

# Java Programming

— Graphics: Rectangle · Oval —

Waseda University

# Graphics

## Today's topic

- Draw graphics by using the Frame class
- Explain the model of this class
- Introduce each Java method in the Graphics class

## Model

- Copy & paste the model on your editor
- Save and run the model as it is (without any editing)
- The program is successfully running if a frame appears on your screen.

# Model (Hina01.java)

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

public class Hina01 extends JFrame{

    public Hina01(){
        setSize(500,500);
        setTitle("Java Programming");
        setDefaultCloseOperation(EXIT_ON_CLOSE);
        MyJPanel myJPanel= new MyJPanel();
        Container c = getContentPane();
        c.add(myJPanel);
        setVisible(true);
    }

    public static void main(String[] args){
        new Hina01();
    }

    public class MyJPanel extends JPanel{
        public MyJPanel(){

        }
        public void paintComponent(Graphics g){

        }
    }
}
```

# Initial settings

```
setSize(500,500);  
// Set the size of a frame  
  
setTitle("Java Programing");  
// Define words on top of the frame  
  
setDefaultCloseOperation(EXIT_ON_CLOSE);  
// Enable the exit button  
  
MyJPanel myJPanel= new MyJPanel();  
// Settle a panel  
  
Container c = getContentPane();  
// Get a container  
  
c.add(myJPanel);  
// Add the panel on the frame  
  
setVisible(true);  
// Display the frame on the screen
```

## Drawing

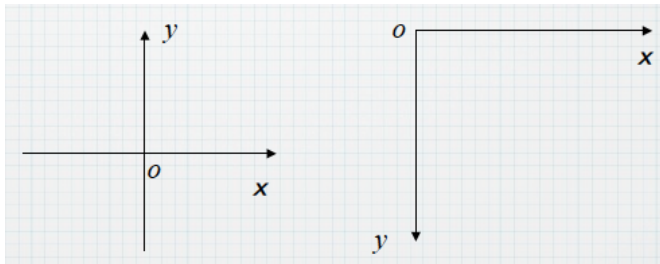
```
public void paintComponent(Graphics g) {  
  
}
```

- Start drawing in “paintComponent” method
- Argument of this method is g as the class of Graphics
- Use several methods in the class of Graphics to draw a figure on the screen

## Coordinate on computers v.s. Cartesian coordinate

### Coordinate system on computers

- Every coordinate is denoted by positive integers.
- Discrete coordinate system by the pixel (not continuous)
- The direction of  $y$  axis is the reverse against the Cartesian coordinate.
- The origin of the coordinate is in the upper left corner.



# Coordinate system on computers ( 500 × 500 )



## Draw Lines & Rectangles

```
public void paintComponent(Graphics g) {  
    g.drawLine(100,100,200,200); //Draw line  
    g.drawRect(100,200,200,300); //Draw rectangle  
    g.fillRect(100,300,200,400); //Draw a filled rectangle  
}
```

Arguments of these methods are

- g.drawLine(**Starting point**, **End point**);
- g.drawRect(**Starting point**, **Width**, **Height**);
- g.fillRect(**Starting point**, **Width**, **Height**);



## Draw Ovals

```
public void paintComponent(Graphics g) {  
    g.drawOval(100,100,200,200); //Draw oval  
    g.fillOval(300,100,400,200); //Draw a filled oval  
}
```

Arguments of these methods are

- g.drawOval(**Starting point**, **Width**, **Height**);
- g.fillOval(**Starting point**, **Width**, **Height**);

# Example

```
public void paintComponent (Graphics g) {  
    int i;  
    for (i=100;i<=300;i+=10)  
        g.drawLine(100,i,i,300);  
    }  
}
```

- Imagine the result of the above program

# Graphics class

- Let's check out the Graphics class about
  - Methods
  - Member variables

The following link is available:

<http://docs.oracle.com/javase/1.5.0/docs/api/java/awt/Graphics.html>