Course: ENSF614 – Fall 2025
Lab #: Lab 6
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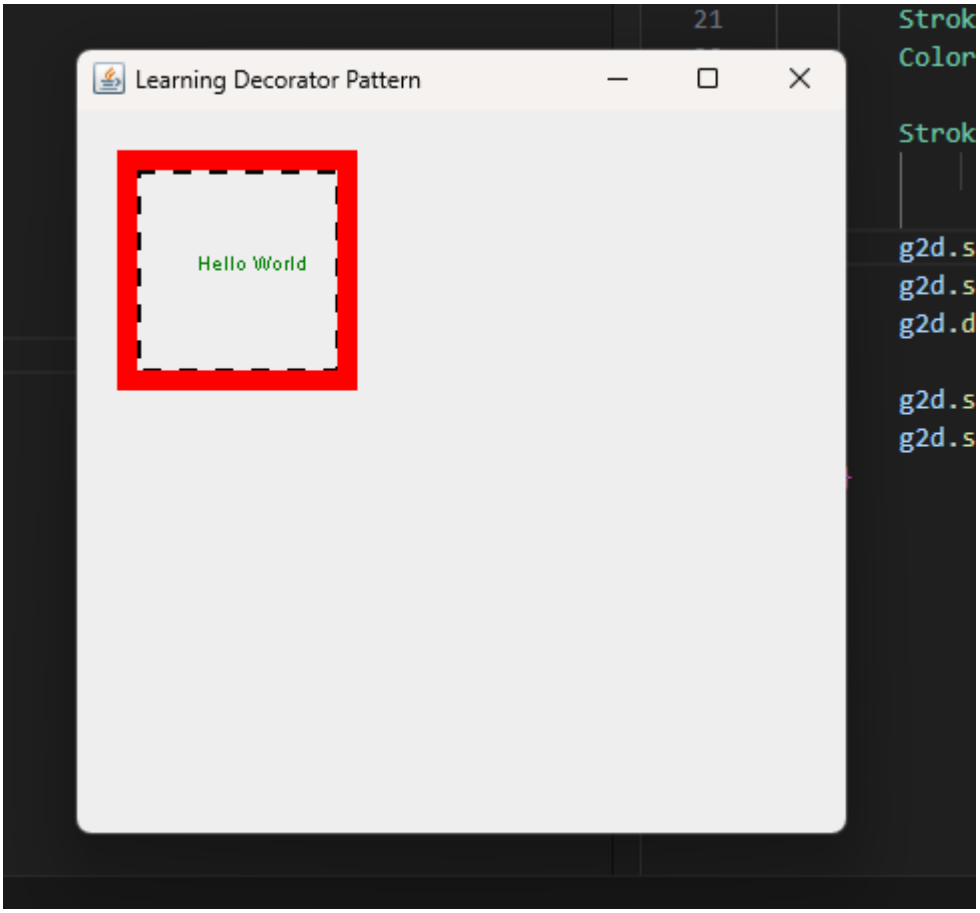
Submission Date: Nov 5th, 2025

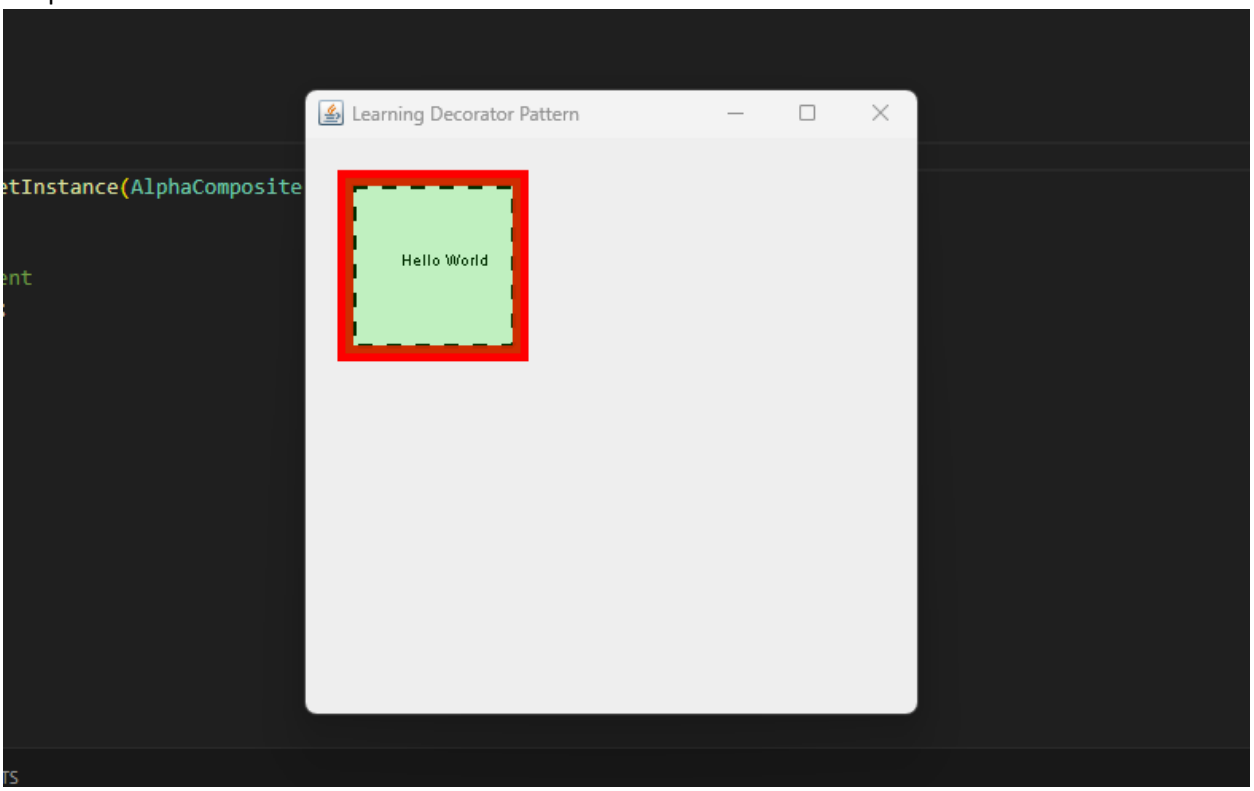
I have been keeping all the files in github. I hope by providing this github link will help you a little bit.
https://github.com/JZ-Zhou-UofC/ENSF-614-assignment-repo

Ex A & Ex B

Output A



Output B



```
/*
*
*
File Name: BorderDecorator.java
Assignment: Lab 6 Exercise A&B
*  Completed by: John Zhou
*  Submission Date: Nov 5th, 2025
*/
package EA;

import java.awt.BasicStroke;
import java.awt.Color;
import java.awt.Graphics;
import java.awt.Graphics2D;
import java.awt.Stroke;
import java.awt.geom.Rectangle2D;

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) {

      cmp.draw(g);
      Graphics2D g2d = (Graphics2D) g;
      Stroke oldStroke = g2d.getStroke();
```

```
        Color oldColor = g2d.getColor();

        Stroke dashed = new BasicStroke(3, BasicStroke.CAP_BUTT,
                BasicStroke.JOIN_BEVEL, 0, new float[] { 9 }, 0);

        g2d.setStroke(dashed);
        g2d.setColor(Color.BLACK);
        g2d.draw(new Rectangle2D.Float(x, y, width, height));

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

}
```

```
/*
*
*
File Name: ColouredFrameDecorator.java
Assignment: Lab 6 Exercise A&B
*  Completed by: John Zhou
*  Submission Date: Nov 5th, 2025
*/
package EA;

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

public class ColouredFrameDecorator extends Decorator {
   protected 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) {
      cmp.draw(g);
      Graphics2D g2d = (Graphics2D) g;
      Stroke oldStroke = g2d.getStroke();
```

```
        Color oldColor = g2d.getColor();


        g2d.getColor();
        g2d.setStroke(new BasicStroke(thickness));
        g2d.setColor(Color.red);
        g2d.drawRect(x, y, width, height);
        g2d.setStroke(oldStroke);
        g2d.setColor(oldColor);


    }
}
```

```
/*
*
*
File Name: Component.java
Assignment: Lab 6 Exercise A&B
*  Completed by: John Zhou
*  Submission Date: Nov 5th, 2025
*/
package EA;
import java.awt.Graphics;

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

```
/*
*
*
File Name: Decorator.java
Assignment: Lab 6 Exercise A&B
*  Completed by: John Zhou
*  Submission Date: Nov 5th, 2025
*/
package EA;

abstract class Decorator implements Component {

    protected Component cmp;
    protected int x;
    protected int y;
    protected int width;
    public 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;
    }
};
```

```
package EA;
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);
    }
}
```

```
/*
*
*
File Name: Text.java
Assignment: Lab 6 Exercise A&B
*  Completed by: John Zhou
*  Submission Date: Nov 5th, 2025
*/
package EA;

import java.awt.Color;
import java.awt.Graphics;

public class Text implements Component {

   protected String text;
   protected int x;
   protected int y;

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

   @Override
   public void draw(Graphics g) {
      Color darkGreen = new Color(0, 128, 0); // Slightly Darker green
```

```
        g.setColor(darkGreen);


        //Changing this back to black for part2
        g.drawString(text, x, y);


    }
}
```

Part B code

```
/*
*
*
File Name: DemoDecoratorPattern.java
Assignment: Lab 6 Exercise A&B
*  Completed by: John Zhou
*  Submission Date: Nov 5th, 2025
*/
package EAPart2;

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);
    }
}
```

```
/*
*
*
File Name: ColouredGlassDecorator.java
Assignment: Lab 6 Exercise A&B
*  Completed by: John Zhou
*  Submission Date: Nov 5th, 2025
*/
package EAPart2;

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) {

      cmp.draw(g);

      Graphics2D g2d = (Graphics2D) g;
```

```
        Color oldColor = g2d.getColor();

        g2d.setColor(Color.green);
        g2d.setComposite(AlphaComposite.getInstance(AlphaComposite.SRC_OVER, 1 *
                0.1f));

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

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