**UNIVERSITATEA TEHNICĂ A MOLDOVEI**

**FACULTATEA CALCULATOARE, INFORMATICĂ ȘI MICROELECTRONICĂ**

[DEPARTAMENTUL INFORMATICĂ ŞI INGINERIA SISTEMELOR](https://utm.md/subdiviziuni-universitare/facultati/facultatea-calculatoare-informatica-si-microelectronica/catedra-calculatoare/)

**Raport**

**LUCRARE DE LABORATOR NR.3**

**la Tehnici avansate de programare**

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**Chișinău 2018**

**1. Tema lucrării:**

Polimorfizmul.

**2.**  **Scopul lucrării:**

* Însuşirea modalităţilor de realizare a polimorfizmului în Java;

**3. Etapele de realizare:**

1. Crearea clase noi;
2. Crearea metodelor necesare;
3. Realizarea formelor de polimorfizm;
4. Crearea interfeţii programului;
5. Prezentarea lucrării.

*Varianta 8*

1. **Polynom 🡨 FractionPolynom.**

***Program Listingul***

import java.awt.\*;

import java.awt.event.\*;

import javax.swing.\*;

public class App3 {

public static void main(String[] args){

ComPolFram fram = new ComPolFram();

fram.setVisible(true);

}

}

class fractie{

int sus;

int jos;

fractie(){

jos=1;

sus=1;

}

fractie(int numa,int numi){

sus=numa;

jos=numi;

}

public int numitorComun(int n1,int n2){

int n=n1\*n2;

if(n1==n2)return n1;

for(int i=2;i<=n;i++){

if(i%n1==0&&i%n2==0)return i;

}

return 1;

}

public fractie aduna(fractie doi){

int z=numitorComun(jos,doi.jos);

int aux1=sus\*(z/jos);

int aux2=doi.sus\*(z/doi.jos);

this.sus=aux1+aux2;

this.jos=numitorComun(jos,doi.jos);

return this;

}

public fractie scade(fractie doi){

int z=numitorComun(jos,doi.jos);

int aux1=doi.sus\*(z/jos);

int aux2=sus\*(z/doi.jos);

this.sus=(-aux1+aux2);

this.jos=numitorComun(jos,doi.jos);

return this;

}

public int getSus(){

return sus;

}

public int getJos(){

return jos;

}

public void simplificare(){

int z=sus\*jos;

for(int j=z;j>0;j--){

if(sus%j==0&&jos%j==0){

sus=sus/j;

jos=jos/j;

}

}

}

public void setf(int numarator,int numitor){

sus=numarator;

jos=numitor;

}

}

class polinom extends fractie{

public polinom[] pol;

public int length;

public polinom(){

super();

pol= new polinom[1];

pol[0]=this;

length=1;

}

public polinom(int x){

super();

pol=new polinom[x];

pol[0]=this;

length=x;

for(int i=1;i<pol.length;i++){

pol[i]=new polinom();

}

}

public void setPolinom(int n,int nsus,int njos){

pol[n].setf(nsus, njos);

}

public polinom adun(polinom x){

int z=x.length;

polinom tmp= new polinom(z);

for(int i=0;i<z;i++){

fractie temp1=new fractie(pol[i].sus,pol[i].jos);

fractie temp2=new fractie(x.pol[i].sus,x.pol[i].jos);

fractie temp=temp1.aduna(temp2);

tmp.pol[i].sus=temp.getSus();

tmp.pol[i].jos=temp.getJos();

}

return tmp;

}

public polinom scad(polinom x){

int z=x.length;

polinom tmp= new polinom(z);

for(int i=0;i<z;i++){

fractie temp1=new fractie(pol[i].sus,pol[i].jos);

fractie temp2=new fractie(x.pol[i].sus,x.pol[i].jos);

fractie temp=temp1.scade(temp2);

//temp.simplificare();

tmp.pol[i].sus=temp.getSus();

tmp.pol[i].jos=temp.getJos();

}

return tmp;

}

}

class ComPolFram extends JFrame{

public ComPolFram(){

this.setTitle("Complex Poligon"); this.setDefaultCloseOperation(

JFrame.EXIT\_ON\_CLOSE);

this.setSize(600, 500);

this.setLocation(300, 200);

Box Hbox1 = Box.createHorizontalBox();

Hbox1.add(new JLabel("n="));

nn = new JTextField(10); nn.setMaximumSize(nn.getPreferredSize());

Hbox1.add(nn);

butmac("add",Hbox1);

butmac("+",Hbox1);

butmac("-",Hbox1);

Hbox2 = Box.createHorizontalBox();

Hbox3 = Box.createHorizontalBox();

Hbox4 = Box.createHorizontalBox();

Hbox5 = Box.createHorizontalBox();

Hbox6 = Box.createHorizontalBox();

Hbox7 = Box.createHorizontalBox();

Box Vbox = Box.createVerticalBox();

Vbox.add(Hbox1);

Vbox.add(Hbox2);

Vbox.add(Hbox3);

Vbox.add(Hbox4);

Vbox.add(Hbox5);

Vbox.add(Hbox6);

Vbox.add(Hbox7);

add(Vbox,BorderLayout.CENTER);

//this.pack();

}

private JTextField nn;

private JTextField[] s1,s2;

private JTextField[] j1,j2;

private Box Hbox2,Hbox3,Hbox4,Hbox5,Hbox6,Hbox7;

private void butmac(String s,Box b){

JButton but = new JButton(s);

but.addActionListener(

new ActionListener(){

public void actionPerformed(ActionEvent e){ System.out.println(e.getActionCommand());

int n = Integer.parseInt(nn.getText());

if (e.getActionCommand()=="add"){

Hbox2.removeAll();

Hbox3.removeAll();

Hbox4.removeAll();

Hbox5.removeAll();

Hbox6.removeAll();

Hbox7.removeAll();

s1 = new JTextField[n];

s2 = new JTextField[n];

j1 = new JTextField[n];

j2 = new JTextField[n];

for(int i=n-1;i>=0;i--){

if(i==0){

s1[i] = new JTextField(2); s1[i].setMaximumSize( new Dimension(25, 20));

s2[i] = new JTextField(2); s2[i].setMaximumSize( new Dimension(25, 20));

j1[i] = new JTextField(2); j1[i].setMaximumSize( new Dimension(25, 20));

j2[i] = new JTextField(2); j2[i].setMaximumSize( new Dimension(25, 20));

Hbox2.add(s1[i]);

Hbox3.add(j1[i]);

Hbox4.add(s2[i]);

Hbox5.add(j2[i]);

}else{

Dimension x =new Dimension();

s1[i] = new JTextField(2); s1[i].setMaximumSize( new Dimension(25, 20));

s2[i] = new JTextField(2); s2[i].setMaximumSize( new Dimension(25, 20));

j1[i] = new JTextField(2); j1[i].setMaximumSize( new Dimension(25, 20));

j2[i] = new JTextField(2); j2[i].setMaximumSize( new Dimension(25, 20));

Hbox2.add(s1[i]);

Hbox2.add(new JLabel("x"+i));

Hbox3.add(j1[i]);

Hbox3.add(new JLabel(" "));

Hbox4.add(s2[i]);

Hbox4.add(new JLabel("x"+i));

Hbox5.add(j2[i]);

Hbox5.add(new JLabel(" "));

}

}

pack(); }

else

if(e.getActionCommand()=="+" || e.getActionCommand()=="-")

{

Hbox6.removeAll();

Hbox7.removeAll();

polinom pol1 = new polinom(n);

for (int i=0;i<n;i++){

pol1.setPolinom(i, Integer.parseInt(s1[i].getText()),Integer.parseInt(j1[i].getText()));

}

polinom pol2 = new polinom(n);

for (int i=0;i<n;i++){

pol2.setPolinom(i, Integer.parseInt(s2[i].getText()),Integer.parseInt(j2[i].getText()));

}

polinom pol3;

if(e.getActionCommand()=="+"){

pol3 = pol1.adun(pol2);

}

else{

pol3 = pol1.scad(pol2);

}

for(int i=n-1;i>=0;i--){

if(i==0){

Hbox6.add(new JLabel(Integer.toString( pol3.pol[i].sus)));

Hbox7.add(new JLabel(Integer.toString(pol3.pol[i].jos)));

}else{

Hbox6.add(new JLabel(Integer.toString( pol3.pol[i].sus)+"x"+Integer.toString(i)+" "));

Hbox7.add(new JLabel(Integer.toString(pol3.pol[i].jos)+" "));

}

}

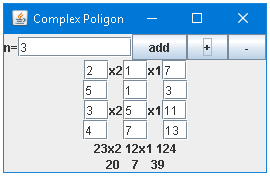
pack();

}}});

b.add(but);

}}

***Rezultatul executarii:***



**Concluzie:**

Laboratorul realizeaza lucrul unui calculator de tip fractional, cu gasirea numitorului comun, compunerea in polinom si respectarea regulilor de adunare/scadere a polinoamelor. In timpul lucrului asupra acestei lucrari am insusit metodele si cerintele de lucru cu interfetele in java.