

## COMPONENTS

Java AWT Component classes exist in java.awt package. **The Component class is a super class of all components such as buttons, checkboxes, scrollbars, etc.**

### Component class constructor:

*Component()* // constructs a new component

### Properties of Java AWT Components:

- A Component object represents a graphical interactive area displayable on the screen that can be used by the user.
- Any subclass of a Component class is known as a component. For example, button is a component.
- Only components can be added to a container, like frame.

*Some of the commonly used methods of Component class are as follows.*

| Method                        | Description                                                                    |
|-------------------------------|--------------------------------------------------------------------------------|
| setBackground(Color)          | Sets the background color of this component.                                   |
| setBounds(int, int, int, int) | Moves and resizes this component.                                              |
| setEnabled(boolean)           | Enables or disables this component, depending on the value of the parameter b. |
| setFont(Font)                 | Sets the font of this component.                                               |
| setForeground(Color)          | Sets the foreground color of this component.                                   |
| setLocation(int, int)         | Moves this component to a new location.                                        |
| setSize(int, int)             | Resizes this component so that it has width width and height.                  |
| setVisible(boolean)           | Shows or hides this component depending on the value of parameter b.           |
| update(Graphics)              | Updates this component.                                                        |
| repaint()                     | Repaints this component.                                                       |
| repaint(int, int, int, int)   | Repaints the specified rectangle of this component.                            |
| add(Component c)              | Inserts a component on this component.                                         |
| remove(Component c)           | Removes the specified component from this component.                           |

### Working with 2D shapes

Java supports 2-dimensional shapes, text and images using methods available in Graphics2D class. The Graphics2D class extends the Graphics class to provide more sophisticated control over geometry, coordinate transformations, color management, and text layout.

Graphics2D class Constructor

Graphics2D() //Constructs a new Graphics2D object.

This class inherits the methods from java.lang.Object. Some of the commonly used methods of Graphics2D class are as follows.

| Method                                                                 | Description                                                                                                                                                                               |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| void draw(Shape s)                                                     | Strokes the outline of a Shape using the settings of the current Graphics2D context                                                                                                       |
| void draw3DRect(int x, int y, int width, int height, boolean raised)   | Draws a 3-D highlighted outline of the specified rectangle.                                                                                                                               |
| void drawImage(BufferedImage img, BufferedImageOp op, int x, int y)    | Renders a BufferedImage that is filtered with a BufferedImageOp.                                                                                                                          |
| boolean drawImage(Image img, AffineTransform xform, ImageObserver obs) | Renders an image, applying a transform from image space into user space before drawing.                                                                                                   |
| void drawString(String str, float x, float y)                          | Renders the text specified by the specified String, using the current text attribute state in the Graphics2D context                                                                      |
| void fill(Shape s)                                                     | Fills the interior of a Shape using the settings of the Graphics2D context.                                                                                                               |
| void rotate(double theta)                                              | Concatenates the current Graphics2D Transform with a rotation transform.                                                                                                                  |
| void scale(double sx, double sy)                                       | Concatenates the current Graphics2D Transform with a scaling transformation. Subsequent rendering is resized according to the specified scaling factors relative to the previous scaling. |
| void setBackground(Color color)                                        | Sets the background color for the Graphics2D context.                                                                                                                                     |
| void setPaint(Paint paint)                                             | Sets the Paint attribute for the Graphics2D context.                                                                                                                                      |
| void setStroke(Stroke s)                                               | Sets the Stroke for the Graphics2D context.                                                                                                                                               |
| void shear(double shx, double shy)                                     | Concatenates the current Graphics2D Transform with a shearing transform.                                                                                                                  |
| void transform(AffineTransform Tx)                                     | Composes an AffineTransform object with the Transform in this Graphics2D according to the rule last-specified-first-applied.                                                              |
| void translate(int x, int y)                                           | Translates the origin of the Graphics2D context to the point (x, y) in the current coordinate system.                                                                                     |

**Example:**

```
import java.awt.*;
import java.applet.*;
/*
<applet code="ShapesDemo" width=350 height=300>
</applet>
*/
public class ShapesDemo extends Applet {
public void init() {}
```

```
public void paint(Graphics g) {  
    Graphics2D g2d = (Graphics2D)g;  
    g2d.setColor(Color.blue);  
    g2d.drawRect(75,75,300,200);  
    Font exFont = new  
    Font("TimesRoman",Font.PLAIN,40);  
    g2d.setFont(exFont);  
    g2d.setColor(Color.black);  
    g2d.drawString("Graphics2D  
    Example",120.0f,100.0f); g2d.setColor(Color.green);  
    g2d.drawLine(100,100,300,200);  
    g2d.drawOval(150,150,100,200);  
    g2d.fillOval(150,150,100,200);  
    }  
}
```

