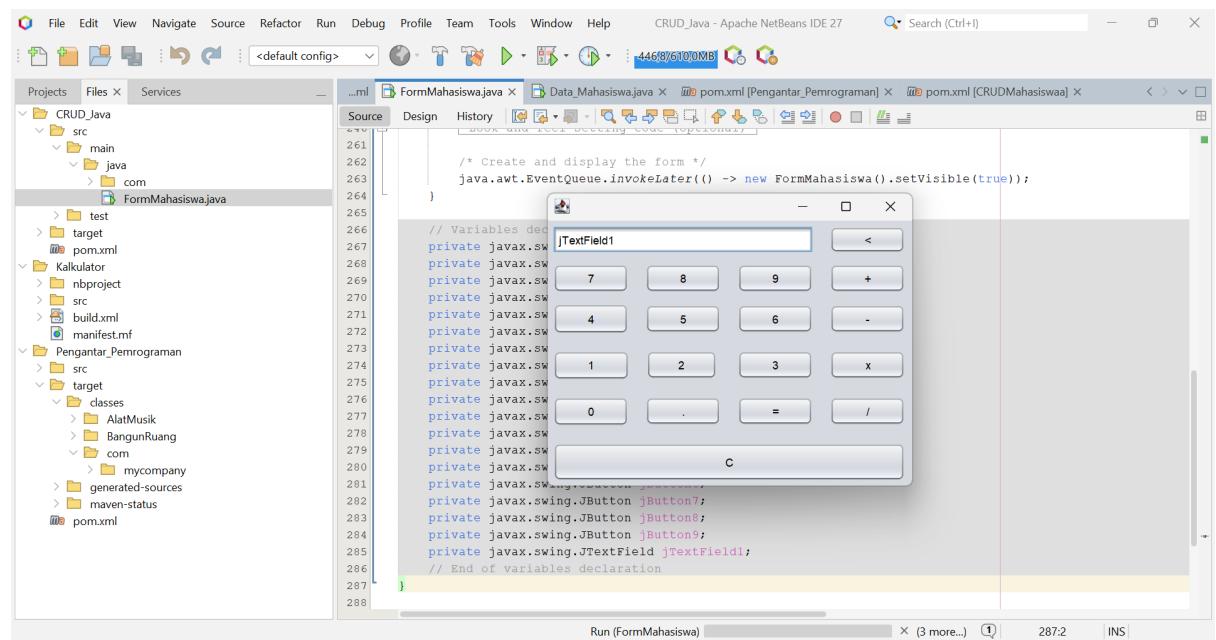


NAMA : KENSHA DARA RIAFINOLA
KELAS : TI.25.C.1
NIM : 312510461

A. Kalkulator

1. GUI



2. Source Code

```
public class FormMahasiswa extends javax.swing.JFrame {

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

    /**
     * Creates new form FormMahasiswa
     */
    public FormMahasiswa() {
        initComponents();
    }

    /**
     * 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() {

        jTextField1 = new javax.swing.JTextField();
        jButton1 = new javax.swing.JButton();
        jButton2 = new javax.swing.JButton();
        jButton3 = new javax.swing.JButton();
        jButton4 = new javax.swing.JButton();
        jButton5 = new javax.swing.JButton();
        jButton6 = new javax.swing.JButton();
        jButton7 = new javax.swing.JButton();
        jButton8 = new javax.swing.JButton();
    }
}
```

```
jButton9 = new javax.swing.JButton();
jButton10 = new javax.swing.JButton();
jButton11 = new javax.swing.JButton();
jButton12 = new javax.swing.JButton();
jButton13 = new javax.swing.JButton();
jButton14 = new javax.swing.JButton();
jButton15 = new javax.swing.JButton();
jButton16 = new javax.swing.JButton();
jButton17 = new javax.swing.JButton();
jButton18 = new javax.swing.JButton();

setDefaultCloseOperation(javax.swing.WindowConstants.EXIT_ON_CLOSE);

jTextField1.setText("jTextField1");

jButton1.setText("<");
jButton1.setName(""); // NOI18N
jButton1.setPreferredSize(new java.awt.Dimension(80, 30));

jButton2.setText("7");
jButton2.setMaximumSize(new java.awt.Dimension(80, 30));
jButton2.setMinimumSize(new java.awt.Dimension(80, 30));
jButton2.setPreferredSize(new java.awt.Dimension(80, 30));

jButton3.setText("8");
jButton3.setMaximumSize(new java.awt.Dimension(80, 30));
jButton3.setMinimumSize(new java.awt.Dimension(80, 30));
```

```
jButton3.setPreferredSize(new java.awt.Dimension(80, 30));

jButton4.setText("9");
jButton4.setMaximumSize(new java.awt.Dimension(80, 30));
jButton4.setMinimumSize(new java.awt.Dimension(80, 30));
jButton4.setPreferredSize(new java.awt.Dimension(80, 30));

jButton5.setText("+");
jButton5.setMaximumSize(new java.awt.Dimension(80, 30));
jButton5.setMinimumSize(new java.awt.Dimension(80, 30));
jButton5.setPreferredSize(new java.awt.Dimension(80, 30));

jButton6.setText("4");
jButton6.setMaximumSize(new java.awt.Dimension(80, 30));
jButton6.setMinimumSize(new java.awt.Dimension(80, 30));
jButton6.setPreferredSize(new java.awt.Dimension(80, 30));

jButton7.setText("5");
jButton7.setMaximumSize(new java.awt.Dimension(80, 30));
jButton7.setMinimumSize(new java.awt.Dimension(80, 30));
jButton7.setPreferredSize(new java.awt.Dimension(80, 30));

jButton8.setText("6");
jButton8.setMaximumSize(new java.awt.Dimension(80, 30));
jButton8.setMinimumSize(new java.awt.Dimension(80, 30));
jButton8.setPreferredSize(new java.awt.Dimension(80, 30));
```

```
jButton9.setText("-");
jButton9.setMaximumSize(new java.awt.Dimension(80, 30));
jButton9.setMinimumSize(new java.awt.Dimension(80, 30));
jButton9.setPreferredSize(new java.awt.Dimension(80, 30));

jButton10.setText("1");
jButton10.setMaximumSize(new java.awt.Dimension(80, 30));
jButton10.setMinimumSize(new java.awt.Dimension(80, 30));
jButton10.setPreferredSize(new java.awt.Dimension(80, 30));

jButton11.setText("2");
jButton11.setMaximumSize(new java.awt.Dimension(80, 30));
jButton11.setMinimumSize(new java.awt.Dimension(80, 30));
jButton11.setPreferredSize(new java.awt.Dimension(80, 30));

jButton12.setText("3");
jButton12.setMaximumSize(new java.awt.Dimension(80, 30));
jButton12.setMinimumSize(new java.awt.Dimension(80, 30));
jButton12.setPreferredSize(new java.awt.Dimension(80, 30));

jButton13.setText("x");
jButton13.setMaximumSize(new java.awt.Dimension(80, 30));
jButton13.setMinimumSize(new java.awt.Dimension(80, 30));
jButton13.setPreferredSize(new java.awt.Dimension(80, 30));

jButton14.setText("0");
jButton14.setMaximumSize(new java.awt.Dimension(80, 30));
```

```
jButton14.setMinimumSize(new java.awt.Dimension(80, 30));
jButton14.setPreferredSize(new java.awt.Dimension(80, 30));
jButton14.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton14ActionPerformed(evt);
    }
});

jButton15.setText(".");
jButton15.setMaximumSize(new java.awt.Dimension(80, 30));
jButton15.setMinimumSize(new java.awt.Dimension(80, 30));
jButton15.setPreferredSize(new java.awt.Dimension(80, 30));

jButton16.setText "=";
jButton16.setMaximumSize(new java.awt.Dimension(80, 30));
jButton16.setMinimumSize(new java.awt.Dimension(80, 30));
jButton16.setPreferredSize(new java.awt.Dimension(80, 30));

jButton17.setText "/";
jButton17.setMaximumSize(new java.awt.Dimension(80, 30));
jButton17.setMinimumSize(new java.awt.Dimension(80, 30));
jButton17.setPreferredSize(new java.awt.Dimension(80, 30));

jButton18.setText "C";

javax.swing.GroupLayout layout = new javax.swing.GroupLayout(getContentPane());
getContentPane().setLayout(layout);
```

```
        .addComponent(jButton2, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
        .addComponent(jButton6, javax.swing.GroupLayout.Alignment.LEADING, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
        .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.TRAILING)
            .addGroup(javax.swing.GroupLayout.Alignment.LEADING, layout.createSequentialGroup()
                .addGap(18, 18, 18)
                .addComponent(jButton7, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(18, 18, 18)
                .addComponent(jButton8, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(18, 18, 18)
                .addComponent(jButton9, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
            ).addGroup(javax.swing.GroupLayout.Alignment.LEADING, layout.createSequentialGroup()
                .addGap(18, 18, 18)
                .addComponent(jButton3, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(18, 18, 18)
                .addComponent(jButton4, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(18, 18, 18)
                .addComponent(jButton5, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
            ).addGroup(layout.createSequentialGroup()
                .addGap(18, 18, 18)
                .addComponent(jTextTextField1, javax.swing.GroupLayout.PREFERRED_SIZE, 276, javax.swing.GroupLayout.PREFERRED_SIZE)
                .addGap(18, 18, 18)
                .addComponent(jButton1, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
            ).addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.RELATED, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE))
        .addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
            .addComponent(jButton2, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
            .addComponent(jButton6, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
        );
    }
    layout.setVerticalGroup(<#>
```

```
layout.setVerticalGroup()
layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
.addGroup(layout.createSequentialGroup()
.addContainerGap()
.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
.addComponent(jTextField1, javax.swing.GroupLayout.PREFERRED_SIZE, 28, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton1, javax.swing.GroupLayout.DEFAULT_SIZE, 28, Short.MAX_VALUE))
.addPreferredGap(javax.swing.LayoutStyle.ComponentPlacement.UNRELATED)
.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
.addComponent(jButton3, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
.addComponent(jButton4, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
.addComponent(jButton5, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton2, 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.BASELINE)
.addComponent(jButton7, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton8, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton9, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton6, javax.swing.GroupLayout.PREFERRED_SIZE, 32, javax.swing.GroupLayout.PREFERRED_SIZE))
.addGap(18, 18)
.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
.addComponent(jButton10, javax.swing.GroupLayout.PREFERRED_SIZE, 31, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton11, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton12, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE)
.addComponent(jButton13, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE))
.addGap(18, 18)
```

```
.addGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
    .addComponent(jButton14, javax.swing.GroupLayout.PREFERRED_SIZE, 31, javax.swing.GroupLayout.PREFERRED_SIZE)
    .addComponent(jButton15, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
    .addComponent(jButton16, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE)
    .addComponent(jButton17, javax.swing.GroupLayout.DEFAULT_SIZE, javax.swing.GroupLayout.DEFAULT_SIZE, Short.MAX_VALUE))
.addGap(18, 18, 18)
.addComponent(jButton18, javax.swing.GroupLayout.PREFERRED_SIZE, 40, javax.swing.GroupLayout.PREFERRED_SIZE)
.addContainerGap()
);

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

private void jButton14ActionPerformed(java.awt.event.ActionEvent evt) {
    // TODO add your handling code here:
}

/**
 * @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

```

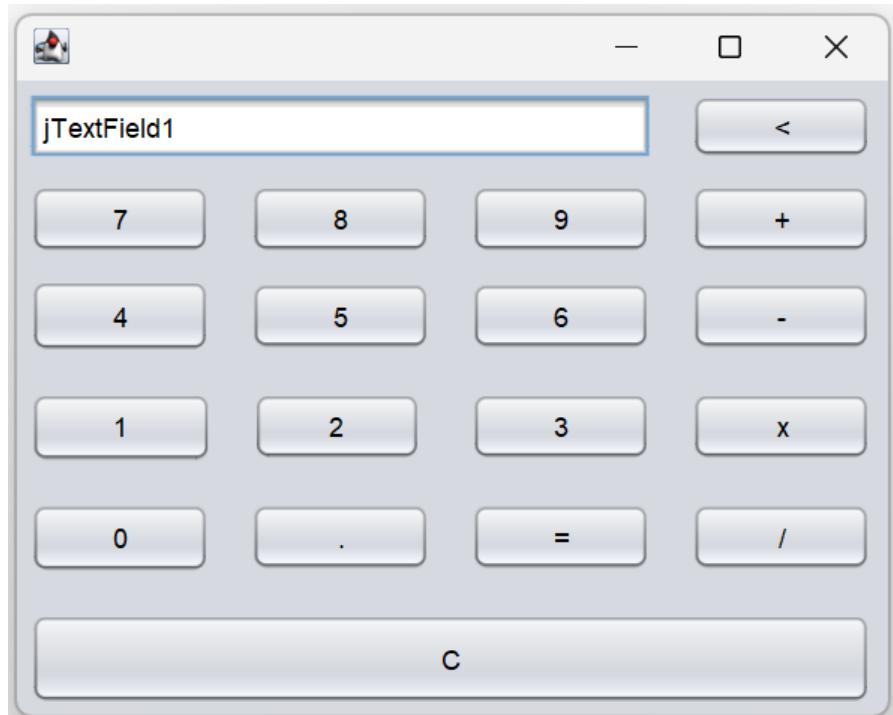
```
/*
try {
    for (javax.swing.UIManager.LookAndFeelInfo info : javax.swing.UIManager.getInstalledLookAndFeels()) {
        if ("Nimbus".equals(info.getName())) {
            javax.swing.UIManager.setLookAndFeel(info.getClassName());
            break;
        }
    }
} catch (ReflectiveOperationException | 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 FormMahasiswa().setVisible(true));
}

// 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;
```

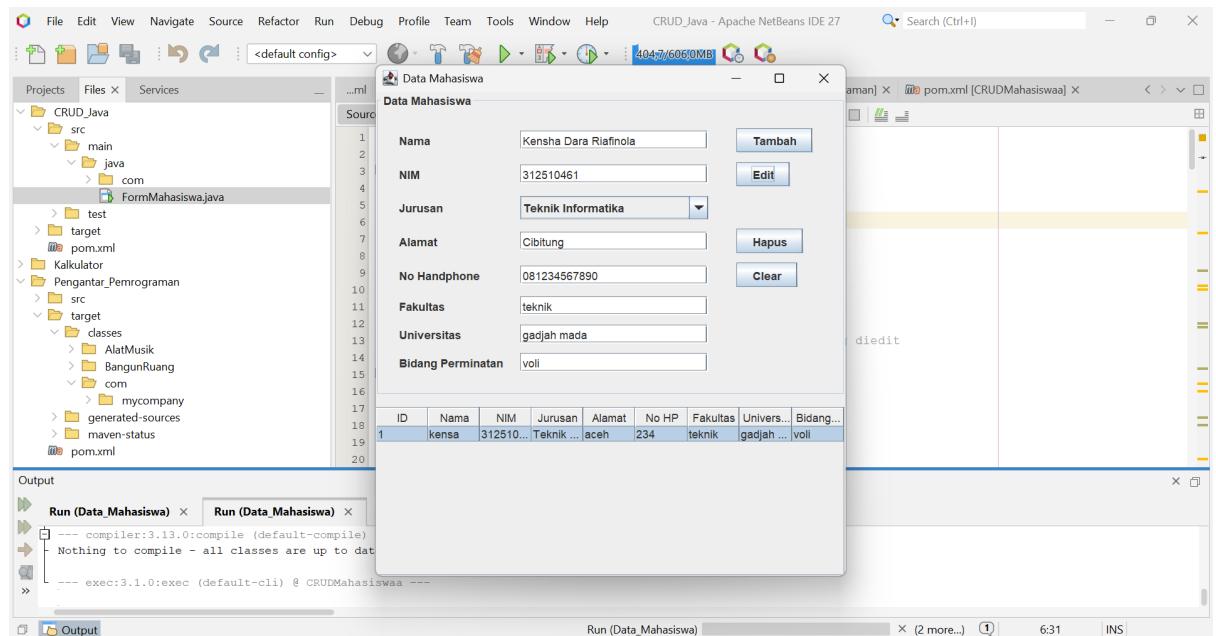
```
private javax.swing.JButton jButton16;
private javax.swing.JButton jButton17;
private javax.swing.JButton jButton18;
private javax.swing.JButton jButton2;
private javax.swing.JButton jButton3;
private javax.swing.JButton jButton4;
private javax.swing.JButton jButton5;
private javax.swing.JButton jButton6;
private javax.swing.JButton jButton7;
private javax.swing.JButton jButton8;
private javax.swing.JButton jButton9;
private javax.swing.JTextField jTextField1;
// End of variables declaration
}
```

3. Result



B. CRUD Mahasiswa

1. GUI



2. Source Code

```
package com.mycompany.pemrogramman.CRUD_Java;

import javax.swing.JOptionPane;
import javax.swing.table.DefaultTableModel;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
import java.sql.ResultSet;

public class Data_Mahasiswa extends javax.swing.JFrame {

    DefaultTableModel model;
    private int currentId = -1; // Menyimpan ID yang sedang diedit

    public Data_Mahasiswa() {
        initComponents();
        initTable();
        loadData();
    }
    // Kensha Dara Riafinola -- TI25C1 -- 312510461
    // ===== KONEKSI DATABASE =====
    private Connection getConnection() {
        Connection conn = null;
        try {
            conn = DriverManager.getConnection(
                "jdbc:mysql://localhost:3306/mahasiswa?useSSL=false&allowPublicKeyRetrieval=true",
                "root", // username
                "" // password mysql
            );
        } catch (SQLException e) {
            JOptionPane.showMessageDialog(null, "Error: " + e.getMessage());
        }
    }
}
```

```
        } catch (Exception e) {
            JOptionPane.showMessageDialog(this, "Koneksi gagal: " + e.getMessage());
        }
        return conn;
    }

// ===== LOAD DATA =====
private void loadData() {
    model.setRowCount(0);
    try {
        String sql = "SELECT * FROM table_mhs";
        Connection conn = getConnection();
        PreparedStatement ps = conn.prepareStatement(sql);
        ResultSet rs = ps.executeQuery();

        while (rs.next()) {
            model.addRow(new Object[]{
                rs.getInt("id"),
                rs.getString("nama"),
                rs.getString("nim"),
                rs.getString("jurusan"),
                rs.getString("alamat"),
                rs.getString("no_telp"),
                rs.getString("fakultas"),
                rs.getString("universitas"),
                rs.getString("bidang_perminatan")
            });
        }
    } catch (Exception e) {
        JOptionPane.showMessageDialog(this, e.getMessage());
    }
}

private void initTable() {
    model = new DefaultTableModel();
    model.addColumn("ID");
    model.addColumn("Nama");
    model.addColumn("NIM");
    model.addColumn("Jurusan");
    model.addColumn("Alamat");
    model.addColumn("No HP");
    model.addColumn("Fakultas");
    model.addColumn("Universitas");
    model.addColumn("Bidang Perminatan");
    tableMahasiswa.setModel(model);
}
```

```
private void clearForm() {
    txtNama.setText("");
    txtNim.setText("");
    cmbJurusan.setSelectedIndex(0);
    txtAlamat.setText("");
    txtNoHp.setText("");
    txtFakultas.setText("");
    txtUniversitas.setText("");
    txtBidangPerminatan.setText("");
    tableMahasiswa.clearSelection();
    currentId = -1;
}

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

    jPanel1 = new javax.swing.JPanel();
    jPanel2 = new javax.swing.JPanel();
    jLabel1 = new javax.swing.JLabel();
    txtNama = new javax.swing.JTextField();
    jLabel2 = new javax.swing.JLabel();
    txtNim = new javax.swing.JTextField();
    jLabel3 = new javax.swing.JLabel();
    cmbJurusan = new javax.swing.JComboBox();
    jLabel4 = new javax.swing.JLabel();
    txtAlamat = new javax.swing.JTextField();

```

```
jLabel5 = new javax.swing.JLabel();
txtNoHp = new javax.swing.JTextField();
jLabel6 = new javax.swing.JLabel();
txtFakultas = new javax.swing.JTextField();
jLabel7 = new javax.swing.JLabel();
txtUniversitas = new javax.swing.JTextField();
jLabel8 = new javax.swing.JLabel();
txtBidangPerminatan = new javax.swing.JTextField();
btnTambah = new javax.swing.JButton();
btnEdit = new javax.swing.JButton();
btnHapus = new javax.swing.JButton();
btnClear = new javax.swing.JButton();
jScrollPane1 = new javax.swing.JScrollPane();
tableMahasiswa = new javax.swing.JTable();

setDefaultCloseOperation(javax.swing.WindowConstants.EXIT_ON_CLOSE);
setTitle("Data Mahasiswa");

jPanel2.setBorder(javax.swing.BorderFactory.createTitledBorder("Data Mahasiswa"));

jLabel1.setText("Nama");
jLabel2.setText("NIM");
jLabel3.setText("Jurusan");
jLabel4.setText("Alamat");
jLabel5.setText("No Handphone");
jLabel6.setText("Fakultas");
```

```
jLabel7.setText("Universitas");
jLabel8.setText("Bidang Perminatan");

cmbJurusan.setModel(new javax.swing.DefaultComboBoxModel<>(
|   new String[] { "Teknik Informatika", "Sistem Informasi", "Bisnis", "Manajemen", "Lainnya" }
));

btnTambah.setText("Tambah");
btnTambah.addActionListener(evt -> btnTambahActionPerformed(evt));

btnEdit.setText("Edit");
btnEdit.addActionListener(evt -> btnEditActionPerformed(evt));

btnHapus.setText("Hapus");
btnHapus.addActionListener(evt -> btnHapusActionPerformed(evt));

btnClear.setText("Clear");
btnClear.addActionListener(evt -> clearForm());

javax.swing.GroupLayout jPanel2Layout = new javax.swing.GroupLayout(jPanel2);
jPanel2.setLayout(jPanel2Layout);
jPanel2Layout.setHorizontalGroup(
    jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
    .addGroup(jPanel2Layout.createSequentialGroup()
        .addGap(20, 20, 20)
        .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)

```

```
.addComponent(jLabel1)
.addComponent(jLabel2)
.addComponent(jLabel3)
.addComponent(jLabel4)
.addComponent(jLabel5)
.addComponent(jLabel6)
.addComponent(jLabel7)
.addComponent(jLabel8)
.addGap(18, 18, 18)
.addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING, false)
    .addComponent(txtNama)
    .addComponent(txthim)
    .addComponent(cmbJurusan)
    .addComponent(txtAlamat)
    .addComponent(txtNoHp)
    .addComponent(txtFakultas)
    .addComponent(txtUniversitas)
    .addComponent(txtBidangPerminatan, javax.swing.GroupLayout.DEFAULT_SIZE, 200, Short.MAX_VALUE))
.addGap(30, 30, 30)
.addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
    .addComponent(btnTambah)
    .addComponent(btnEdit)
    .addComponent(btnHapus)
    .addComponent(btnClear)))

```

```
        .addContainerGap(30, Short.MAX_VALUE))
);
jPanel2Layout.setVerticalGroup(
    jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
    .addGroup(jPanel2Layout.createSequentialGroup()
        .addGap(20, 20, 20)
        .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
            .addComponent(jLabel1)
            .addComponent(txtNama)
            .addComponent(btnTambah))
        .addGap(10)
        .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
            .addComponent(jLabel2)
            .addComponent(txtNim)
            .addComponent(btnEdit))
        .addGap(10)
        .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
            .addComponent(jLabel3)
            .addComponent(cmbJurusan))
        .addGap(10)
        .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
            .addComponent(jLabel4)
            .addComponent(txtAlamat)
            .addComponent(btnHapus))
    );
    .addGap(10)
    .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
        .addComponent(jLabel5)
        .addComponent(txtNoHp)
        .addComponent(btnClear))
    .addGap(10)
    .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
        .addComponent(jLabel6)
        .addComponent(txtFakultas))
    .addGap(10)
    .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
        .addComponent(jLabel7)
        .addComponent(txtUniversitas))
    .addGap(10)
    .addGroup(jPanel2Layout.createParallelGroup(javax.swing.GroupLayout.Alignment.BASELINE)
        .addComponent(jLabel8)
        .addComponent(txtBidangPerminatan))
    .addContainerGap(20, Short.MAX_VALUE))
);

tableMahasiswa.addMouseListener(new java.awt.event.MouseAdapter() {
    public void mouseClicked(java.awt.event.MouseEvent evt) {
        int row = tableMahasiswa.getSelectedRow();
        currentId = Integer.parseInt(model.getValueAt(row, 0).toString());
    }
});
```

```

        txtNama.setText(model.getValueAt(row, 1).toString());
        txtNim.setText(model.getValueAt(row, 2).toString());
        cmbJurusan.setSelectedItem(model.getValueAt(row, 3).toString());
        txtAlamat.setText(model.getValueAt(row, 4).toString());
        txtNoHp.setText(model.getValueAt(row, 5).toString());
        txtFakultas.setText(model.getValueAt(row, 6).toString());
        txtUniversitas.setText(model.getValueAt(row, 7).toString());
        txtBidangPerminatan.setText(model.getValueAt(row, 8).toString());
    }
);

jScrollPane1.setViewportView(tableMahasiswa);

javax.swing.GroupLayout layout = new javax.swing.GroupLayout(getContentPane());
getContentPane().setLayout(layout);
layout.setHorizontalGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
    .addComponent(jPanel2)
    .addComponent(jScrollPane1)
);
layout.setVerticalGroup(layout.createParallelGroup(javax.swing.GroupLayout.Alignment.LEADING)
    .addGroup(layout.createSequentialGroup()
        .addComponent(jPanel2, javax.swing.GroupLayout.PREFERRED_SIZE, 180, javax.swing.GroupLayout.PREFERRED_SIZE)
        .addGap(0, 0, 0)
        .addComponent(jScrollPane1, javax.swing.GroupLayout.PREFERRED_SIZE, javax.swing.GroupLayout.PREFERRED_SIZE))
);
pack();
setLocationRelativeTo(null);
}// </editor-fold>

// ===== CRUD =====
private void btnTambahActionPerformed(java.awt.event.ActionEvent evt) {
    // Validasi semua field required
    if (txtNama.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Nama wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtNim.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "NIM wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (!txtNim.getText().matches("\\d+")) {
        JOptionPane.showMessageDialog(this, "NIM hanya boleh berisi angka!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (cmbJurusan.getSelectedIndex() == -1 || cmbJurusan.getSelectedItem().toString().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Jurusan wajib dipilih!", "Validasi", JOptionPane.WARNING_MESSAGE);
    }
}

```

```
        return;
    }
    if (txtAlamat.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Alamat wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtNoHp.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "No Handphone wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (!txtNoHp.getText().matches("\\d+")) {
        JOptionPane.showMessageDialog(this, "No Handphone hanya boleh berisi angka!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtFakultas.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Fakultas wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtUniversitas.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Universitas wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtBidangPerminatan.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Bidang Perminatan wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
}
```

```
try {
    String sql = "INSERT INTO table_mhs VALUES (?,?,?,?,?,?,?,?,?,?)";
    Connection conn = getConnection();
    PreparedStatement ps = conn.prepareStatement(sql);

    ps.setString(1, null);
    ps.setString(2, txtNama.getText());
    ps.setString(3, txtNim.getText());
    ps.setString(4, cmbJurusan.getSelectedItem().toString());
    ps.setString(5, txtAlamat.getText());
    ps.setString(6, txtNoHp.getText());
    ps.setString(7, txtFakultas.getText());
    ps.setString(8, txtUniversitas.getText());
    ps.setString(9, txtBidangPerminatan.getText());

    ps.executeUpdate();
    JOptionPane.showMessageDialog(this, "Data berhasil disimpan");
    loadData();
    clearForm();
} catch (Exception e) {
    JOptionPane.showMessageDialog(this, e.getMessage());
}
}
```

```

private void btnEditActionPerformed(java.awt.event.ActionEvent evt) {
    // Validasi semua field required
    if (txtNama.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Nama wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtNim.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "NIM wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (cmbJurusan.getSelectedIndex() == -1 || cmbJurusan.getSelectedItem().toString().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Jurusan wajib dipilih!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtAlamat.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Alamat wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtNoHp.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "No Handphone wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (!txtNoHp.getText().matches("\\d+")) {
        JOptionPane.showMessageDialog(this, "No Handphone hanya boleh berisi angka!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
    if (txtFakultas.getText().trim().isEmpty()) {
        JOptionPane.showMessageDialog(this, "Fakultas wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
    }
}

```

```

    return;
}
if (txtUniversitas.getText().trim().isEmpty()) {
    JOptionPane.showMessageDialog(this, "Universitas wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
    return;
}
if (txtBidangPerminatan.getText().trim().isEmpty()) {
    JOptionPane.showMessageDialog(this, "Bidang Perminatan wajib diisi!", "Validasi", JOptionPane.WARNING_MESSAGE);
    return;
}
if (currentId == -1) {
    JOptionPane.showMessageDialog(this, "Pilih data dari tabel terlebih dahulu!", "Validasi", JOptionPane.WARNING_MESSAGE);
    return;
}

try {
    String sql = "UPDATE table_mhs SET nama=?, nim=?, jurusan=?, alamat=?, no_telp=? , fakultas=?, universitas=?, bidang_perminatan=? WHERE id=?";
    Connection conn = getConnection();
    PreparedStatement ps = conn.prepareStatement(sql);

    ps.setString(1, txtNama.getText());
    ps.setString(2, txtNim.getText());
    ps.setString(3, cmbJurusan.getSelectedItem().toString());
    ps.setString(4, txtAlamat.getText());
    ps.setString(5, txtNoHp.getText());
    ps.setString(6, txtFakultas.getText());
}

```

```

    ps.setString(5, txtNoHp.getText());
    ps.setString(6, txtFakultas.getText());
    ps.setString(7, txtUniversitas.getText());
    ps.setString(8, txtBidangPerminatan.getText());
    ps.setInt(9, currentId);

    int rowsUpdated = ps.executeUpdate();
    if (rowsUpdated > 0) {
        JOptionPane.showMessageDialog(this, "Data berhasil diupdate");
        loadData();
        clearForm();
    } else {
        JOptionPane.showMessageDialog(this, "Gagal mengupdate data!", "Peringatan", JOptionPane.WARNING_MESSAGE);
    }
    ps.close();
    conn.close();
} catch (Exception e) {
    JOptionPane.showMessageDialog(this, "Error: " + e.getMessage());
}
}

private void btnHapusActionPerformed(java.awt.event.ActionEvent evt) {
    // Validasi ID untuk identifikasi data
    if (currentId == -1) {
        JOptionPane.showMessageDialog(this, "Pilih data dari tabel terlebih dahulu!", "Validasi", JOptionPane.WARNING_MESSAGE);
        return;
    }
}

```

```

        }

        int confirm = JOptionPane.showConfirmDialog(this, "Yakin ingin menghapus data ini?", "Konfirmasi", JOptionPane.YES_NO_OPTION);
        if (confirm != JOptionPane.YES_OPTION) {
            return;
        }

        try {
            String sql = "DELETE FROM table_mhs WHERE id=?";
            Connection conn = getConnection();
            PreparedStatement ps = conn.prepareStatement(sql);
            ps.setInt(1, currentId);

            ps.executeUpdate();
            JOptionPane.showMessageDialog(this, "Data berhasil dihapus");
            loadData();
            clearForm();
            ps.close();
            conn.close();
        } catch (Exception e) {
            JOptionPane.showMessageDialog(this, e.getMessage());
        }
    }

    public static void main(String args[]) {
        java.awt.EventQueue.invokeLater(() -> new Data_Mahasiswa().setVisible(true));
    }
}

```

```

}

// Variables declaration
private javax.swing.JButton btnClear;
private javax.swing.JButton btnEdit;
private javax.swing.JButton btnHapus;
private javax.swing.JButton btnTambah;
private javax.swing.JComboBox<String> cmbJurusan;
private javax.swing.JLabel jLabel1;
private javax.swing.JLabel jLabel2;
private javax.swing.JLabel jLabel3;
private javax.swing.JLabel jLabel4;
private javax.swing.JLabel jLabel5;
private javax.swing.JLabel jLabel6;
private javax.swing.JLabel jLabel7;
private javax.swing.JLabel jLabel8;
private javax.swing.JPanel jPanel1;
private javax.swing.JPanel jPanel2;
private javax.swing.JScrollPane jScrollPane1;
private javax.swing.JTable tableMahasiswa;
private javax.swing.JTextField txtAlamat;
private javax.swing.JTextField txtBidangPerminatan;
private javax.swing.JTextField txtFakultas;
private javax.swing.JTextField txtNama;
private javax.swing.JTextField txtNim;
private javax.swing.JTextField txtNoHp;

```

```

private javax.swing.JPanel jPanel1;
private javax.swing.JPanel jPanel2;
private javax.swing.JScrollPane jScrollPane1;
private javax.swing.JTable tableMahasiswa;
private javax.swing.JTextField txtAlamat;
private javax.swing.JTextField txtBidangPerminatan;
private javax.swing.JTextField txtFakultas;
private javax.swing.JTextField txtNama;
private javax.swing.JTextField txtNim;
private javax.swing.JTextField txtNoHp;
private javax.swing.JTextField txtUniversitas;
}

```

3. Result Database

ID	Nama	NIM	Jurusan	Alamat	No HP	Fakultas	Univers...	Bidang...
1	fdjbgyudh	8646	Teknik ...	hngfh	7497	ngsjds	jdfghnfh	hhjegj
2	bcvhdhi	876	Teknik ...	chjdg	6543	jjndfg	sfgh	fty
3	fdsgthb	457	Sistem I...	hxfg	6568	fghdf	dgydt	dhdtr
4	cghdjfg	5634	Bisnis	fghdfj	456	gfuryt	dfjg	dgj
5	jghytk	6568	Manaje...	vhjh	2365	mkhk	hfkh	hgdfj