LAPORAN HASIL PRAKTIKUM 11

PEMROMGRAMAN BERBASIS OBJEK

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2025

Percobaan 1 – JFrame HelloGUI

Class HelloGui

```
import javax.swing.*;

public class HelloGui {


    public static void main(String[] args) {

        // TODO code application logic here

        JFrame frame;

        frame = new JFrame("ini percobaan HelloGui Frame");



frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);//program akan
berhenti jika ditutup

        frame.setSize(600, 300);//lebar, tinggi windows

        frame.setLocation(200,200);//x.y tampilan pada windows

        //frame.setLocationRelativeTo(null);//menempatkan frame
ditengah-tengah layar

        frame.setVisible(true);// untuk menampilkan fram

    }

}
```

Output :

Percobaan 2 – Menangani Input Pada GUI

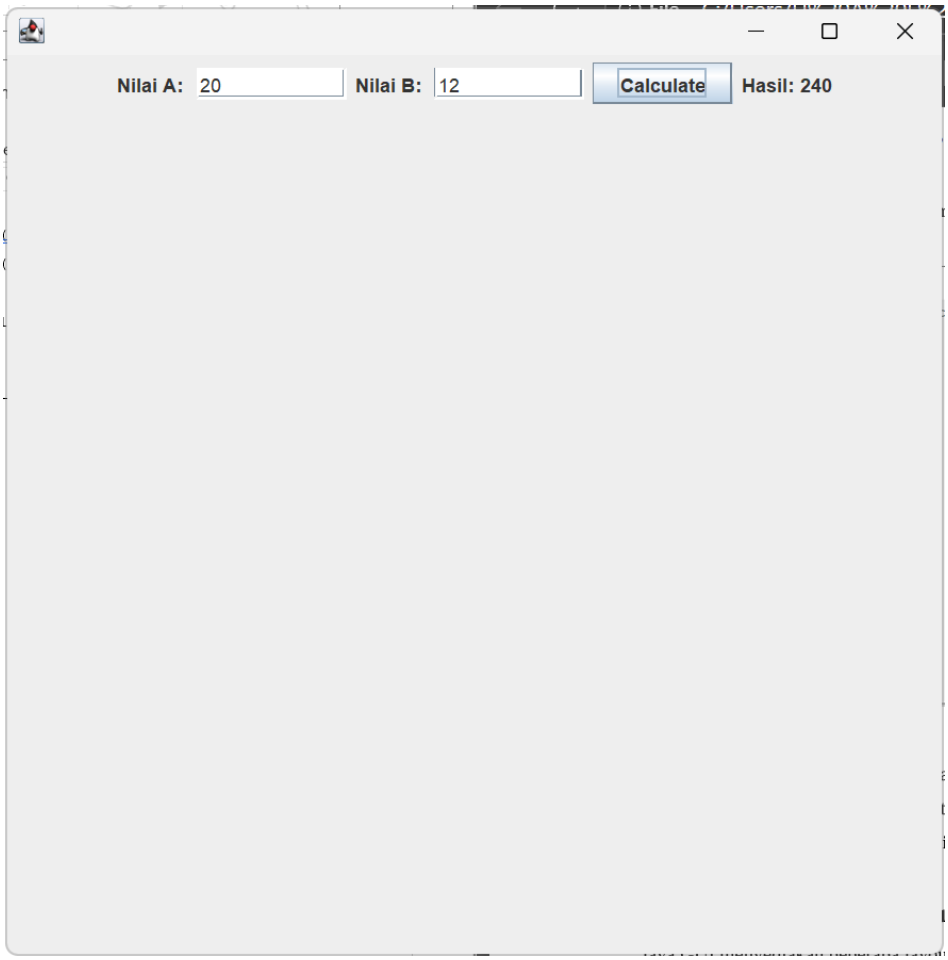
Class MyInputForm

```
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;
import javax.swing.*;

public class MyInputForm extends JFrame {

    private static final int FRAME_WIDTH = 600;
    private static final int FRAME_HEIGHT = 200;
    private JLabel aLabel;
    private JLabel bLabel;
    private JLabel cLabel;
    private JTextField aField;
    private JTextField bField;
    private JButton button;
    private JPanel panel;

    public MyInputForm() {
        createTextField();
        createButton();
        createPanel();
        // Jobsheet menggunakan FRAME_WIDTH dua kali
        setSize(FRAME_WIDTH, FRAME_WIDTH);
    }

    private void createTextField() {
        aLabel = new JLabel("Nilai A: ");
        // Label disesuaikan dari PDF "Nilai C:" menjadi "Nilai B:"
        bLabel = new JLabel("Nilai B: ");
        cLabel = new JLabel("Hasil: ");

        final int FIELD_WIDTH = 10;
        aField = new JTextField(FIELD_WIDTH);
        aField.setText("0");
```

```
        bField = new JTextField(FIELD_WIDTH);
        bField.setText("0");
    }

    private void createButton() {
        button = new JButton("Calculate");//untuk membuat tombol
"Calculate"

        class AddInterestListener implements ActionListener {
            @Override
            public void actionPerformed(ActionEvent event) {
                int a =
Integer.valueOf(aField.getText());//mengambil inputan textbox
                int b = Integer.valueOf(bField.getText());
                // Typo 'a b;' di PDF diperbaiki menjadi perkalian
                int c = a * b;
                cLabel.setText("Hasil: " + c);
            }
        }

        ActionListener listener = new AddInterestListener();
        button.addActionListener(listener);
    }

    private void createPanel() {
        panel = new JPanel();
        panel.add(aLabel);
        panel.add(aField);
        panel.add(bLabel);
        panel.add(bField);
        panel.add(button);
        panel.add(cLabel);
        add(panel);
    }
```

```
    public static void main(String[] args) {
        // TODO code application logic here
        JFrame frame = new MyInputForm();
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);
        frame.setLocationRelativeTo(null);
    }
}
```

Output :



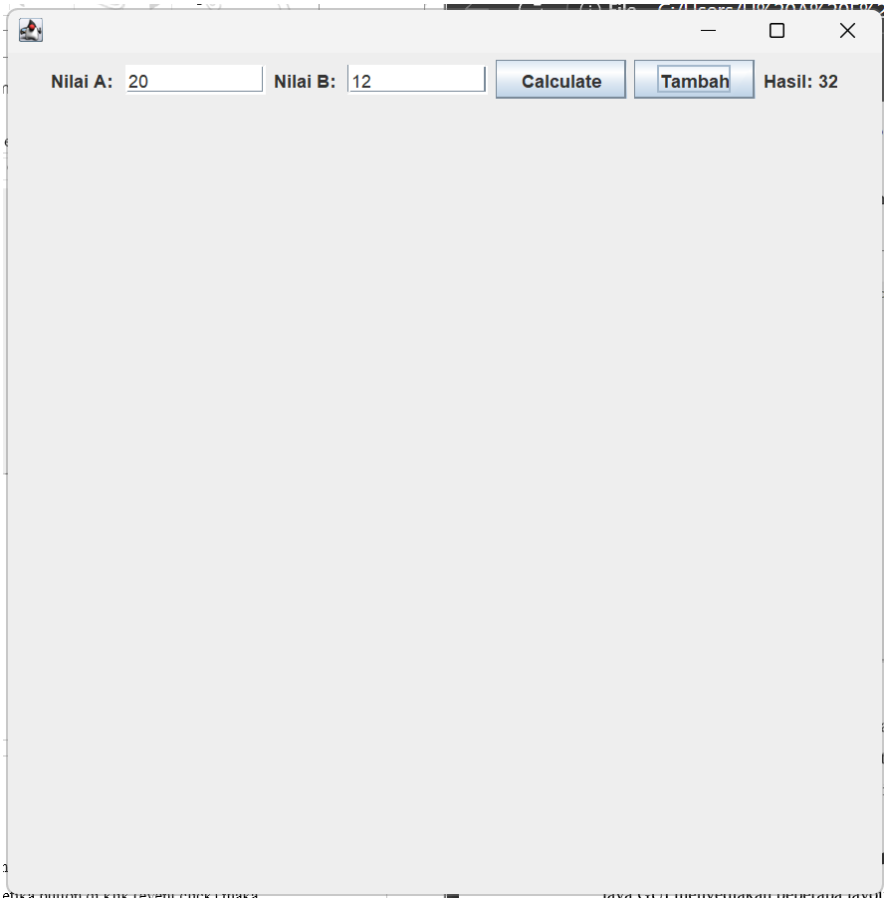
Pertanyaan :

a) Modifikasi kode program dengan menambahkan JButton baru untuk melakukan fungsi perhitungan penambahan, sehingga ketika button di klik (event click) maka akan menampilkan hasil penambahan dari nilai A dan B.

Tambahan :

```
private JButton buttonTambah; // Tombol Tambah (Modifikasi)
createButtonTambah(); // Memanggil method tombol tambah (Modifikasi)
int c = a + b; // Logika diubah menjadi penambahan
panel.add(buttonTambah); // Menambahkan tombol Tambah ke panel (Modifikasi)
```

Output :



Percobaan 3 – Manajemen Layout

Class Border

```
import java.awt.BorderLayout;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;

public class Border extends JFrame {
    private static final int FRAME_WIDTH = 600;
    private static final int FRAME_HEIGHT = 200;
    private JPanel panel;

    //membuat konstruktor BorderLayoutForm
    public Border() {
        panel = new JPanel();
        panel.setLayout(new BorderLayout());
        panel.add(new JButton("1"), BorderLayout.NORTH);
        panel.add(new JButton("2"), BorderLayout.WEST);
        panel.add(new JButton("3"), BorderLayout.CENTER);
        panel.add(new JButton("4"), BorderLayout.EAST);
        panel.add(new JButton("5"), BorderLayout.SOUTH);

        add(panel);
        setSize(FRAME_WIDTH, FRAME_HEIGHT);
        setTitle("Border Layout Demo");
    }
}
```

Class Box

```
import javax.swing.BoxLayout;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;

public class Box extends JFrame {
    private static final int FRAME_WIDTH = 600;
    private static final int FRAME_HEIGHT = 200;
    private JPanel panel;

    public Box() {
        panel = new JPanel();
        panel.setLayout(new BoxLayout(panel, BoxLayout.Y_AXIS));
        panel.add(new JButton("1"));
        panel.add(new JButton("2"));
        panel.add(new JButton("3"));
        panel.add(new JButton("4"));
        panel.add(new JButton("5"));

        add(panel);
        setSize(FRAME_WIDTH, FRAME_HEIGHT);
        setTitle("Box Layout Demo");
    }
}
```

Class Grid

```
import java.awt.GridLayout;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;

public class Grid extends JFrame {
    private static final int FRAME_WIDTH = 600;
```

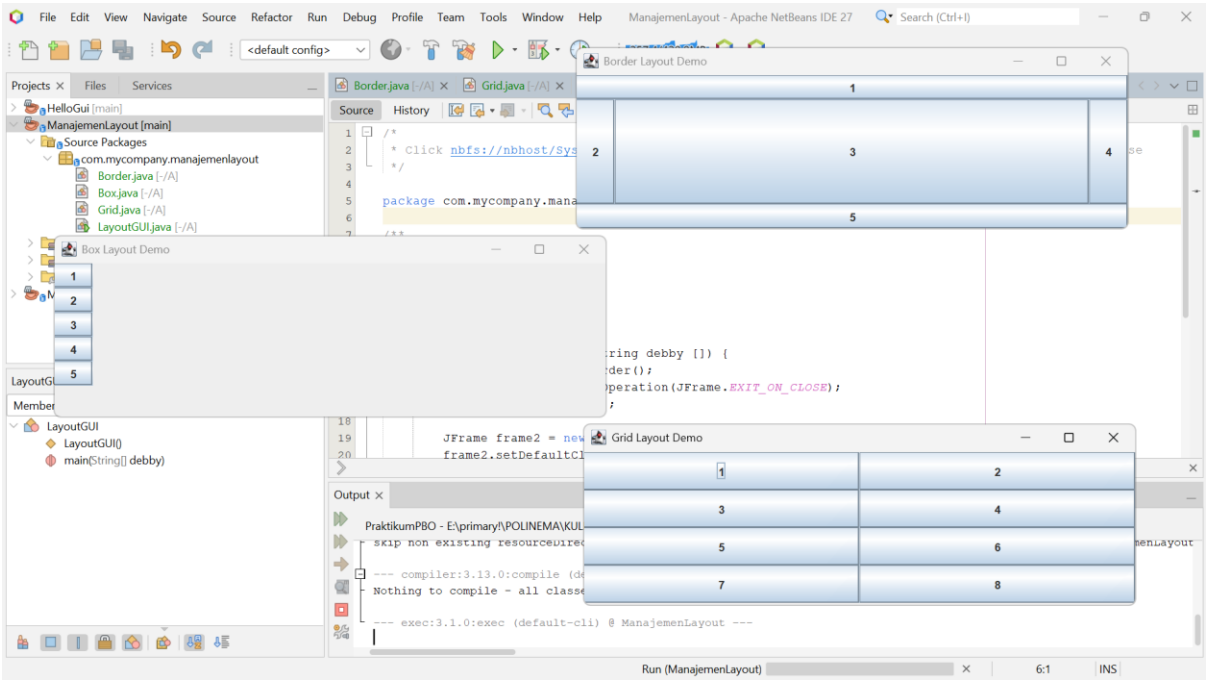
```
    private static final int FRAME_HEIGHT = 200;
    private JPanel panel;

    public Grid() {
        panel = new JPanel();
        panel.setLayout(new GridLayout(4, 2));
        panel.add(new JButton("1"));
        panel.add(new JButton("2"));
        panel.add(new JButton("3"));
        panel.add(new JButton("4"));
        panel.add(new JButton("5"));
        panel.add(new JButton("6"));
        panel.add(new JButton("7"));
        panel.add(new JButton("8"));

        add(panel);
        setSize(FRAME_WIDTH, FRAME_HEIGHT);
        setTitle("Grid Layout Demo");
    }
}
```

Main Class LayoutGUI

```
import javax.swing.JFrame;

public class LayoutGUI {
    public static void main(String debby []) {
        JFrame frame = new Border();
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);

        JFrame frame2 = new Grid();
        frame2.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame2.setVisible(true);

        JFrame frame3 = new Box();
```

```
        frame3.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame3.setVisible(true);
    }
}
```

Output :



Pertanyaan

a) Apa perbedaan dari Grid Layout, Box Layout dan Border Layout?

- **BorderLayout:** Membagi *container* menjadi 5 area: Utara (NORTH), Selatan (SOUTH), Barat (WEST), Timur (EAST), dan Tengah (CENTER).

- **GridLayout:** Menyusun komponen dalam format baris dan kolom (kisi-kisi), di mana semua sel memiliki ukuran yang sama.

- **BoxLayout:** Menyusun komponen secara berurutan dalam satu baris (horizontal/`X_AXIS`) atau satu kolom (vertikal/`Y_AXIS`).

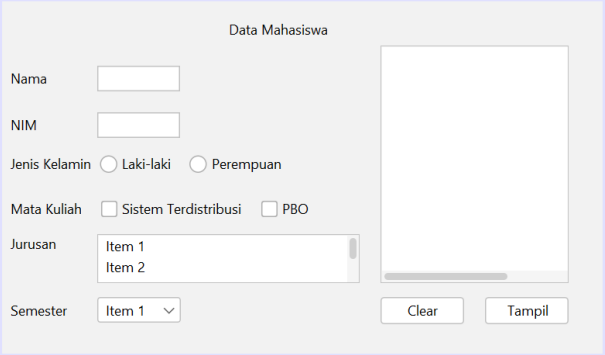
b) Apa perbedaan dari Grid Layout, Box Layout dan Border Layout?

```
JFrame frame = new Border();
frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
frame.setVisible(true);

JFrame frame2 = new Grid();
frame2.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
frame2.setVisible(true);

JFrame frame3 = new Box();
frame3.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
frame3.setVisible(true);
```

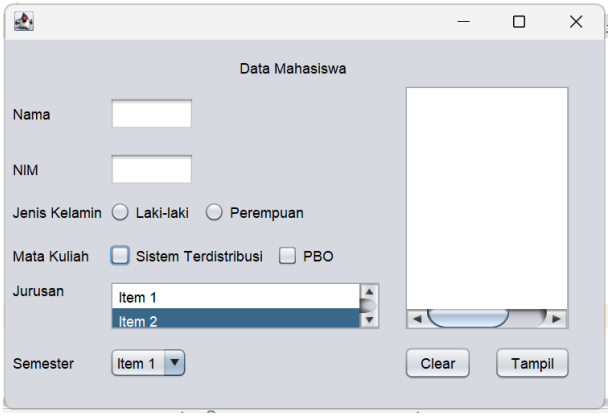
- JFrame frame = new Border(); (dan frame2, frame3): Membuat objek (instansi) baru dari kelas Border (atau Grid, Box) yang merupakan turunan JFrame.
- frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);: Mengatur agar program berhenti total (terminasi) ketika jendela ditutup (di-klik 'X').
- frame.setVisible(true);: Menampilkan jendela (frame) tersebut ke layar.

Percobaan 4 – Membuat GUI Melalui IDE Netbeans

Design Komponen Swing



Hasil Compile dan Run



Pertanyaan

a) Apakah fungsi dari kode berikut?

```
java.awt.EventQueue.invokeLater(new Runnable() {
    public void run() {
        new Swing().setVisible(true);
    }
});
```

Kode tersebut berfungsi untuk menjalankan kode pembuatan dan penampilan GUI Swing (new Swing().setVisible(true)) di dalam *Event Dispatch Thread (EDT)*. Ini adalah praktik standar di Swing untuk memastikan *thread-safety*, yang mencegah masalah tampilan dan responsivitas yang bisa terjadi jika UI dimodifikasi dari *thread* yang salah.

b) Mengapa pada bagian logika checkbox dan radio button digunakan multiple if ?

- **Checkbox (cbMK1, cbMK2):** Menggunakan multiple if karena *checkbox* memungkinkan pengguna memilih lebih dari satu opsi (non-eksklusif).

- **Radio Button (rdjeniskelamin):** Kode ini juga menggunakan multiple if. Idealnya, *radio button* (yang eksklusif/hanya bisa pilih satu) menggunakan if-else if. Penggunaan multiple if di sini (seperti di *jobsheet*) secara teknis akan berfungsi jika *radio button* sudah diatur dalam ButtonGroup di mode *Design*, namun jika tidak, kode tersebut berpotensi salah (misalnya, menghasilkan jeniskelamin "Laki-LakiPerempuan" jika keduanya terpilih).

c) Lakukan modifikasi pada program untuk melakukan menambahkan inputan berupa alamat dan berikan fungsi pemeriksaan pada nilai Alamat tersebut jika belum diisi dengan menampilkan pesan peringatan

Kode Program

- **GUI (Design):** Tambahkan JLabel (teks "Alamat") dan JTextField (nama variabel txtAlamat) ke *form*.
- **Variabel:** Tambahkan private String alamat; di atas.
- **Modifikasi cmdtampilActionPerformed:**

Java

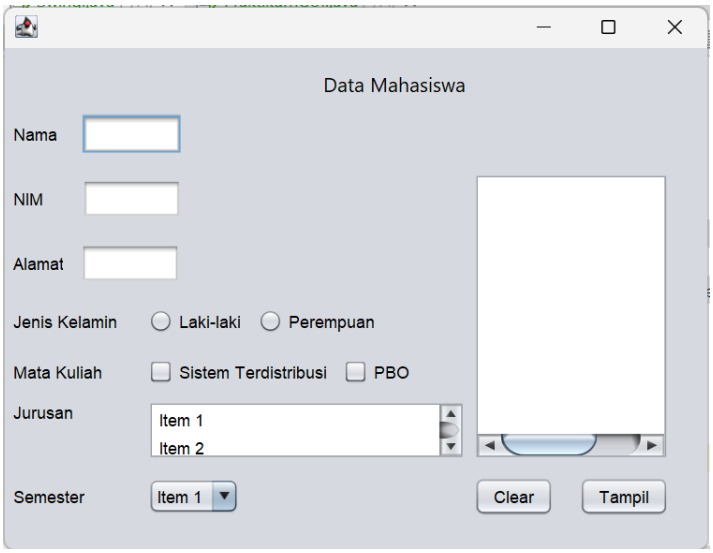
```
private void cmdtampilActionPerformed(java.awt.event.ActionEvent evt) {
    nama = txtname.getText();
    nim = txtnim.getText();
    alamat = txtAlamat.getText();

    // 2. Validasi alamat
    if (alamat.trim().isEmpty()) {
        JOptionPane.showMessageDialog(null, "Alamat wajib diisi!");
        return;
    }

    // ... (Kode if checkbox dan radio button) ...
    // ... (Kode jurusan dan semester) ...

    info="Nama : "+nama+"\n";
    info+="NIM : "+nim+"\n";
    info+="Jenis Kelamin : "+jeniskelamin+"\n";
    info+="Alamat : "+alamat+"\n";
    info+="Jurusan : "+jurusan+"\n";
    info+="Semester : "+semester+"\n";
    info+="Mata Kuliah : "+matakuliah+"";

    hasil.setText(info);
    JOptionPane.showMessageDialog(null, info);
}
```

- **Modifikasi cmdolearActionPerformed:**

Java

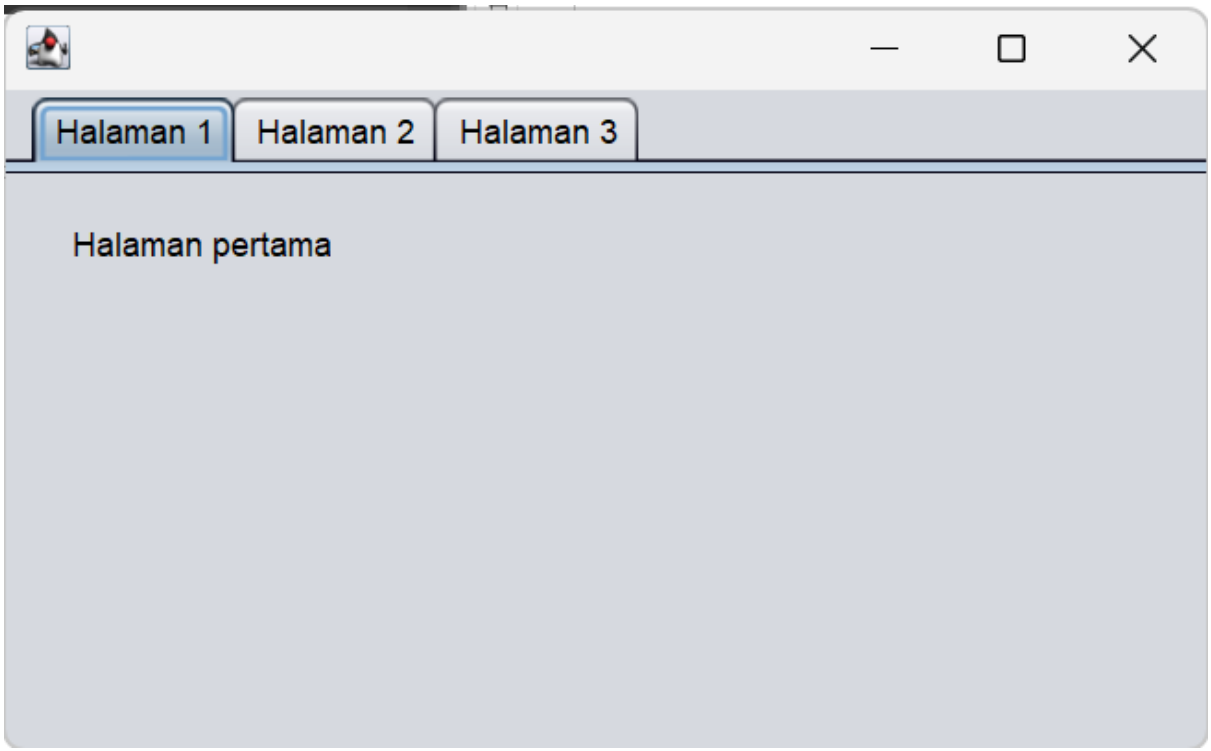
```
private void cmdolearActionPerformed(java.awt.event.ActionEvent evt) {
    // ... (clear txtname, txtnim, cbMK1, cbMK2, hasil) ...
    txtAlamat.setText("");
}
```

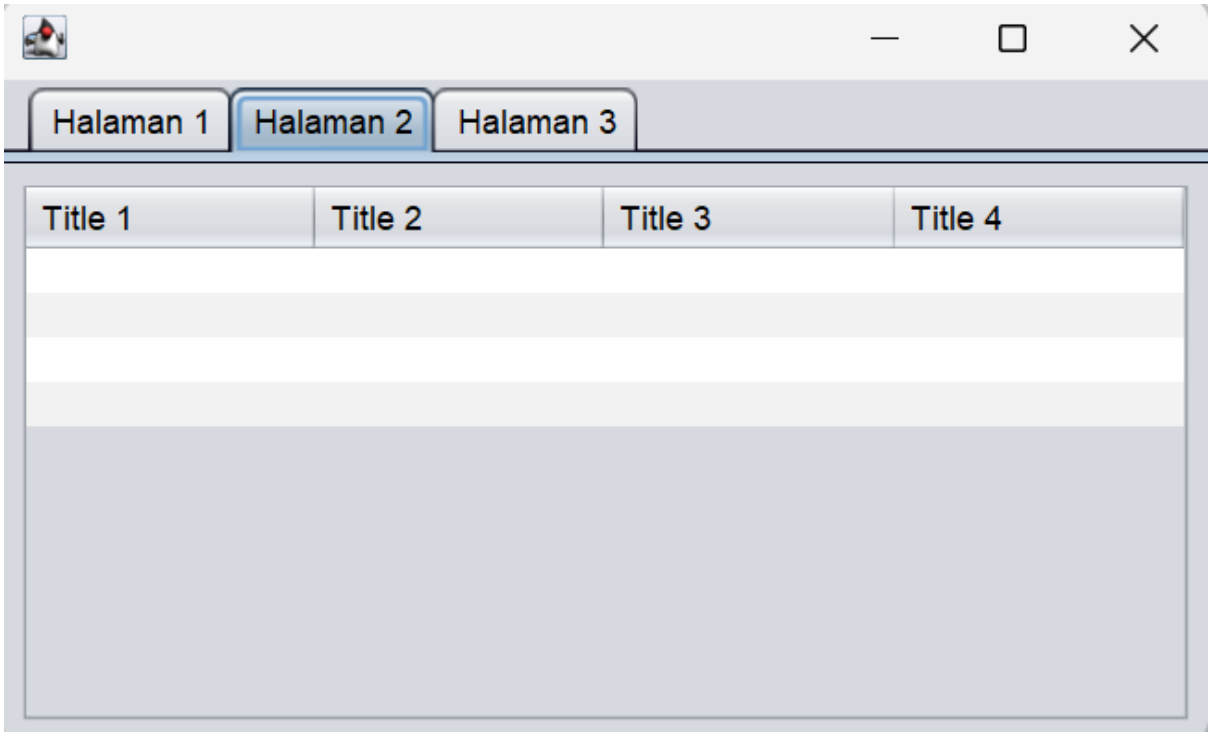
Output

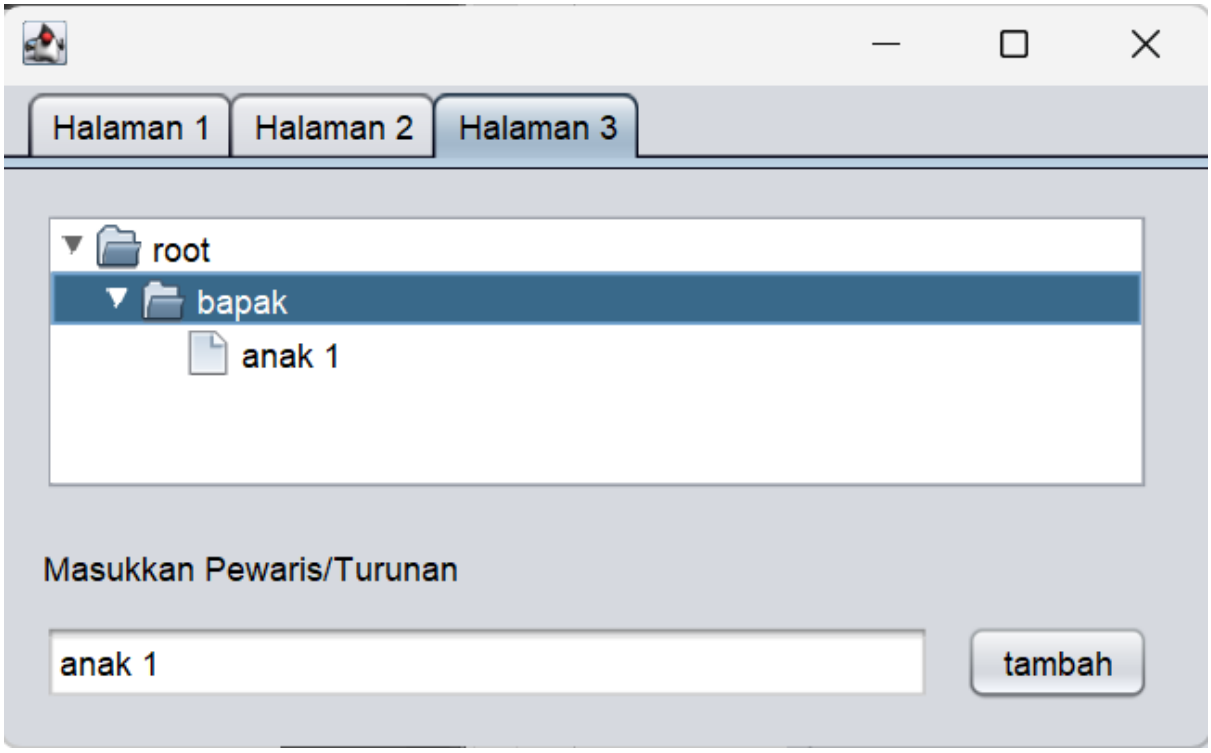


Percobaan 5: JTabPane, JTree, JTable

Hasil Akhir Design JtabPane







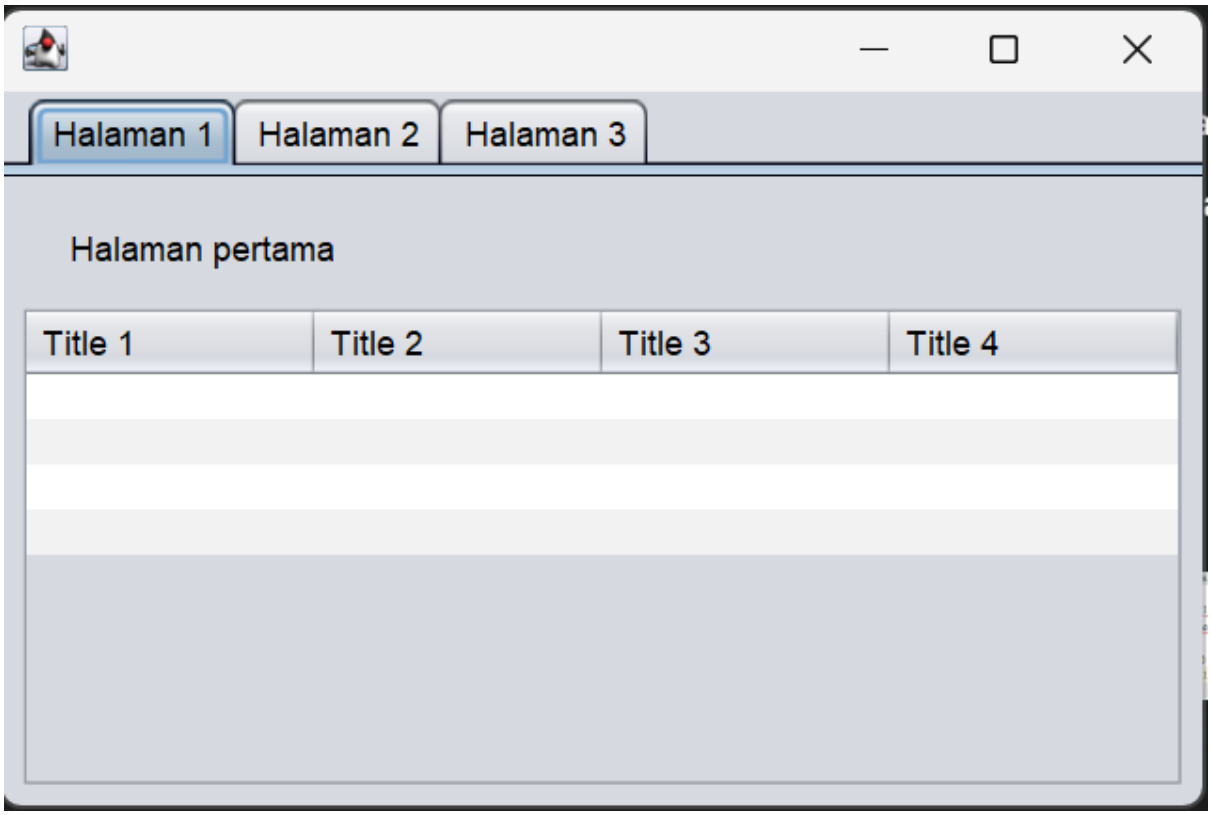
Pertanyaan

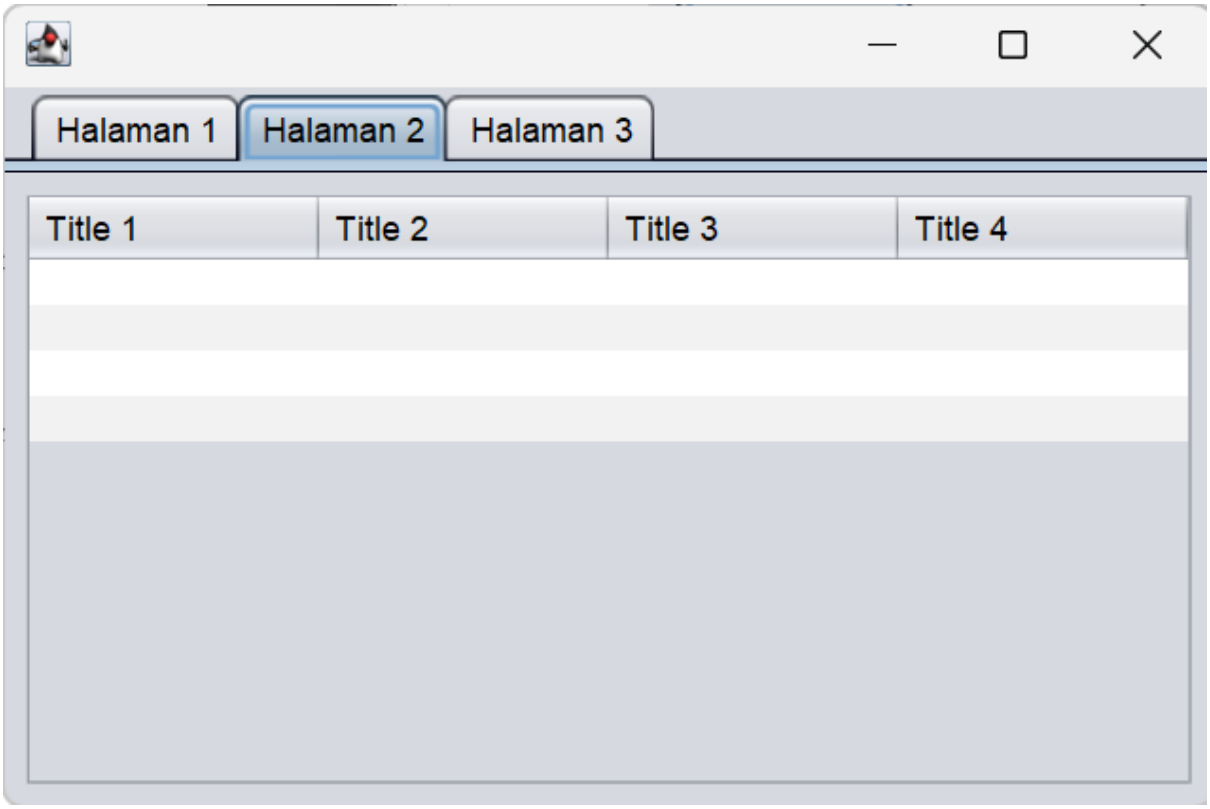
a) **Apa kegunaan komponen swing JTabPane, JTtree, pada percobaan 5?**

JTabPane: Berfungsi sebagai *container* yang memungkinkan pengguna beralih di antara beberapa panel (kelompok komponen) yang berbeda dengan mengklik *tab* di bagian atasnya .

JTree: Digunakan untuk menampilkan sekumpulan data yang bersifat hierarkis (memiliki induk dan anak, seperti *folder* dan *file*) dalam bentuk struktur pohon

b) **Modifikasi program untuk menambahkan komponen JTable pada tab Halaman 1 dan tab Halaman 2**





Assignment

Implementasi kalkulator fungsional menggunakan BorderLayout dan GridLayout.

Design :

Kode :

```
/*
 * Click nbfs://nbhost/SystemFileSystem/Templates/Licenses/license-default.txt to change this license
 * Click nbfs://nbhost/SystemFileSystem/Templates/GUIForms/JFrame.java to edit this template
 */
package com.mycompany.tugaskalkulator;

/**
 *
 * @author H A F I Z H
 */
public class Kalkulator extends javax.swing.JFrame {
    double num1 = 0;
    String operator = "";
    boolean sedangMenulisAngkaBaru = true;

    private static final java.util.logging.Logger logger = java.util.logging.Logger.getLogger(Kalkulator.class.getName());

    /**
     * Creates new form Kalkulator
     */
    public Kalkulator() {
        initComponents();
jTextField1.setHorizontalAlignment(javax.swing.JTextField.RIGHT);
        jTextField1.setText("0");
    }

    /**
     * This method is called from within the constructor to initialize the form.
     * WARNING: Do NOT modify this code. The content of this method is always
     * regenerated by the Form Editor.
```

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

    jScrollBar1 = new javax.swing.JScrollBar();
    jTextField1 = new javax.swing.JTextField();
    jPanel1 = new javax.swing.JPanel();
    jButton1 = new javax.swing.JButton();
    jButton5 = new javax.swing.JButton();
    jButton8 = new javax.swing.JButton();
    jButton12 = new javax.swing.JButton();
    jButton2 = new javax.swing.JButton();
    jButton6 = new javax.swing.JButton();
    jButton9 = new javax.swing.JButton();
    jButton13 = new javax.swing.JButton();
    jButton3 = new javax.swing.JButton();
    jButton7 = new javax.swing.JButton();
    jButton10 = new javax.swing.JButton();
    jButton14 = new javax.swing.JButton();
    jButton15 = new javax.swing.JButton();
    jButton11 = new javax.swing.JButton();
    jButton4 = new javax.swing.JButton();
    jButton16 = new javax.swing.JButton();

    setDefaultCloseOperation(javax.swing.WindowConstants.EXIT_ON_CLOSE);

    jTextField1.addActionListener(new java.awt.event.ActionListener() {
        public void actionPerformed(java.awt.event.ActionEvent evt) {
            jTextField1ActionPerformed(evt);
        }
    });

    jButton1.setText("7");
```

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

jButton5.setText("8");
jButton5.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton5ActionPerformed(evt);
    }
});

jButton8.setText("9");
jButton8.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton8ActionPerformed(evt);
    }
});

jButton12.setText("/");
jButton12.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton12ActionPerformed(evt);
    }
});

jButton2.setText("4");
jButton2.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton2ActionPerformed(evt);
    }
});
```

```
jButton6.setText("5");
jButton6.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton6ActionPerformed(evt);
    }
});

jButton9.setText("6");
jButton9.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton9ActionPerformed(evt);
    }
});

jButton13.setText("*");
jButton13.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton13ActionPerformed(evt);
    }
});

jButton3.setText("1");
jButton3.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton3ActionPerformed(evt);
    }
});

jButton7.setText("2");
jButton7.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton7ActionPerformed(evt);
    }
});
```

```
jButton10.setText("3");
jButton10.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton10ActionPerformed(evt);
    }
});

jButton14.setText("-");
jButton14.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton14ActionPerformed(evt);
    }
});

jButton15.setText("+");
jButton15.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton15ActionPerformed(evt);
    }
});

jButton11.setText(".");
jButton11.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton11ActionPerformed(evt);
    }
});

jButton4.setText("0");
jButton4.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton4ActionPerformed(evt);
    }
```

```
        });

        jButton16.setText("=");
        jButton16.addActionListener(new java.awt.event.ActionListener() {
            public void actionPerformed(java.awt.event.ActionEvent evt) {
                jButton16ActionPerformed(evt);
            }
        });

        javax.swing.GroupLayout jPanel1Layout = new
javax.swing.GroupLayout(jPanel1);
        jPanel1.setLayout(jPanel1Layout);
        jPanel1Layout.setHorizontalGroup(

jPanel1Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
            .addGroup(javax.swing.GroupLayout.Alignment.TRAILING,
jPanel1Layout.createSequentialGroup()
                .addContainerGap()

.addGroup(jPanel1Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.
TRAILING)
                    .addComponent(jButton16, javax.swing.GroupLayout.DEFAULT_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
                    .addGroup(javax.swing.GroupLayout.Alignment.LEADING,
jPanel1Layout.createSequentialGroup()
                        .addComponent(jButton1,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)
                        .addGap(18, 18, 18)
                        .addComponent(jButton5,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)
                        .addGap(18, 18, 18)
```

```
                    .addComponent(jButton8,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED, 41,
Short.MAX_VALUE)
                    .addComponent(jButton12,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE))
                .addGroup(javax.swing.GroupLayout.Alignment.LEADING,
jPanel1Layout.createSequentialGroup()
                    .addComponent(jButton2,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)
                    .addGap(18, 18, 18)
                    .addComponent(jButton6,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)
                    .addGap(18, 18, 18)
                    .addComponent(jButton9,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
                    .addComponent(jButton13,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE))
                .addGroup(javax.swing.GroupLayout.Alignment.LEADING,
jPanel1Layout.createSequentialGroup()
                    .addComponent(jButton3,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)
                    .addGap(18, 18, 18)
```

```
                    .addComponent(jButton7,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)
                    .addGap(18, 18, 18)
                    .addComponent(jButton10,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
                    .addComponent(jButton14,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE))
                .addGroup(jPanel1Layout.createSequentialGroup()
                    .addComponent(jButton4,
javax.swing.GroupLayout.PREFERRED_SIZE, 128,
javax.swing.GroupLayout.PREFERRED_SIZE)
                    .addGap(18, 18, 18)
                    .addComponent(jButton11,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)

.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
                    .addComponent(jButton15,
javax.swing.GroupLayout.PREFERRED_SIZE, 55,
javax.swing.GroupLayout.PREFERRED_SIZE)))
            .addContainerGap())
        );
        jPanel1Layout.setVerticalGroup(

jPanel1Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
            .addGroup(jPanel1Layout.createSequentialGroup()
                .addContainerGap()
```

```
.addGroup(jPanel1Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.
BASELINE)
                .addComponent(jButton1,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton5,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton8,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton12,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGap(18, 18, 18)

.addGroup(jPanel1Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.
BASELINE)
                .addComponent(jButton2,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton6,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton9,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton13,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGap(18, 18, 18)
```

```
.addGroup(jPanel1Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.
BASELINE)
                .addComponent(jButton3,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton7,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton10,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton14,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGap(18, 18, 18)

.addGroup(jPanel1Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.
BASELINE)
                .addComponent(jButton15,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton11,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addComponent(jButton4,
javax.swing.GroupLayout.PREFERRED_SIZE, 53,
javax.swing.GroupLayout.PREFERRED_SIZE))
            .addGap(18, 18, 18)
            .addComponent(jButton16, javax.swing.GroupLayout.PREFERRED_SIZE,
53, javax.swing.GroupLayout.PREFERRED_SIZE)
            .addContainerGap(javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE))
        );
```

```
        javax.swing.GroupLayout layout = new
javax.swing.GroupLayout(getContentPane());
        getContentPane().setLayout(layout);
        layout.setHorizontalGroup(
            layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
            .addGroup(layout.createSequentialGroup()
                .addGap(19, 19, 19)

.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADIN
G, false)
                    .addComponent(jPanel1, javax.swing.GroupLayout.DEFAULT_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
                    .addComponent(jTextField1))
                .addContainerGap(23, Short.MAX_VALUE))
        );
        layout.setVerticalGroup(
            layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
            .addGroup(layout.createSequentialGroup()
                .addGap(14, 14, 14)
                .addComponent(jTextField1,
javax.swing.GroupLayout.PREFERRED_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(18, 18, 18)
                .addComponent(jPanel1, javax.swing.GroupLayout.PREFERRED_SIZE,
javax.swing.GroupLayout.DEFAULT_SIZE,
javax.swing.GroupLayout.PREFERRED_SIZE)
                .addContainerGap(javax.swing.GroupLayout.DEFAULT_SIZE,
Short.MAX_VALUE))
        );

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

```
private void jTextField1ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
}

private void jButton2ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("4");
}

private void jButton3ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("1");
}

private void jButton4ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("0");
}

private void jButton5ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("8");
}

private void jButton6ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("5");
}

private void jButton7ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("2");
}
```

```
private void jButton8ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("9");
}

private void jButton9ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("6");
}

private void jButton10ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputAngka("3");
}

private void jButton11ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    inputTitik();
}

private void jButton12ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    pilihOperator("/");
}

private void jButton13ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    pilihOperator("*");
}

private void jButton14ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
    pilihOperator("-");
```

```
    }

    private void jButton15ActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        pilihOperator("+");
    }

    private void jButton16ActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        hitung();
        operator = ""; // Reset
    }

    private void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
        // TODO add your handling code here:
        inputAngka("7");
    }

    /**
     * @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 (ReflectiveOperationException |
javax.swing.UnsupportedLookAndFeelException ex) {
        logger.log(java.util.logging.Level.SEVERE, null, ex);
    }
    //</editor-fold>

    /* Create and display the form */
    java.awt.EventQueue.invokeLater(() -> new Kalkulator().setVisible(true));
}
//
============================================================
// == BAGIAN LOGIKA KALKULATOR (METHOD PEMBANTU) ==
//
============================================================

/**
 * Dipanggil saat tombol angka (0-9) ditekan
 */
private void inputAngka(String angka) {
    if (sedangMenulisAngkaBaru) {
        jTextField1.setText(angka);
        sedangMenulisAngkaBaru = false;
    } else {
        jTextField1.setText(jTextField1.getText() + angka);
    }
}

/**
 * Dipanggil saat tombol titik (.) ditekan
 */
```

```
private void inputTitik() {
    if (sedangMenulisAngkaBaru) {
        jTextField1.setText("0.");
        sedangMenulisAngkaBaru = false;
    } else {
        // Cek agar tidak ada dua titik
        if (!jTextField1.getText().contains(".")) {
            jTextField1.setText(jTextField1.getText() + ".");
        }
    }
}

/**
 * Dipanggil saat tombol operator (+, -, *, /) ditekan
 */
private void pilihOperator(String op) {
    // Jika sebelumnya sudah ada operator, hitung dulu
    if (!operator.isEmpty() && !sedangMenulisAngkaBaru) {
        hitung();
    }
    num1 = Double.parseDouble(jTextField1.getText());
    operator = op;
    sedangMenulisAngkaBaru = true;
}

/**
 * Dipanggil saat tombol sama dengan (=) ditekan
 */
private void hitung() {
    if (sedangMenulisAngkaBaru || operator.isEmpty()) {
        return; // Tidak ada yang dihitung
    }

    double num2 = Double.parseDouble(jTextField1.getText());
```

```
    double hasil = 0;

    switch (operator) {
        case "+":
            hasil = num1 + num2;
            break;
        case "-":
            hasil = num1 - num2;
            break;
        case "*":
            hasil = num1 * num2;
            break;
        case "/":
            if (num2 == 0) {
                jTextField1.setText("Error");
                sedangMenulisAngkaBaru = true;
                operator = "";
                num1 = 0;
                return;
            }
            hasil = num1 / num2;
            break;
    }

    // Tampilkan hasil (format integer jika tidak ada desimal)
    if (hasil == (long) hasil) {
        jTextField1.setText(String.format("%d", (long) hasil));
    } else {
        jTextField1.setText(String.format("%s", hasil));
    }

    num1 = hasil; // Simpan hasil untuk operasi selanjutnya
    sedangMenulisAngkaBaru = true;
}
```

```
    // Variables declaration - do not modify//GEN-BEGIN:variables
    // ... (variabel Anda ada di bawah sini) ...
    // Variables declaration - do not modify
    private javax.swing.JButton jButton1;
    private javax.swing.JButton jButton10;
    private javax.swing.JButton jButton11;
    private javax.swing.JButton jButton12;
    private javax.swing.JButton jButton13;
    private javax.swing.JButton jButton14;
    private javax.swing.JButton jButton15;
    private javax.swing.JButton jButton16;
    private javax.swing.JButton jButton2;
    private javax.swing.JButton jButton3;
    private javax.swing.JButton jButton4;
    private javax.swing.JButton jButton5;
    private javax.swing.JButton jButton6;
    private javax.swing.JButton jButton7;
    private javax.swing.JButton jButton8;
    private javax.swing.JButton jButton9;
    private javax.swing.JPanel jPanel1;
    private javax.swing.JScrollBar jScrollBar1;
    private javax.swing.JTextField jTextField1;
    // End of variables declaration
}
```

Output : (Berhasil dan Fungsional)