Medientechnik

Übung

Heute

- Java2D:
  - Primitive und Text
  - Farben und Füllungen
  - Bilder (+ Bildmanipulation)
- Mausinteraktion

Java2D

- Draw lines, rectangles and any other geometric shape.
- Fill those shapes with solid colors or gradients and textures.
- Draw text with options for fine control over the font and rendering process.
- Draw images, optionally applying filtering operations.
- Apply operations such as compositing and transforming during any of the above rendering operations.

Using 2D Graphics API to display complex charts

aus http://java.sun.com/docs/books/tutorial/2d/index.html

Grundlage

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

public class View extends JFrame {

	public View(){
		super("View");
		this.setDefaultCloseOperation(WindowConstants.EXIT_ON_CLOSE);
		this.setSize(600, 600);
	}

	public void paint(Graphics g){
		Graphics2D g2 = (Graphics2D) g;
					/* Java2D: */
		g2.setPaint(Color.BLACK);
		g2.fill(new Rectangle2D.Float(0,0,this.getWidth(),
					this.getHeight()));
					/*         */
	}
```

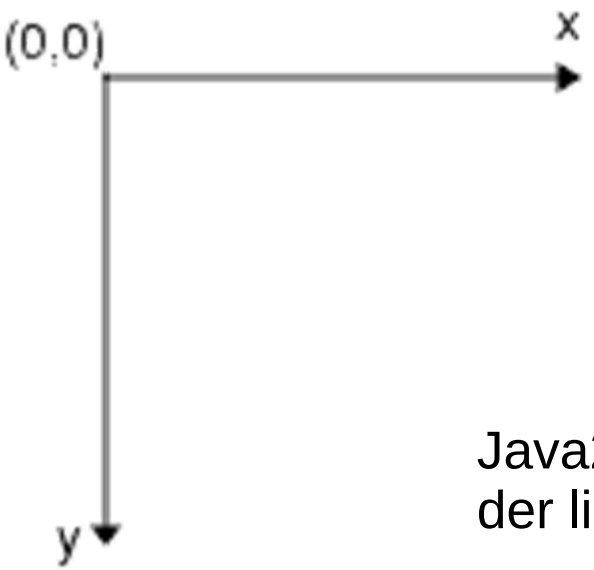
View.java

Grundlage

```
	public static void main(String[] args){
		View v = new View();
		v.setVisible(true);
	}
}
```

View.java

Etwas Geometrie...



Java2D Koordinatensystem hat den Ursprung in der linken oberen Ecke der jeweiligen Komponente!

Koordinatensystem kann manipuliert werden, um Transformationen und Verzerrungen zu ermöglichen (s. Übungsblatt)

Primitive

Übergang von Java 1.1 zu Java 2:

Graphics

`draw`*`Xxx`*
`(drawLine, drawRect, drawArc, etc.)`

`fill`*`Xxx`*
`(fillRect, fillArc, etc.)`

Graphics**2D**

`draw(Shape s)`

`fill(Shape s)`

Shape ist Oberklasse von z.B.:

`Arc2D, Ellipse2D, Rectangle2D, RoundRectangle2D`

(jeweils *`Xxx.Float`* und *`Xxx.Double`*)

Text: `drawString(String s, float x, float y)`

Java-API: http://java.sun.com/javase/6/docs/api/

Farben und Füllungen

Setzen von Füllvarianten:

```
setPaint(Paint p)
```

`Paint` ist Oberklasse von:

`Color`	(Farbe)
`GradientPaint`	(Gradient)
`TexturePaint`	(Bild)

Laden von Bildern

```
import java.awt.image.*;

...

public BufferedImage loadBufferedImage(String imagefile) {
      try {
            Image i = new ImageIcon(new java.net.URL(imagefile)).getImage();

            BufferedImage bi = new BufferedImage(i.getWidth(this), i
                              .getHeight(this), BufferedImage.TYPE_INT_RGB);
            Graphics2D g = bi.createGraphics();
            g.drawImage(i, 0, 0, this);

            return bi;
      } catch (Exception e) {
            e.printStackTrace();
      }
      return null;
}
```

View.java

Bilder als Texturen

```
private BufferedImage img;

public View(){
      /* ... */
      this.img = loadBufferedImage(
        "http://www.medien.ifi.lmu.de/lehre/ss08/mt/uebungen/butterfly.jpg"
      );
}


public void paint(Graphics g){
      /* ... */
      TexturePaint tp = new TexturePaint(this.img,
               new Rectangle2D.Float(0, 0, 200, 200));

      g2.setPaint(tp);
      g2.fill(new Ellipse2D.Float(50, 50, 400, 400));
}
```

View.java

Bildmanipulation

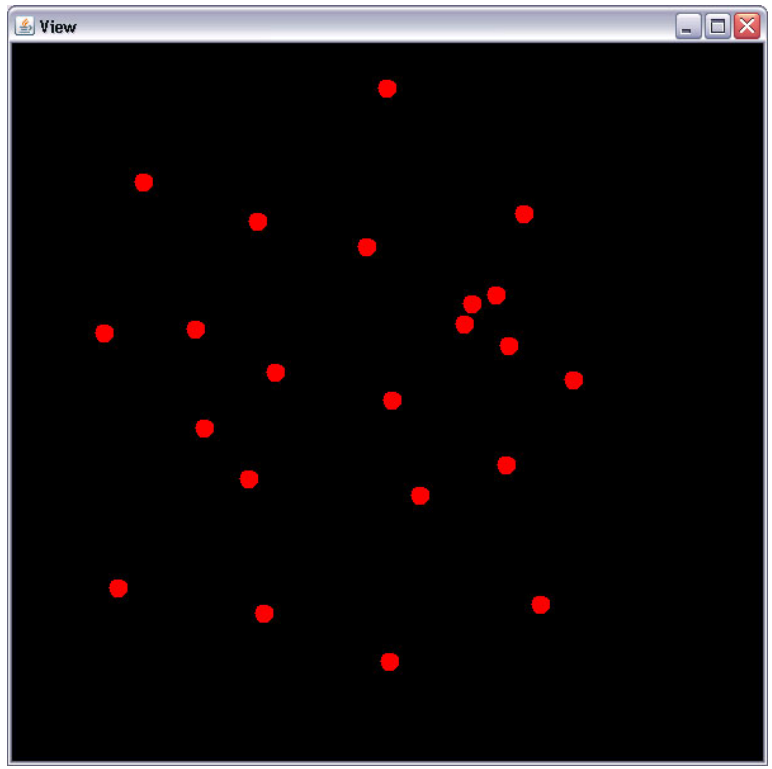
```
public void paint(Graphics g){
      /* ... */
      float ninth = 1.0f / 9.0f;
      float[] blurKernel = {
               ninth, ninth, ninth,
               ninth, ninth, ninth,
               ninth, ninth, ninth };
      BufferedImageOp blur = new ConvolveOp(new Kernel(3, 3, blurKernel));

      g2.drawImage(this.img, blur, 300, 200);
      g2.drawImage(this.img, null, 0, 200);
}
```

Mehr Informationen:
http://www.javaworld.com/javaworld/jw-09-1998/jw-09-media.html

View.java

Mausinteraktion

Ein Mausklick soll einen neuen Kreis an der jeweiligen Position erzeugen.



Dazu wichtig:

```
JFrame.addMouseListener()

MouseListener / MouseAdapter
```

Java-API: http://java.sun.com/javase/6/docs/api/

Mausinteraktion

```
import java.awt.event.*;
import java.util.*;


...
      private BufferedImage img;
      private Vector<Point2D> circles;

      public View() {
            /* ... */
            this.circles = new Vector<Point2D>();

            this.addMouseListener(new MouseAdapter(){
                  public void mouseClicked(MouseEvent e){
                        circles.add(e.getPoint());
                        repaint();
                  }
            });
      }
```

View.java

Mausinteraktion

```
public void paint(Graphics g) {
      /* ... */

      g2.setPaint(Color.RED);

      for(int i = 0; i < this.circles.size(); i++){
               Point2D pos = this.circles.get(i);
               g2.fill(new Ellipse2D.Double(pos.getX(), pos.getY(), 15, 15));
      }
}
```

View.java