

Names: Neha Parmar, Shahed Issa

Course Name: Principles of Software Design

Lab Section: B01

Course Code: ENSF 480

Assignment Number: Lab 6

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Exercise A:

BorderDecorator.java:

```
import java.awt.BasicStroke;
import java.awt.Color;
import java.awt.Graphics;
import java.awt.Graphics2D;

public class BorderDecorator extends Decorator {

    public BorderDecorator(Component cmp, int x, int y, int width, int height)
    {
        super(cmp, x, y, width, height);
    }

    @Override
    public void draw(Graphics g) {
        super.draw(g);
        Graphics2D g2d = (Graphics2D) g;

        Color oldColor = g2d.getColor();
        g2d.setColor(Color.BLACK);

        BasicStroke oldStroke = (BasicStroke) g2d.getStroke();
        g2d.setStroke(new BasicStroke(3, BasicStroke.CAP_BUTT,
        BasicStroke.JOIN_BEVEL, 0, new float[]{9}, 0));

        g2d.drawRect(x, y, width, height);

        g2d.setStroke(oldStroke);
        g2d.setColor(oldColor);
    }
}
```

ColouredFrameDecorator.java:

```
import java.awt.BasicStroke;
import java.awt.Color;
import java.awt.Graphics;
import java.awt.Graphics2D;

public class ColouredFrameDecorator extends Decorator {
    private int thickness;

    public ColouredFrameDecorator(Component cmp, int x, int y, int width, int
height, int thickness) {
        super(cmp, x, y, width, height);
        this.thickness = thickness;
    }

    @Override
```

```

    public void draw(Graphics g) {
        super.draw(g);

        Graphics2D g2d = (Graphics2D) g;
        Color oldColor = g2d.getColor();
        g2d.setColor(Color.RED);

        BasicStroke oldStroke = (BasicStroke) g2d.getStroke();
        g2d.setStroke(new BasicStroke(thickness));

        g2d.drawRect(x, y, width, height); // Draw the frame

        g2d.setStroke(oldStroke);
        g2d.setColor(oldColor);
    }
}

```

ColouredFrameDecorator.java:

```

import java.awt.BasicStroke;
import java.awt.Color;
import java.awt.Graphics;
import java.awt.Graphics2D;

public class ColouredFrameDecorator extends Decorator {
    private int thickness;

    public ColouredFrameDecorator(Component cmp, int x, int y, int width, int
height, int thickness) {
        super(cmp, x, y, width, height);
        this.thickness = thickness;
    }

    @Override
    public void draw(Graphics g) {
        super.draw(g);

        Graphics2D g2d = (Graphics2D) g;
        Color oldColor = g2d.getColor();
        g2d.setColor(Color.RED);

        BasicStroke oldStroke = (BasicStroke) g2d.getStroke();
        g2d.setStroke(new BasicStroke(thickness));

        g2d.drawRect(x, y, width, height);

        g2d.setStroke(oldStroke);
        g2d.setColor(oldColor);
    }
}

```

Component.java

```
import java.awt.Graphics;

public interface Component {
    void draw(Graphics g);
}
```

Decorator.java:

```
import java.awt.Graphics;

public abstract class Decorator implements Component {
    protected Component cmp;
    protected int x;
    protected int y;
    protected int width;
    protected int height;

    public Decorator(Component cmp, int x, int y, int width, int height) {
        this.cmp = cmp;
        this.x = x;
        this.y = y;
        this.width = width;
        this.height = height;
    }

    @Override
    public void draw(Graphics g) {
        cmp.draw(g);
    }
}
```

DemoDecoratorPattern.java

```
import java.awt.Font;
import java.awt.Graphics;
import javax.swing.JFrame;
import javax.swing.JPanel;

public class DemoDecoratorPattern extends JPanel {
    Component t;

    public DemoDecoratorPattern(){
        t = new Text ("Hello World", 60, 80);
    }

    public void paintComponent(Graphics g){
        int fontSize = 10;
    }
}
```

```

        g.setFont(new Font("TimesRoman", Font.PLAIN, fontSize));

        // Now lets decorate t with BorderDecorator: x = 30, y = 30, width =
100, and height 100
        t = new BorderDecorator(t, 30, 30, 100, 100);

        // Now lets add a ColouredFrameDecorator with x = 25, y = 25, width
= 110, height = 110,
        // and thickness = 10.
        t = new ColouredFrameDecorator(t, 25, 25, 110, 110, 10);

        // Now lets draw the product on the screen
        t.draw(g);
    }

    public static void main(String[] args) {
        DemoDecoratorPattern panel = new DemoDecoratorPattern();
        JFrame frame = new JFrame("Learning Decorator Pattern");
        frame.getContentPane().add(panel);
        frame.setSize(400,400);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setLocationRelativeTo(null);
        frame.setVisible(true);
    }
}

```

Text.java:

```

import java.awt.Graphics;
import java.awt.Graphics2D;
import java.awt.Stroke;
import java.awt.BasicStroke;
import java.awt.RenderingHints;
import java.awt.Font;
import java.awt.Color;

public class Text implements Component {

    int x;
    int y;
    String text;

    public Text(String text, int x, int y) {
        this.text = text;
        this.x = x;
        this.y = y;
    }

    @Override

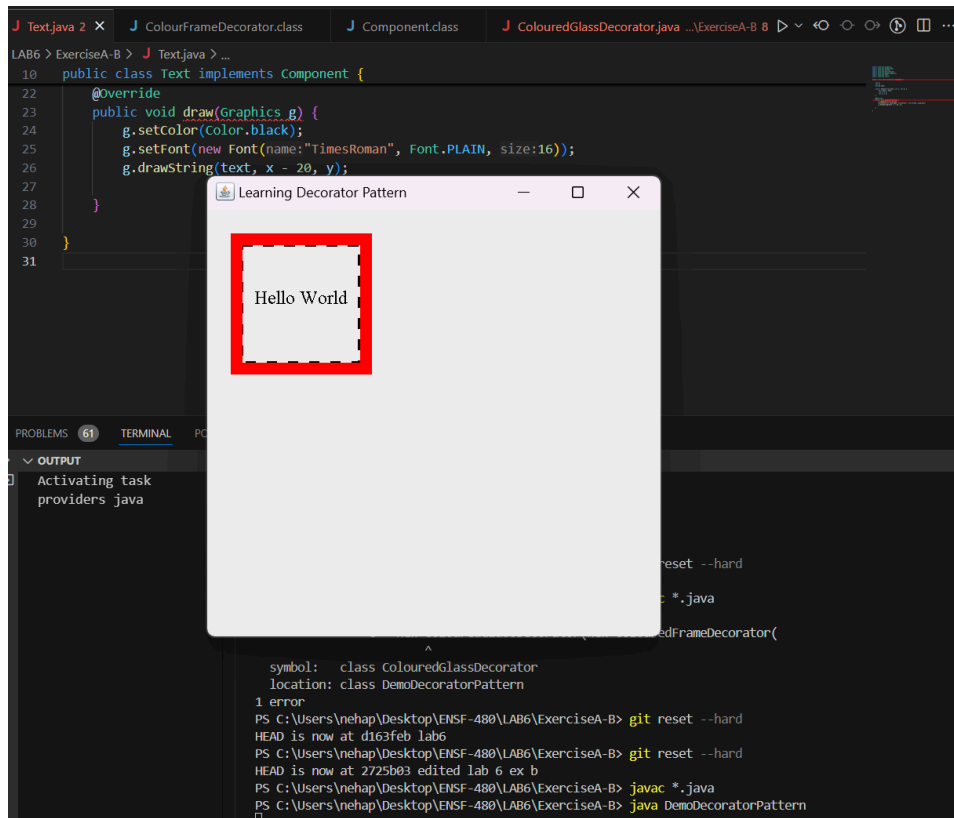
```

```

    public void draw(Graphics g) {
        g.setColor(Color.black);
        g.setFont(new Font("TimesRoman", Font.PLAIN, 16));
        g.drawString(text, x - 20, y);
    }
}

```

Output:



Exercise B:

DemoDecoratorPattern.java

```
import java.awt.Font;
import java.awt.Graphics;
import javax.swing.JFrame;
import javax.swing.JPanel;

public class DemoDecoratorPattern extends JPanel {
    Component t;

    public DemoDecoratorPattern(){
        t = new Text ("Hello World", 60, 80);
    }

    public void paintComponent(Graphics g){
        int fontSize = 10;
        g.setFont(new Font("TimesRoman", Font.PLAIN, fontSize));
        // GlassFrameDecorator info: x = 25, y = 25, width = 110, and
height = 110
        t = new ColouredGlassDecorator(new ColouredFrameDecorator(
            new BorderDecorator(t, 30, 30, 100, 100), 25, 25, 110, 110,
10), 25, 25,
            110, 110);
        t.draw(g);
    }

    public static void main(String[] args) {
        DemoDecoratorPattern panel = new DemoDecoratorPattern();
        JFrame frame = new JFrame("Learning Decorator Pattern");
        frame.getContentPane().add(panel);
        frame.setSize(400,400);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setLocationRelativeTo(null);
        frame.setVisible(true);
    }
}
```

ColouredGlassDecorator.java

```
import java.awt.AlphaComposite;
import java.awt.Color;
import java.awt.Graphics;
import java.awt.Graphics2D;

public class ColouredGlassDecorator extends Decorator {

    public ColouredGlassDecorator(Component cmp, int x, int y, int width, int
height) {
        super(cmp, x, y, width, height);
    }

    @Override
```

```

    public void draw(Graphics g) {
        super.draw(g);

        Graphics2D g2d = (Graphics2D) g;

        AlphaComposite oldComposite = (AlphaComposite) g2d.getComposite();
        g2d.setComposite(AlphaComposite.getInstance(AlphaComposite.SRC_OVER,
0.5f));
        g2d.setColor(new Color(0, 255, 0, 100));

        g2d.fillRect(x, y, width, height);

        g2d.setComposite(oldComposite);
    }
}

```

All other files are the same.

Output:

