

```

public class Fraction
{
    private int numerator;
    private int denominator;

    public Fraction(int pNumerator, int pDenominator)
    {
        setFraction(pNumerator, pDenominator);
    }

    public void setFraction(int pNumerator, int pDenominator)
    {
        numerator = pNumerator;
        denominator = pDenominator;

        simplify();
    }

    public int getNumerator()
    {
        return numerator;
    }

    public int getDenominator()
    {
        return denominator;
    }

    public double getDecimal()
    {
        if (denominator != 0)
            return (double) numerator / denominator;
        else
            return Double.NaN;
    }

    public String toString()
    {
        String res = "[" + numerator;
        if (denominator != 1)
            res = res + "/" + denominator;
        res = res + " (" + getDecimal() + ")";
        return res;
    }

    public int gcd(int a, int b)
    {
        int h;
        while (b != 0)
        {
            h = a % b;
            a = b;
            b = h;
        }
        return a;
    }

    public int lcm(int a, int b)
    {
        return (a * b) / gcd(a, b);
    }

    public void simplify()
    {
        int g = gcd(numerator, denominator);
        numerator = numerator / g;
        denominator = denominator / g;
    }

    /**
     * operation:
     *  $f = f + pF$ 
     * (f est l'objet courant)
     */
    public void add(Fraction pF)
    {
        int l = lcm(denominator, pF.getDenominator());
        int m1 = l / denominator;
        int m2 = l / pF.getDenominator();

        numerator = numerator * m1 + pF.getNumerator() * m2;
        denominator = l;

        simplify();
    }

    /**
     * operation:
     *  $f = f - pF$ 
     * (f est l'objet courant)
     */
    public void subtract(Fraction pF)
    {
        int l = lcm(denominator, pF.getDenominator());
        int m1 = l / denominator;
        int m2 = l / pF.getDenominator();

        numerator = numerator * m1 - pF.getNumerator() * m2;

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        denominator = 1;
        simplify();
    }

    /**
     * operation:
     *  $f = f * pF$ 
     * (f est l'objet courant)
     */
    public void multiply(Fraction pF)
    {
        numerator = numerator * pF.getNumerator();
        denominator = denominator * pF.getDenominator();

        simplify();
    }

    /**
     * operation:
     *  $f = f / pF$ 
     * (f est l'objet courant)
     */
    public void divide(Fraction pF)
    {
        numerator = numerator * pF.getDenominator();
        denominator = denominator * pF.getNumerator();

        simplify();
    }
}
```

```

public class MainFrame extends javax.swing.JFrame
{
    /*
     * Version 2: *pas* de fraction initiale
     */

    // Pas de valeur initiale !
    private Fraction fraction = null;

    public MainFrame()
    {
        initComponents();
        // désactiver tous les boutons (sauf enter...), car il n'y a pas de fraction (modèle)
        reduceButton.setEnabled(false);
        addButton.setEnabled(false);
        subtractButton.setEnabled(false);
        multiplyButton.setEnabled(false);
        divideButton.setEnabled(false);
    }
    // Skipped: ... initComponents { ... }
    private Fraction getFractionFromView()
    {
        int n = Integer.valueOf( numeratorTextField.getText() );
        int d = Integer.valueOf( denominatorTextField.getText() );
        return new Fraction( n, d );
    }

    private void updateView()
    {
        numeratorTextField.setText( String.valueOf( fraction.getNumerator() ) );
        denominatorTextField.setText( String.valueOf( fraction.getDenominator() ) );
        decimalLabel.setText( String.valueOf( fraction.getDecimal() ) );
    }

    private void reduceButtonActionPerformed( java.awt.event.ActionEvent evt ) { //GEN-FIRST:event_reduceButtonActionPerformed
        fraction.simplify();
        updateView();
    } //GEN-LAST:event_reduceButtonActionPerformed

    private void addButtonActionPerformed( java.awt.event.ActionEvent evt ) //GEN-FIRST:event_addButtonActionPerformed
    { //GEN-HEADEREND:event_addButtonActionPerformed
        fraction.add( getFractionFromView() );
        updateView();
    } //GEN-LAST:event_addButtonActionPerformed

    private void multiplyButtonActionPerformed( java.awt.event.ActionEvent evt ) //GEN-FIRST:event_multiplyButtonActionPerformed
    { //GEN-HEADEREND:event_multiplyButtonActionPerformed
        fraction.multiply( getFractionFromView() );
        updateView();
    } //GEN-LAST:event_multiplyButtonActionPerformed

    private void subtractButtonActionPerformed( java.awt.event.ActionEvent evt ) //GEN-FIRST:event_subtractButtonActionPerformed
    { //GEN-HEADEREND:event_subtractButtonActionPerformed
        fraction.subtract( getFractionFromView() );
        updateView();
    } //GEN-LAST:event_subtractButtonActionPerformed

    private void divideButtonActionPerformed( java.awt.event.ActionEvent evt ) //GEN-FIRST:event_divideButtonActionPerformed
    { //GEN-HEADEREND:event_divideButtonActionPerformed
        fraction.divide( getFractionFromView() );
        updateView();
    } //GEN-LAST:event_divideButtonActionPerformed

    private void enterButtonActionPerformed( java.awt.event.ActionEvent evt ) { //GEN-FIRST:event_enterButtonActionPerformed
        fraction = getFractionFromView();

        // activer boutons, car on a une fraction (modèle)
        reduceButton.setEnabled(true);
        addButton.setEnabled(true);
        subtractButton.setEnabled(true);
        multiplyButton.setEnabled(true);
        divideButton.setEnabled(true);

        updateView();
    } //GEN-LAST:event_enterButtonActionPerformed

    /**
     * @param args the command line arguments
     */
    public static void main( String args[] )
    {
        java.awt.EventQueue.invokeLater( new Runnable()
        {
            public void run()
            {
                new MainFrame().setVisible(true);
            }
        }
        );
    }

    // Variables declaration - do not modify //GEN-BEGIN:variables
    private javax.swing.JButton addButton;
    private javax.swing.JLabel decimalLabel;
    private javax.swing.JLabel denominatorLabel;
    private javax.swing.JTextField denominatorTextField;
    private javax.swing.JButton divideButton;
    private javax.swing.JButton enterButton;
    private javax.swing.JLabel jLabel2;

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private javax.swing.JLabel jLabel3;  
private javax.swing.JButton multiplyButton;  
private javax.swing.JTextField numeratorTextField;  
private javax.swing.JButton reduceButton;  
private javax.swing.JButton subtractButton;  
// End of variables declaration//GEN-END:variables  
}
```