W11_COMPUTER PROGRAMMINING 2019 SPRING

W11 Introduction to graphics

We will use the class FrameGraphic

```
 import javax.swing.*;
import java.awt.Graphics;
import java.awt.*;
import java.awt.event.*;
public class FrameGraphic extends JFrame
{  private static final long serialVersionUID = 8478974L;
  JPanel d;
   public FrameGraphic(String a,JPanel di)
   {    super(a);
        d=di;
        add(d);
   }
   public static void plot(String a,JPanel di)
   {
        FrameGraphic f = new FrameGraphic(a,di);
        f.setDefaultCloseOperation( JFrame.EXIT_ON_CLOSE );
        f.setSize(800,500);
        f.setVisible(true);
   }
}
```

EX 1: Welcome to Graphic programming

```
import javax.swing.*;
import java.awt.Graphics;
import java.awt.*;
import java.awt.event.*;
import java.awt.geom.*;

public class WelcomeP extends JPanel
{  private static final long serialVersionUID = 38579L;
 String isim;
 public WelcomeP()
 {isim=JOptionPane.showInputDialog("enter your name : ");}
 public void paint(Graphics g)
 {
 Graphics2D g2=(Graphics2D)g;
 g2.setFont(new Font("Serif",Font.ITALIC,24));
 g2.drawString("Welcome to Java class " + isim,50,50);
 }
}
```

```
class H11E1 {
public static void main(String args[])
{FrameGraphic.plot("Welcome to graphic window",new WelcomeP());}}
```

EX2:

```
import java.io.*;
import java.applet.Applet;
import java.awt.*;
import java.awt.event.*;
import java.util.*;
import javax.swing.*;
import javax.swing.table.*;
import javax.swing.event.*;
import java.awt.geom.*;
import java.net.URL;
import java.awt.image.*;


public class pictureP extends JPanel
{ private static final long serialVersionUID = 827895698L;
 private Image picture;

 public pictureP(String s)
 {super();
  URL url = getClass().getResource(s);
```

```
 picture = getToolkit().getImage(url);
 }


 public void paint(Graphics g)
 {
 Graphics2D g2=(Graphics2D)g;
 Dimension d=getSize();
 int dx = d.width;
 int dy = d.height;
 g2.drawImage( picture, 0, 0,dx,dy, this);
 }
}
```

```
class H11E2 {
public static void main(String args[])
{
pictureP pp=new pictureP("fall.jpg");
FrameGraphic.plot("fall",pp);
}
}
```

EX3:

```
import javax.swing.*;
import java.awt.Graphics;
import java.awt.*;
import java.awt.event.*;
import java.awt.geom.*;

public class lineP extends JPanel
{

 public void paintComponent(Graphics g)
 { private static final long serialVersionUID = 9580975L;
 super.paintComponent(g);
 Graphics2D g2=(Graphics2D)g;
 g2.setFont(new Font("Serif",Font.BOLD,24));
 this.setBackground(Color.YELLOW);
 g2.setColor(Color.red);
 g2.setStroke(new BasicStroke(5.0f));
 Line2D x=new Line2D.Double(50,50,800,800);
 g2.draw(x);
 }}
```

```
class H11E3 {
public static void main(String args[])
{lineP pp=new lineP();
FrameGraphic.plot("Plot window",pp);
}}
```

EX4:

```
import java.awt.Graphics;
import java.awt.*;
import java.awt.event.*;
import java.awt.geom.*;
import javax.swing.*;

public class rectangleP extends JPanel
{ private static final long serialVersionUID = 985397L;
 public void paintComponent(Graphics g)
 {
 Graphics2D g2=(Graphics2D)g;
 super.paintComponent(g);
 g2.setFont(new Font("Serif",Font.BOLD,24));
 g2.setColor(Color.red);
 this.setBackground(Color.MAGENTA);
 g2.setStroke(new BasicStroke(10.0f));
 Rectangle2D x=new Rectangle2D.Double(50,50,300,200);
 g2.draw(x);
 //g2.fill(x);
 }
```

```
}
```

```
class H11Ex4 {
public static void main(String args[])
{rectangleP pp=new rectangleP();
FrameGraphic.plot("Plot window",pp);}}
```

EX5:

```
import java.util.*;
import javax.swing.*;
import javax.swing.table.*;
import java.awt.*;
import java.awt.event.*;
import javax.swing.event.*;
import java.awt.geom.*;
import java.net.URL;
import java.awt.image.*;
import java.util.*;

public class ellipseP2 extends JPanel
{ private static final long serialVersionUID = 873956L;
   TexturePaint tp = getImageTexture("fall.jpg");

   public TexturePaint getImageTexture(String imageFile)
   {
   URL url = getClass().getResource(imageFile);
   Image img = getToolkit().getImage(url);
   try {
     MediaTracker tracker = new MediaTracker(this);
     tracker.addImage(img, 0);
     tracker.waitForID(0);
   } catch (Exception e) {}
   int width = img.getWidth(this);
   int height = img.getHeight(this);
   BufferedImage buffImg = new BufferedImage(width, height, BufferedImage.TYPE_INT_ARGB);
   Graphics g = buffImg.getGraphics();
   g.drawImage(img, 0, 0, this);
   Rectangle2D rect = new Rectangle(0, 0, width, height);
   return new TexturePaint(buffImg, rect);
   }

              public void paintComponent(Graphics g) {
              super.paintComponent(g);
    Graphics2D g2=(Graphics2D)g;
    g2.setPaint(tp);
    g2.setFont(new Font("Serif",Font.BOLD,24));
    //g2.setColor(Color.RED);
    //this.setBackground(new Color(255,255,255));
    Ellipse2D x=new Ellipse2D.Double(50,50,500,200);
    g2.fill(x);
   }
}
```

```
class H11E5 {
public static void main(String args[])
{ellipseP2 pp=new ellipseP2();
FrameGraphic.plot("Plot window",pp);
}}
```

EX6:

```
import javax.swing.*;
import java.awt.Graphics;
import java.awt.*;
import java.awt.event.*;
import java.awt.geom.*;

public class starP extends JPanel
{

public void paint(Graphics g)
```

```
{
int x[]={55,67,109,73,83,55,27,37,1,43};
int y[]={0,36,36,54,96,72,96,54,36,36};
Graphics2D g2=(Graphics2D)g;
GeneralPath star=new GeneralPath();
star.moveTo(x[0],y[0]);
for(int i=1;i<x.length;i++)
   {star.lineTo(x[i],y[i]);}
star.closePath();
g2.setColor(Color.blue);
//g2.draw(star);
g2.fill(star);
  }
}
```

```
class H11E6 {
public static void main(String args[])
{
starP pp=new starP();
FrameGraphic.plot("Plot window",pp);
}}
```

HOMEWORK EXERCISES

Homework exercises will be done at home and will bring to next Thursday class printed no late exercises will be excepted. Each code should include student name id#, code plus results should be given. Homeworks will be accepted in written format plus a computer copy in pdf format will be sent to computer_programming@turhancoban.com adress your file name should be "group"+"week#"+studentname+studentid#.pdf

A W1_turhan_coban_0101333.pdf

B W3_ali_veli_02335646.pdf

W11HW1 :

```
 import javax.swing.*;

class H11HW1 {
public static void main(String args[])
{
if_x ff=(x)->Math.sin(x);
plot2P pp=new plot2P(ff,0.0,2.0*Math.PI,500,500);
FrameGraphic.plot("Plot window",pp);
}}
```

```
//interface
interface if_x
{public double func(double x);
default double dfunc(double x)
{  double h=0.00001;
  return (-func(x+2.0*h)+8.0*func(x+h)-8.0*func(x-h)+func(x-2.0*h))/(12.0*h);
}
default double integral(double a,double b)
{
//integral f(x)dx
 double r[]={-0.973906528517171,-0.865063366688984,-0.679409568299024,-0.433395394129247,-0.148874338981631,
 0.148874338981631,0.433395394129247,0.679409568299024,0.865063366688984,0.973906528517171};
 double c[]={0.066671344308684,0.149451349150580,0.219086362515982,0.269266719309996,0.295524224714752,
 0.295524224714752,0.269266719309996,0.219086362515982,0.149451349150580,0.066671344308684};
double z=0,x,y;
double k1=(b-a)/2.0;
double k2=(b+a)/2.0;
for(int i=0;i<r.length;i++)
{
x=k2+k1*r[i];
y=func(x);
z+=k1*c[i]*y;
}
return z;
```

```
}
}
```

```
 import javax.swing.*;
import java.awt.Graphics;
import java.awt.*;
import java.awt.event.*;
import java.awt.geom.*;
// a simple plot program
public class plot2P extends JPanel
{ private static final long serialVersionUID = 6476348L;
 int x[];
 int y[];
 double xmin;
 double xmax;
 int n;
 int width;
 int height;
 double x1,x2,y1,y2;
 public plot2P(if_x f,double xmini,double xmaxi,int widthi,int heighti)
 {
   // height : height of the plot window;
   // width  : width of the plot window
   // xmin minimum x value
   // x maximum x value
   xmin=xmini;
   xmax=xmaxi;
   width=widthi;
   height=heighti;
   n=100;
   x=new int[n+1];
   y=new int[n+1];
   double xd[]=new double[n+1];
   double yd[]=new double[n+1];
   double ymin=1.0e60;
   double ymax=-1.0e60;
   for(int i=0;i<=n;i++)
   {xd[i] = (xmax-xmin)*(double)i/(double)n;
    yd[i] =  f.func(xd[i]);
    if(yd[i]<ymin) ymin=yd[i];
    if(yd[i]>ymax) ymax=yd[i];
   }
  for(int i=0;i<=n;i++)
  {x[i]=(int)(0.8*width*xd[i]/(xmax-xmin));
   y[i]=height/3+(int)(0.6*height*yd[i]/(ymax-ymin));
  }
  x1=0;
  x2=(int)(0.8*width*(2.0*Math.PI)/(xmax-xmin));
  y1=height/3;
  y2=height/3;
 }

 public void paintComponent(Graphics g)
 {
 Graphics2D g2=(Graphics2D)g;
 g2.setRenderingHint(RenderingHints.KEY_ANTIALIASING, RenderingHints.VALUE_ANTIALIAS_ON);
 GeneralPath pp=new GeneralPath();
 pp.moveTo(x[0],y[0]);
 for(int i=1;i<x.length;i++)
 {pp.lineTo(x[i],y[i]);}
 //pp.closePath();
 g2.setColor(Color.blue);
 g2.draw(pp);
 final float dash1[] = {10.0f};
 final BasicStroke d1 = new BasicStroke(1.0f,BasicStroke.CAP_BUTT,
                                        BasicStroke.JOIN_MITER,
                                        3.0f, dash1, 2.0f);
 g2.setStroke(d1);
 Line2D xx=new Line2D.Double(x1,y1,x2,y2);
 g2.draw(xx);
 g2.setStroke(new BasicStroke(1.0f));
 Rectangle2D r=new Rectangle2D.Double(0,0,height,width);
 g2.draw(r);
```

```
 }
}
```

Plot program is given . Now change the program top plot $f(x) = x^2 - 3x + 5$ plot line will be dotted and 2 pixel thick.
Some hint to the problem:

```
Graphics2D g2=(Graphics2D)g;
    g2.setFont(new Font("Serif",Font.BOLD,24));
    g2.setColor(Color.RED);
    this.setBackground(new Color(255,255,255));
    float dash3[] = {10.0f,3.0f,3.0f};
    BasicStroke d3 = new BasicStroke(3.0f,BasicStroke.CAP_BUTT,
                                     BasicStroke.JOIN_MITER,
                                     3.0f, dash3, 2.0f);
    g2.setStroke(d3);
```

W11HW2 : Plot the following shape: