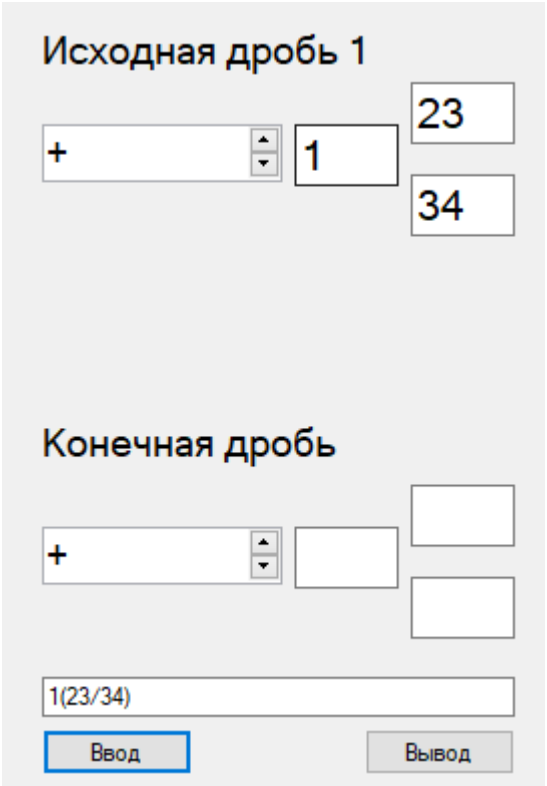
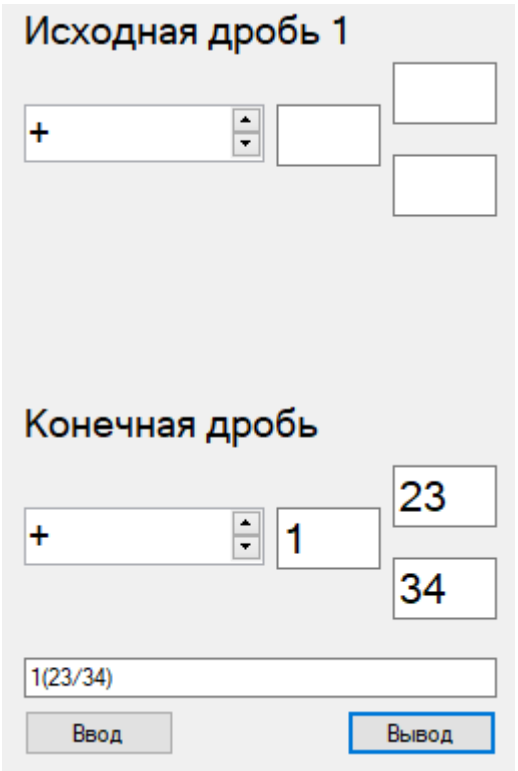
Практическая работа №11

На основе класса, реализованного в практической работа №10, внестиизменения и реализовать методы преобразования дроби в строку и наоборот, т.е. переопределить метод ToString() и метод Parse(string s)

Продемонстрировать работу реализованных методов.





Fraction.cs

```
public class Fraction
    {
        public int sign, integer, numerator, denominator;

        public Fraction(int n_sign, int n_integer, int n_numerator, int
n_denominator)//конструктор класса
        {
            sign =n_sign;
            integer = n_integer;
            numerator = n_numerator;
            denominator = n_denominator;

        }
        public Fraction() {
            sign = 1;
            integer = 0;
            numerator = 0;
            denominator = 1;
        }

        private int NOD(int A, int B)
        {
            while (A != B)
            {
                if (A > B)
                {
                    A = A - B;
                }
                else
                {
                    B = B - A;
                }
            }
            return A;
        }
        public void Reduction()// сокращение дроби
        {
            if (numerator > 0)
            {
                int k = NOD(numerator, denominator);
                if (k != 1)
                {
                    numerator = numerator / k;
                    denominator = denominator / k;
                }
            }
        }

        public void Incorrect_fraction()//приведение в неправильную дробь
        {
            numerator = integer * denominator + numerator;
            integer = 0;
        }

        public void Correct_fraction()//создание правильной дроби и выделение целой части
        {
            int k = integer;
            integer = numerator / denominator;
            numerator = numerator - integer * denominator;
            integer = integer + k;
        }

        public void Addition(Fraction d)//сложение дробей
```

```
        {
            integer = sign* integer + d.sign*d.integer;
            int k1 = sign*numerator * d.denominator + d.sign*d.numerator * denominator;
            denominator = denominator * d.denominator;
            numerator = k1;
            if (integer < 0)
            {
                integer = integer * (-1);
                sign = sign * (-1);
            }
        }
        public void Subtraction(Fraction d)//Вычитание дробей
        {
            Incorrect_fraction();
            d.Incorrect_fraction();
            //integer = sign * integer - d.sign * d.integer;
            int k1 = (sign * numerator) * d.denominator - (d.sign * (d.numerator)) *
denominator;
            numerator = k1;
            denominator = d.denominator * denominator;
            if (numerator < 0)
            {
                numerator = numerator * (-1);
                sign = sign * (-1);
            }
            Correct_fraction();
            Reduction();
        }

public void Multiplication(Fraction d)
        {
            Incorrect_fraction();
            d.Incorrect_fraction();
            int t = sign * numerator * d.sign * d.numerator;
            int t2 = denominator * d.denominator;
            numerator = t;
            denominator = t2;
            if (numerator < 0)
            {
                numerator = numerator * (-1);
                sign = -1;
            }
            else
            {
                sign = 1;
            }

            Correct_fraction();
            Reduction();


        }
        public void Division(Fraction d)//Деление дробей
        {
            Incorrect_fraction();
            d.Incorrect_fraction();
            int t = sign * numerator * d.sign * d.denominator;
            int t2 = d.numerator * denominator;
            numerator = t;
            denominator = t2;
            if (numerator < 0)
            {
                numerator = numerator * (-1);
                sign = -1;
            }
```

```
            else
            {
                sign = 1;
            }
            Correct_fraction();
            Reduction();
        }
        //вычитание, умножение деление дописать

        public static Fraction operator +(Fraction b1, Fraction b2)
        {
            Fraction b = new Fraction();
            b1.Incorrect_fraction();
            b2.Incorrect_fraction();
            //integer = sign * integer - d.sign * d.integer;
            int k1 = (b1.sign * b1.numerator) * b2.denominator
                + (b2.sign * (b2.numerator)) * b1.denominator;
            b.numerator = k1;
            b.denominator = b1.denominator * b2.denominator;
            if (b.numerator < 0)
            {
                b.numerator = b.numerator * (-1);
                b.sign = b.sign * (-1);
            }
            b.Correct_fraction();
            b.Reduction();
            return b;
        }
        public static Fraction operator -(Fraction b1, Fraction b2)
        {
            Fraction b = new Fraction();
            b1.Incorrect_fraction();
            b2.Incorrect_fraction();
            //integer = sign * integer - d.sign * d.integer;
            int k1 = (b1.sign * b1.numerator) * b2.denominator - (b2.sign *
(b2.numerator)) * b1.denominator;
            b.numerator = k1;
            b.denominator = b1.denominator * b2.denominator;
            if (b.numerator < 0)
            {
                b.numerator = b.numerator * (-1);
                b.sign = b.sign * (-1);
            }
            b.Correct_fraction();
            b.Reduction();
            return b;
        }
        public static Fraction operator *(Fraction b1, Fraction b2)
        {
            Fraction b = new Fraction();
            b1.Incorrect_fraction();
            b2.Incorrect_fraction();
            int t = b1.sign * b1.numerator * b2.sign * b2.numerator;
            int t2 = b1.denominator * b2.denominator;
            b.numerator = t;
            b.denominator = t2;
            if (b.numerator < 0)
            {
                b.numerator = b.numerator * (-1);
                b.sign = -1;
            }
            else
            {
                b.sign = 1;
            }
```

```
    b.Correct_fraction();
    b.Reduction();
    return b;
}
public static Fraction operator /(Fraction b1, Fraction b2)
{
    Fraction b = new Fraction();
    b1.Incorrect_fraction();
    b2.Incorrect_fraction();
    int t = b1.sign * b1.numerator * b2.sign * b2.denominator;
    int t2 = b2.numerator*b1.denominator;
    b.numerator = t;
    b.denominator = t2;
    if (b.numerator < 0)
    {
        b.numerator = b.numerator * (-1);
        b.sign = -1;
    }
    else
    {
        b.sign = 1;
    }

    b.Correct_fraction();
    b.Reduction();
    return b;
}
public static bool operator >= (Fraction b1, Fraction b2)
{
    b1.Incorrect_fraction();
    b2.Incorrect_fraction();
    int k1 = b1.numerator * b1.sign * b2.denominator;
    int k2 = b2.numerator * b2.sign * b1.denominator;
    if (k1 >= k2)
    {
        return true;
    }
    else
    {
        return false;
    }
}
public static bool operator <=(Fraction b1, Fraction b2)
{
    b1.Incorrect_fraction();
    b2.Incorrect_fraction();
    int k1 = b1.numerator * b1.sign * b2.denominator;
    int k2 = b2.numerator * b2.sign * b1.denominator;
    if (k1 <= k2)
    {
        return true;
    }
    else
    {
        return false;
    }
}
public static bool operator <(Fraction b1, Fraction b2)
{
    b1.Incorrect_fraction();
    b2.Incorrect_fraction();
    int k1 = b1.numerator * b1.sign * b2.denominator;
    int k2 = b2.numerator * b2.sign * b1.denominator;
    if (k1 < k2)
    {
```

```
                return true;
            }
            else
            {
                return false;
            }
        }
        public static bool operator >(Fraction b1, Fraction b2)
        {
            b1.Incorrect_fraction();
            b2.Incorrect_fraction();
            int k1 = b1.numerator * b1.sign * b2.denominator;
            int k2 = b2.numerator * b2.sign * b1.denominator;
            if (k1 > k2)
            {
                return true;
            }
            else
            {
                return false;
            }
        }
        public static bool operator ==(Fraction b1, Fraction b2)
        {
            b1.Incorrect_fraction();
            b2.Incorrect_fraction();
            int k1 = b1.numerator * b1.sign * b2.denominator;
            int k2 = b2.numerator * b2.sign * b1.denominator;
            if (k1 == k2)
            {
                return true;
            }
            else
            {
                return false;
            }
        }

public static bool operator != (Fraction b1, Fraction b2)
        {
            b1.Incorrect_fraction();
            b2.Incorrect_fraction();
            int k1 = b1.numerator * b1.sign * b2.denominator;
            int k2 = b2.numerator * b2.sign * b1.denominator;
            if (k1 != k2)
            {
                return true;
            }
            else
            {
                return false;
            }
        }
        public override string ToString()
        {
            string s = "";
            if (sign < 0)
            {
                s = s + "";
            }
            if (integer != 0)
            {
                s = s + integer.ToString();
            }
            s = s + "(" + numerator + "/" + denominator + ")";
```

```
            return s;
        }
        public static Fraction Parse(string str)
        {
            Fraction f = new Fraction();
            int k = str.IndexOf("(");
            string s2 = str.Substring(0, k);
            f.integer = Convert.ToInt32(s2);
            if (f.integer < 0)
            {
                f.sign = -1;
                f.integer = -f.integer;
            }
            int k2 = str.IndexOf(")");
            s2 = str.Substring(k + 1, k2 - k - 1);
            int k3 = s2.IndexOf("/");
            f.numerator = Convert.ToInt32(s2.Substring(0, k3));
            f.denominator = Convert.ToInt32(s2.Substring(k3+1,s2.Length-k3-1));
            return f;
        }
    }
```

Form1.cs

```
public partial class Form1 : Form
    {

        public Form1()
        {
            InitializeComponent();
        }

        private void Form1_Load(object sender, EventArgs e)
        {
            domainUpDown1.SelectedIndex = 0;
            domainUpDown2.SelectedIndex = 0;
            domainUpDown3.SelectedIndex = 0;
        }


        public void Print(Fraction f)
        {

            if (f.sign > 0)
            {
                domainUpDown2.SelectedIndex = 0;
            }
            else
            {
                domainUpDown2.SelectedIndex = 1;
            }
            textBox6.Text = f.integer.ToString();
            textBox5.Text = f.numerator.ToString();
            textBox4.Text = f.denominator.ToString();
        }

        public Fraction ReceiveF()
        {
            int sign = 1;
            if (domainUpDown1.SelectedIndex == 1)
            {
                sign = -1;
            }
            else if (domainUpDown1.SelectedIndex == 0)
            {
```

```
            sign = 1;
        }

        int integer = Convert.ToInt32(textBox2.Text);
        int numerator = Convert.ToInt32(textBox1.Text);
        int denominator = Convert.ToInt32(textBox3.Text);

        Fraction newf = new Fraction(sign, integer, numerator, denominator);
        return newf;
    }

    public Fraction ReceiveF2()
    {
        int sign2 = 1;
        if (domainUpDown3.SelectedIndex == 1)
        {
            sign2 = -1;
        }
        else if (domainUpDown3.SelectedIndex == 0)
        {
            sign2 = 1;
        }

        int integer2 = Convert.ToInt32(textBox9.Text);
        int numerator2 = Convert.ToInt32(textBox8.Text);
        int denominator2 = Convert.ToInt32(textBox7.Text);

        Fraction newf2 = new Fraction(sign2, integer2, numerator2, denominator2);
        return newf2;
    }



    private void button1_Click(object sender, EventArgs e)
    {
        Fraction f = ReceiveF();

        f.Reduction();
        Print(f);
    }

    private void button2_Click(object sender, EventArgs e)
    {
        Fraction f = ReceiveF();
        ReceiveF();
        f.Incorrect_fraction();
        Print(f);
    }

    private void button3_Click(object sender, EventArgs e)
    {
        Fraction f = ReceiveF();

        f.Correct_fraction();
        Print(f);
    }

    private void button5_Click(object sender, EventArgs e)
    {
        Fraction f = ReceiveF();
        Fraction f2 = ReceiveF2();
        f.Subtraction(f2);
        Print(f2);
    }
```

```
private void button6_Click(object sender, EventArgs e)
{
    Fraction f = ReceiveF();
    Fraction f2=ReceiveF2();
    f.Multiplication(f2);
    Print(f2);
}

private void button7_Click(object sender, EventArgs e)
{


        Fraction f1 = ReceiveF();
        Fraction f2 = ReceiveF2();
        Fraction f3 = f1 + f2;
        //Fraction f4 = f1 * f2;
        // Fraction f5 = f1 - f2;
        //Fraction f6 = f1 / f2;
        Print(f3);


}

private void button4_Click(object sender, EventArgs e)
{
    Fraction f = ReceiveF();
    Fraction f2 = ReceiveF2();
    f.Addition(f2);
    Print(f2);
}

private void button8_Click(object sender, EventArgs e)
{
    Fraction f1 = ReceiveF();
    Fraction f2 = ReceiveF2();
    Fraction f5 = f1 - f2;
    Print(f5);
}

private void button9_Click(object sender, EventArgs e)
{
    Fraction f1 = ReceiveF();
    Fraction f2 = ReceiveF2();
    Fraction f4 = f1 * f2;
    Print(f4);
}

private void button10_Click(object sender, EventArgs e)
{
    Fraction f1 = ReceiveF();
    Fraction f2 = ReceiveF2();
    Fraction f6 = f1 / f2;
    Print(f6);
}

private void button11_Click(object sender, EventArgs e)
{


    Fraction f = ReceiveF();
    Fraction f2 = ReceiveF2();
    f.Division(f2);
    Print(f2);

}
```

```
private void radioButton1_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton1.Checked)
    {
        Fraction f1 = ReceiveF();
        Fraction f2 = ReceiveF2();
        Fraction f3 = f1 + f2;
        //Fraction f4 = f1 * f2;
        // Fraction f5 = f1 - f2;
        //Fraction f6 = f1 / f2;
        Print(f3);
    }
}

private void radioButton2_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton2.Checked)
    {
        Fraction f1 = ReceiveF();
        Fraction f2 = ReceiveF2();
        Fraction f5 = f1 - f2;
        Print(f5);
    }
}

private void radioButton3_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton3.Checked)
    {
        Fraction f1 = ReceiveF();
        Fraction f2 = ReceiveF2();
        Fraction f4 = f1 * f2;
        Print(f4);
    }
}

private void radioButton4_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton4.Checked)
    {
        Fraction f1 = ReceiveF();
        Fraction f2 = ReceiveF2();
        Fraction f6 = f1 / f2;
        Print(f6);
    }
}

private void radioButton5_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton5.Checked)
    {
        Fraction f = ReceiveF();
        Fraction f2 = ReceiveF2();
        if (f >= f2)
        {
            MessageBox.Show("Верно");
        }
        else
        {
            MessageBox.Show("Неверно");
        }
    }
}
```

```
private void radioButton6_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton6.Checked)
    {
        Fraction f = ReceiveF();
        Fraction f2 = ReceiveF2();
        if (f <= f2)
        {
            MessageBox.Show("Верно");
        }
        else
        {
            MessageBox.Show("Неверно");
        }
    }
}

private void radioButton7_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton7.Checked)
    {
        Fraction f = ReceiveF();
        Fraction f2 = ReceiveF2();
        if (f < f2)
        {
            MessageBox.Show("Верно");
        }
        else
        {
            MessageBox.Show("Неверно");
        }
    }
}

private void radioButton8_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton8.Checked)
    {
        Fraction f = ReceiveF();
        Fraction f2 = ReceiveF2();
        if (f > f2)
        {
            MessageBox.Show("Верно");
        }
        else
        {
            MessageBox.Show("Неверно");
        }
    }
}

private void radioButton9_CheckedChanged(object sender, EventArgs e)
{
    if (radioButton9.Checked)
    {
        Fraction f = ReceiveF();
        Fraction f2 = ReceiveF2();
        if (f == f2)
        {
            MessageBox.Show("Верно");
        }
        else
        {
            MessageBox.Show("Неверно");
        }
```

```
            }
        }

        private void radioButton10_CheckedChanged(object sender, EventArgs e)
        {
            if (radioButton10.Checked)
            {
                Fraction f = ReceiveF();
                Fraction f2 = ReceiveF2();
                if (f != f2)
                {
                    MessageBox.Show("Верно");
                }
                else
                {
                    MessageBox.Show("Неверно");
                }
            }
        }

        private void button1_Click_1(object sender, EventArgs e)
        {
            Fraction f = ReceiveF();
            textBox10.Text = f.ToString();
        }

        private void button2_Click_1(object sender, EventArgs e)
        {
            string s = textBox10.Text;
            Fraction ff = Fraction.Parse(s);
            Print(ff);
        }
    }
```

Ссылка на гитхаб:

https://github.com/Alexandrov911/Practical-N11.2022.git