread t = null;
   int hours =0,minutes=0,seconds=0;
   String timeString=" ";

   public void init()
   {
      setBackground(Color.blue);
   }
   public void start()
   {
      t = new Thread(this);
      t.start();
   }

   public void run()
   {
      try{
         while(true)
         {
            Calendar cal = Calendar.getInstance();
            hours = cal.get(Calendar.HOUR_OF_DAY);
            if(hours>12)    hours-=12;
            minutes = cal.get(Calendar.MINUTE);
            seconds = cal.get(Calendar.SECOND);


            SimpleDateFormat formatter = new SimpleDateFormat("hh:mm:ss");
```

```
            Date date = cal.getTime();
            timeString = formatter.format(date);

            repaint();
            t.sleep(1000);
          }
      }
      catch(Exception e){
   }
   }
 public void paint(Graphics g)
   {
      g.setColor(Color.yellow);
      g.drawString(timeString,150,150);
   }
   }
```

Output:

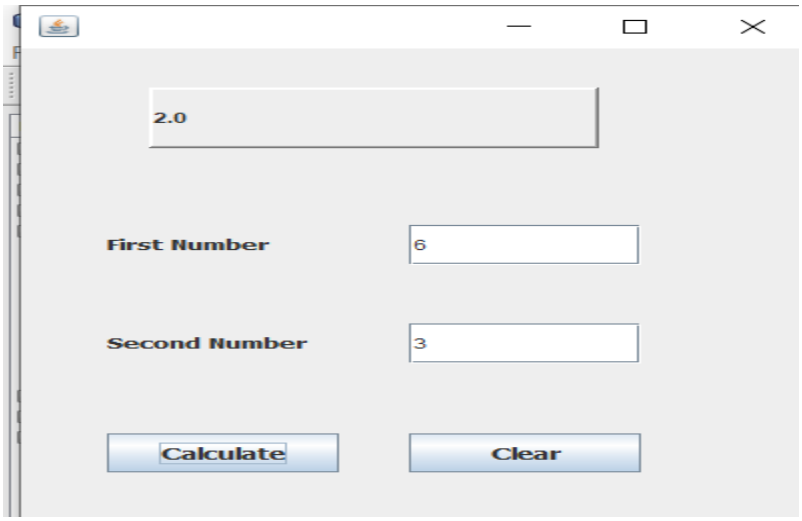


Problem no-5:Integer division.

```
public class javaframe extends javax.swing.JFrame {
    public javaframe() {
        initComponents();
    }
```

```
    @SuppressWarnings("unchecked")
private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
    int num1= Integer.parseInt(jTextField1.getText());
    int num2= Integer.parseInt(jTextField2.getText());
    float result=(float)num1/num2;
    jLabel4.setText("Division of "+num1+" and "+num2+" is "+result);
    }
    private void jButton2ActionPerformed(java.awt.event.ActionEvent evt) {
    jLabel4.setText(null);
       }
      public static void main(String args[]) {
java.awt.EventQueue.invokeLater(new Runnable() {
          public void run() {
              new javaframe().setVisible(true);
          }
       });
    }
    private javax.swing.JButton jButton1;
    private javax.swing.JButton jButton2;
    private javax.swing.JLabel jLabel1;
    private javax.swing.JLabel jLabel2;
       private javax.swing.JLabel jLabel4;
    private javax.swing.JTextField jTextField1;
    private javax.swing.JTextField jTextField2;
}
```

Output:


2.0
First Number
6
Second Number
3
Calculate
Clear