# Pertemuan 15

ExclusiveOR dan Intersect

- Intersect dalam komputer grafik 2D
- Exclusive Or dalam komputer grafik 2D

# Constructive Area Geometry

# Constructive Area Geometry

AREA KONTRUKSI GEOMETRI

Satu cara untuk membuat bentuk lebih kompleks adalah dengan mengkombinasikan beberapa bentuk sebelumnya (objek geometri). Cara ini dikenal sebagai geometri area konstruktif (constructive area geometry). Kelas Area didesain untuk menghasilkan geometri area konstruktif

* void add(Area a)
  void intersect(Area a)
  void subtract(Area a)
  void exclusiveOr(Area a)



original shapes    addition    intersection    subtraction    exclusive or
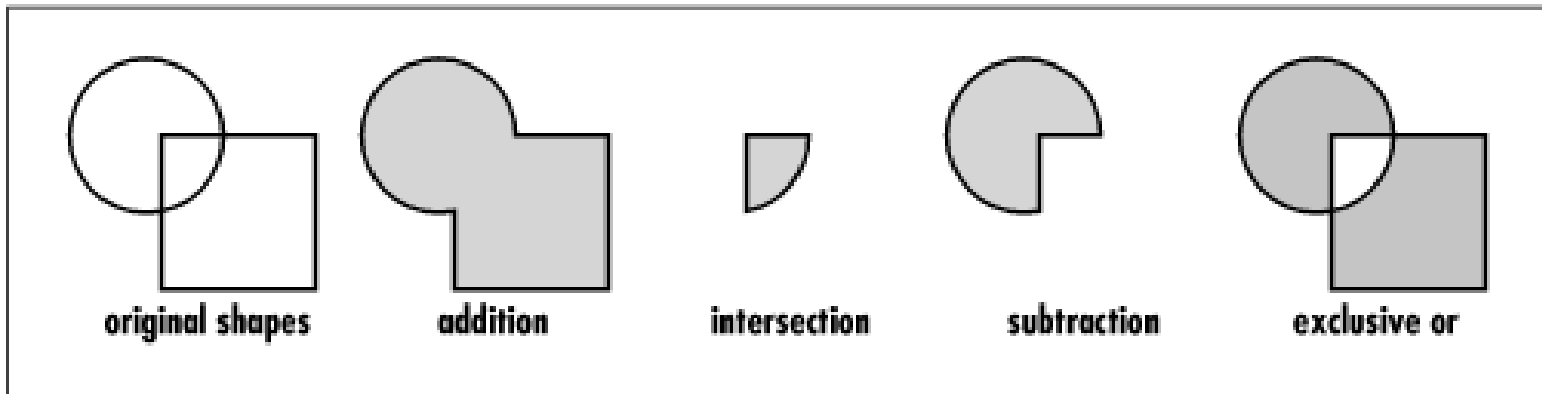
Untuk void add(Area a)
void intersect(Area a)
Sudah di bahan Dalam Pertemuan
Sebelumnya

# Intersect dalam komputer grafik 2D

# void intersect(Area a)

```java
import java.awt.*;
import javax.swing.*;
import java.awt.geom.*;
 public class BasicSample2D extends JPanel{
   public static void main(String[] args){
     JFrame f = new JFrame("Basic Sample 2D");
     BasicSample2D bs = new BasicSample2D();
     f.getContentPane().add("Center",bs);
     f.pack();
     f.setSize(new Dimension(200,200));
     f.setVisible(true);
   }
```
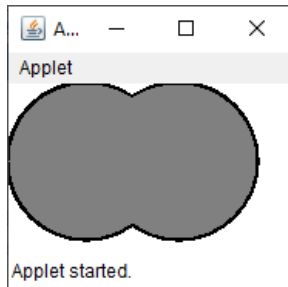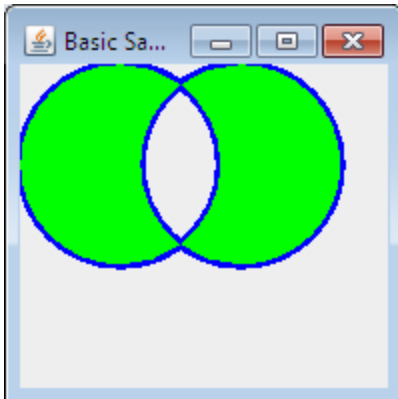


```java
public void paintComponent(Graphics g){
    Graphics2D g2 = (Graphics2D)g;
    Shape s1 = new Ellipse2D.Double(0, 0, 100, 100);
    Shape s2 = new Ellipse2D.Double(60, 0, 100, 100);
    Area a1 = new Area(s1);
    Area a2 = new Area(s2);
    BasicStroke bsThickLine = new BasicStroke(5.0f);
    g2.setStroke(bsThickLine);
    g2.setPaint(Color.blue);
    g2.draw(s1);
    g2.draw(s2);
     a2.intersect(a1);
    g2.setPaint(Color.green);
    g2.fill(a2);
    }
}
```

# Constructive Area Geometry

# void exclusiveOr(Area a)

```java
import java.awt.*;
import javax.swing.*;
import java.awt.geom.*;
 public class BasicSample2D extends JPanel{
   public static void main(String[] args){
     JFrame f = new JFrame("Basic Sample 2D");
     BasicSample2D bs = new BasicSample2D();
     f.getContentPane().add("Center",bs);
     f.pack();
     f.setSize(new Dimension(200,200));
     f.setVisible(true);
   }
```



```java
   public void paintComponent(Graphics g){
     Graphics2D g2 = (Graphics2D)g;
     Shape s1 = new Ellipse2D.Double(0, 0, 100, 100);
     Shape s2 = new Ellipse2D.Double(60, 0, 100, 100);
     Area a1 = new Area(s1);
     Area a2 = new Area(s2);
     BasicStroke bsThickLine = new BasicStroke(5.0f);
     g2.setStroke(bsThickLine);
     g2.setPaint(Color.blue);
     g2.draw(s1);
     g2.draw(s2);
a2.exclusiveOr(a1);
g2.setPaint(Color.green);
     g2.fill(a2);
     }
}
```

# Materi Tambahan Cukup Waktunya

# STROKING

Stroke Graphisc2D ini atribut mengontrol pen-stroke digunakan untuk garis besar bentuk. Hal ini diatur melalui Graphis2D ini setStroke (). Sebuah objek Stroke mengimplementasikan interface java.awt.Stroke. Java 2D menyediakan built-in java.awt.BasicStroke. BasicStroke umum (lebar float, int topi, int bergabung, mengapung miterlimit, mengapung [] dasbor, mengapung dash_phase)

 // Semua parameter adalah opsional

// Width: lebar stroke pena

// Tutup: dekorasi ujung, CAP_ROUND, CAP_SQUARE atau CAP_BUTT.

// Bergabung: dekorasi di mana dua segmen bertemu, JOIN_ROUND, JOIN_MITER, atau JOIN_BEVEL

 // Miterlimit: batas untuk memangkas mitra bergabung.

// Dasbor: array mewakili pola gagah.

 // Dash_phase: offset untuk memulai pola gagah

# STROKING



```java
import java.awt.*;
import javax.swing.*;
import java.awt.geom.*;
 public class BasicSample2D extends JPanel{
   public static void main(String[] args){
      JFrame f = new JFrame("Basic Sample 2D");
      BasicSample2D bs = new BasicSample2D();
      f.getContentPane().add("Center",bs);
      f.pack();
      f.setSize(new Dimension(300,300));
      f.setVisible(true);
   }
   public void paintComponent(Graphics g){
        Graphics2D g2d = (Graphics2D)g;
 g2d.setStroke(new BasicStroke(10, BasicStroke.CAP_ROUND, BasicStroke.JOIN_ROUND));
g2d.setColor(Color.CYAN);
g2d.draw(new Rectangle2D.Double(300, 50, 200, 100));
 // Test dash-stroke
float[] dashPattern = {20, 5, 10, 5};  // dash, space, dash, space
g2d.setStroke(new BasicStroke(5, BasicStroke.CAP_BUTT, BasicStroke.JOIN_ROUND,
    10, dashPattern, 0));
g2d.setColor(Color.CYAN);
g2d.draw(new Rectangle2D.Double(50, 200, 200, 100));
 }
}
```
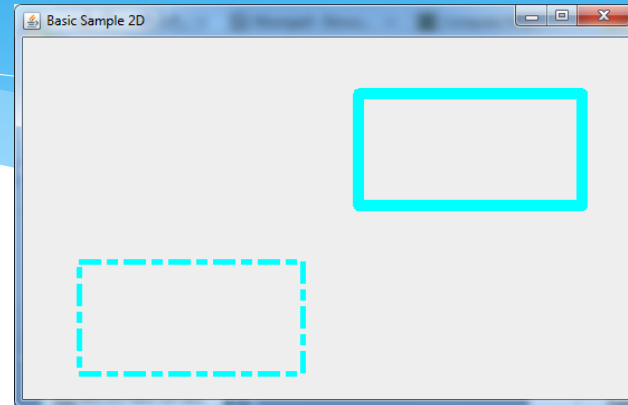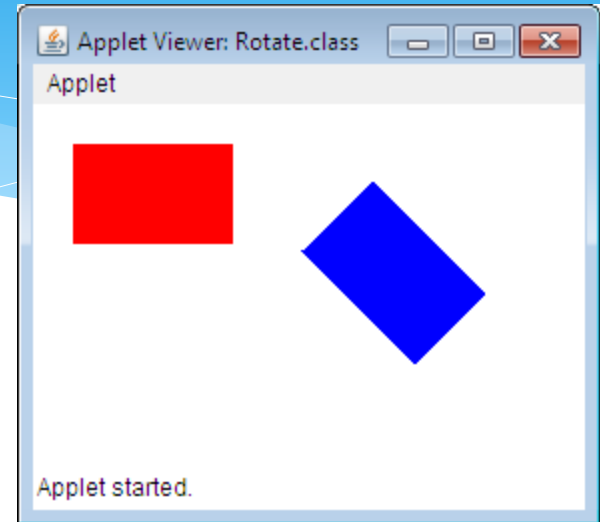
# Transforming

– Rotasi
– Translasi
– Perskala
– Transformasi

# Transforming

## - Rotasi

```java
import java.awt.*;
import java.awt.Graphics2D;
import java.applet.*;
public class Rotate extends Applet
{
    public void paint(Graphics g)
    {
        super.paint(g);
        Graphics2D g2d = (Graphics2D) g;
        //Objek Pertama
        //g2d.setColor(new Color(150, 150, 150));
        g2d.setColor(Color.red);
        g2d.fillRect(20, 20, 80, 50);

        // Membuat sumbu koordinat baru -> translate(xbaru, yBaru)
        g2d.translate(170, 10);
        //g2d.rotate(Math.toRadians(85));
        g2d.rotate(Math.PI / 4);
        //g2d.setColor(new Color(250, 250, 250));
        g2d.setColor(Color.blue);
        g2d.fillRect(20, 20, 80, 50);

    }
}
```
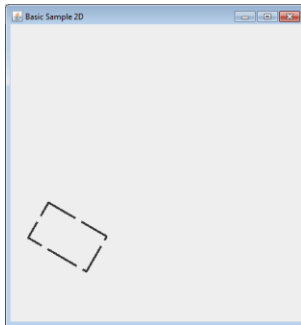
# Transforming

## - Rotasi

```
import java.awt.*;
import javax.swing.*;
import java.awt.geom.*;
 public class BasicSample2D extends JPanel{
   public static void main(String[] args){
     JFrame f = new JFrame("Basic Sample 2D");
     BasicSample2D bs = new BasicSample2D();
     f.getContentPane().add("Center",bs);
     f.pack();
     f.setSize(new Dimension(300,300));
     f.setVisible(true);
   }
```



```
public void paintComponent(Graphics g){
    Graphics2D g2d = (Graphics2D)g;
   g2d.setStroke(new BasicStroke(3.0f));
   Rectangle2D.Double rect = new
Rectangle2D.Double(180,200,100,60);
   //  g2d.draw(rect);

   AffineTransform rotating = new AffineTransform();
   rotating.setToRotation(Math.PI/6);

   g2d.setStroke(new
BasicStroke(3.0f,BasicStroke.CAP_BUTT,BasicStroke.JOI
N_BEVEL,8.0f,new float[]{50.0f,10.0f},4.0f));
   g2d.draw(rotating.createTransformedShape(rect));


 }
}
```
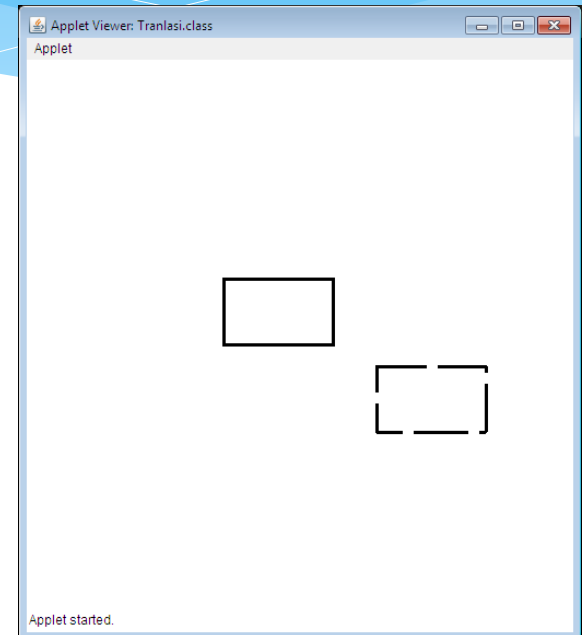
# Transforming

## Translasi

```java
import java.awt.*;
import java.awt.Graphics2D;
import java.applet.*;
import java.awt.geom.*;
public class Translation extends Applet
{
    public void paint(Graphics g)
    {
        Graphics2D g2d = (Graphics2D)g;
        g2d.setStroke(new BasicStroke(3.0f));
        Rectangle2D.Double rect = new Rectangle2D.Double(180,200,100,60);
        g2d.draw(rect);
        AffineTransform translation = new AffineTransform();
        translation.setToTranslation(140,80);
g2d.draw(translation.createTransformedShape(rect));

    }
}
```

# Transforming

**-Penskalaan**

```java
public void paintComponent(Graphics g) {
    super.paintComponent(g);
    Graphics2D g2d = (Graphics2D)g;

    //Ketebalan garis diset menjadi 3
    g2d.setStroke(new BasicStroke(3.0f));

    //Generate dan gambar segiempat yang akan ditransfomasi
    Rectangle2D.Double rect = new Rectangle2D.Double(80,120,100,60);
    g2d.draw(rect);

    //Definisi transformasi (penskalaan)
    AffineTransform scaling = new AffineTransform();
    scaling.setToScale(2,0.5);

    //Gambar segiempat hasil penskalaan dengan garis putus-putus
    g2d.setStroke(new BasicStroke(3.0f,BasicStroke.CAP_BUTT,
                                  BasicStroke.JOIN_BEVEL,8.0f,
                                  new float[] {50.0f, 10.0f},4.0f));
    g2d.draw(scaling.createTransformedShape(rect));
}
```

# Transforming

**-Transformasi**

```java
public void paintComponent(Graphics g) {
    super.paintComponent(g);
    Graphics2D g2 = (Graphics2D)g;
    g2.translate(100,100);
    Shape e = new Ellipse2D.Double(300, 200, 200, 100);
    g2.setColor(new Color(160,160,160));
    g2.fill(e);
    AffineTransform transform = new AffineTransform();
    transform.translate(-400,-250);
    e = transform.createTransformedShape(e);
    g2.setColor(new Color(220,220,220));
    g2.fill(e);
    g2.setColor(Color.black);
    g2.drawLine(0, 0, 150, 0);
    g2.drawLine(0, 0, 0, 150);
    transform.setToRotation(Math.PI / 6.0);
    e = transform.createTransformedShape(e);
    //g2.setColor(new Color(100,100,100));
    g2.setColor(Color.red);
    g2.draw(e);
    transform.setToTranslation(400, 250);
    e = transform.createTransformedShape(e);
    g2.setColor(new Color(0,0,0));
    g2.draw(e);
}
```

# Clipping

```java
import java.awt.*;
import javax.swing.*;
import java.awt.geom.*;
 public class BasicSample2D extends JPanel{
   public static void main(String[] args){
     JFrame f = new JFrame("Basic Sample 2D");
     BasicSample2D bs = new BasicSample2D();
     f.getContentPane().add("Center",bs);
     f.pack();
     f.setSize(new Dimension(300,300));
     f.setVisible(true);
   }
   public void paintComponent(Graphics g){

   Graphics2D g2 = (Graphics2D)g;
   GeneralPath path = new GeneralPath(GeneralPath.WIND_EVEN_ODD);
   path.moveTo(100,200);
   path.quadTo(250,50,400,200);
   path.lineTo(400,400);
   path.quadTo(250,250,100,400);
   path.closePath();
   g2.clip(path);
   g2.setColor(Color.black);
   g2.setFont(new Font("Serif",Font.BOLD,60));
   g2.drawString("agus darmawan",80,200);
   g2.drawOval(50,250,400,100);

  }
}
```

# Terima Kasih