Sri SAI RAM ENGINEERING COLLEGE
INSTITUTE OF TECHNOLOGY
West Tambaram, Chennai - 44

SAIRAM DIGITAL RESOURCES

YEAR II SEM III

CS8392

OBJECT ORIENTED PROGRAMMING
(Common to CSE, EEE, EIE, ICE, IT)

UNIT NO 5

EVENT DRIVEN PROGRAMMING

5.1 Graphics Programming-Frames-Components

COMPUTER SCIENCE & ENGINEERING

GRAPHICS PROGRAMMING

- Graphics is one of the most important features of java.
- Java 2D API is powerful and complex.
- Graphics class is the abstract super class for all graphics contexts which allow an application to draw onto components that can be realized on various devices, or onto off-screen images as well.
- Most methods of the Graphics class can be divided into two basic groups:
  - Draw and fill methods, enabling you to render basic shapes, text, and images
  - Attributes setting methods, which affect how that drawing and filling appears
  - Methods such as setFont and setColor define how draw and fill methods render.

GRAPHICS PROGRAMMING

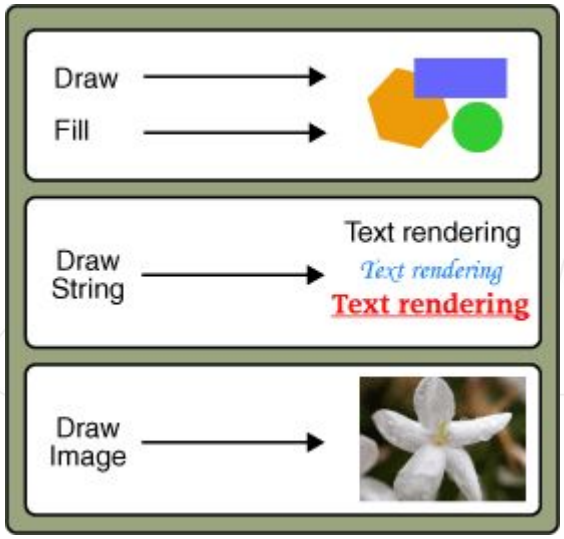
- A Graphics object encapsulates all state information required for the basic rendering operations that Java supports.

- State information includes the following properties.

  - The Component object on which to draw.
  - A translation origin for rendering and clipping coordinates.
  - The current clip.
  - The current color.
  - The current font.
  - The current logical pixel operation function.
  - The current XOR alternation color

GRAPHICS PROGRAMMING

- This figure illustrates how these methods relate to graphic objects:



- Two packages are mainly used for Java.
  - Applet Package
  - AWT Package

APPLET PACKAGE

Package java.applet

- An applet is a java program that runs on web browser.
- Provides the classes necessary to create an applet and the classes an applet uses to communicate with its applet context.
- An applet is a small program that is intended not to be run on its own, but rather to be embedded inside another application.

APPLET PACKAGE

Package java.applet

- The applet framework involves two entities: the applet and the applet context.

- An applet is an embeddable window (see the Panel class) with a few extra methods that the applet context can use to initialize, start, and stop the applet.

- The applet context is an application that is responsible for loading and running applets. For example, the applet context could be a Web browser or an applet development environment.

APPLET PACKAGE

EXAMPLE APPLET PROGRAM:

HelloWorld - WordPad

File Edit View Insert Format Help

```
import java.awt.*;
import java.applet.*;

public class HelloWorld extends Applet {

  public void paint (Graphics g)
  {
    g.drawString ("Hello World!", 50, 50);
  }

}
```

For Help, press F1

DRAWING METHODS OF THE GRAPHICS CLASS

S.No	Method	Description
1.	clearRect()	Erase a rectangular area of the canvas.
2.	copyAre()	Copies a rectangular area of the canvas to another area
3.	drawArc()	Draws a hollow arc
4.	drawLine()	Draws a straight line
5.	drawOval()	Draws a hollow oval
6.	drawPolygon()	Draws a hollow polygon
7.	drawRect()	Draws a hollow rectangle

DRAWING METHODS OF THE GRAPHICS CLASS

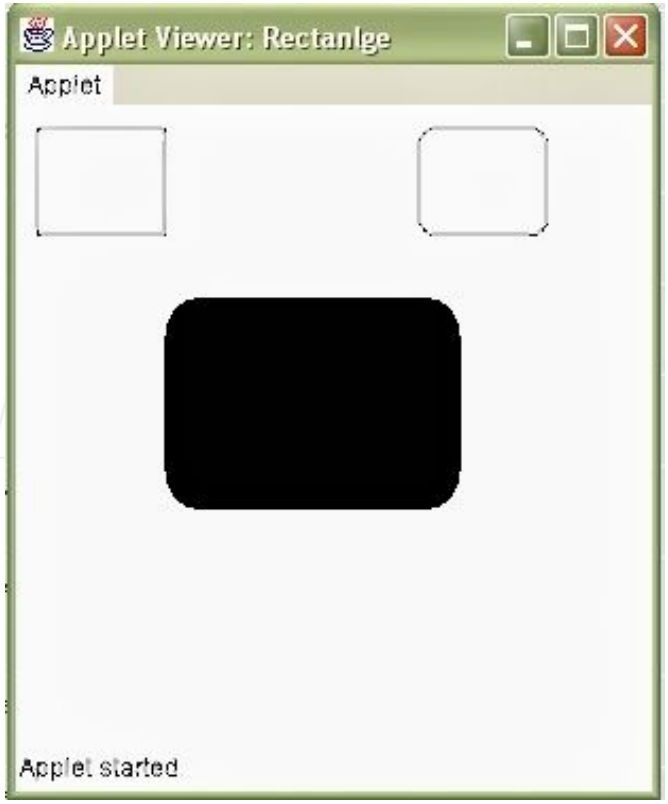
S.No	Method	Description
8.	drawRoundRect()	Draws a hollow rectangle with rounded corners
9.	drawString()	Display a text string
10.	FillArc()	Draws a filled arc
11.	fillOval()	Draws a filled Oval
12.	fillPolygon()	Draws a filled Polygon
13.	fillRect()	Draws a filled rectangle
14.	fillRoundRect()	Draws a filled rectangle with rounded corners

DRAWING METHODS OF THE GRAPHICS CLASS

S.No	Method	Description
15.	getColor()	Retrieves the current drawing color
16.	getFont()	Retrieves the currently used font
17.	getFontMetrics()	Retrieves the information about the current font
18.	setColor()	Sets the drawing color
19.	setFont()	Sets the font

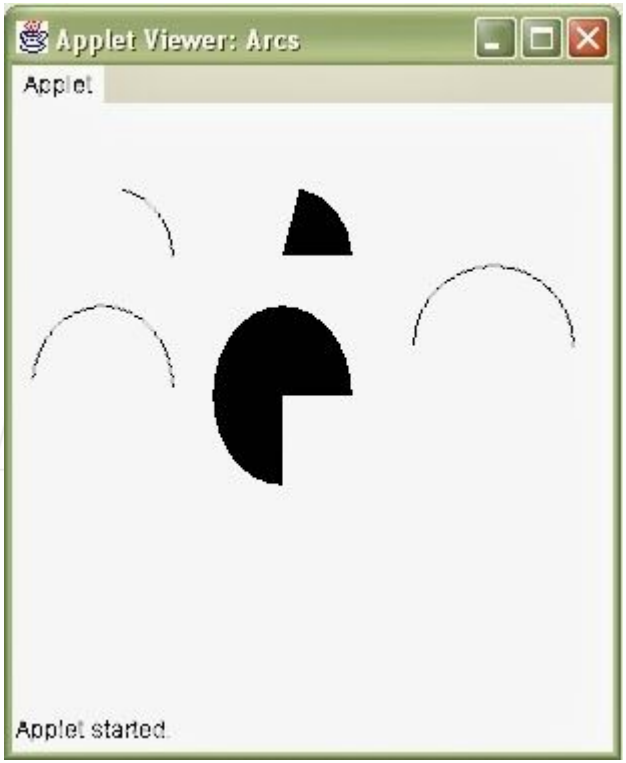
EXAMPLE PROGRAM - RECTANGLE

```
import java.awt.*;
import java.applet.*;
/*
<applet code="Rectanlge" width=300 Height=300>
</applet>
*/
public class Rectanlge extends Applet
{
	public void paint(Graphics g)
	{
		g.drawRect(10,10,60,50);
		g.fillRect(100,100,100,0);
		g.drawRoundRect(190,10,60,50,15,15);
		g.fillRoundRect(70,90,140,100,30,40);
	}
}
```



EXAMPLE PROGRAM - ARCS

```
import java.awt.*;
import java.applet.*;
/*
<applet code="Arcs" width=300 Height=300>
</applet>
*/
public class Arcs extends Applet
{
        public void paint(Graphics g)
        {
                g.drawArc(10,40,70,70,0,75);
                g.fillArc(100,40,70,70,0,75);
                g.drawArc(10,100,70,80,0,175);
                g.fillArc(100,100,70,90,0,270);
                g.drawArc(200,80,80,80,0,180);
        }
}
```



AWT PACKAGE

- **Class Declaration**
  - Following is the declaration for java.awt.Graphics class:

```
public abstract class Graphics extends Object
```

- **Class Constructors**
  - java.Graphics() () - It Constructs a new Graphics object.

AWT PACKAGE - EXAMPLE PROGRAM

```
import java.awt.*;
import java.awt.event.*;
import java.awt.geom.*;
 public class AWTGraphicsDemo extends Frame {
 public AWTGraphicsDemo(){
        super("Java AWT Examples");
        prepareGUI();
   }
public static void main(String[] args){
        AWTGraphicsDemo  awtGraphicsDemo = new AWTGraphicsDemo();
        awtGraphicsDemo.setVisible(true);
   }
```

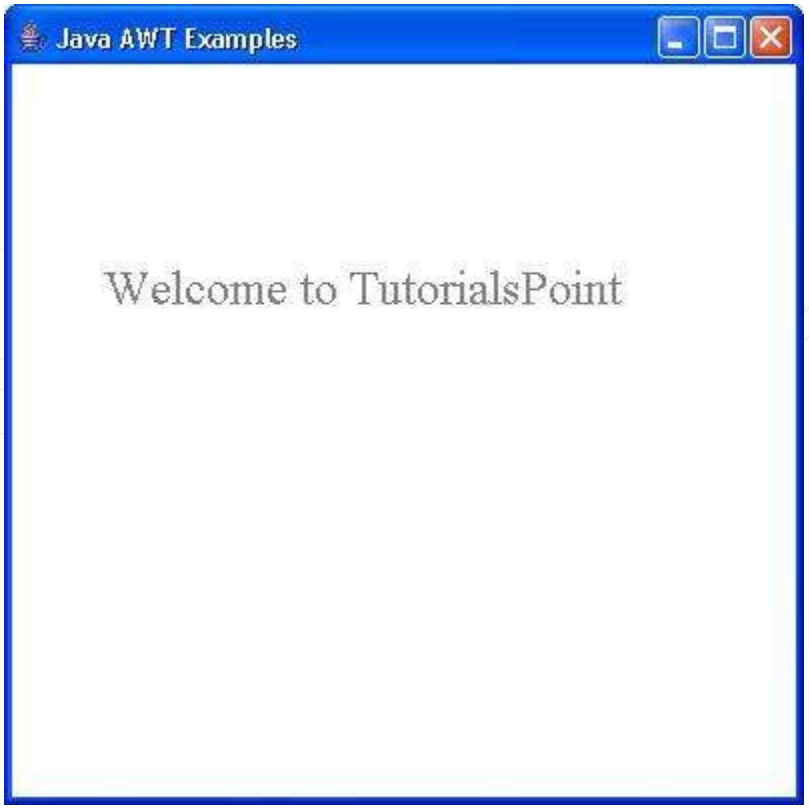
AWT PACKAGE

```
private void prepareGUI(){
        setSize(400,400);
        addWindowListener(new WindowAdapter() {
        public void windowClosing(WindowEvent windowEvent){
                System.exit(0);
        }
        });
    }
```

AWT PACKAGE

```
@Override
   public void paint(Graphics g) {
      g.setColor(Color.GRAY);
      Font font = new Font("Serif", Font.PLAIN, 24);
      g.setFont(font);
      g.drawString("Welcome to TutorialsPoint", 50, 150);
   }
}
```

EXAMPLE PROGRAM - OUTPUT



Video Link

https://www.youtube.com/watch?v=tw83iyGo0SI